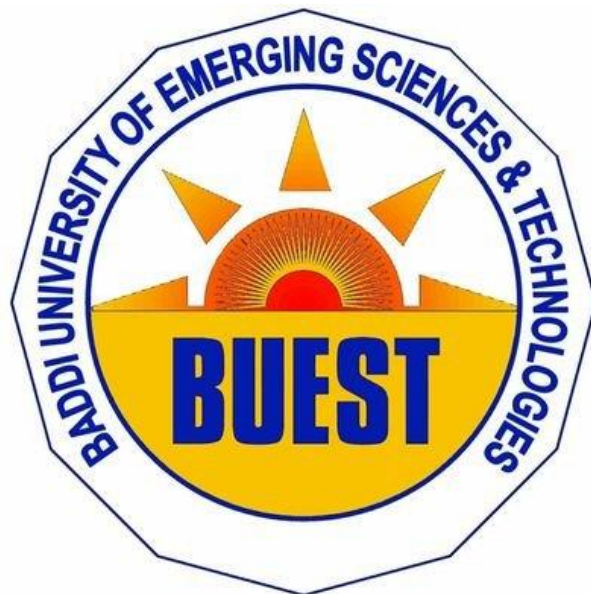


COURSE PACKAGE

Bachelor of Physiotherapy (BPT)



BACHELOR OF PHYSIOTHERAPY PROGRAM OUTCOMES (POs)

The aim of the course is to provide comprehensive, individually focused training that prepares the students for providing a quality physiotherapy care to the patients so that at the end of the course he/she will be able to perform the following:

PO1: Recognize the role of Physiotherapy in the context of the health needs of the community and National priorities in the health sector.

PO2: Demonstrate professional and ethical behavior appropriate to atleast the minimum standard expected for a Physiotherapy Graduate.

PO3: Ability to acquire knowledge on Basic Medical sciences, Human Movement Sciences, Various Medical Conditions and Surgical Treatments to identify Psychological, Social, Economical, Cultural aspects of diseases and its impact on community.

PO4: Ability to perform a safe, systematic and appropriate physiotherapy assessment for various conditions.

PO5: Identify, define and Deal with problems of professional practice through logical, analytical and critical thinking.

PO6: Ability to analyze and interpret physical assessment and diagnosis and set appropriate short and long term goals.

PO7: Ability to choose, demonstrate intervention safely and document the progression appropriately.

PO8: Communicate effectively across wide range of professional and personal contexts.

PO9: An ability to work independently or collaboratively as a part of rehabilitation team.

PO10: Ability to understand and conduct research activities.

PO11: Engage in activities that contribute to the betterment of society and behave ethically and responsible in social environment.

PROGRAM SPECIFIC OUTCOMES (PSOs)

Demonstrate sufficient understanding of knowledge in Physiotherapy.

PSO1: Able to integrate theoretical knowledge with clinical assessment.

PSO2: Develop the ability to collect history, perform relevant clinical assessment and frame

PSO3: Appropriate electrotherapeutic and exercise therapy management for the patients.

PSO4: Demonstrate clinical decision making ability and provide appropriate patient care.

PSO5: Develop effective communication with patients, family, colleagues and students.

PSO6: Promote health education and improved quality of life through the practice of the profession.

PSO7: To carry out research and publications towards upliftment of the field of Physiotherapy.

PSO8: Actively engage in lifelong learning activities.

PSO9: Work effectively in various inter professional collaborative settings like hospitals, Rehabilitation Centers, Special Schools, Educational Institutions, Health and Fitness Centers, Geriatric Centers, Ergonomic Consultant in Corporate Sectors, Private Consultation, Home Care Services, Industrial Sectors, Sports Management, Fitness Consultant.

Programme Structure				
BPT-1st Year				
Course Code	Course Title	Teaching Hours		
		Theory	Practical	Total
BPT-101	Human Anatomy	170	150	320
BPT-102	Human Physiology	140	140	280
BPT-103	Biochemistry	120	-	120
BPT-104	Electrotherapy-I	100	100	200
BPT-105	Exercise Therapy-I	100	100	200
BPT-106	Communication Skill	50	-	50
BPT-107	Fundamentals of Computer		50	50
TOTAL				1220

Programme Structure				
BPT-2nd Year				
Course Code	Course Title	Teaching Hours		
		Theory	Practical	Total
BPT-201	Pathology & Microbiology	60	-	60
		60	-	60
BPT-202	Pharmacology	80	-	80
BPT-203	Electrotherapy -II	100	100	200
BPT-204	Exercise Therapy-II	100	100	200
BPT-205	Biomechanics & Kinesiology	100	100	200
BPT-206	Psychology & Sociology	100	-	100
		100	-	100
BPT-207	Environmental studies	50	-	50
BPT-208	First Aid	-	50	50
TOTAL				1100

Programme Structure				
BPT-3rd Year				
Course Code	Course Title	Teaching Hours		
		Theory	Practical	Total
BPT-301	General Medicine	100	100	200
BPT-302	General Surgery	100	100	200
BPT-303	Orthopedics	100	100	200
BPT-304	OBS & Gynecology, ENT, Ophthalmology	20	-	20
		10	-	10
		10	-	10
BPT-305	Physiotherapy in Orthopedic Condition	100	100	200
BPT-306	Physiotherapy in Cardio-Respiratory Condition	100	100	200
BPT- 307	Clinical Training	-	320	320
TOTAL				1360

Programme Structure				
BPT-4th Year				
Course Code	Course Title	Teaching Hours		
		Theory	Practical	Total
BPT-401	Neurology & Neurosurgery	100	100	200
BPT-402	Physiotherapy in Neurological Condition	100	100	200
BPT-403	Physiotherapy in General Medical & Surgical Condition	100	100	200
BPT-404	Paedriatics& Geriatrics	40	-	40
		40	-	40
BPT-405	Rational of Rehabilitation	60	60	120
BPT-406	Research Methodology & Biostatistics	120	-	120
BPT-407	Ethics & Law	60	-	60
BPT-408	Clinical Training	-	320	320
TOTAL				1300

HUMAN ANATOMY

Course Outcomes-

CO1: To know about the general anatomy & histology of connective tissue.

CO2: Understand the theoretical and practical knowledge of musculoskeletal system which is useful in clinical judgment.

CO3: Ability to know the theoretical & practical knowledge of Nervous system including Central Nervous System cranial nerve, peripheral nerve.

CO4: Illustrate about the systemic anatomy of alimentary, urinary and genital system.

CO5: Understand the theoretical & practical knowledge of cardiovascular & respiratory system which is useful in clinical aspect.

CO6: Understand the anatomical bases of clinical condition of abdomen, sensory organ, endocrine & exocrine system.

CO7: Ability to know about the radiology of specific region in related to clinical aspect.

HUMAN PHYSIOLOGY

Course Outcomes-

CO1: To, know about the adequate knowledge of general physiology of cell, blood, nerve and muscle.

CO2: Understand the theoretical and practical knowledge of nervous system, its classification with physiology of voluntary movement.

CO3: Ability to understand the excretory system and function with applied physiology.

CO4: Understand the physiological bases of endocrine system and function in relation to clinical judgment.

CO5: Understand the physiology of reproductive systems and physiological changes during pregnancy.

CO6: Illustrate about the human physiology of respiratory system diagrams. 7 To know the theoretical and practical knowledge of CVS and GIT system with applied.

BIOCHEMISTRY

Course Outcomes-

CO1: Understand the knowledge of carbohydrates its metabolism and protein with its structure.

CO2: To know about enzymes factor affecting and its therapeutic uses.

CO3: To know about the vitamins and its deficiency manifestation sources.

CO4: Illustrate about the minerals, functions and its deficiency manifestation.

CO5: To know about hormones and nutrition with mechanism.

CO6: Understand the knowledge of clinical biochemistry with demonstration.

CO7: Understand muscle contraction mechanism and connective tissue biochemistry.

ELECTROTHERAPY-I

Course Outcomes-

CO1: Recoiling modalities for pain modulation.

CO2: Illustrate the skill of application of the electrotherapy modes for the purpose of treatment application.

CO3: To be able to apply knowledge of appropriate mode as per tissues specific and area specific and area specific application

CO4: Understand the physiology and therapeutic effect of low / medium and high frequency modes.

EXERCISE THERAPY-I

Course Outcomes-

CO1: To know about mechanics biomechanics and kinesiology.

CO2: Understand to know Biophysics related to kinesiotherapy.

CO3: Understand clarification of movement, muscle work related to exercise therapy.

CO4: Understand basic evaluation of vitals sensation and reflex testing.

CO5: To know about theoretical and practical knowledge of massage techniques.

CO6: Understand relaxation techniques, its principles along with their effects & uses.

CO7: To know aerobic condition and basic principles of general fitness.

COMMUNICATION SKILLS

Course Outcomes-

CO1: Projecting the first impression.

CO2: Use simple forms of polite expressions to establish basic social contact and to perform everyday functions including making requests and offers, conducting simple phone conversations, asking and telling time, giving simple directions, asking about price, ordering a meal, etc.

CO3: Students learn to use general, social and professional language.

CO4: Polishing manners to behave appropriately in social and professional circles.

CO5: Handling difficulty situations with grace style and professionalism

FUNDAMENTALS OF COMPUTER

Course Outcomes-

CO1: Understanding the concept of input and output devices of Computers and how it works and recognize the basic terminology used in computer programming.

CO2: Use different data structures and create.

CO3: Design programs connecting decision structures, loops and functions.

PATHOLOGY & MICROBIOLOGY

Course Outcomes-

CO1: Recall etiology pathogenesis and clinic pathological correlation of common infections & non-infections disease.

CO2: Illustrate the knowledge of cell injury and its healing process.

CO3: Describe normal and altered different organ system in different diseases and their clinical significance

CO4: Understand common hematological disorders and investigations necessary to diagnose them.

CO5: Know about prevalent communicable diseases

CO6: Describe the agents responsible for causing clinical infection to CNS, Musculoskeletal Respiratory, and Genitourinary system.

CO7: Illustrate the best method to prevent the development of infection.

CO8: Understand to recognize the sign and symptom considered red flag for serious diseases.

PHARMACOLOGY

Course Outcomes-

CO1: Know about history, routes of drugs administration, source and classification of drugs.

CO2: Understand the basics knowledge of pharmacology including physiological response and adverse effects of drugs

CO3: Describe pharmacological effects of commonly used drugs by patient referred for physiotherapy

CO4: Identify the pharmacology drugs interferes with the therapeutic response

ELECTROTHERAPY-II

Course Outcomes-

CO1: Recoiling modalities for pain modulation.

CO2: Illustrate the skill of application of the electrotherapy modes for the purpose of treatment application.

CO3: To be able to apply knowledge of appropriate mode as per tissues specific and area specific and area specific application

CO4: Understand the physiology and therapeutic effect of low / medium and high frequency modes.

EXERCISE THERAPY-II

Course Outcomes-

CO1: To know about mechanics biomechanics and kinesiology.

CO2: Understand to know Biophysics related to kinesiotherapy.

CO3: Understand clarification of movement, muscle work related to exercise therapy.

CO4: Understand basic evaluation of vitals sensation and reflex testing.

CO5: To know about theoretical and practical knowledge of massage techniques.

CO6: Understand relaxation techniques, its principles along with their effects & uses.

CO7: To know aerobic condition and basic principles of general fitness

BIOMECHANICS & KINESIOLOGY

Course Outcomes-

- CO1:** Know about the introduction of biomechanics
- CO2:** Understand the principles of biomechanics
- CO3:** Acquire the knowledge of kinetics and kinematics
- CO4:** Acquire the knowledge of musculoskeletal movement during normal gait and
- CO5:** Recall axis and plane of spine and extremities

PSYCHOLOGY & SOCIOLOGY

Course Outcomes-

- CO1:** Understand the definition, relevant with physiotherapy on social factor effecting health status, decision making and taking treatment.
- CO2:** Illustrate the concept, influence of formal and informal social factors on personality, socialization in hospital and rehabilitation setting
- CO3:** To identify role of rural and urban communities in public health, practices and home remedies in treatment
- CO4:** Identify the role social security, role of medical social worker and the role of NGO's
- CO5:** Understand the role of social planning in the improvement of health & in rehabilitation.
- CO6:** Understand the role of norms, customs, morals, religion, law & & other means of social controls in the regulation of Human Behavior and disease.
- CO7:** Know about importance of psychology in health delivery system
- CO8:** Understand etiology, pathology symptoms and management of various conditions
- CO9:** Understand patients empathetically.
- CO10:** Illustrate the development of personal professional attitude and value in relation to the therapeutic practice.

ENVIRONMENTAL STUDIES

Course Outcomes-

CO1: To understand the concept and function of the environment and recognize the physical, chemical, and biological components of the earth's systems and their functions.

CO2: To acquire the awareness on the ecosystem structure and process which interlinked with human survival, intensively need attention at global and regional level.

CO3: To identify common and adverse impacts of human activities on biotic communities, soil, water, and air quality and suggest sustainable strategies to mitigate these impacts.

CO4: Develop an understanding of environmental pollutions and hazards and general measures to control them.

CO5: To identify surrounding natural resources including renewable resources and nonrenewable resources and practices for their restoration.

CO6: To realize the importance of biodiversity for maintaining ecological balance and Global conservation practices and strategies.

CO7: To analyze the need for sustainable development in respect of environmental management through Policies, movements and social awareness.

FIRST AID

Course Outcomes-

CO1: Candidates will be able to assess situations and circumstances in order to provide First aid safety, promptly and effectively in a range of emergencies.

GENERAL MEDICINE

Course Outcomes-

CO1: Identify and describe the etiology, pathology clinical symptoms and management of various diseases involved body systems.

CO2: Knowledge of various drugs used for each medical condition to understand its effects and uses during therapy

CO3: Understand skill of history taking and clinical examination of neurological and paediatric conditions as a part of clinical teaching

CO4: Be able to acquire the skills of basic life support and describe the principles of management at the intensive care unit.

GENERAL SURGERY

Course Outcomes-

CO1: Describe the effect of surgical trauma and anesthesia in general

CO2: To be able to evaluate and describe the surgical management of general, cardiovascular and thoracic surgery and reconstruct the surgeries

CO3: Identify and interpret findings of the relevant investigations.

ORTHOPEDIC

Course Outcomes-

CO1: To be able to discuss etiology, clinical symptoms and management of various musculoskeletal conditions.

CO2: Illustrate the clinical examination, special test and interpretation of pre & post operative cases.

CO3: To be able to read and interpret features of X-ray and co-relate with the clinical findings

CO4: Understand the treatment started according with up gradation need to be match with patient condition

OBS & GYNECOLOGY, ENT, OPHTHALMOLOGY

Course Outcomes-

CO1: Develop competence in medical interview and physical examination of the obstetric and gynecologic, ENT and Ophthalmology patient.

CO2: Explain normal physiologic changes of pregnancy and describe common problems in obstetrics and their management.

CO3: Demonstrate knowledge of the normal menstrual cycle and understand the physiologic basis of action of methods of contraception, their effectiveness, risks and benefits and financial considerations.

CO4: Demonstrate understanding of common problems in gynecology, ENT and ophthalmology.

PHYSIOTHERAPY IN ORTHOPEDIC CONDITIONS

Course Outcomes-

CO1: Know about the primary and secondary musculoskeletal dysfunction based on biomechanical kinesiological and pathophysiological principles.

CO2: Understand the physiotherapy diagnosis with skilful evaluation of structure and function with clinical reasoning

CO3: Understand the pharmaco-therapeutics its interaction with physiotherapeutic measures and modify physiotherapeutic intervention

CO4: Acquire ethical skill by demonstrating safe, respectful and effective performance of physical handling techniques taking into account the patient's clinical condition, the need for privacy, the resource available and the environment

PHYSIOTHERAPY IN CARDIO-RESPIRATORY CONDITIONS

Course Outcomes-

CO1: Understand the basic cardiorespiratory conditions which commonly cause disability and their management.

CO2: Know the aetiology, Classification, Pathology, Clinical Features, Relevant Investigations, Complications, Surgical & Non Surgical Management of various cardiorespiratory Conditions

CLINICAL TRAINING

Course Outcomes- On successful completion of the course students will be able to:

CO1: Deliver a physiotherapy healthcare service in a collaborative, ethical, client-centred and culturally responsive manner.

CO2: Identify and manage adverse events/near misses and minimize risk associated with physiotherapy assessment and intervention.

CO3: Demonstrate the use and integration of current research and evidence in the delivery of a physiotherapy healthcare service.

CO4: Select, and safely and effectively perform, an appropriate assessment (including, but not limited to; patient history and physical examination) using relevant assessment tools

CO5: Demonstrate skills in clinical reasoning and clinical decision making to correctly interpret and analyse assessment findings in order to plan intervention and management

CO6: Select, and safely and effectively deliver, appropriate evidence-based interventions and management strategies.

CO7: Select and apply appropriate outcome measures and adapt or progress management on the basis of measured outcomes including planning for discharge.

CO8: Effectively deliver appropriate preventative and educational strategies.

NEUROLOGY & NEUROSURGERY

Course Outcomes-

CO1: Know about the various neurological describe and regional neuropathy

CO2: Understand etiology, pathophysiology sign and symptoms and management of the various neurological conditions

CO3: Acquire the skill of history taking, clinical examination and various surgical treatments of neurological conditions

CO4: Acquire the knowledge of various drugs used for each medical condition to understand its effects and its use during therapy.

PHYSIOTHERAPY IN NEUROLOGICAL CONDITIONS

Course Outcomes-

CO1: Know about the identification and analyze movement dysfunction due to neuromuscular skeletal disorders in terms of biomechanical and biophysical basics correlate the same with health condition

CO2: Understand the routine electro physiological, radiological and biochemical investigation and arrive at appropriate physical therapy diagnosis using WHO – ICF with clinical reasoning

CO3: Able to plan realistic goal based on the knowledge of prognosis of the diseases of the nervous system and prescribe appropriate, safe evidence based physiotherapy intervention

CO4: Understand infection control principles, best practices and techniques applicable to a range of setting where client with neurological conditions

PHYSIOTHERAPY IN GENERAL MEDICAL & SURGICAL CONDITIONS

Course Outcomes-

CO1: Demonstrate a general understanding of the diseases that therapists would encounter in their practice.

CO2: Understand the etiology and pathology, the patient's symptoms and the resultant functional disability.

CO3: Understand the limitations imposed by the diseases on any therapy.

CO4: Elaborate broad outline of goals of pharmacological and surgical therapy imparted in those diseases in which physical therapy will be an important component of overall management

PEDIATRICS & GERIATRICS

Course Outcomes-

CO1: Know about the various paediatrics and geriatric conditions in spine and extremities

CO2: Describe etiology, pathophysiology sign and symptom and management of the various paediatrics and geriatric conditions.

CO3: Describe normal development and growth of a child, importance of Immunization, breast feeding and psychological aspect of development

RATIONALE OF REHABILITATION

Course Outcomes-

CO1: Understand their role in the management of the disability within the rehabilitation team.

CO2: Understand the concept of team approach in rehabilitation.

CO3: Observe and identify the diagnostic features in physical conditions.

CO4: Understand the medical and surgical aspects of disabling conditions

CO5: Identify the residual potentials in patients with partial or total disability (temporary or permanent).

CO6: Formulate appropriate goals (long & short term) in treatment & rehabilitation prescribe, check - out and train the uses of various rehabilitation aids.

RESEARCH METHODOLOGY AND BIOSTATISTICS

Course Outcomes-

CO1: Apply the principles of research and biostatistics to health practice including the design and implementation of health related research studies.

CO2: Plan and execute a research study, including clinical trials.

CO3: Use / organize bio-statistical analysis using computers and software and prepare reports /papers. Critically evaluate research activities.

CO4: Make recommendations on policy and procedures.

CO5: Plan and conduct an educational session / programme.

PHYSIOTHERAPY ETHICS & LAW

Course Outcomes-

CO1: Understand the ethical principles of physiotherapy profession.

CO2: Understand principles of management in personal management, time management and administration including budgeting.

CLINICAL TRAINING

Course Outcomes- On successful completion of the course students will be able to:

CO1: Deliver a physiotherapy healthcare service in a collaborative, ethical, client-centred and culturally responsive manner.

CO2: Identify and manage adverse events/near misses and minimize risk associated with physiotherapy assessment and intervention.

CO3: Demonstrate the use and integration of current research and evidence in the delivery of a physiotherapy healthcare service.

CO4: Select, and safely and effectively perform, an appropriate assessment (including, but not limited to; patient history and physical examination) using relevant assessment tools

CO5: Demonstrate skills in clinical reasoning and clinical decision making to correctly interpret and analyse assessment findings in order to plan intervention and management

CO6: Select, and safely and effectively deliver, appropriate evidence-based interventions and management strategies.

CO7: Select and apply appropriate outcome measures and adapt or progress management on the basis of measured outcomes including planning for discharge.

CO8: Effectively deliver appropriate preventative and educational strategies.

SYLLABUS OF B.Sc. NURSING PROGRAMME
BUEST NURSING COLLEGE
(Session 2022-23)



BADDI UNIVERSITY, SOLAN
HIMACHAL PRADESH, INDIA

SCHEME OF EXAMINATION

The distribution of marks in internal assessment, End Semester College Exam, and End Semester University Exam for each course is shown below.

I SEMESTER

S.No.	Course	Assessment (Marks)				
		Internal	End Semester College Exam	End Semester University Exam	Hours	Total Marks
Theory						
1	Communicative English	25	25		2	50
2	Applied Anatomy & Applied Physiology	25		75	3	100
3	Applied Sociology & Applied Psychology	25		75	3	100
4	Nursing Foundations I	*25				
Practical						
5	Nursing Foundations I	*25				

***Will be added to the internal marks of Nursing Foundations II Theory and Practical respectively in the next semester (Total weightage remains the same)**

II SEMESTER

S.No.	Course	Assessment (Marks)				
		Internal	End Semester College Exam	End Semester University Exam	Hours	Total Marks
Theory						

1	Applied Biochemistry and Applied Nutrition & Dietetics	25		75	3	100
2	Nursing Foundations (I & II)	25 I Sem-25 & II Sem-25 (with average of both)		75	3	100
3	Health/Nursing Informatics & Technology	25	25		2	50
Practical						
4	Nursing Foundations (I & II)	50 I Sem-25 & II Sem-25		50		100

III SEMESTER

S.No.	Course	Assessment (Marks)				
		Internal	End Semester College exam	End Semester University Exam	Hours	Totalmarks
Theory						
1	Applied Microbiology and Infection Control including Safety	25		75	3	100
2	Pharmacology I and Pathology I	*25				
3	Adult Health Nursing I	25		75	3	100

	Practical					
4	Adult Health Nursing I	50		50		100

***Will be added to the internal marks of Pharmacology II and Pathology II & Genetics in the next semester (Total weightage remains the same).**

IV SEMESTER

S.No.	Course	Assessment (Marks)				
		Internal	End Semester College exam	End Semester University Exam	Hours	Total marks
	Theory					
1	Pharmacology & Pathology (I & II) and Genetics	25 III Sem- 25 & IV Sem- 25 (with average of both)		75	3	100
2	Adult Health Nursing II	25		75	3	100
3	Professionalism, Ethics and Professional Values	25	25		2	50
	Practical					
4	Adult Health Nursing II	50		50		100

V SEMESTER

S.No.	Course	Assessment (Marks)				
		Internal	End	End Semester	Hours	Total marks

			Semester College exam	University Exam		
Theory						
1	Child Health Nursing I	*25				
2	Mental Health Nursing I	*25				
3	Community Health Nursing I including Environmental Science & Epidemiology	25		75	3	100
4	Educational Technology/Nursing Education	25		75	3	100
5	Introduction to Forensic Nursing and Indian Laws	25	25		2	50
Practical						
6	Child Health Nursing I	*25				
7	Mental Health Nursing I	*25				
8	Community Health Nursing I	50		50		100

***Will be added to the internal marks of Child Health Nursing II and Mental Health Nursing II in both theory and practical respectively in the next semester (Total weightage remains same).**

VI SEMESTER

S.No.	Course	Assessment (Marks)				
		Internal	End Semester College exam	End Semester University Exam	Hours	Totalmarks
Theory						

1	Child Health Nursing (I & II)	25 Sem V-25 & Sem VI-25 (with average ofboth)		75	3	100
2	Mental Health Nursing (I & II)	25 Sem V-25 & Sem VI-25 (with average ofboth)		75	3	100
3	Nursing Management & Leadership	25		75	3	100
4	Midwifery/Obstetrics & Gynecology I	*25				
Practical						
5	Child Health Nursing (I & II)	50 (Sem V-25 & Sem VI-25)		50		100
6	Mental Health Nursing (I & II)	50 (Sem V-25 & Sem VI-25)		50		100
7	Midwifery/Obstetrics & Gynecology I	*25				

***Will be added to Internal marks of Midwifery II theory and practical respectively in the next semester (Totalweightage remains the same)**

VII SEMESTER

S.No.	Course	Assessment (Marks)				
		Internal	End Semester College Exam	End Semester University Exam	Hours	Totalmarks
Theory						
1	Community Health Nursing II	25		75	3	100
2	Nursing Research & Statistics	25		75	3	100
2	Midwifery/Obstetrics and Gynecology (OBG) Nursing (I & II)	25 Sem VI-25 & Sem VII-25 (with average of both)		75	3	100
Practical						
3	Community Health Nursing II	50		50		100
4	Midwifery/Obstetrics and Gynecology (OBG) Nursing (I & II)	50 (Sem VI-25 & Sem VII-25)		50		100

VIII SEMESTER

S.No.	Course	Assessment (Marks)				
		Internal	End Semester College Exam	End Semester University Exam	Hours	Totalmarks
	Practical					
1	Competency Assessment	100		100		200

List of Programme objectives, Programme specific outcomes (PSOs) and course objectives.

PROGRAMME OBJECTIVES

On completion of B.Sc. Nursing degree programme the graduates will be able to:

1. Utilize critical thinking to synthesize knowledge derived from physical, biological, behavioral sciences, and humanities, in the practice of professional nursing and midwifery.
2. Practice professional nursing and midwifery competently and safely in diverse settings, utilizing caring, critical thinking and therapeutic nursing interventions with individuals, families, populations and communities at any developmental stage and with varied lived health experiences.
3. Provide promotive, preventive and restorative health services in line with national health policies and programs.
4. Integrate professional caring into practice decisions that encompass values, ethical, and moral and legal aspects of nursing.
5. Respect the dignity, worth, and uniqueness of self and others.
6. Apply concepts of leadership, autonomy and management to the practice of nursing and midwifery to enhance quality and safety in health care.
7. Utilize the latest knowledge and skills related to information and technology to enhance patient outcomes.
8. Communicate effectively with patients, peers, and all health care providers.
9. Utilize the requisite knowledge, skills and technologies to practice independently and

collaboratively with all health professionals applying the principles of safety and quality improvement.

10. Integrate research findings and nursing theory in decision making in evidence-based practice.
11. Accept responsibility and accountability for the effectiveness of one's own nursing and midwifery practice and professional growth as a learner, clinician and leader.
12. Participate in the advancement of the profession to improve health care for the betterment of the global society.

Program Specific Outcomes B.Sc. Nursing

1. **Patient centered care:** Provide holistic care recognizing individual patient's preferences, values and needs, that is compassionate, coordinated, age and culturally appropriate safe and effective care.
2. **Professionalism:** Demonstrate accountability for the delivery of standard-based nursing care as per the Council standards that is consistent with moral, altruistic, legal, ethical, regulatory and humanistic principles.
3. **Teaching & Leadership:** Influence the behavior of individuals and groups within their environment and facilitate establishment of shared goals through teaching and leadership
4. **System-based practice:** Demonstrate awareness and responsiveness to the context of healthcare system and ability to manage resources essential to provide optimal quality of care.
5. **Health informatics and Technology:** Use technology and synthesize information and collaborate to make critical decisions that optimize patient outcomes.
6. **Communication:** Interact effectively with patients, families and colleagues fostering mutual respect and shared decision making to enhance patient satisfaction and health outcomes.
7. **Teamwork and Collaboration:** Function effectively within nursing and interdisciplinary teams, fostering open communication, mutual respect, shared decision making, team learning and development.
8. **Safety:** Minimize risk of harm to patients and providers through both system effectiveness and individual performance.

9. **Quality improvement:** Use data to monitor the outcomes of care processes and utilize improvement methods to design and test changes to continuously improve the quality and safety of healthcare system.
10. **Evidence based practice:** Identify, evaluate and use the best current evidence coupled with clinical expertise and consideration of patient's preferences, experience and values to make practical decisions.

COURSE OUTCOMES

PLACEMENT: I SEMESTER

COMMUNICATIVE ENGLISH

The course is designed to enable students to enhance their ability to speak and write the language (and use English) required for effective communication in their professional work. Students will practice their skills in verbal and written English during clinical and classroom experience.

APPLIED ANATOMY

The course is designed to assist student to recall and further acquire the knowledge of the normal structure of human body, identify alteration in anatomical structure with emphasis on clinical application to practice nursing.

APPLIED PSYCHOLOGY

The course is designed to assist student to acquire comprehensive knowledge of the normal functions of the organ systems of the human body to facilitate understanding of physiological basis of health, identify alteration in functions and provide the student with the necessary physiological knowledge to practice nursing.

APPLIED SOCIOLOGY

This course is designed to enable the students to develop understanding about basic concepts of sociology and its application in personal and community life, health, illness and nursing.

APPLIED PSYCHOLOGY

This course is designed to enable the students to develop understanding about basic concepts of psychology and its application in personal and community life, health, illness and nursing. It further provides students opportunity to recognize the significance and application of soft skills and self-empowerment in the practice of nursing

NURSING FOUNDATION - I (including First Aid module)

This course is designed to help novice nursing students develop knowledge and competencies required to provide evidence-based, comprehensive basic nursing care for adult patients, using nursing process approach.

PLACEMENT: II SEMESTER

APPLIED BIOCHEMISTRY

The course is designed to assist the students to acquire knowledge of the normal biochemical composition and functioning of human body, its alterations in disease conditions and to apply this knowledge in the practice of nursing.

APPLIED NUTRITION AND DIETETICS

The course is designed to assist the students to acquire basic knowledge and understanding of the principles of Nutrition and Dietetics and apply this knowledge in the practice of Nursing.

NURSING FOUNDATION - II (including Health Assessment Module)

This course is designed to help novice nursing students develop knowledge and competencies required to provide evidence-based, comprehensive basic nursing care for adult patients, using nursing process approach.

HEALTH/NURSING INFORMATICS AND TECHNOLOGY

This course is designed to equip novice nursing students with knowledge and skills necessary to deliver efficient informatics-led health care services.

NURSING FOUNDATION - I & II PRACTICAL

This course is designed to help the students to develop an understanding of the Physiology, Objective theories & Process of Nursing in various clinical setting. It is aimed at helping the students to acquire knowledge, understanding & skills in techniques of nursing & practice them in clinical setting.

PLACEMENT: III SEMESTER

APPLIED MICROBIOLOGY AND INFECTION CONTROL INCLUDING SAFETY

SECTION A: APPLIED MICROBIOLOGY

This course is designed to enable students to acquire understanding of fundamentals of Microbiology, compare and contrast different microbes and comprehend the means of

transmission and control of spread by various microorganisms. It also provides opportunities for practicing infection control measures in hospital and community settings.

SECTION B: INFECTION CONTROL & SAFETY

This course is designed to help students to acquire knowledge and develop competencies required for fundamental patient safety and infection control in delivering patient care. It also focuses on identifying patient safety indicators, preventing and managing hospital acquired infections, and in following universal precautions.

PHARMACOLOGY – I

This course is designed to enable students to acquire understanding of Pharmacodynamics, Pharmacokinetics, principles of therapeutics and nursing implications.

PATHOLOGY – I

This course is designed to enable students to acquire knowledge of pathology of various disease conditions, understanding of genetics, its role in causation and management of defects and diseases and to apply this knowledge in practice of nursing.

ADULT HEALTH NURSING - I

This course is designed to equip the students to review and apply their knowledge of Anatomy, Physiology, Biochemistry and Behavioral sciences in caring for adult patients with Medical/Surgical disorders using nursing process approach and critical thinking. It also intends to develop competencies required for assessment, diagnosis, treatment, nursing management, and supportive/palliative care to patients with various Medical Surgical disorders.

ADULT HEALTH NURSING – I PRACTICAL

The purpose of this course is to acquire, develop attitude and proficiency in caring for patient with Medical and Surgical disorders in varieties of health care settings and at home.

PLACEMENT: IV SEMESTER

PHARMACOLOGY – II

This course is designed to enable students to acquire understanding of Pharmacodynamics, Pharmacokinetics, principles of therapeutics & nursing implications. Further it develops understanding of fundamental principles of prescribing in students.

PATHOLOGY - II AND GENETICS

This course is designed to enable students to acquire knowledge of pathology of various disease conditions, understanding of genetics, its role in causation and management of defects and diseases and to apply this knowledge in practice of nursing.

ADULT HEALTH NURSING - II

This course is designed to equip the students to review and apply their knowledge of Anatomy, Physiology, Biochemistry and Behavioral sciences in caring for adult patients with Medical/Surgical disorders using nursing process approach. It also intends to develop competencies required for assessment, diagnosis, treatment, nursing management, and supportive/palliative and rehabilitative care to adult patients with various Medical Surgical disorders.

ADULT HEALTH NURSING – II PRACTICAL

The purpose of this course is to acquire, develop attitude and proficiency in caring for patient with Medical and Surgical disorders in varieties of health care settings and at home.

PROFESSIONALISM, PROFESSIONAL VALUES & ETHICS INCLUDING BIOETHICS

This course is designed to help students to develop an understanding of professionalism and demonstrate professional behavior in their workplace with ethics and professional values. Further the students will be able to identify ethical issues in nursing practice and participate effectively in ethical decision making along with health team members.

PLACEMENT: V SEMESTER

CHILD HEALTH NURSING – I

This course is designed for developing an understanding of the modern approach to child-care, identification, prevention and nursing management of common health problems of neonates and children.

MENTAL HEALTH NURSING – I

This course is designed to develop basic understanding of the principles and standards of mental health nursing and skill in application of nursing process in assessment and care of patients with mental health disorders.

COMMUNITY HEALTH NURSING – I

This course is designed to help students develop broad perspectives of health, its determinants, about community health nursing and understanding about the health care delivery services, health care policies and regulations in India. It helps the students to develop knowledge and understanding of environmental science. It helps students to practice Community Health Nursing for the individuals, family and groups at rural, urban and tribal settings by applying principles of community health nursing and epidemiological approach.

COMMUNITY HEALTH NURSING – I PRACTICAL

This course is designed for students to appreciate the principals of promotion and maintenance of Health in the community area. It also helps the students to develop knowledge and competencies required to screen, assess, diagnose, manage and refer clients appropriately in various health care settings.

EDUCATIONAL TECHNOLOGY/NURSING EDUCATION

This course is designed to help the students to develop knowledge, attitude and beginning competencies essential for applying basic principles of teaching and learning among individuals and groups both in educational and clinical settings. It also introduces basics of curriculum planning and organization. It further enables students to participate actively in team and collaborative learning.

INTRODUCTION TO FORENSIC NURSING AND INDIAN LAWS

This course is designed to help students to know the importance of forensic science in total patient care and to recognize forensic nursing as a specialty discipline in professional nursing practice.

PLACEMENT: VI SEMESTER

CHILD HEALTH NURSING – II

This course is designed for developing an understanding of the modern approach to child-care, identification, prevention and nursing management of common health problems of neonates and children.

CHILD HEALTH NURSING – I & II PRACTICAL

The purpose of this course is to acquire and develop an understanding of the modern approach to child care, identification, prevention and nursing management of common health Problems of neonates and children.

MENTAL HEALTH NURSING – II

This course is designed to provide the students with basic understanding and skills essential to meet psychiatric emergencies and perform the role of community mental health nurse.

MENTAL HEALTH NURSING – I & II PRACTICAL

The purpose of this course is to acquire and develop an understanding of the modern approach to mental health, Identification, prevention and nursing, management of common mental health problems with special emphasis on therapeutic interventions for individuals, family and community.

NURSING MANAGEMENT AND LEADERSHIP

This course is designed to enable students to acquire knowledge and competencies in areas of administration, and management of nursing services and education. Further prepares the students to develop leadership competencies and perform their role as effective leaders in an organization.

MIDWIFERY/OBSTETRICS AND GYNECOLOGY (OBG) NURSING – I

This course is designed for students to develop knowledge and competencies on the concepts and principles of midwifery. It helps them to acquire knowledge and skills in rendering respectful maternity care to woman during antenatal, intranatal and postnatal periods in hospitals and community settings. It further helps to develop skills in managing normal neonates and participate in family welfare programs.

PLACEMENT: VII SEMESTER

COMMUNITY HEALTH NURSING – II

This course is designed to help students gain broad perspective of specialized roles and responsibilities of community health nurses and to practice in various specialized health care settings. It helps students to develop knowledge and competencies required for assessment, diagnosis, treatment, and nursing management of individuals and families within the community in wellness and illness continuum.

COMMUNITY HEALTH NURSING – II PRACTICAL

The course is designed to enable to student to acquire the understanding of basic concept Research & Research Process and Statistics. The hours for practical will be utilized for conducting individual or group research project.

NURSING RESEARCH AND STATISTICS

The Course is designed to enable students to develop an understanding of basic concepts of research, research process and statistics. It is further, structured to conduct/ participate in need-based research studies in various settings and utilize the research findings to provide quality nursing care. The hours for practical will be utilized for conducting individual/group research project.

MIDWIFERY/OBSTETRIC AND GYNECOLOGY NURSING – II

This course is designed for students to develop knowledge and competencies on the concepts and principles of obstetrics and gynecology nursing. It helps them to acquire knowledge and skills in rendering respectful maternity care to high risk woman during antenatal, natal and postnatal periods in hospitals and community settings and help to develop skills in initial management and referral of high risk neonates. It would also help students to gain knowledge, attitude and skills in caring for women with gynecological disorders.

MIDWIFERY/OBSTETRIC AND GYNECOLOGY NURSING – I & II PRACTICAL

The purpose of this course is to appreciate the concepts and principles of midwifery and obstetrical nursing, acquire knowledge and skills in rendering nursing care to normal and high risk pregnant women during antenatal, natal and post natal periods in hospitals and community settings, develop attitude and proficiency in managing normal and high risk neonates in family welfare programme.

PLACEMENT: VIII SEMESTER: INTERNSHIP

MIDWIFERY/OBSTETRIC AND GYNECOLOGY NURSING

The major objective of the midwifery program is to prepare midwives who are able to provide effective and appropriate primary, secondary, and tertiary care to improve the health of women, newborns, and families in various settings. The program also prepares graduates to function independently among the health care team.

COMMUNITY HEALTH NURSING

In this course the students are able to promote, protect and preserve the health of the individual, family, and groups at both urban and rural setting by using concept and principles of health and community health nursing.

ADULT HEALTH NURSING

In this course the students are able to assess the patient health problems systematically, evaluate the effectiveness of intervention and patient response to nursing action. Students are able to perform the aseptic procedure, assist in the operations and provide preoperative nursing care. Students practice nursing procedures related to medical and surgical conditions

CHILD HEALTH NURSING

In this course students will be able to appreciate the history and developments in the field of pediatrics and pediatric nursing as a specialty. Students will be able to perform physical, development and nutritional assessment of pediatric clients. Recognize and manage emergencies in neonates. This course helps to describe various recent technologies and treatment modalities in the management of high risk neonate. Helps to recognize the role of pediatric nurse practitioner and as a member of the pediatric and neonatal health teaching.

MENTAL HEALTH NURSING

This course is designed for developing an understanding of the modern approach to mental health, identification, prevention and nursing management of common mental health problems with special emphasis on therapeutic interventions for individuals, family and community. This course helps to explain scope and challenges in mental health, it helps to describe misconception as a challenge in mental health, and it also explain the challenges related to rally of mental health nurse and lack of clinical guidelines.

COURSE OUTCOMES

1st SEMESTER

COMMUNICATIVE ENGLISH

- CO1. Identify the significance of Communicative English for healthcare professionals.
- CO2. Apply the concepts and principles of English Language use in professional development such as pronunciation, vocabulary, grammar, paraphrasing, voice modulation, Spelling, pause and silence.
- CO3. Demonstrate attentive listening in different hypothetical situations.
- CO4. Converse effectively, appropriately and timely within the given context and the individual or team they are communicating with either face to face or by other means.
- CO5. Read, interpret and comprehend content in text, flow sheet, framework, figures, tables, reports, anecdotes etc.
- CO6. Analyse the situation and apply critical thinking strategies.
- CO7. Enhance expressions through writing skills.
- CO8. Apply LSRW (Listening, Speaking, Reading and Writing) Skill in combination to learn, teach, educate and share information, ideas and results.

APPLIED ANATOMY

- CO1. Describe anatomical terms.
- CO2. Explain the general and microscopic structure of each system of the body.
- CO3. Identify relative positions of the major body organs as well as their general anatomic locations.
- CO4. Explore the effect of alterations in structure.
- CO5. Apply knowledge of anatomic structures to analyze clinical situations and therapeutic applications

APPLIED PHYSIOLOGY

- CO1. Develop understanding of the normal functioning of various organ systems of the body.
- CO2. Identify the relative contribution of each organ system towards maintenance of homeostasis.
- CO3. Describe the effect of alterations in functions.
- CO4. Apply knowledge of physiological basis to analyze clinical situations and therapeutic applications.

APPLIED SOCIOLOGY

- CO1. Identify the scope and significance of sociology in nursing.
- CO2. Apply the knowledge of social structure and different culture in a society in identifying social needs of sick clients.
- CO3. Identify the impact of culture on health and illness.
- CO4. Develop understanding about types of family, marriage and its legislation.
- CO5. Identify different types of caste, class, social change and its influence on health and health practices.
- CO6. Develop understanding about social organization and disorganization and social problems in India.
- CO7. Integrate the knowledge of clinical sociology and its uses in crisis intervention.

APPLIED PSYCHOLOGY

- CO1. Identify the importance of psychology in individual and professional life.
- CO2. Apply the knowledge of self-empowerment in workplace, society and personal life.
- CO3. Identify the role of nurse in promoting mental health and dealing with altered personality.
- CO4. Perform the role of nurses applicable to the psychology of different age groups.
- CO5. Identify the cognitive and affective needs of clients.
- CO6. Integrate the principles of motivation and emotion in performing the role of nurse in caring for emotionally sick client.
- CO7. Demonstrate basic understanding of psychological assessment and nurse's role.
- CO8. Apply the knowledge of soft skills in workplace and society.

NURSING FOUNDATION - I (including First Aid module)

- CO1. Develop understanding about the concept of health, illness and scope of nursing within health care services.
- CO2. Apply values, code of ethics and professional conduct in professional life.
- CO3. Apply the principles and methods of effective communication in establishing communication links with patients, families and other health team members.
- CO4. Develop skill in recording and reporting.
- CO5. Demonstrate competency in monitoring and documenting vital signs.
- CO6. Describe the fundamental principles and techniques of infection control and biomedical waste management.

CO7. Identify and meet the comfort needs of the patients.

CO8. Perform admission, transfer, and discharge of a patient under supervision applying the knowledge.

CO9. Demonstrate understanding and application of knowledge in caring for patients with restricted mobility.

CO10. Perform first aid measures during emergencies.

CO11. Identify the educational needs of patients and demonstrate basic skills of patient education.

NURSING FOUNDATION – I practical (including First Aid module)

CO1. Maintain effective human relations (projecting professional image)

CO2. Communicate effectively with patient, families and team members

CO3. Demonstrate skills in techniques of recording and reporting

CO4. Demonstrate skill in monitoring vital signs

CO5. Care for patients with altered vital signs

CO6. Demonstrate skill in implementing standard precautions and use of PPE

CO7. Demonstrate skill in meeting the comfort needs of the patients

CO8. Provide safe and clean environment

CO9. Demonstrate skill in admission, transfer, and discharge of a patient

CO10. Demonstrate skill in caring for patients with restricted mobility

CO11. Plan and provide appropriate health teaching following the principles

CO12. Acquire skills in assessing and performing First Aid during emergencies.

2ND SEMESTER

APPLIED BIOCHEMISTRY

CO1. Describe the metabolism of carbohydrates and its alterations.

CO2. Explain the metabolism of lipids and its alterations.

CO3. Explain the metabolism of proteins and amino acids and its alterations.

CO4. Explain clinical enzymology in various disease conditions.

CO5. Explain acid base balance, imbalance and its clinical significance.

CO6. Describe the metabolism of hemoglobin and its clinical significance.

CO7. Explain different function tests and interpret the findings.

CO8. Illustrate the immunochemistry.

APPLIED NUTRITION AND DIETETICS

- CO1. Identify the importance of nutrition in health and wellness.
- CO2. Apply nutrient and dietary modifications in caring patients.
- CO3. Explain the principles and practices of Nutrition and Dietetics.
- CO4. Identify nutritional needs of different age groups and plan a balanced diet for them.
- CO5. Identify the dietary principles for different diseases.
- CO6. Plan therapeutic diet for patients suffering from various disease conditions.
- CO7. Prepare meals using different methods and cookery rules.

NURSING FOUNDATION - II (including Health Assessment Module)

- CO1. Develop understanding about fundamentals of health assessment and perform health assessment in supervised clinical Settings.
- CO2. Demonstrate fundamental skills of assessment, planning, implementation and evaluation of nursing care using Nursing process approach in supervised clinical settings
- CO3. Assess the Nutritional needs of patients and provide relevant care under supervision
- CO4. Identify and meet the hygienic needs of patients
- CO5. Identify and meet the elimination needs of patient
- CO6. Interpret findings of specimen testing applying the knowledge of normal values
- CO7. Promote oxygenation based on identified oxygenation needs of patients under supervision
- CO8. Review the concept of fluid, electrolyte balance integrating the knowledge of applied physiology
- CO9. Apply the knowledge of the principles, routes, effects of administration of medications in administering medication
- CO10. Calculate conversions of drugs and dosages within and between systems of measurements
- CO11. Demonstrate knowledge and understanding in caring for patients with altered functioning of sense organs and unconsciousness
- CO12. Explain loss, death and grief
- CO13. Describe sexual development and sexuality
- CO14. Identify stressors and stress adaptation modes
- CO15. Integrate the knowledge of culture and cultural differences in meeting the spiritual needs
- CO16. Explain the introductory concepts relevant to models of health and illness in patient care.

NURSING FOUNDATION - II practical (including Health Assessment Module)

- CO1. Perform health assessment of each body system
- CO2. Develop skills in assessment, planning, implementation and evaluation of nursing care using Nursing process approach
- CO3. Identify and meet the Nutritional needs of patients
- CO4. Implement basic nursing techniques in meeting hygienic needs of patients
- CO5. Plan and Implement care to meet the elimination needs of patient
- CO6. Develop skills in instructing and collecting samples for investigation.
- CO7. Perform simple lab tests and analyze & interpret common diagnostic values
- CO8. Identify patients with impaired oxygenation and demonstrate skill in caring for patients with impaired oxygenation
- CO9. Identify and demonstrate skill in caring for patients with fluid, electrolyte and acid – base imbalances
- CO10. Assess, plan, implement & evaluate the basic care needs of patients with altered functioning of sense organs and unconsciousness
- CO11. Care for terminally ill and dying patients

HEALTH/NURSING INFORMATICS AND TECHNOLOGY

- CO1. Develop a basic understanding of computer application in patient care and nursing practice.
- CO2. Apply the knowledge of computer and information technology in patient care and nursing education, practice, administration and research.
- CO3. Describe the principles of health informatics and its use in developing efficient healthcare.
- CO4. Demonstrate the use of information system in healthcare for patient care and utilization of nursing data.
- CO5. Demonstrate the knowledge of using Electronic Health Records (EHR) system in clinical practice.
- CO6. Apply the knowledge of interoperability standards in clinical setting.
- CO7. Apply the knowledge of information and communication technology in public health promotion.
- CO8. Utilize the functionalities of Nursing Information System (NIS) system in nursing.
- CO9. Demonstrate the skills of using data in management of health care.
- CO10. Apply the knowledge of the principles of digital ethical and legal issues in clinical practice.

CO11. Utilize evidence-based practices in informatics and technology for providing quality patient care.

CO12. Update and utilize evidence-based practices in nursing education, administration, and practice.

3RD SEMESTER

APPLIED MICROBIOLOGY AND INFECTION CONTROL INCLUDING SAFETY

CO1. Identify the ubiquity and diversity of microorganisms in the human body and the environment.

CO2. Classify and explain the morphology and growth of microbes.

CO3. Identify various types of microorganisms.

CO4. Explore mechanisms by which microorganisms cause disease.

CO5. Develop understanding of how the human immune system counteracts infection by specific and non-specific mechanisms.

CO6. Apply the principles of preparation and use of vaccines in immunization.

CO7. Identify the contribution of the microbiologist and the microbiology laboratory to the diagnosis of infection.

CO8. Develop knowledge and understanding of Hospital acquired Infections (HAI) and effective practices for prevention.

CO9. Integrate the knowledge of isolation (Barrier and reverse barrier) techniques in implementing various precautions.

CO10. Demonstrate and practice steps in Hand washing and appropriate use of different types of PPE.

CO11. Illustrate various disinfection and sterilization methods and techniques.

CO12. Demonstrate knowledge and skill in specimen collection, handling and transport to optimize the diagnosis for treatment.

CO13. Incorporate the principles and guidelines of Bio Medical waste management.

PHARMACOLOGY – I

CO1. Describe pharmacodynamics and pharmacokinetics.

CO2. Review the principles of drug calculation and administration.

CO3. Explain the commonly used antiseptics and disinfectants.

CO4. Describe the pharmacology of drugs acting on the GI system.

CO5. Describe the pharmacology of drugs acting on the respiratory system.

CO6. Describe drugs used in the treatment of cardiovascular and blood disorders.

CO7. Explain the drugs used in the treatment of endocrine system disorders.

CO8. Describe the drugs acting on skin and drugs used to treat communicable diseases.

PATHOLOGY – I

CO1. Apply the knowledge of pathology in understanding the deviations from normal to abnormal pathology.

CO2. Rationalize the various laboratory investigations in diagnosing pathological disorders.

CO3. Demonstrate the understanding of the methods of collection of blood, body cavity fluids, urine and feces for various tests.

CO4. Apply the knowledge of genetics in understanding the various pathological disorders.

CO5. Appreciate the various manifestations in patients with diagnosed genetic abnormalities.

CO6. Rationalize the specific diagnostic tests in the detection of genetic abnormalities.

CO7. Demonstrate the understanding of various services related to genetics.

ADULT HEALTH NURSING – I

CO1. Explain the etiology, pathophysiology, manifestations, diagnostic studies, treatments and complications of common medical and surgical disorders.

CO2. Perform complete health assessment to establish a data base for providing quality patient care and integrate the knowledge of anatomy, physiology and diagnostic tests in the process of data collection.

CO3. Identify nursing diagnoses, list them according to priority and formulate nursing care plan.

CO4. Perform nursing procedures skillfully and apply scientific principles while giving comprehensive nursing care to patients.

CO5. Integrate knowledge of pathology, nutrition and pharmacology in caring for patients experiencing various medical and surgical disorders.

CO6. Identify common diagnostic measures related to the health problems with emphasis on nursing assessment and responsibilities.

CO7. Demonstrate skill in assisting/performing diagnostic and therapeutic procedures.

CO8. Demonstrate competencies/skills to patients undergoing treatment for medical surgical disorders.

CO9. Identify the drugs used in treating patients with medical surgical conditions.

CO10. Plan and give relevant individual and group education on significant medical surgical topics.

CO11. Maintain safe environment for patients and the health care personnel in the hospital.

CO12. Integrate evidence-based information while giving nursing care to patients.

ADULT HEALTH NURSING – I PRACTICAL

CO1. Utilize the nursing process in providing care to the sick adults in the hospital:

a. Perform complete health assessment to establish a data base for providing quality patient care.

b. Integrate the knowledge of diagnostic tests in the process of data collection

CO2. Provide comfort and safety to adult patients in the hospital.

CO3. Maintain safe environment for patients during hospitalization.

CO4. Explain nursing actions appropriately to the patients and family members.

CO5. Ensure patient safety while providing nursing procedures.

CO6. Assess the educational needs of the patient and their family related to medical and surgical disorders and provide appropriate health education to patients.

CO7. Provide pre, intra and post-operative care to patients undergoing surgery.

CO8. Integrate knowledge of pathology, nutrition and pharmacology for patients experiencing various medical and surgical disorders.

CO9. Integrate evidence-based information while giving nursing care to patients.

CO10. Demonstrate the awareness of legal and ethical issues in nursing practice.

4TH SEMESTER

PHARMACOLOGY – II

CO1. Explain the drugs used in the treatment of ear, nose, throat and eye disorders.

CO2. Explain the drugs used in the treatment of urinary system disorders.

CO3. Describe the drugs used in the treatment of nervous system disorders.

CO4. Explain the drugs used for hormonal replacement and for the pregnant women during antenatal, intra natal and postnatal period.

CO5. Explain the drugs used to treat emergency conditions and immune disorders.

CO6. Discuss the role and responsibilities of nurses towards safe administration of drugs used to treat disorders of various systems with basic understanding of pharmacology.

CO7. Demonstrate understanding about the drugs used in alternative system of medicine.

CO8. Demonstrate understanding about the fundamental principles of prescribing.

PATHOLOGY - II AND GENETICS

CO1. Apply the knowledge of pathology in understanding the deviations from normal to abnormal pathology

CO2. Rationalize the various laboratory investigations in diagnosing pathological disorders

CO3. Demonstrate the understanding of the methods of collection of blood, body cavity fluids, urine and feces for various tests

CO4. Apply the knowledge of genetics in understanding the various pathological disorders

CO5. Appreciate the various manifestations in patients with diagnosed genetic abnormalities

CO6. Rationalize the specific diagnostic tests in the detection of genetic abnormalities.

CO7. Demonstrate the understanding of various services related to genetics.

ADULT HEALTH NURSING – II

CO1. Explain the etiology, pathophysiology, manifestations, diagnostic studies, treatments and complications of selected common medical and surgical disorders.

CO2. Perform complete health assessment to establish a data base for providing quality patient care and integrate the knowledge of diagnostic tests in the process of data collection.

CO3. Identify diagnoses, list them according to priority and formulate nursing care plan.

CO4. Perform nursing procedures skillfully and apply scientific principles while giving comprehensive nursing care to patients.

CO5. Integrate knowledge of anatomy, physiology, pathology, nutrition and pharmacology in caring for patients experiencing various medical and surgical disorders.

CO6. Identify common diagnostic measures related to the health problems with emphasis on nursing assessment and responsibilities.

CO7. Demonstrate skill in assisting/performing diagnostic and therapeutic procedures.

CO8. Demonstrate competencies/skills to patients undergoing treatment for medical surgical disorders.

ADULT HEALTH NURSING – II PRACTICAL

CO1. Utilize the nursing process in providing care to the sick adults in the hospital

a. Perform complete health assessment to establish a data base for providing quality patient care.

b. Integrate the knowledge of diagnostic tests in patient assignment

CO2. Provide comfort and safety to adult patients in the hospital.

CO3. Maintain safe environment for patients during hospitalization.

CO4. Explain nursing actions appropriately to the patients and family members.

CO5. Ensure patient safety while providing nursing procedures.

CO6. Assess the educational needs of the patient and their family related to medical and surgical disorders and provide appropriate health education to patients.

PROFESSIONALISM, PROFESSIONAL VALUES & ETHICS INCLUDING BIOETHICS

CO1. Describe profession and professionalism.

CO2. Identify the challenges of professionalism.

CO3. Maintain respectful communication and relationship with other health team members, patients and society.

CO4. Demonstrate professional conduct.

CO5. Describe various regulatory bodies and professional organizations related to nursing.

CO6. Discuss the importance of professional values in patient care.

CO7. Explain the professional values and demonstrate appropriate professional values in nursing practice.

CO8. Demonstrate and reflect on the role and responsibilities in providing compassionate care in the healthcare setting.

CO9. Demonstrate respect, human dignity and privacy and confidentiality to self, patients and their caregivers and other health team members.

CP10. Advocate for patients' wellbeing, professional growth and advancing the profession.

CO11. Identify ethical and bioethical concerns, issues and dilemmas in nursing and healthcare.

CO12. Apply knowledge of ethics and bioethics in ethical decision making along with health team members.

CO13. Protect and respect patient's rights.

SEMESTER : V

CHILD HEALTH NURSING – I

- CO1. Develop understanding of the history and modern concepts of child health and child-care.
- CO2. Explore the national child welfare services, national programs and legislation in the light of National Health Policy 2017.
- CO3. Describe the role of preventive pediatrics and perform preventive measures towards accidents.
- CO4. Participate in national immunization programs/Universal Immunization Program (UIP).
- CO5. Identify the developmental needs of children and provide parental guidance.
- CO6. Describe the principles of child health nursing and perform child health nursing procedures.
- CO7. Demonstrate competencies in newborn assessment, planning and implementation of care to normal and high-risk newborn including neonatal resuscitation.
- CO8. Apply the principles and strategies of Integrated management of neonatal and childhood illness (IMNCI).
- CO9. Apply the knowledge of pathophysiology and provide nursing care to children with respiratory system disorders.
- CO10. Identify and meet childhood emergencies and perform child CPR.

CHILD HEALTH NURSING – I PRACTICAL

- CO1. Perform assessment of children: health, developmental & anthropometric.
- CO2. Provide nursing care to children with various medical disorders.
- CO3. Provide pre & postoperative care to children with common pediatric surgical conditions/malformation.
- CO4. Perform immunization as per NIS.
- CO5. Provide nursing care to critically ill children.
- CO6. Give health education/nutritional education to parents.
- CO7. Counsel parents according to identified counseling needs.

MENTAL HEALTH NURSING – I

- CO1. Trace the historical development of mental health nursing and discuss its scope.
- CO2. Identify the classification of the mental disorders.
- CO3. Develop basic understanding of the principles and concepts of mental health nursing
- CO4. Apply the Indian Nursing Council practice standards for psychiatric mental health nursing in supervised clinical settings.

- CO5. Conduct mental health assessment.
- CO6. Identify and maintain therapeutic communication and nurse patient relationship.
- CO7. Demonstrate knowledge of the various treatment modalities and therapies used in mental disorders.
- CO8. Apply nursing process in delivering care to patients with mental disorders.
- CO9. Provide nursing care to patients with schizophrenia and other psychotic disorders based on assessment findings and treatment/therapies used.
- CO10. Provide nursing care to patients with mood disorders based on assessment findings and treatment/therapies used.
- CO11. Provide nursing care to patients with neurotic disorders based on assessment findings and treatment/ therapies used.

COMMUNITY HEALTH NURSING - I

- CO1. Explore the evolution of public health in India and community health nursing
- CO2. Explain the concepts and determinants of health
- CO3. Identify the levels of prevention and health problems of India
- CO4. Develop basic understanding about the health care planning and the present health care delivery system in India at various levels
- CO5. Locate the significance of primary health care and comprehensive primary health care as part of current health care COdelivery system focus
- CO6. Discuss health care policies and regulations in India
- CO7. Demonstrate understanding about an overview of environmental science, environmental health and sanitation
- CO8. Demonstrate skill in nutritional assessment for different age groups in the community and provide appropriate nutritional counseling
- CO9. Provide health education to individuals and families applying the principles and techniques of behavior change appropriate to community settings
- CO10. Describe community health nursing approaches and concepts
- CO11. Describe the role and responsibilities of community health nursing personnel
- CO12. Utilize the knowledge and skills in providing comprehensive primary health care across the life span at various settings
- CO13. Make effective home visits applying principles and methods used for home visiting
- CO14. Use epidemiological approach in community diagnosis

CO15. Utilize the knowledge of epidemiology, epidemiological approaches in caring for people with communicable and non communicable diseases

CO16. Investigate an epidemic of communicable diseases

CO17. Assess, diagnose, manage and refer clients for various communicable and non-communicable diseases appropriately at the primary health care level.

EDUCATIONAL TECHNOLOGY/NURSING EDUCATION

CO1. Develop basic understanding of theoretical foundations and principles of teaching and learning

CO2. Identify the latest approaches to education and learning

CO3. Initiate self- assessment to identify one's own learning styles

CO4. Demonstrate understanding of various teaching styles that can be used, based on the learners' readiness and generational needs

CO5. Develop understanding of basics of curriculum planning, and organizing

CO6. Analyze and use different teaching methods effectively that are relevant to student population and settings

CO7. Make appropriate decisions in selection of teaching learning activities integrating basic principles

CO8. Utilize active learning strategies that enhance critical thinking, team learning and collaboration

CO9. Engage in team learning and collaboration through inter professional education

CO10. Integrate the principles of teaching and learning in selection and use of educational media/technology

CO11. Apply the principles of assessment in selection and use of assessment and evaluation strategies

CO12. Construct simple assessment tools/tests integrating cognitive, psychomotor and affective domains of learning that can measure knowledge and competence of students

CO13. Develop basic understanding of student guidance through mentoring and academic advising

CO14. Identify difficult situations, crisis and disciplinary/grievance issues experienced by students and provide appropriate counseling

CO15. Engage in ethical practice in educational as well as clinical settings based on values, principles and ethical standards

CO16. Develop basic understanding of evidence-based teaching practices

INTRODUCTION TO FORENSIC NURSING AND INDIAN LAWS

CO1. Identify forensic nursing as an emerging specialty in healthcare and nursing practice

CO2. Explore the history and scope of forensic nursing practice

CO3. Identify forensic team, role and responsibilities of forensic nurse in total care of victim of violence and in preservation of evidence

CO4. Develop basic understanding of the Indian judicial system and legal procedures

6TH SEMESTER

CHILD HEALTH NURSING - II

CO1. Apply the knowledge of pathophysiology and provide nursing care to children with Cardiovascular, GI, genitourinary, nervous system disorders, orthopedic disorders, eye, ear and skin disorders and communicable diseases

CO2. Provide care to children with common behavioural, social and psychiatric problems

CO3. Manage challenged children

CO4. Identify the social and welfare services for challenged children

MENTAL HEALTH NURSING – II

CO1. Apply nursing process in providing care to patients with substance use disorders, and personality and sexual disorders.

CO2. Apply nursing process in providing care to patients with behavioural and emotional disorders occurring during childhood and adolescence.

CO3. Apply nursing process in providing care to patients with organic brain disorders.

CO4. Identify and respond to psychiatric emergencies.

CO5. Carry out crisis interventions during emergencies under supervision.

CO6. Perform admission and discharge procedures as per MHCA 2017.

CO7. Explore the roles and responsibilities of community mental health nurse in delivering community mental health services.

MENTAL HEALTH NURSING - I & II PRACTICAL

CO1. Assess patients with mental health problems/disorders

- CO2. Observe and assist in various treatment modalities or therapies
- CO3. Counsel and educate patients and families
- CO4. Perform individual and group psychoeducation
- CO5. Provide nursing care to patients with mental health problems/disorders
- CO6. Motivate patients in the community for early treatment and follow up
- CO7. Observe the assessment and care of patients with substance abuse disorders in deaddiction centre.

NURSING MANAGEMENT AND LEADERSHIP

- CO1. Analyze the health care trends influencing development of nursing services and education in India.
- CO2. Describe the principles, functions and process of management applied to nursing.
- CO3. Develop basic understanding and beginning competencies in planning and organizing nursing services in a hospital.
- CO4. Apply the concept of human resource management and identify the job description for all categories of nursing personnel including in service education.
- CO5. Discuss the principles and methods of staffing and scheduling in an individual hospital/nursing unit.
- CO6. Develop skill in management of materials and supplies including inventory control.
- CO7. Develop team working and inter professional collaboration competencies.
- CO8. Identify effective leadership styles and develop leadership competencies.
- CO9. Utilize the knowledge of principles and line of control and participate in quality management and evaluation activities.
- CO10. Utilize the knowledge related to financial planning in nursing services and education during budgetary process.

MIDWIFERY/OBSTETRICS AND GYNECOLOGY (OBG) NURSING – I

- CO1. Demonstrate professional accountability for the delivery of nursing care as per INC standards/ICM competencies that are consistent with moral, altruistic, legal, ethical, regulatory and humanistic principles in midwifery practice.
- CO2. Communicate effectively with individuals, families and professional colleagues fostering mutual respect and shared decision making to enhance health outcomes.

- CO3. Recognize the trends and issues in midwifery and obstetrical nursing.
- CO4. Review and describe the anatomy and physiology of human reproductive system and conception.
- CO5. Describe and apply physiology in the management of normal pregnancy, birth and puerperium.
- CO6. Demonstrate competency in providing respectful and evidence based maternity care for women during the antenatal, intranatal and postnatal period.
- CO7. Uphold the fundamental human rights of individuals when providing midwifery care.
- CO8. Promote physiologic labour and birth, and conduct normal childbirth.
- CO9. Provide evidence based essential newborn care.
- CO10. Apply nursing process approach in caring for women and their families.
- CO11. Describe the methods of contraception and role of nurse/midwife in family welfare services.
- CO12. Recognize the importance of and actively participate in family welfare programs.
- CO13. Provide youth friendly health services and care for women affected by gender based violence.

7TH SEMESTER

COMMUNITY HEALTH NURSING – II

- CO1. Demonstrate beginning practice competencies/skills relevant to provide comprehensive primary health care/community based care to clients with common diseases and disorders including emergency and first aid care at home/clinics/ centers as per predetermined protocols/drug standing orders approved by MOH&FW
- CO2. Provide maternal, newborn and child care, and reproductive health including adolescent care in the urban and rural health care settings
- CO3. Describe the methods of collection and interpretation of demographic data
- CO4. Explain population control and its impact on the society and describe the approaches towards limiting family size
- CO5. Describe occupational health hazards, occupational diseases and the role of nurses in occupational health programs
- CO6. Identify health problems of older adults and provide primary care, counseling and supportive health services

- CO7. Participate in screening for mental health problems in the community and providing appropriate referral services
- CO8. Discuss the methods of data collection for HMIS, analysis and interpretation of data
- CO9. Discuss about effective management of health information in community diagnosis and intervention
- CO10. Describe the management system of delivery of community health services in rural and urban areas
- CO11. Describe the leadership role in guiding, supervising, and monitoring the health services and the personnel at the PHCs, SCs and community level including financial management and maintenance of records & reports
- CO12. Describe the roles and responsibilities of Mid-Level Health Care Providers (MHCPs) in Health Wellness Centers (HWCs)
- CO13. Identify the roles and responsibilities of health team members and explain their job description
- CO14. Demonstrate initiative in preparing themselves and the community for disaster preparedness and management
- CO15. Demonstrate skills in proper bio-medical waste management as per protocols
- CO16. Explain the roles and functions of various national and international health agencies

NURSING RESEARCH AND STATISTICS

- CO1. Identify research priority areas
- CO2. Formulate research questions/problem statement/hypotheses
- CO3. Review related literature on selected research problem and prepare annotated bibliography
- CO4. Prepare sample data collection tool
- CO5. Analyze and interpret the given data
- CO6. Practice computing, descriptive statistics and correlation
- CO7. Draw figures and types of graphs on given select data
- CO8. Develop a research proposal
- CO9. Plan and conduct a group/individual research project

MIDWIFERY/OBSTETRIC AND GYNECOLOGY NURSING - II

- CO1. Describe the assessment, initial management, referral and respectful maternity care of women with high risk pregnancy.

- CO2. Demonstrate competency in identifying deviation from normal pregnancy.
- CO3. Describe the assessment, initial management, referral and nursing care of women with high risk labour.
- CO4. Assist in the conduction of abnormal vaginal deliveries and caesarean section.
- CO5. Describe the assessment, initial management, referral and nursing care of women with abnormal postnatal conditions.
- CO6. Demonstrate competency in the initial management of complications during the postnatal period.
- CO7. Demonstrate competency in providing care for high risk newborn.
- CO8. Apply nursing process in caring for high risk women and their families.
- CO9. Describe the assessment and management of women with gynecological disorders.
- CO10. Demonstrate skills in performing and assisting in specific gynecological procedures.
- CO11. Describe the drugs used in obstetrics and gynecology.
- CO12. Counsel and care for couples with infertility.
- CO13. Describe artificial reproductive technology

MIDWIFERY/OBSTETRICS AND GYNECOLOGY (OBG) NURSING – I &II PRACTICAL

- CO1. Counsel women and their families on pre-conception care
- CO2. Demonstrate lab tests ex. urine pregnancy test
- CO3. Perform antenatal assessment of pregnant women
- CO4. Assess and care for normal antenatal mothers
- CO5. Assist and perform specific investigations for antenatal mothers
- CO6. Counsel mothers and their families on antenatal care and preparation for parenthood
- CO7. Conduct childbirth education classes
- CO8. Organize labour room
- CO9. Prepare and provide respectful maternity care for mothers in labour
- CO10. Perform per-vaginal examination for a woman in labour if indicated
- CO11. Conduct normal childbirth with essential newborn care
- CO12. Demonstrate skills in resuscitating the newborn
- CO13. Assist women in the transition to motherhood
- CO14. Perform postnatal and newborn assessment
- CO15. Provide care for postnatal mothers and their newborn

SEET
BCA

Programme Outcomes (POs)
Programme Specific Outcomes
(PSOs)
Course Outcomes (COs)

PROGRAM OBJECTIVE (PO)

PO1: The graduates will become successful professional by demonstrating logical and analytical thinking abilities.

PO2: The graduates will work and communicate effectively in interdisciplinary environment, either independently or in team, and demonstrate scientific leadership in academia and industry.

PO3: The students will engage in lifelong learning and professional development through advanced degrees in information technology, discussion, professional studies and research.

PROGRAM OUTCOMES (PO's)

Upon completion of the BCA programme, students will be able to:

PO1: Use and apply current technical concepts and practices in the core computer applications.

PO2: Identify computer application related problems, analyze them and design the system or provide the solution for the problem considering legal, ethical and societal issues.

PO3: Recognize the need for and an ability to engage in continuing professional development.

PO4: Work and communicate effectively in interdisciplinary environment, either independently or in team, and demonstrate scientific leadership in academia and industry.

PO5: Communicate effectively by oral, written, computing and graphical means

UCA-101 Fundamentals of Computers and Information Technology

COURSE OUTCOMES (CO)

- CO1:** Understand the basic knowledge of computers
- CO2:** Learning about computer memory
- CO3:** Learning various computer languages
- CO4:** Learning generations of computers
- CO5:** Understand basic concepts and terminology of information technology.
- CO6:** Be able to identify issues related to information security.

UMA-121 Mathematics-I

COURSE OUTCOMES (CO)

- CO1:** Understand the notion of a matrix, the use of double suffix notation for matrices, matrix equality and the transpose of a matrix.
- CO2:** Name and identify special types of matrices and exploit their properties. Identify and use the Zero, Identity, diagonal matrices, lower and upper triangular matrices, symmetric and skew-symmetric matrices as well as Idempotent and Orthogonal matrices and understand their properties.
- CO3:** Students will be able to evaluate limits and continuity
- CO4:** To analyze and solve limits problem.
- CO5:** To solve differentiation problems using direct limit concept and technique develop from limit concept.
- CO6:** To apply derivative technique in finding inverse trigonometric functions.
- CO7:** To find the derivatives of hyperbolic functions and inverse hyperbolic functions

UCA-103 Programming in C

COURSE OUTCOMES (CO)

- CO1:** Able to implement the algorithms and draw flowcharts for solving Mathematical and Engineering problems.
- CO2:** Demonstrate an understanding of computer programming language concepts.
- CO3:** To be able to develop C programs on Linux platform

UMG-104 Introduction to Financial Accounting and Accounting Packages

COURSE OUTCOMES (CO)

- CO1:** This course will enable the students to combine practice and theoretical knowledge of financial accounting.
- CO2:** The students of this course will be active learners and develop awareness of emerging trends in financial accounting.
- CO3:** The course will provide decision making skills to the students in the financial analysis c
- CO4:** The students of this course will have the ability to identify and analyze financial accounting problems and opportunities in real life situations.

UCA-107 Introduction to Internet & web designing

COURSE OUTCOMES (CO)

After studying this course student should be able to:

- CO1:** Emerging applications of Internet from Its History
- CO2:** Able to differentiate Internet – Intranet - Extranet
- CO3:** Types of Internet Connection
- CO4:** Layout of desktop called Topology of Computer Network

UPD-101 Personality Development Programme

COURSE OUTCOMES (CO)

CO1: Enhances mathematical ability and logical thinking towards various problems and sharpens the thinking capability.

CO2: Better understanding of English language and increased awareness towards the urgency of inculcating/honing their soft skills.

UCA-151 Data Structures Using C

COURSE OUTCOMES (CO)

CO1: Understand the concepts of Preliminaries, arrays and linked lists.

CO2: Learning about Stacks and Queues

CO3: Learning about Tree structures and Graphs

CO4: Learning about Storage System along with Sorting and Searching

UMA-161 Mathematics-II

COURSE OUTCOMES (CO)

CO1: Apply the concepts of sets, relations and functions to simple problems arising from information systems.

CO2: Relate set theoretic concepts and logical concepts to solve probabilistic problems and simple systems. Understand the partial derivatives of a function of several variables at a point; be able to find these; and understand the relationship between these notions;

CO3: Find the coordinates of the mid-point of a line

CO4: Understand the relationship between parallel and perpendicular lines

CO5: Apply concepts and solve a variety of applied real-world problems using appropriate multiple-variable calculus tools and techniques

UHU-101 Effective Communication Skills

COURSE OUTCOMES (CO)

CO1: Improvement in language competence and Acquisition of language inside and outside the classroom

CO2: Removal of barriers between languages; and between languages and subjects.

CO3: Better understanding of socio-cultural codes resulting in individual, aesthetic and moral growth

UEC-161 Digital Circuits and Logic Design

COURSE OUTCOMES (CO)

CO1: To understand the working and design of simple electronic device

UCA-153 Management Information System

COURSE OUTCOMES (CO)

CO1: Student should have understanding Managerial Practices.

CO2: Student should have a knowhow and setup of hierarchy of Information System

UPD-151 Personality Development Programme

COURSE OUTCOMES (CO)

CO1: Enhances mathematical ability and logical thinking towards various problems and sharpens the thinking capability.

CO2: Better understanding of English language and increased awareness towards the urgency of inculcating/honing their soft skills.

UCA-201 Introduction to Operating System

COURSE OUTCOMES (CO)

CO1: To understand the basic functions and process management by a computer system.

CO2: To have the understanding of how processes are handled and causes of Deadlocks, its recovery

CO3: It also gives in depth knowledge of Critical section problem.

UMG-225 Principles of Management and Introduction to ERP

COURSE OUTCOMES (CO)

CO1: To understand the learn the concepts of management and evolution of an ERP system

UMA-221 Mathematics-III

COURSE OUTCOMES (CO)

Students should be able to:

CO1: Able to apply vector calculus in different applications

CO2: Able to evaluate line, surface and volume integrals in simple coordinate systems

CO3: Able to employ divergence's Green's and Stokes' theorems to solve line and surface Integrals

CO4: Apply the concepts of sets, relations and functions to simple problems arising from information systems.

CO5: Define the terminology which is commonly used in differential equations.

CO6: Verify that the given function is a solution of the given differential equation.

CO7: Solve the problems of ordinary differential equations.

CO8: Find the Fourier series of a given function

CO9: Apply the knowledge of differential equations in order to solve engineering problems

CO10: Elementary functions – exponential and logarithm: Understand the similarities and differences between the real and complex exponential function. Compute the complex logarithm.

CO11: Elementary functions – trigonometric and hyperbolic

UCA-202 Database Management System

COURSE OUTCOMES (CO)

CO1: The course students will be able to learn basic Concepts of RDBMS and ER Diagrams & Normalization and its types.

CO2: The course students will be able to learn Concepts of SQL, Transaction and Recovery Management.

CO3: the course students will be able to learn file Organization and its types.

UCA-203 Object Oriented Programming in C++

COURSE OUTCOMES (CO)

CO1: Student should be able to explain how object-oriented software engineering enhances the software development process.

CO2: Student should be able to explain & identify the major elements in an object-oriented programming language.

CO3: Student should be able to explain the concept of C++.

UPD-201 Personality Development Programme

COURSE OUTCOMES (CO)

CO1: Enhances mathematical ability and logical thinking towards various problems and sharpens the thinking capability.

CO2: Better understanding of English language and increased awareness towards the urgency of inculcating/honing their soft skills.

UCA-251 Introduction to Linux

COURSE OUTCOMES (CO)

CO1: Students should have understanding and knowledge of LINUX operating system its

CO2: Students should have understanding and knowledge of LINUX OS's file system, commands, user management in LINUX based networks

UCA-252 Introduction to Data Science

COURSE OUTCOMES (CO)

CO1: To learn about data science and its technologies.

CO2: To learn about the role of mathematics and statistics in data science.

UCA-253 Computer Networks

COURSE OUTCOMES (CO)

CO1: Student should have understanding of networking in practical life.

CO2: Student should have understanding of wireless Transmission and Topologies of networking.

CO3: Student should have understanding of knowhow of Routing algorithms

UCA-254 System Analysis and Design

COURSE OUTCOMES (CO)

CO1: Design concepts of a system.

CO2: Formulation of Decision support system.

CO3: Methodology to design Questionnaires for requirement gathering.

CO4: Parameters to ensure the meaningful Information.

UCA- 255 Introductions to Python

COURSE OUTCOMES (CO)

CO1: Know some basic concept about Python programming Language

CO2: Be able in principle to program in an imperative (or procedural), an object-oriented, a functional, and a logical programming language

CO3: Improve the background for choosing appropriate programming languages for certain classes of programming problems

UPD-251 Personality Development Programme

COURSE OUTCOMES (CO)

CO1: Enhances mathematical ability and logical thinking towards various problems and sharpens the thinking capability.

CO2: Better understanding of English language and increased awareness towards the urgency of inculcating/honing their soft skills

UCA-301 Artificial Intelligence and Machine Learning

COURSE OUTCOMES (CO)

CO1: Develop an appreciation for what is involved in learning models from data Understand a wide variety of learning algorithms

CO2: Understand how to evaluate models generated from data

CO3: Apply the algorithms to a real problem, optimize the models learned and report on the expected accuracy that can be achieved by applying the models.

UCA-302 Object Oriented Programming with Java

COURSE OUTCOMES (CO)

CO1: Use object oriented programming concepts to solve real world problems.

CO2: Explain the concept of class and objects with access control to represent real world entities.

CO3: Demonstrate the behavior of programs involving the basic programming constructs like control structures, constructors, string handling and garbage collection.

CO4: Use overloading methodology on methods and constructors to develop application programs.

CO5: Demonstrate the implementation of inheritance (multilevel, hierarchical and multiple) by using extend and implement keywords.

CO6: Describe the concept of interface and abstract classes to define generic classes.

CO7: Use dynamic and static polymorphism to process objects depending on their class

UCA-303 Computer Organization and Architecture

COURSE OUTCOMES (CO)

CO1: Understanding of fundamental operating system abstractions such as processes, threads, files, semaphores, IPC abstractions, shared memory regions, etc.

CO2: Understanding of how the operating system abstractions can be used in the development of application programs, or to build higher level abstractions,

UMA-321 Operation Research

COURSE OUTCOMES (CO)

CO1: Identify and develop operational research models from the verbal description of the real system.

CO2: Understand the mathematical tools that are needed to solve optimization problems.

CO3: Use mathematical software to solve the proposed models.

CO4: Develop a report that describes the model and the solving technique, analyse the results and propose recommendations in language understandable to the decision-making processes in Management Engineering.

UPD-301 Personality Development Programme

COURSE OUTCOMES (CO)

CO1: Enhances mathematical ability and logical thinking towards various problems and sharpens the thinking capability.

CO2: Better understanding of English language and increased awareness towards the urgency of inculcating/honing their soft skills

UMG-476 Human Ethics & values

COURSE OUTCOMES (CO)

Upon completion of this course, students should have

CO1: Understood the core values that shape the ethical behavior of an engineer

CO2: Exposed awareness on professional ethics and human values.

CO3: Known their role in technological development

UEC-462 Biomedical Instrumentation

COURSE OUTCOMES (CO)

CO1: Understand the physiology of biomedical system

CO2: Measure biomedical and physiological information

CO3: Discuss the application of Electronics in diagnostics and therapeutic area.

UEC-463 Television Engineering

COURSE OUTCOMES (CO)

CO1: Understand the fundamental concepts of television transmitter and receiver systems, the transmission of video signals and importance of television standards to effectively work with broadcasting applications, trouble shooting of television systems.

CO2: Understand different colour television systems used worldwide and its compatibility.

CO3: Understand principles of digital video and component video signal.

CO4: Understand advanced TV technology, MAC signals and DTH technology.

CO5: Describe and differentiate working principles of latest digital TV, HDTV, and WDTV.

UEE-403 Energy Management

COURSE OUTCOMES (CO)

CO1: An ability to understand different types of energy conservation.

CO2: To get familiar with energy auditing.

CO3: To get an idea about energy efficient technology

UEE-452 Non-Conventional Electrical Power Generation

COURSE OUTCOMES (CO)

CO1: Student will understand about wind and solar energy.

CO2: Student will understand different types of mini hydro power plants.

UCE-312 Advance Construction Techniques and Project Management

COURSE OUTCOMES (CO)

CO1: Properties and application of admixture

CO2: Mix Design

CO3: Properties of concrete

CO4: Awareness of modern technology

CO5: Knowledge of special type of concrete

UCA-351 Software Engineering

COURSE OUTCOMES (CO)

CO1: Understanding of fundamental operating system abstractions such as processes, threads, files, semaphores, IPC abstractions, shared memory regions, etc.,

CO2: Understanding of how the operating system abstractions can be used in the development of application programs, or to build higher level abstractions,

CO3: Understanding of how the operating system abstractions can be implemented,

CO4: Understand the principles of concurrency and synchronization, and apply them to write correct concurrent programs/software.

UCA-352 Cyber Security

COURSE OUTCOMES (CO)

CO1: Assess the current security landscape, including the nature of the threat, the general status of common vulnerabilities, and the likely consequences of security failures;

CO2: Critique and assess the strengths and weaknesses of general cyber security models, including the CIA triad;

CO3: Appraise the interrelationships among elements that comprise a modern security system, including hardware, software, policies, and people;

CO4: Assess how all domains of security interact to achieve effective system-wide security at the enterprise level.

UCA-353 Computer Graphics

COURSE OUTCOMES (CO)

CO1: Interpret and evaluate requirements for program projects

CO2: Develop detailed design specifications and test strategies

CO3: Identify and articulate physical requirements for systems implementation

UPD-351 Personality Development Programme

COURSE OUTCOMES (CO)

CO1: Enhances mathematical ability and logical thinking towards various problems and sharpens the thinking capability.

CO2: Better understanding of English language and increased awareness towards the urgency of inculcating/honing their soft skills

UCA-391 Block Chain

COURSE OUTCOMES (CO)

COURSE OUTCOMES (CO)

CO1: Enhances logical thinking towards various problems and sharpens the thinking capability.

CO2: Better understanding of English language and increased awareness towards the urgency of inculcating/honing better speaking and listening skills.

Upon completion of this course, the students will be able to

CO1: Contentedly discuss and describe the history, types and applications of Block chain.

CO2: Gains familiarity with cryptography.

UCA-392 Mobile Computing

COURSE OUTCOMES (CO)

Student will better understand:

CO1: mobile computing and mobile data management.

CO2: aware of innovative solution and limitations; and

CO3: apply different techniques to various applications.

UCA- 393 Deep Learning

COURSE OUTCOMES (CO)

CO1: Identify the deep learning algorithms which are more appropriate for various types of learning tasks in various domains.

CO2: Implement deep learning algorithms and solve real-world problems.

UCA-394 E-Commerce

COURSE OUTCOMES (CO)

CO1: Understand the complexity of e-commerce and its many facets.

CO2: Explore how e-business and e-commerce fit together.

CO3: Identify the impact of e-commerce.

CO4: Recognize the benefits and limitations of e-commerce.

CO5: Identify the main barriers to the growth and development of e-commerce in organizations

UCA-395 Introduction to IOT

COURSE OUTCOMES (CO)

Course Outcome:

CO1: Understand the concept of IOT

CO2: Study IOT architecture and applications in various fields.

CO3: Study the security and privacy issues in IOT.

CO4: Understand various applications of sensor in Industrial, healthcare, commercial, and building automation.

UCA-396 Data Warehousing & Data Mining

COURSE OUTCOMES (CO)

CO1: Design a Data warehouse system and perform business analysis with OLAP tools.

CO2: Apply suitable pre-processing and visualization techniques for data analysis

CO3: Apply frequent pattern and association rule mining techniques for data analysis

CO4: Apply appropriate classification and clustering techniques for data analysis

UCA- 397 Introduction to internet & web designing

COURSE OUTCOMES (CO)

At the end of this Course, student shall be able to:

CO1: Understand the complexity of the real world objects

CO2: Learn the best practices for designing Web forms and Usability Reviews

CO3: Understand the Principles behind the design and construction of Web applications.

CO4: Develop and Deploy an Enterprise Application

UMG-450 Entrepreneurship Development & Enterprise Management

COURSE OUTCOMES (CO)

After studying this course, students will be able to

CO1: state the meaning of entrepreneurship.

CO2: describe the importance of entrepreneurship.

CO3: outline the qualities of a successful entrepreneur;

CO4: state the functions of an entrepreneur.

CO5: distinguish between entrepreneur and promoter.

CO6: explain the issues and problems faced by entrepreneurs.

CO7: describe the entrepreneurial practices in India.

UEC-464 Satellite Communication

COURSE OUTCOMES (CO)

CO1: Understand principle, working and operation of various sub systems of satellite as well as the earth station.

CO2: Apply various communication techniques for satellite applications

CO3: Analyze and design satellite communication link

CO4: Learn advanced techniques and regulatory aspects of satellite communication

CO5: Understand role of satellite in various application.

UEC-465 Digital Signal Processing & Applications

COURSE OUTCOMES (CO)

CO1: Comprehend adaptive system and functions.

CO2: Understand the design criteria for a linear adaptive processor.

CO3: Develop different adaptive modeling systems.

CO4: Understand the properties of Kalman filtering.

UEE-457 Transformer Engineering

COURSE OUTCOMES (CO)

CO1: Student will understand different types cooling mechanism, ventilation.

CO2: Student will understand about transformer design, machine design.

UEE-411 Direct Energy Conversion

COURSE OUTCOMES (CO)

CO1: Student will understand about fuel cells.

CO2: Student will understand about MHD generation.

UCE-311 Advance Concrete Technology

COURSE OUTCOMES (CO)

CO1: Properties and application of admixture

CO2: Mix Design

CO3: Properties of concrete

CO4: Awareness of modern technology

CO5: Knowledge of special type of concrete

UCE-409 Geographic Information Systems for Resources Management

COURSE OUTCOMES (CO)

CO1: Understanding concepts of geographic information system

CO2: Learning about ArcGIS software

CO3: Learning special data analysis

UME –464 Renewable Energy Sources

COURSE OUTCOMES (CO)

CO1: To understand the Elements of hydropower scheme and wind energy production.

CO2: To learn about the types of Hydraulic turbines and Wind turbines.

CO3: To learn the calculation of Wind turbine loads and wind energy conversion systems.

UME – 466 Automation & Robotics

COURSE OUTCOMES (CO)

CO1: To learn about Automation, Fluid Control Components.

CO2: To have a basic introduction to Robotics: Basic Concepts, Transfer Device, Feeders & Material Handling, Automated Inspection & Testing, Control Systems, Transfer Device, Feeders & Material Handling , Automated Inspection & Testing , Industrial Applications.

CO3: To understand the concept of Sources and Sensors, Manipulators, Actuators and Grippers.

UMG-475 Total Quality Management

COURSE OUTCOMES (CO)

CO1: Better understanding of the life cycle phases.

CO2: Acquiring knowledge for process automation
CO3: Preparedness for skills used in iterative process planning.

UEC-466 Optical Communication

COURSE OUTCOMES (CO)

CO1: Realize basic elements in optical fibers, different modes and configurations
CO2: Analyze the transmission characteristics associated with dispersion and polarization techniques
CO3: Design optical sources and detectors with their use in optical communication system
CO4: Construct fiber optic receiver systems, measurements and coupling techniques.
CO5: Design optical communication systems and its networks

UEC-467 Principles of Digital Communication

COURSE OUTCOMES (CO)

CO1: Understand the basics of information theory, source coding techniques and calculate Entropy of source.
CO2: Describe and determine the performance of line codes and methods to mitigate inter symbol interference.
CO3: Learn the generation and detection of base band system.
CO4: Understand the generation, detection signal space diagram, spectrum, bandwidth efficiency, and probability of error analysis of different band pass modulation techniques
CO5: Describe and determine the performance of different error control coding schemes for the reliable transmission of digital representation of signals and information over the channel.

UCE-476 Disaster Management

COURSE OUTCOMES (CO)

CO1: Behavior of building during earthquake
CO2: Able to find the critical element of building
CO3: Knowledge of repair of critical element

UCE-412 Building Project and Estimates

COURSE OUTCOMES (CO)

CO1: Estimate various types of structures
CO2: Able to make bill of various works

UEE-456 Hydro Power Station Design

COURSE OUTCOMES (CO)

CO1: Student will understand different types of dam.
CO2: Student will understand different types of hydro power design.

UEE-408 Illumination Engineering

COURSE OUTCOMES (CO)

CO1: Student will understand about color mixing.

CO2: Student will understand different types of lighting system

UME – 459 Engineering in Industry & Entrepreneurship

COURSE OUTCOMES (CO)

CO1: To solve the production planning and inventory control related problems.

CO2: To understand Organizational structure and roles of worker at their level.

CO3: To understand project management.

CO4: To understand the JIT, MRP management tools.

CO5: To understand concept about small scale industries.

UME – 458 Emerging Automotive Technologies

COURSE OUTCOMES (CO)

CO1: To make student aware about fuel cell technology adopted by automotive industry

CO2: To introduce latest engine technology features and 42 volt system

CO3: To give knowledge about Hybrid Vehicles Integrated Starter Alternator and X-By Wire Technology

SEET
MCA

Programme Outcomes (POs)
Programme Specific Outcomes
(PSOs)
Course Outcomes (COs)

PROGRAM OUTCOME

PO1: Develop an ability to apply knowledge in the computing discipline.

PO2: Develop ability to design and conduct experiments, as well as interpret data

PO3: Develop ability to demonstrate team work with the ability of leadership, analytical reasoning for solving time critical problems and strong human values for responsible professional.

PO4: Develop ability to use current technologies, skills and models for computing practice.

PO5: Develop ability to communicate ideas effectively.

PO6: Develop ability to use research, experiment, contemporary issues to solve industrial problems.

PO7: Develop techniques to enhance ability for lifelong learning.

PO8: Develop class environment congenial and competitive for generation of ideas, innovation and sharing.

PO9: To make graduates understand cross cultural, societal, professional, legal and ethical issues prevailing in industry.

PROGRAM SPECIFIC OUTCOMES (PSO's)

PSO1: Develop an ability to apply knowledge in the computing discipline.

PSO2: Develop ability to design and conduct experiments, as well as interpret data

PSO3: Develop ability to demonstrate team work with the ability of leadership, analytical reasoning for solving time critical problems and strong human values for responsible professional.

PSO4: Develop ability to use current technologies, skills and models for computing practice.

PSO5: Develop ability to communicate ideas effectively

PSO6: Develop ability to use research, experiment, contemporary issues to solve industrial problems.

PSO7: Develop techniques to enhance ability for lifelong learning.

PSO8: Develop class environment congenial and competitive for generation of ideas, innovation and sharing.

PSO9: To make graduates understand cross cultural, societal, professional, legal and ethical issues prevailing in industry.

PCA-101 Programming in C

COURSE OUTCOMES (CO)

CO1: Better understanding of how to analyze the given problem and logic building.

CO2: To understand the programming fundamentals

CO3: Getting started with data types and memory Better.

PCA-102 Introduction to Operating Systems and Linux

COURSE OUTCOMES (CO)

CO1: Identify basic components of operating system.

CO2: Conceptualize synchronization amongst various components of a typical operating system.

CO3: Understand and simulate activities of various operating system components.

CO4: Correlate basic concepts of operating system with an existing operating system.

PCA-103 Computer Organization and Architecture

COURSE OUTCOMES (CO)

CO1: know the classes of computers, and new trends and developments in computer architecture

CO2: Understand pipelining, instruction set architectures, memory addressing.

CO3: Understand the performance metrics of microprocessors, memory, networks, and disks

PCA-104 Relational Data Base Management System

COURSE OUTCOMES (CO)

CO1: Better equipped with the understanding of Query Processing and Optimization.

CO2: Introduction to Recovery techniques and Distributed Databases and Client-Server.

CO3: Acquiring know of Deductive Databases.

CO4: Familiar with basic database storage structures and access techniques: file and page organizations, Indexing methods including B tree, and hashing.

PAM-105 Discrete Mathematics

COURSE OUTCOMES (CO)

CO1: Student has better idea about how to analysis the given data.

CO2: Student has better idea about basic operations.

CO3: Student has better idea about relation and function.

PPD-101 Personality Development Programme

COURSE OUTCOMES (CO)

CO1: Enhances mathematical ability and logical thinking towards various problems and sharpens the thinking capability.

CO2: Better understanding of English language and increased awareness towards the urgency of inculcating/honing their soft skills.

PCA-151 Advanced Data Structures and Algorithms Data Structure

COURSE OUTCOMES (CO)

- CO1:** Able to carry out simple asymptotic analysis of algorithms..
- CO2:** Time/Space Complexity Analysis.
- CO3:** Improve Searching

PCA-152 Theory of Automata

COURSE OUTCOMES (CO)

- CO1:** Better understanding of finite automata and regular expressions.
- CO2:** Acquiring knowledge for analysis of algorithms.
- CO3:** Understand the equivalence between Non-deterministic Finite State Automata and Deterministic Finite State Automata.
- CO4:** Appreciate the power of the Turing Machine, as an abstract automaton, that describes computation, Effectively and efficiently

PCA-153 Software Engineering

COURSE OUTCOMES (CO)

- CO1:** Solve specific problems alone or in teams
- CO2:** Manage a project from beginning to end
- CO3:** Work independently as well as in teams
- CO4:** Define, formulate and analyse a problem

PCA-154 Data Communication and Computer Networks

COURSE OUTCOMES (CO)

Upon completion of this course, students will be able to:

- CO1:** Understand the structure and organization of computer networks; including the division into network layers, role of each layer, and relationships between the layers.
- CO2:** Understand the basic concepts of application layer protocol design; including client/server models, peer to peer models, and network naming.
- CO3:** In depth understanding of transport layer concepts and protocol design; including connection oriented and connection-less models, techniques to provide reliable data

PCA-155 Artificial Intelligence

COURSE OUTCOMES (CO)

- CO1:** To understand some of the basic theory and practical techniques in artificial intelligence.
- CO2:** Problem solving, Search, Heuristic methods
- CO3:** Introduction to Robotics, Expert Systems, Intelligent Tutoring Systems, Neural Networks, Evolutionary Computation, Artificial Life
- CO4:** Game Playing, Knowledge Representation, Uncertainty, Propositional Logic, Predicate Logic, Logic-Based Agents.

PPD-151 Personality Development Programme

COURSE OUTCOMES (CO)

- CO1:** Enhances mathematical ability and logical thinking towards various problems and sharpens the thinking capability.

CO2: Better understanding of English language and increased awareness towards the urgency of inculcating/honing their soft skills.

PCA-201 Programming in PYTHON

COURSE OUTCOMES (CO)

- CO1:** Know some basic concept about Python programming Language
- CO2:** Be able in principle to program in an imperative (or procedural), an object-oriented, a functional, and a logical programming language
- CO3:** Improve the background for choosing appropriate programming languages for certain classes of programming problems

PCA-202 Computer Graphics

COURSE OUTCOMES (CO)

- CO1:** Better understanding of how to comprehend data
- CO2:** Organizing the data for analysis
- CO3:** Describing the data – through written and visual representation
- CO4:** Selecting the most logical method of analysis for given set of data and figuring the most appropriate mode of representation.
- CO5:** Acquiring knowhow for high end courses like data warehousing, data mining and business analytics
- CO6:** Better equipped for intelligent decision making from a given data
- CO7:** Preparedness for skills used in Business Intelligence

PCA-203 Soft Computing

COURSE OUTCOMES (CO)

- CO1:** Comprehend the fuzzy logic and the concept of fuzziness involved in various systems and fuzzy set theory.
- CO2:** Understand the concepts of fuzzy sets, knowledge representation using fuzzy rules, approximate reasoning, fuzzy inference systems, and fuzzy logic
- CO3:** To understand the fundamental theory and concepts of neural networks, Identify different neural network architectures, algorithms, applications and their limitations
- CO4:** Understand appropriate learning rules for each of the architectures and learn several neural network paradigms and its applications
- CO5:** Reveal different applications of these models to solve engineering and other problems

PCA-204 Machine Learning

COURSE OUTCOMES (CO)

- CO1:** Gain knowledge about basic concepts of Machine Learning
- CO2:** Identify machine learning techniques suitable for a given problem
- CO3:** Solve the problems using various machine learning techniques and apply Dimensionality Reduction techniques.
- CO4:** Design application using machine learning techniques.

PPD-201 Personality Development Programme

COURSE OUTCOMES (CO)

CO1: Enhances mathematical ability and logical thinking towards various problems and sharpens the thinking capability.

CO2: Better understanding of English language and increased awareness towards the urgency of inculcating/honing their soft skills.

PCA-215 Mobile Computing

COURSE OUTCOMES (CO)

Student will better understand:

CO1: mobile computing and mobile data management.

CO2: be aware of innovative solution and limitations.

CO3: apply different techniques to various applications.

PCA-216 Information Security

COURSE OUTCOMES (CO)

CO1: Student will gain knowledge about securing both clean and corrupted systems, protect personal data, and secure computer networks.

CO2: Understand key terms and concepts in cyber law, intellectual property and cybercrimes, trademarks and domain theft.

CO3: Able to examine secure software development practices.

CO4: The learner will be able to incorporate approaches for incident analysis and response.

CO5: The learner will gain an understanding of cryptography, how it has evolved, and some key encryption techniques used today.

PCA-217 Web Technologies

COURSE OUTCOMES (CO)

CO1: Develops suitable server-side applications using PHP.

CO2: Illustrates the representation of data in XML format and Parses the data using various Java Parsers.

CO3: Develops programs to interact with the Data Base using Java Servlets

CO4: Develops programs using JSP for processing session tracking using Cookies and sessions.

CO5: Develops appropriate client-side scripting programs using Java Script and AJAX

CO6: Determines the appropriate web technology and builds web applications.

PCA-218 Mobile Application Development

COURSE OUTCOMES (CO)

CO1: By the end of the course, student will be able to write simple GUI applications

CO2: Able to use built-in widgets and components,

CO3: Ability to work with the database to store data locally, and much more.

CO4: Illustrate the android Wi-Fi features and advance android development

PCA-219 Big data Analytical

COURSE OUTCOMES (CO)

CO1: The students will be able to Identify Big Data and its Business Implications.

CO2: The students will be able to List the components of Hadoop and Hadoop Eco-System

CO3: Access and Process Data on Distributed File System

CO4: Manage Job Execution in Hadoop Environment and develop Big Data Solutions using Hadoop Eco System.

PCA-220 Cyber Security

COURSE OUTCOMES (CO)

CO1: Basics of Authentication Applications and System Level Security

CO2: Knowledge of security attacks and how to prevent from getting attack from outside..

PCA-221 Internet of Things

COURSE OUTCOMES (CO)

Course Outcome:

CO1: Understand the concept of IOT

CO2: Study IOT architecture and applications in various fields.

CO3: Study the security and privacy issues in IOT.

CO4: Understand various applications of sensor in Industrial, healthcare, commercial, and building automation.

PCA-222 Deep Learning

COURSE OUTCOMES (CO)

CO1: Identify the deep learning algorithms which are more appropriate for various types of learning tasks in Various domains.

CO2: Implement deep learning algorithms and solve real-world problems

PCA-251 Internet & Web Fundamentals

COURSE OUTCOMES (CO)

At the end of this Course, student shall be able to:

CO1: Understand the complexity of the real world objects

CO2: Learn the best practices for designing Web forms and Usability Reviews

CO3: Understand the Principles behind the design and construction of Web applications.

CO4: Develop and Deploy an Enterprise Application

Baddi University

of Emerging Sciences & Technologies

Department of Civil Engineering

**Programme Outcomes (POs), Programme Specific
Outcomes (PSOs) & Course Outcomes (COs)**

PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences

PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes

The graduates of the Civil Engineering Programme will be able to:

PSO1: Problem Solving: ability to identify, formulate, and find the solution for complex problems of civil engineering by applying the knowledge of mathematics, science and principles of civil engineering.

PSO2: Design: ability to apply civil engineering design principles to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors;

PSO3: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions related to Civil Engineering problems.

PSO4: Create, select, and apply suitable techniques, resources, and modern engineering tools such as CAD, STAAD, etc., and modelling to complex Civil Engineering activities with an understanding of the limitations.

PSO5: Professional and Ethical Responsibility: Understand the impact of the professional Civil Engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development. Apply ethical principles and commit to professional ethics and responsibilities and norms of the Civil Engineering practice.

PSO6: Teamwork: an ability to perform effectively in a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives

Course outcomes

UMA-101: Engineering Mathematics-I

- CO1: In matrices, complex numbers, and differential calculus, students would be able to recall terms and formulae.
- CO2: The definitions of matrices, complex numbers, and differential calculus will be understood and interpreted by students.
- CO3: Students will be able to compare and evaluate the methods of matrices, complex numbers, and differential calculus.
- CO4: In matrices, complex numbers, and differential calculus, students would be able to predict and analyze the problem.
- CO5: Learn about Cauchy's theorem, Taylor's and Laurent's series in complex form.

UCH-101: Engineering Chemistry

- CO1: To understand nature of chemical bonding in materials and predict their properties.
- CO2: To comprehend various analytical techniques/ methods towards qualitative and quantitative analysis.
- CO3: To outline synthesis procedures and separation techniques of some engineering substances.
- CO4: To apply specific models and processes for better understanding of material properties and applications.
- CO5: The students would be able to apply basic chemical concepts and principles in understanding simple real life problems.

UCS-101: Fundamentals of Computer & C programming

- CO1: Better understanding of basic concept of computers.
- CO2: Acquiring knowledge for developing programming skill related to C language.
- CO3: Preparedness for skills used in various fields of computers.

Principles of Electrical Engineering

- CO1: Student will learn how to solve DC and AC circuits
- CO2: Different method of solving simultaneous equation will help the student to solve any engineering problems.
- CO3: Learn about basic electrical machines

Engineering Graphical Drawing

CO1: Student will learn how To make engineering drawings

CO2: Different method of drawing and orthographic projection

CO3: Learn about sections & development of lateral surfaces of solids

Environmental Science

CO1: Gain knowledge of fundamental principles in environmental science and policies.

CO2: Create awareness about sustainable development.

CO3: Identify different types of environmental pollution and control measures.

CO4: To learn different Modern Techniques for sustainable Development.

Engineering Physics

CO1: Recall and recognize the terminologies of Electrodynamics, Optics and Relativity

CO2: Interpret the notions of Electrodynamics, Optics and Relativity

CO3: Classify and compare these notions with respect to their domains of validity

CO4: Execute procedures toward solving problems in Electrodynamics, Optics and Relativity

CO5: Differentiate and organize basic ideas and mathematical relations of Electrodynamics, Optics and Relativity

CO6: Check, judge and critique the applications of Electrodynamics, Optics and Relativity

Advanced C programming

CO1: Better understanding of concepts of C like pointer and functions.

CO2: Acquiring knowledge for developing programming skill related to C language.

CO3: Preparedness for skills used in various fields of computers.

Communication & Professional skills in English

CO1: Improvement in language competence.

CO2: Acquisition of language inside and outside the classroom.

CO3: Removal of barriers between languages; and between languages and subjects.

CO4: Better understanding of socio-cultural codes resulting in individual, aesthetic and moral growth.

Engineering Mathematics-II

CO1: Come to know about the normal equations of differentials and their applications

CO2: A mathematical model of linear differential equations could also be built.

CO3: Students learn how the solution to the built model can be found.

CO4: Other students are familiar with order differential equations and their techniques for transformations and solutions.

CO5: Students learn about the how to solve mathematical model with Laplace Transform and error functions and their applications.

Principles of Electronics Engineering

CO1: Students will develop an understanding of the fundamental principles of electronics and

CO2: Will be able to apply this knowledge and understanding to perform tests

CO3: Will be able to troubleshoot and repair electronic circuits and instruments.

CO4: Apply basic A.C. electric circuit law in solving A.C. circuit problems and able to perform A.C. power calculation

CO5: Describe the basic concepts of junction diode and junction transistors and use OP-AMPS in applications.

Principles of Mechanical Engineering

CO1: In the end of the semester the student have the knowledge of–Basics of thermodynamics, refrigeration, strength of materials, internal combustion engine, fluid machines, and automobile engineering.

CO2: Understand Simple stresses & Strains

CO3: Understanding bending stresses in beams

CO4: Learning how to draw shear force and bending moment diagram

Solid Mechanics

CO1: Calculations of simple stresses and strains when materials are subjected to external forces.

CO2: Bending moment and shear force diagrams for different types of beams.

CO3: Torsion of shafts and springs.

CO4: Deflection of beams with different end conditions, strain energy due to axial loads.

Fluid mechanics-I

CO1: The students learnt fundamental physical and analytical principles of fluid mechanics.

CO2: The students have demonstrated the understanding of fundamentals by solving problems.

Surveying – I

CO1: Students are able to conduct the preliminary survey of any site.

CO2: Students are able to design the geographic maps.

Building construction and materials

CO1: About building materials.

CO2: About building construction.

Concrete technology

CO1: The student will be able to have deep knowledge of the properties of concrete.

CO2: They will also be able to understand the constituent materials and its behaviour in the fresh and hardened states of concrete.

Engg. Geology & Rock mechanics

CO1: Students are able to understand the different types of map, how & which types of rock used in construction sites.

CO2: They also be able to understand the structures feature of rocks and how they formed.

Structural analysis-I

CO1: The students will understand fundamental, physical and analytical principles of structures.

CO2: The students will also able to demonstrate and understand these fundamentals by solving problems dealing with Deflection of beams, stresses on cylinders and spheres, bending moments and cable and suspension bridges.

Design of steel structures – I

CO1: I.S. Design specifications

CO2: Design of steel structures

Fluid mechanics – II

CO1: The students will learn physical and analytical principles of fluid mechanics.

CO2: The students will demonstrate the understanding of fundamentals by solving problems.

Surveying-II

CO1: The students will learn the advance knowledge of surveying.

CO2: The students will demonstrate the understanding of fundamentals by using latest survey equipment like Total Station, GIS, GPS etc.

Soil mechanics

CO1: The students will learn the fundamental and engineering properties of soil.

CO2: The students also able to understand the shear stress parameters and failures.

Principles of Engineering Economics and Management

CO1: It teaches us many interesting and instructive factors about man's behavior when he is engaged in economic activity.

CO2: Economics brains the minds, Economic reasoning trains our mind.

CO3: It helps in understanding the economic system which is in functioning today.

CO4: It is very useful in any professions. It is helpful in banking, marketing, agriculture, and in industry. In other words who knows economics, he can achieve success in his field, economics he can achieve success in his field.

CO5: It is useful in solving the problems of poverty.

CO6: It is helpful to house holders and labor leaders.

CO7: It is also useful for good citizenship.

Applied Hydraulics and Fluid Mechanics

CO1: The students will be able to apply their knowledge of fluid mechanics in addressing problems in open channels.

CO2: They will possess the skills to solve problems in uniform, gradually and rapidly varied flows in steady state conditions.

CO3: They will have knowledge in hydraulic machineries (pumps & turbine)

Water Supply Engineering including Drawing

CO1: The students will be familiar with current and emerging environmental engineering and global issues, and have an understanding of ethical and social responsibilities

CO2: The students will also be able to design of municipal Water Supply and Industrial Waste treatment.

Sanitary Engineering including drawing

CO1: The students will be familiar with current and emerging environmental engineering and global issues, and have an understanding of ethical and social responsibilities

CO2: The students will also be able to design of municipal Water Supply and Industrial Waste treatment.

Basic Structural design and Drawing

CO1: The students will be familiar with Engineering Drawings

Civil Engineering Drawing

CO1: Draw and conduct experiments, analyze and interpret data.

CO2: Draw a component, system or process to meet desired needs within realistic constraints

Structural analysis-II

CO1: An ability to apply knowledge of mathematics, science, and engineering for the analysis of engineering structures.

CO2: An ability to design a system, component, or process to meet desired needs of civil engineering structures.

CO3: An ability to identify, formulate, and solve engineering problems.

Design of Concrete structure -I

CO1: Students will be able to design the various structural elements like Beam, Slab, columns and footings.

CO2: Students will be able to know the Indian standard codes and their applications.

Hydrology and Irrigation engineering

CO1: Students are able to conduct survey, design and feasibility studies of the irrigation schemes.

CO2: The student also knows the irrigation management practices of the past, present and future.

Construction planning & management

CO1: Managerial skills in construction industry

CO2: Project management

Geotechnical and foundation engineering

CO1: Students will be able to know the various types of forces acting on the foundation.

CO2: Students will be able to know the different types of foundations and their design procedure.

Environmental Engineering

CO1: Students will be familiar with current and emerging environmental engineering and global issues, and have an understanding of ethical and social responsibilities.

CO2: The student also able to the design of municipal water supply and industrial waste water treatment.

Structural Analysis-III

CO1: Students will be able to understand the different complicated structural frames and there analyzing methods.

CO2: Students will know the basics of finite element method and modeling.

Design of Steel Structure-II

CO1: Students will be able to know the design procedure of various industrial steel structural parts.

Design of concrete structures -II

CO1: Students will be able to design the advanced RCC structures like foundation, retaining wall, water tank, domes etc.

CO2: Students will be able to know about design of prestressed concrete structures and its IS codal provisions.

Highway Engineering

CO1: Students able to understand the network (Highway).

CO2: They are able to understand Highway design (flexible pavement & rigid Pavement).

CO3: Upon completion of the course the student is expected to begin to understand the interplay of many of the various elements that go into highway design.

Irrigation Engineering

CO1: Basic understanding of the theories of irrigation and hydraulic structure.

CO2: Students will be able to independently analyze & design the hydraulic and irrigation structures.

Civil Engineering Software Lab-I

CO1: Basic understanding of the Civil Engineering Softwares

CO2: Students will be able to independently analyze & design the civil engineering structures

Environment Impact Assessment

CO1: Improvement in language competence.

CO2: Acquisition of language inside and outside the classroom.

CO3: Removal of barriers between languages; and between languages and subjects.

CO4: Better understanding of socio-cultural codes resulting in individual, aesthetic and Moral growth

Advance Concrete Technology

CO1: Properties and application of admixture

CO2: Mix Design

CO3: Properties of concrete

CO4: Awareness of modern technology

CO5: Knowledge of special type of concrete

Advance Construction Techniques and Project Management

CO1: Properties and application of admixture

CO2: Mix Design

CO3: Properties of concrete

CO4: Awareness of modern technology

CO5: Knowledge of special type of concrete

Mechanics of Composite Material

CO1: Engineering Applications of composite material,

CO2: Cost effective design of structure

CO3: Design of light weight structure and increase the stiffness of structural element

CO4: Stress-strain relationship of composite material

Applied elasticity and plasticity

CO1: Students will be known the different types of mechanisms Student will understand the Structure analysis.

Traffic Engineering

CO1: The students will understand the principles of traffic and Digital signaling

CO2: The students will understand the principles of LOS

Matrix computation method of structure analysis

CO1: Design a component, system or process to meet desired needs within realistic constraints.

CO2: An ability to function on multidisciplinary terms.

CO3: Identify, formulate and solve problems.

CO4: Through assignments and quizzes, we can improve their communication and presentation skills.

CO5: Understand the impact of engineering solutions in global, economic

Air Pollution Control

CO1: The students will understand the Different causes and control Measures of Air Pollution and Its Effect on Human Health.

Design of Tall Buildings

CO1: The students will be familiar with current and emerging Designing Techniques in engineering

Advanced Environmental Engineering

CO1: The introduction of Waste Water and their treatment

CO2: Advanced Treatments for Air and Water Pollution

Building Repair and Maintenance

CO1: Study the techniques and process to repair and maintenance of the existing building

CO2: Repair the damage building during earthquake

CO3: Able to find the critical element of building

CO4: Knowledge of repair of critical element

CO5: Increase the capacity of existing building

ESTIMATING COSTING AND SPECIFICATIONS

CO1: With the completion of course students will be able to design or estimate the Engineering project (earth works, road works, water supply, storm and foul drainage, concrete works, structural steel works, retaining walls and ancillary works) cost before starting.

RAILWAYS & AIRPORT ENGINEERING

CO1: Students are able to understand the network system of railways track.

CO2: They are able to understand the rail design & signal design.

CO3: They are also able to understand the airport planning and design.

Earthquake Engineering

CO1: Behavior of building during earthquake

CO2: Able to find the critical element of building

CO3: Knowledge of repair of critical element

Civil Engineering Software Lab-II

CO1: Basic understanding of the theories of irrigation and hydraulic structure.

CO2: Students will be able to independently analyze & design the hydraulic and irrigation structures.

Waste Water Engineering

CO1: Students will able to understand the utility of wastewater treatment

CO2: Students will able to do audit for the characteristics of wastewater

Professional Practice and Entrepreneurship Development

CO1: Appreciate the importance of embarking on self-employment and has developed the confidence and personal skills for the same.

CO2: Identify business opportunities in chosen sector / sub-sector and plan and market and sell products / services

CO3: Start a small business enterprise by liaising with different stake holders

CO4: Effectively manage small business enterprise

Maintenance and Rehabilitation of Structures

CO1: Students will able to understand the utility of wastewater treatment

CO2: Students will be able to do audit for the characteristics of wastewater

Green Concepts in Buildings

CO1: Getting a brief knowledge of Green building

CO2: Information about green energy

CO3: Understanding concepts of solar energy and its uses

Geographic Information Systems for Resources Management

CO1: Understanding concepts of geographic information system

CO2: Learning about ArcGIS software

CO3: Learning special data analysis

Urban Transportation Planning

CO1: Understand the principle of traffic and Digital Signaling

CO2: Understand the principles of LOS

Building Project and Estimates

CO1: Estimate various types of structures

CO2: Able to make bill of various works

Stability of Structures

CO1: Understanding concepts of static equilibrium

CO2: Learning about analysis of Eccentrically Loaded column

CO3: Learning about various repair techniques

Prefabricated Concrete Structures

CO1: Learning design principles in Prefabricated concrete structures

CO2: Prefabricated structures using reinforced concrete

CO3: Floors, stairs and roofs made as a prefabricated structure

Land Information System

CO1: Introduction to Land Information system

CO2: Application of LIS in civil engineering

CO3: Understanding satellite positioning system

Bridge Engineering

CO1: Students will be able to know the concepts of bridges

CO2: Students will be able to know the design concepts of bridges

CO3: Studying various case studies regarding failure of bridges

Soil Dynamics

CO1: Students will be able to know the fundamental of vibration.

CO2: Students will be able to know the interpretation of vibration in geotechnical engineering.

Prestressed Concrete Structures

CO1: Concept of Prestress Design

CO2: Design of Prestress concrete structures by Pre-Tensioned Technique

CO3: Design of Prestress concrete structures by Post-Tensioned Technique

Groundwater Engineering

CO1: Students are able to understand groundwater flow to adjacent locks and dams.

CO2: The student also knows the Base flow between aquifers and fixed bodies, including streams and reservoirs.

Advance Structure Analysis

CO1: The students will understand fundamental, physical and analytical principles of advance structural analysis.

CO2: The students will able to demonstrate and understand these fundamentals by solving problems dealing with: stress analysis, Finite element method, analysis by stiffness method.

Hydrology & Dams

CO1: Students will be known the different types of dams and the choice of dams according to site location.

CO2: Student will understand the hydrologic analysis of dams.

Docks & Harbours

CO1: Students will be able to understand, planning, designing and construction of docks harbours and ports as a whole.

CO2: Learning about port amenities & navigation aids

CO3: Learning about harbour maintenance

Town Planning & Architechtural Assistantship

CO1: Students will able to understand use and various aspects of town planning for development of the society in turn the infrastructural development of country.

CO2: Introduction to architecture

CO3: Learning about planning legislations

Principles of Remote Sensing

CO1: Understand the principles of remote sensing and digital image processing.

CO2: Understand the principles of geographic information systems (GIS).

CO3: Gain experience in the applications of remote sensing and GIS to solving problems in the environmental and life sciences.

CO4: Gain experience in the use of image processing and GIS software.

Advanced Surveying

CO1: Learn about tacheometric surveying & geodetic surveying

CO2: Theory of errors Field astronomy

CO3: Learning about photogrammetric surveying & special survey instruments

Design of Industrial Structures

CO1: Calculate design loads and methods to combine them with anticipated loads

CO2: Determine dynamic loading, including crane, equipment and seismic factors

CO3: Provide durable, flat, low maintenance concrete floors on grade

CO4: Select economical structural systems that would provide long life and scalability for the inevitable future changes

CO5: Ensure suitable and efficient crane buildings

CO6: Design floor systems for vibration control, fatigue, ultimate strength and deflection control

Dams

CO1: Design of Dams

CO2: Flood Design

Software Project Management

CO1: Better understanding of the life cycle phases.

CO2: Acquiring knowledge for process automation

CO3: Preparedness for skills used in iterative process planning.

Distributed operating system

CO1: Explain the objectives and functions of modern operating systems

CO2: Describe how operating systems have evolved over time from primitive batch systems to sophisticated multi-user systems

CO3: Analyze the tradeoffs inherent in operating system design

CO4: Describe the functions of a contemporary operating system with respect to convenience, efficiency, and the ability to evolve

Grid Computing

CO1: Better equipped with the understanding of Grid Architecture and its relationship to other Distributed technologies.

CO2: Introduction to Grid Resource Management Systems.

CO3: Acquiring know how of Security Issues in Grids and Grid Middleware and Programming model.

Software Reliability

CO1: Better equipped with the understanding of Grid Architecture and its relationship to other Distributed technologies.

CO2: Introduction to Grid Resource Management Systems.

CO3: Acquiring know how of Security Issues in Grids and Grid Middleware and Programming Model.

E-COMMERCE & ERP

CO1: To demonstrate a clear and relevant understanding of the definitions, importance, potential business values, and relevant technologies of ERP systems;

CO2: To demonstrate the ability in Course the applications of ERP and using the up-to-date ERP systems (such as SAP) for business.

CO3: To demonstrate a clear understanding of the life-cycle model of the process that a firm goes through with ERP system.

Data Warehousing & Data Mining

CO1: Better understanding of dataware housing and data mining.

CO2: Acquiring knowledge for rules associated with data mining.

CO3: Preparedness for skills used in various methodologies and the case studies in building data mining.

Biomedical Instrumentation

CO1: Differentiate different bio potentials and its propagations.

CO2: Illustrate different electrode placement for various physiological recordings

CO3: Design bio amplifier for various physiological recordings

CO4: Explain various technique for non-electrical physiological measurements

CO5: Demonstrate different biochemical measurement techniques.

Television Engineering

CO1: Learning about principle of Television

CO2: Learning about picture tubes

CO3: Understanding concepts of TV receiver

CO4: Colour TV and its function

Satellite Communication

CO1: Introduction to satellite origin

CO2: Designing of satellite link

CO3: Learning FDMA techniques and SCPC & CSSB systems

Digital Signal Processing & Applications

CO1: Learning about classification of signals

CO2: System function

CO3: Learning about Discrete Fourier Transform

CO4: Learning about applications of DSP in voice

Optical Communication

CO1: Understanding need for Fiber optic communication system

CO2: Learning about Light sources & Transmitters

CO3: Learning about receivers & photodiodes

Principles of Digital Communication

CO1: Learning about pulse modulation

CO2: Understanding digital modulation techniques

CO3: Understanding concepts of data transmission

CO4: Learning about spread spectrum modulation

Energy Management

CO1: The students shall have an understanding of the impact of energy on society, the need for sustainable energy, global and Indian energy policies

CO2: They would have gained knowledge on various techniques of energy management and conservation. They would also have gained the basic ideas of conducting an energy audit

Illumination Engineering

CO1: Identify the criteria for the selection of lamps and lighting systems for an indoor or outdoor space

CO2: Perform calculations on photometric performance of light sources and luminaires for lighting design

CO3: Evaluate different types of lighting designs and applications

Direct Energy Conversion

CO1: Design, develop and assess solar thermal systems including solar cooker, solar dryer, solar cooler and solar heater.

CO2. Evaluate the potential of solar and wind energy at a given location.

CO3. Build a model of wind turbine system and evaluate its performance characteristics under varying experimental conditions.

CO4. Justify the selection of solar and wind energy systems for a given location based on economics.

Non Conventional Electrical Power Generation

CO1: Analyze solar thermal and photovoltaic systems and related technologies for energy conversion.

CO2: Understand Wind energy conversion and devices available for it.

CO3: Understand Biomass conversion technologies, Geo thermal resources and energy conversion principles and technologies.

CO4: Realize Power from oceans (thermal, wave, tidal) and conversion devices.

CO5: Understand fundamentals of fuel cells and commercial batteries.

Hydro Power Station Design

CO1: Introduction to Hydrology

CO2: Learning about various types of dams and hydroelectric plants

CO3: Learning about design of turbines

CO4: Understanding draft tubes and various design aspects of mini and micro hydel plants

Transformer Engineering

CO1: The student can be acquired the basic knowledge of energy conversion principle and electrical:

machine thus being prepared to pursue any area of engineering spectrum in depth as desired.

CO2: The students will be able to effectively employ electrical systems and lead the exploration of new applications and techniques for their use.

Basic Manufacturing Technology

CO1: Better understanding of the manufacturing

CO2: Acquiring knowledge for process automation in manufacturing

CO3: Preparedness for skills used in iterative process planning.

Measurement Techniques

CO1: Better understanding of the manufacturing

CO2: Acquiring knowledge for process automation in manufacturing

CO3: Preparedness for skills used in iterative process planning.

Renewable Energy Sources

CO1: Learning about various energy resources

CO2: Understanding Bio Energy

CO3: Solar Energy and it's concept

CO4: Concepts of Economic analysis in Engineering

Automation & Robotics

CO1: Learning basics of automation

CO2: Learning transfer devices and feeders

CO3: Learning basic concepts of robotics

CO4: Understanding manipulators and their uses

Engineering in Industry & Entrepreneurship

CO1: Introduction to Industrial Engineering

CO2: Concepts of Product development and design

CO3: Learning about Entrepreneurship development

Emerging Automotive Technologies

CO1: Learning about fuel cell technology for vehicles

CO2: Learning about latest technology in mechanical engineering

CO3: Learning about 42 volt system

CO4: learning about X-By wire technology

Entrepreneurship Development & Enterprise Management

CO1: Better understanding of the life cycle phases.

CO2: Acquiring knowledge for process automation

CO3: Preparedness for skills used in iterative process planning.

Total Quality Management

CO1: Better understanding of the life cycle phases.

CO2: Acquiring knowledge for process automation

CO3: Preparedness for skills used in iterative process planning.

Human Values and Professional Ethics

CO1: Learning human values and ethics

CO2: Importance of value education

CO3: Understanding harmony in human being

CO4: Understanding harmony in yourself

Department of Civil Engineering

PSOs, POs of

M.Tech. in Structural Engineering (SE)

Program Specific Objectives (PEOs) for M.Tech. program in Structural Engineering (SE):

PSO-1: To expose the graduate students to advanced Structural Analysis, Structural Dynamics, allied theory in elasticity and plasticity, FEM etc.

PSO-2: To impart training to graduate students in behavior and design of Advanced RC structures, behavior and design of Advanced Steel structure, latest procedures in earthquake resistant design practices and earthquake resistant design philosophies.

PSO-3: To expose the graduate students to latest design codes, current national and international scenario on Structural Engineering and to motivate them in interdisciplinary involvement in problems related to Structural Engineering.

PSO-4: To orient the graduate students to high value research related to Structural Engineering so that they get impetus to pursue research and lifelong learning.

Program Outcomes (POs) for the M.Tech. program in Structural Engineering (SE):

List of Program Outcomes (POs) of P.G. program in Structural Engineering:

PO1: Graduates of the program will be able to demonstrate in-depth knowledge of:

Structural Engineering discipline and build capability to apply that knowledge to real problems.

PO2: Program graduates will gain knowledge and skill in integrating Structural engineering concepts across multiple disciplines.

PO3: Graduates will have the ability to employ technical knowledge and leadership skills to Structural Engineering research and consultancy problems.

PO4: Graduates of the Structural Engineering program will demonstrate the ability to carry out original and useful research in key areas of Structural Engineering.

PO5: Program graduates will be able to identify and analyze the impact of Structural Engineering in development project and find a suitable solution from number of alternatives.

Course Outcomes M.Tech structure Engineering

Advance Structural Analysis

CO1: Understand the basic concepts of structural analysis and matrix algebra

CO2: Recognizing how matrix algebra provides the excellent mathematical framework for the Structural analysis.

CO3: Understanding the analysis of elastic instability and second-order response

Advanced RCC Design

CO1: Modeling of RC building frames,

CO2: load calculations with detailed emphasis on seismic loading,

CO3: Analysis and design using computer programs.

CO4: Design philosophies and procedures for liquid retaining structures

CO5: Earth retaining structures

THEORY OF PLATE AND SHELLS

CO1: Analyze and design thin shell structures including domes. hyperbolic, paraboloid, elliptic and cylindrical shells

CO2: Formulate Finite Element Equations for solution of the structural response of plate bending problems and obtain solutions to shell structures.

Optimization Techniques

CO1: Operation techniques use in industrial field to find out effective cost.

CO2: Understand the basic concepts of linear and non-linear programming.

CO3: Recognizing how non-linear programming provides the excellent mathematical framework for the solution of equations

Advanced Structures Lab

CO1: Evaluation of causes of deterioration

CO2: Evaluation of structure health

CO3: Structural health monitoring

CO4: Knowledge of repairing techniques

Plastic Analysis and Design of Steel Structures

CO1: Recognize the design philosophy of steel structures and have concept on limit state design.

CO2: Understand the behavior of steel structures, in particular the various forms of failure for members and connections under tension, compression, bending and combined.

CO3: Apply the principles, procedures and current code requirements to the analysis and design of steel tension members, beams, columns, beam-columns and connections.

CO4: Ability to follow different structural design specifications and apply computer software to analyze steel structural systems under gravity and lateral loads.

Structure Dynamics and Earthquake Analysis

CO1: This course will impart an understanding of the dynamic behavior and strength of structural members.

CO2: To develop the ability to read the pertinent literature and to understand related design codes.

CO3: Understand the Systems with single degree of freedom (SDOF) and Multi Degree of Freedom(MDOF)

Advanced Bridge Engineering

CO1: To develop an understanding of and appreciation for basic concepts in proportioning and design of bridges in terms of aesthetics, geographical location and functionality.

CO2: To help the student develop an intuitive feeling about the sizing of bridge elements, ie develop a clear understanding of conceptual design.

CO3: To understand the load flow mechanism and identify loads on bridges.

CO4: To carry out a design of bridge starting from conceptual design, selecting suitable bridge, geometry to sizing of its elements.

Advanced Civil Software Lab

CO1: Application of AUTOCAD

CO2: Structure design and analysis using different software packages

CO3: Application of MATLAB to civil Engineering applications

Research Methodology

CO1: Understand some basic concepts of research and its methodologies

CO2: Identify appropriate research topics

CO3: Select and define appropriate research problem and parameters

CO4: Prepare a project proposal (to undertake a project)

CO5: Organize and conduct research (advanced project) in a more appropriate manner

CO6: Write a research report and thesis

CO7: Write a research proposal (grants)

Advance Optimization Technique

CO1: Explain the fundamental knowledge of Linear Programming and Dynamic Programming problems.

CO2: Use classical optimization techniques and numerical methods of optimization.

CO3: Describe the basics of different evolutionary algorithms.

CO4: Enumerate fundamentals of Integer programming technique and apply different techniques to solve various optimization problems arising from engineering areas.

Finite Element Method in Structural Analysis

CO1: To cover the analysis methodologies for 1-D, 2-D and 3-D problems with the advantages and disadvantages

CO2: To develop computer codes for any physical problem using Finite Element technique

Advanced Foundation Design

CO1: Exploration of Geophysical Data enabling students to foresee the soil conditions affecting the design of a foundation

CO2: Designing different types of foundations under varying soil surface conditions

CO3: Design of Machine foundations- a prerequisite to enable a student to start a consultancy services – after passing out with this subject

CO4: Techniques, methods to improve ground water conditions, soil conditions to reach an amicable and economical foundation design of a structure in unfavorable soil conditions.

Composite Materials

CO1: Engineering Applications of composite material,

CO2: Cost effective design of structure

CO3: Design of light weight structure and increase the stiffness of structural element

CO4: Stress-strain relationship of composite material

Modern Concrete Technology

CO1: Properties and application of admixture

CO2: Mix Design

CO3: Properties of concrete

CO4: Awareness of modern technology

CO5: Knowledge of special type of concrete

High Rise Buildings

CO1: The problems associated with large heights of structures with respect to loads (wind and earthquake and deflections of the structure).

CO2: Principles of designing tall buildings as per the existing course.

SEET
M.Tech (CSE)

Programme Outcomes (POs)
Programme Specific Outcomes
(PSOs)
Course Outcomes (COs)

PROGRAM OUTCOMES (PO's)

After completion of the program the students will be able to:

- **PO1. Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO2. Problem analysis:** Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO3. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO4. Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
- **PO5. The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- **PO 6:** Graduates will have a thorough grounding in the key principles and practices of computing, and will have applied their computer engineering skills and knowledge of foundational principles to the design and implementation of practical systems by actively getting engaged into learning, understanding, and applying new ideas and technologies as the field evolves.
- **PO 7:** Graduate will be exposed to contemporary research which meets the research and development needs of the industry and they are able to carry out research and intellectual endeavors of the highest standards that advances the theoretical knowledge and are of immediate and long-range practical significance.
- **PO 8:** Graduates will develop strong reasoning skills to enable them to take successful decisions in key management and marketing positions and get exposed to cutting edge developments in computing technology.
- **PO 9:** Graduates will develop communication skills so that they are able to express ideas clearly and persuasively, in written and oral forms.
- **PO 10:** Graduates will develop the ability to work with others, in both, professional and social settings and will raise the curiosity, the desire, the awareness, the competence and the ability among themselves to keep learning throughout life.
- **PO 11:** Graduates will be exposed to global view so that they can appreciate diversity in the world and in intellectual pursuits which will be attained by inculcating in them an understanding of the human, social and business context in which they will utilize their engineering skills.

PCS-101 Advanced Computer Architecture

COURSE OUTCOMES (CO)

- CO1:** Better understanding of computer system architecture.
- CO2:** Acquiring knowledge for memories performance, design and compatibility.
- CO3:** Understanding of parallelism and best ways to achieve it.

PCS-102 Advanced Database Management System

COURSE OUTCOMES (CO)

- CO1:** Identify effective basic operations on databases.
- CO2:** What are the implications according to business purpose for databases and it affects.
- CO3:** To understand the role of DB.
- CO4:** Developing effective solutions for unstructured data.
- CO5:** As a result development of small module of databases to manage data effectively.

PCS-103 Advanced Operating System

COURSE OUTCOMES (CO)

- CO1:** Understand approaches to scheduling and allocation in operating system.
- CO2:** Memory management and I/O networking concepts.
- CO3:** Deep study of Distributed operating system with its design issues.
- CO4:** Understand concept of threading and types of it.

PCS-104 Advanced Data Structures and Algorithms

COURSE OUTCOMES (CO)

- CO1:** Able to articulate the main concepts, key technologies, strengths, and limitations.
- CO2:** Identify the best to worst sorting and searching algorithms.
- CO3:** Different problems and their solution.
- CO4:** These subject concepts will help out to understand other core subjects with far better understanding.
- CO5:** Understand the P. NP and approximation Algorithms

PCS-105 Advanced Computer Networks

COURSE OUTCOMES (CO)

- CO1;** Describe fundamental concepts of network types with their usage in different aspects.
- CO2:** Explore about MANETs and their applications.
- CO3:** Understand fundamental concepts of security with protocols.
- CO4:** Different flow and congestion control techniques.
- CO5:** Demonstrate the security, and quality standard to network system.

PCS-106 Advanced Database Management System Lab

COURSE OUTCOMES (CO)

- CO1:** Understand the importance functional dependencies.
- CO2:** Importance of cursors and triggers in PL/SQL programming.

CO3: The students will be able to create, view, alter, delete, update and understand their main strengths and weaknesses while working on different databases.

CO4: Understand the importance and role of database administrator.

PCS-107 Advanced Data Structure and Algorithm Lab

COURSE OUTCOMES (CO)

CO1: Be able to design and analyse the time and space efficiency of the data structure.

CO2: Be capable to identify the appropriate data structure for given problem

CO3: Have practical knowledge on the applications of data structures.

CO4: It strengthen the ability to the students to identify and apply the suitable data structure for the given real world problem.

PCS-152 Soft Computing

COURSE OUTCOMES (CO)

CO1: Comprehend the fuzzy logic and the concept of fuzziness involved in various systems and fuzzy set theory.

CO2: Understand the concepts of fuzzy sets, knowledge representation using fuzzy rules, approximate reasoning, fuzzy inference systems, and fuzzy logic

CO3: To understand the fundamental theory and concepts of neural networks, Identify different neural network architectures, algorithms, applications and their limitations

CO4: Understand appropriate learning rules for each of the architectures and learn several neural network paradigms and its applications

CO5: Reveal different applications of these models to solve engineering and other problems

PCS-158 Artificial Intelligence& Machine learning

COURSE OUTCOMES (CO)

CO1: Develop an appreciation for what is involved in learning models from data Understand a wide variety of learning algorithms

CO2: Understand how to evaluate models generated from data

CO3: Apply the algorithms to a real problem, optimize the models learned and report on the expected accuracy that can be achieved by applying the models.

PCS-159 Cyber Security

COURSE OUTCOMES (CO)

CO1: Develop an appreciation for what is involved in learning models from data Understand a wide variety of learning algorithms

CO2: Understand how to evaluate models generated from data

CO3: Apply the algorithms to a real problem, optimize the models learned and report on the expected accuracy that can be achieved by applying the models.

PCS-154 Computer Vision and Image Processing

COURSE OUTCOMES (CO)

CO1: Better understanding of color image processing.

CO2: Acquiring knowledge for pattern and pattern classes.

CO3: Preparedness for skills used in various image compression and image enhancement.

CO4: Develop hands-on experience in using computers to process images.

PMG-151 Research Methodology

COURSE OUTCOMES (CO)

Upon the completion of this course, the students will be able to:

CO1: Create, simulate and analyze elementary probability models.

CO2: Apply fundamental concepts in exploratory data analysis.

CO3: Understand industrial strength by statistical analysis.

CO4: Predict the inference of the sample statistics on the population

PCS-155 Soft Computing Lab

COURSE OUTCOMES (CO)

CO1: Comprehend the fuzzy logic and the concept of fuzziness involved in various systems and fuzzy set theory.

CO2: Understand the concepts of fuzzy sets, knowledge representation using fuzzy rules, approximate reasoning, fuzzy inference systems, and fuzzy logic

CO3: To understand the fundamental theory and concepts of neural networks, Identify different neural network architectures, algorithms, applications and their limitations

CO4: Understand appropriate learning rules for each of the architectures and learn several neural network paradigms and its applications

CO5: Reveal different applications of these models to solve engineering and other problems

PCS-201 Big Data Analytics

COURSE OUTCOMES (CO)

CO1: Identify Big Data and its Business Implications.

CO2: List the components of Hadoop and Hadoop Eco-System

CO3: Access and Process Data on Distributed File System

CO4: Manage Job Execution in Hadoop Environment

CO5: Develop Big Data Solutions using Hadoop Eco System

CO6: Analyze Infosphere Big In sights Big Data Recommendations.

CO7: Apply Machine Learning Techniques using R

PCS-206 Natural Language Processing

COURSE OUTCOMES (CO)

CO1: Understand approaches to syntax and semantics in NLP.

CO2: Understand approaches to discourse, generation, dialogue and summarization within NLP.

CO3: Understand current methods for statistical approaches to machine translation.

CO4: Understand machine learning techniques used in NLP, including hidden Markov models and probabilistic context-free grammars, clustering and unsupervised methods, log-linear and discriminative models, and the EM algorithm as applied within NLP

PCS-207 Cloud Computing

COURSE OUTCOMES (CO)

CO1: Able to articulate the main concepts, key technologies, strengths, and limitations of cloud computing and the possible applications for state-of-the-art cloud computing

CO2: identify the architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, etc.

CO3: Explain the core issues of cloud computing such as security, privacy, and interoperability.

CO4: Choose the appropriate technologies, algorithms, and approaches for the related issues.

CO5: Identify problems, and explain, analyze, and evaluate various cloud computing solutions.

PCS-208 Software Testing and Quality Management

COURSE OUTCOMES (CO)

CO1; Describe fundamental concepts of software quality assurance.

CO2: Explore test planning and its management.

CO3: Understand fundamental concepts of software automation.

CO4: Apply Selenium automation tool for testing web based application.

CO5: Demonstrate the quality management, assurance, and quality standard to software system.

CO6: Demonstrate Software Quality Tools and analyze their effectiveness.

PCS-209 Software Verification Validation and Testing

COURSE OUTCOMES (CO)

CO1: Understand the importance of the stages in the software life cycle

CO2: Plan a software engineering process to account for quality issues and non-functional Issue.

CO3: the students will be able to apply main stream testing techniques, understand their main strengths and weaknesses, and determine when they are appropriate.

CO4: Acquired basic knowledge of concepts related to safety and reliability analyses, fault tolerance, and defensive programming.

PCS-208 Deep Learning

COURSE OUTCOMES (CO)

CO1: Identify the deep learning algorithms which are more appropriate for various types of learning tasks in various domains.

CO2: Implement deep learning algorithms and solve real-world problems.

PCS-209 Information Retrieval

COURSE OUTCOMES (CO)

CO1: Better equipped with the understanding of Query optimization and Dictionary data Structures.

CO2: Introduction to Dictionaries and tolerant retrieval.

CO3: Acquiring know how of Naive Bayes model and Web Crawling.

PCS- 210 Information Security

COURSE OUTCOMES (CO)

CO1: Student will gain knowledge about securing both clean and corrupted systems, protect personal data, and secure computer networks.

CO2: Understand key terms and concepts in cyber law, intellectual property and cybercrimes, trademarks and domain theft.

CO3: Able to examine secure software development practices.

CO4: The learner will be able to incorporate approaches for incident analysis and response.

CO5: The learner will gain an understanding of cryptography, how it has evolved, and some key encryption techniques used today.

PCS-212 Distributed Operating System

COURSE OUTCOMES (CO)

CO1: To know about Shared Memory Techniques.

CO2: Have sufficient knowledge about file access.

CO3: Have knowledge of Synchronization and Deadlock

PCS-213 Object Oriented Analysis and Design using UML

COURSE OUTCOMES (CO)

CO1: Describe the concepts, fundamentals, and terminology of object-oriented (OO)

CO2: Elucidate the modeling concepts and Object-Oriented Software Development (OOSD) process covering Requirements Gathering, Requirements Analysis, Architecture, Design, Implementation, Testing & Deployment

CO3: Create Use Diagrams, Use Case Scenarios, Activity Diagrams, and Forms

CO4: Use Interaction Diagrams to transform the analysis conducted into designs

PCS-215 Business Intelligence

COURSE OUTCOMES (CO)

CO1: Identify the major frameworks of computerized decision support: decision support systems (DSS), data analytics and business intelligence (BI).

CO2: Explain the foundations, definitions, and capabilities of DSS, data analytics and BI.

CO3: List the definitions, concepts, and architectures of data warehousing.

CO4: Demonstrate the impact of business reporting, information visualization, and dashboards.

PCS-214 Social Network Analysis

COURSE OUTCOMES (CO):

CO1: Better understanding of social network analysis and its different measures.

CO2: Work on the internal components of the social network

CO3: Model and visualize the social network

CO4: Predict the possible next outcome of the social network

CO5: Apply social network in real time applications

PCS-216 Embedded systems for IOT

COURSE OUTCOMES (CO)

After completion of course, students would be able to:

CO1: Understand the embedded system concepts and architecture of embedded systems.

CO2: Understand the different hardware/software co-design techniques for microcontroller-based embedded systems, apply techniques in IoT applications.

CO3: To be able to design web/cloud based IoT applications

SEET
B.Tech (CSE)

Programme Outcomes (POs)
Programme Specific Outcomes
(PSOs)
Course Outcomes (COs)

PROGRAM OUTCOMES (PO's)

After completion of the program the students will be able to:

- **PO1. Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO2. Problem analysis:** Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO3. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO4. Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
- **PO5. The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- **PO6. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- **PO7. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- **PO8. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PO9. Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- **PO10. Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments. Batch 2018-2022 4
- **PO11. Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

Program Specific Outcomes (PSO's):

On completion of the B. Tech in Computer Science & Engineering with specialization in Artificial Intelligence & Machine Learning (AI & ML) And Data Science the student will be able to:

PSO1: Apply the knowledge of science, mathematics, statistics, information technology and other engineering disciplines to identify and solve computer science and engineering problems across a broad range of application areas.

PSO2: To apply the knowledge gained in the field of networking, artificial intelligence & machine Learning, Data Science, computer architecture and designing software systems for the overall benefit of society.

PSO3: To regulate technical knowledge and skills gained in computer science and engineering into industrial practices with an understanding of realistic constraints.

PSO4: To comprehend and write effective technical project reports in multidisciplinary environment with regards to evolving technological advancements

UMA-101 Engineering Mathematics I

COURSE OUTCOMES (CO)

CO1: Able to solve the problems of differentiation of functions of one/two variables and know about the maximization and minimization of functions and also familiarize with the concept of analytic function, C-R equations and its uses.

CO2: Come to know the applications of double and triple integration in finding the area and volume and also Know about qualitative applications of Gauss, Stoke's and Green's theorem.

CO3: Will be able to apply knowledge in various engineering complex problems.

UPY-101 Engineering Physics

COURSE OUTCOMES (CO)

CO1: Will have basic understanding of the engineering physics concepts such as optics, industrial application of optical fiber, industrial and scientific applications of LASER, relativistic mechanics and quantum mechanics and its applications

CO2: Will be able to know the limits of classical physics & to apply the ideas in solving the problems in their parent streams

CO3: Will have knowledge to apply concepts in various engineering problems.

UHU-101 Communication and Professional Skills in English

COURSE OUTCOMES (CO)

CO1: Improvement in language competence and Acquisition of language inside and outside the classroom

CO2: Removal of barriers between languages; and between languages and subjects.

CO3: Better understanding of socio-cultural codes resulting in individual, aesthetic and moral growth

UEC-105 Principles of Electronics Engineering

COURSE OUTCOMES (CO)

CO1: Students will develop an understanding of the fundamental principles of mechanical engineering.

CO2: Will be able to apply this knowledge to solve engineering problems of thermodynamics, refrigeration, and strength of materials, internal combustion engine, fluid machines, and automobile engineering.

UME-105 Principles of Mechanical Engineering

COURSE OUTCOMES (CO)

CO1: Students will develop an understanding of the fundamental principles of mechanical engineering.

CO2: Will be able to apply this knowledge to solve engineering problems of thermodynamics, refrigeration, and strength of materials, internal combustion engine, fluid machines, and automobile engineering.

CO3: Will have basic idea to perform practicals

UPD-101 Personality Development Programme

COURSE OUTCOMES (CO)

At the completion of this Course, student will have the basic skills:

CO1: To study basics of semiconductor & devices and their applications in different areas.

CO2: To study different biasing techniques to operate transistor, FET, MOSFET and operational amplifier in different modes.

CO3: Analyze output in different operating modes of different semiconductor devices.

CO4: Compare design issues, advantages, disadvantages and limitations of basic electronics.

UCS-103 Fundamentals of Computers & C Programming

COURSE OUTCOMES (CO)

On completion of the course students will be able to:

CO1: Understanding the concept of input and output devices of Computers and how it works and recognize the basic terminology used in computer programming

CO2: Write, compile and debug programs in C language and use different data types for writing the programs.

CO3: Design programs connecting decision structures, loops and functions.

UCS-104 Programming in C

COURSE OUTCOMES (CO)

On completion of the course students will be able to:

CO1: Write, compile and debug programs in C language and use different data types for writing the programs.

CO2: Write, compile and debug programs in C language and use different data types for writing the programs.

CO3: Design programs connecting decision structures, loops and functions

UCS-101 Engineering Chemistry

COURSE OUTCOMES (CO)

CO1: Will be able to develop innovative methods to produce soft water for industrial use and potable water at cheaper cost.

CO2: Will have knowledge to substitute metals with conducting polymers and also produce cheaper biodegradable polymers to reduce environmental pollution

CO3: Able to apply their knowledge for protection of different metals from corrosions.

UEE-105 Principles of Electrical Engineering

COURSE OUTCOMES (CO)

CO1: Student will learn how to solve DC and AC circuits.

CO2: Different method of solving simultaneous equation will help the student to solve any engineering problems.

CO3: Learn about basic electrical machines

UEG-101 Engineering Graphics Drawing

COURSE OUTCOMES (CO)

CO1: Will be able to understand the conventions and the method of engineering drawing and will have knowledge to construct basic and intermediate geometry.

CO2: Able to apply their improved visualization skills in developing new products

CO3: Will have technical communication skills in the form of communicative drawings

UEN-101 Environmental Science

COURSE OUTCOMES (CO)

CO1: Understand fundamental physical and biological principles that govern natural processes.

CO2: Understand fundamental concepts from the social sciences and the humanities underlying environmental thought and governance.

CO3: Communicate integrated perspectives on complex environmental problems in the form of written and oral argument to both professional and lay audiences.

CO4: Design and conduct independent research that contributes to environmental thought and/or problem solving.

UMA-102 Engineering Mathematics II

COURSE OUTCOMES (CO)

CO1: Will be able to develop a mathematical model of linear differential equations. And also students learn about how to find the solution of designed model.

CO2: Know about Fourier series initial conditions and its applications to different engineering models

CO3: Further students know about nth order differential equations and their transformations and solutions through methods.

UCS-105 Introduction to PHP using IDE

COURSE OUTCOMES (CO)

CO1: Write PHP scripts to handle HTML forms.

- CO2:** What are the implications according to business purpose for databases and it affects.
- CO3:** Write regular expressions including modifiers, operators, and met characters.
- CO4:** Analyze and solve various database tasks using the PHP language.
- CO5:** Analyze and solve common Web application tasks by writing PHP programs.

UCS-102 Advanced C Programming

COURSE OUTCOMES (CO)

On completion of the course students will be able to

- CO1:** Concept of function and its types with hands on experience.
- CO2:** Arrays, pointers and Strings with practical examples.
- CO3:** File handling and basic file handling operations.

UCS-222 Relational Database Management System

COURSE OUTCOMES (CO)

On completion of the course students will be able to

- CO1:** Concept of databases and also comparison between old file system and RDBMS.
- CO2:** Practice SQL queries on database.
- CO3:** Understand the concurrency control and distributed data processing.

UEC-201 Digital Electronics

COURSE OUTCOMES (CO)

- CO1:** Analyze semiconductor digital circuits
- CO2:** Analyze, design and implement combinational logic circuits.
- CO3:** Analyze, design and implement sequential logic circuits.

UCS-200 Data Structure & Algorithms with C

COURSE OUTCOMES (CO)

On completion of the course students will be able to

- CO1:** Concept of different search and sorting algorithms.
- CO2:** Difference of different data structures like tree, graphs.
- CO3:** Understand the array and memory allocation schemes.

UCS-201 Computer Architecture & Organization

COURSE OUTCOMES (CO)

On completion of the course students will be able to

- CO1:** Basics of Flynn classification and classification of processors.
- CO2:** Difference between memories in detail.
- CO3:** Understand the goals and levels of parallelism.

UCS-230 Python Programming

COURSE OUTCOMES (CO)

CO1: Interpret and evaluate requirements for program projects

CO2: Develop detailed design specifications and test strategies

CO3: Identify and articulate physical requirements for systems implementation

UPD-201 Personality Development Programme

COURSE OUTCOMES (CO)

CO1: Enhances logical thinking towards various problems and sharpens the thinking capability.

CO2: Better understanding of English language and increased awareness towards the urgency of Inculcating/honing their soft skills.

UCS-235 Introduction to Artificial Intelligence

COURSE OUTCOMES (CO)

CO1: Better equipped with the understanding of Artificial Intelligence and Logic Programming.

CO2: Introduction to Propositional Logic and Heuristic Search Techniques

CO3: Acquiring knowledge of various algorithms and expert Systems.

UCS-231 Cognitive Science and Analytics

COURSE OUTCOMES (CO)

CO1: Describe the field of AI and its subfields machine learning, NLP and computer vision

CO2: Understand the relationship between AI and NLP

CO3: Identify some of the tools and services of Computer Vision

UCS-232 Introduction to Data Science

COURSE OUTCOMES (CO)

CO1: Describe the basic fundamentals of data science.

CO2: Describe the various roles of mathematics and statistics in data science.

CO3: Describe machine learning.

CO4: Describe the different types of project management and framework in data science.

UCS-233 Programming in Data Science

COURSE OUTCOMES (CO)

- CO1:** Ability to gain basic knowledge on data science
- CO2:** Convert the real time data into suitable form for analysis
- CO3:** Gain the insights from the data through statistical inferences
- CO4:** Develop suitable models using machine learning techniques and to analyze its performance
- CO5:** Identify the requirement and visualize the results
- CO6:** Analyze on the performance of the model and the quality of the results

UCS-205 Introduction to Virtualization Technology

COURSE OUTCOMES (CO)

- CO1:** Better understanding of how virtualization is used in various spheres of life.
- CO2:** To understand various types of virtualization.
- CO3:** Getting started with usage, need and requirement of virtualization.
- CO4:** To be capable of understanding cloud computing and its usage
- CO5:** Implementation of private cloud by VMWare.

UCS-209 Human Aspects of Information Technology

COURSE OUTCOMES (CO)

Course Outcomes: On completion of the course students will be able to

- CO1:** Analyse the final design needed by respective customer.
- CO2:** Design an interactive and user friendly design.
- CO3:** Human computer interaction needs in more focused manner.

UCS-210 Ecommerce and ERP

COURSE OUTCOMES (CO)

Course Outcomes:

- CO1:** Investigate how e-commerce has affected the way people buy goods and services
- CO2:** Investigate one e-commerce website, and
- CO3:** Understand legal and moral issues in the digital age
- CO4:** Understand an Enterprise and Resource Management Perspective
- CO5:** Understand Information System perspective and Key Managerial issues

UCS-250 Object Oriented Methods & Programming

COURSE OUTCOMES (CO)

On completion of the course students will be able to

- CO1:** Learn basics of OOP concept.
- CO2:** Understand different types of inheritance in detail.

CO3: Understand the concept of exception handling.

UCS-255 Analysis and Design of Algorithms

COURSE OUTCOMES (CO)

CO1: Design and Analyze the complexity of algorithms.

CO2: Be familiar with mathematical and scientific principles relevant to computer science.

CO3: Be familiar with fundamental data structure and techniques for designing algorithms.

CO4: Be familiar with advanced and modern topics in computer science.

UCS-281 Operating System

COURSE OUTCOMES (CO)

CO1: Better equipped with the understanding of various operation system concepts.

CO2: Knowledge of distributed system and its components.

CO3: Acquiring knowhow for various types of operating system and their working.

CO4: Some knowledge of the services provided by operating systems.

UCS-252 Software Engineering

COURSE OUTCOMES (CO)

CO1: Solve specific problems alone or in teams

CO2: Manage a project from beginning to end

CO3: Work independently as well as in teams

CO4: Define, formulate and analyse a problem

UCS-253 Computer Networks

COURSE OUTCOMES (CO)

CO1: Understand how computers communicate with each other and the methods employed to assure that the communication is reliable

CO2: Study the functions of OSI Layers.

CO3: familiarise with the Transmission Media, Flow Control and Error Detection & Correction.

CO4: Understand fundamental concepts in Routing, Addressing & working of Transport Protocols.

CO5: Gain familiarity with common networking & Application Protocols.

CO6: Understand Wireless LANs & Wireless Sensor Networks Operation

UPD-251 Personality Development Programme

COURSE OUTCOMES (CO)

CO1: Enhances logical thinking towards various problems and sharpens the thinking capability.

CO2: Better understanding of English language and increased awareness towards the urgency of Inculcating/honing their soft skills.

UCS-271 Machine Learning

COURSE OUTCOMES (CO)

CO1: Gain knowledge about basic concepts of Machine Learning

CO2: Identify machine learning techniques suitable for a given problem

CO3: Solve the problems using various machine learning techniques and apply Dimensionality reduction techniques.

CO4: Design application using machine learning techniques.

UCS-272 Introduction to Deep Learning

COURSE OUTCOMES (CO)

CO1: Identify the deep learning algorithms which are more appropriate for various types of learning tasks in Various domains.

CO2: Implement deep learning algorithms and solve real-world problems

UCS-273 Data Wrangling

COURSE OUTCOMES (CO)

CO1: Identify and execute the basic data format.

CO2: Perform the computations with Excel and pdf files

CO3: Understand the concepts of data cleanup

CO4: Explore and analyze the Image and video data

UCS-274 Data Visualization and Presentation

COURSE OUTCOMES (CO)

After successfully completing the course the student should be able to

CO1: Identify the different data types, visualization types to bring out the insight.

CO2: Relate the visualization towards the problem based on the dataset to analyze and bring out Valuable insight on large dataset.

CO3: Design visualization dashboard to support the decision making on large scale data.

CO4: Demonstrate the analysis of large dataset using various visualization techniques and tools.

CO5: Identify the different attributes and showcasing them in plots. Identify and create various Visualizations for geospatial and table data.

CO6: Ability to create and interpret plots using R/Python.

UCS-256 Business Strategy and Analytics

COURSE OUTCOMES (CO)

CO1: The course aims at providing fundamental knowledge and exposure to the strategies at corporate and Business level.

CO2: The students should be able to analysis problems and identify analytics problem and challenges in data Analytics.

UCS-251 Cloud Computing

COURSE OUTCOMES (CO)

- CO1:** Significance and requirement of Cloud Computing
- CO2:** Analyze use of Hypervisor and Its Types
- CO3:** Understand Anatomy and Delivery Model of Cloud
- CO4:** Cloud Workload Management

UCS-254 Modeling and Simulation

COURSE OUTCOMES (CO)

On completion of the course students will be able to

- CO1:** Create relevant model for problems from science and engineering.
- CO2:** Define the different modelling terms by analysing data
- CO3:** Able to understand the limitation of their model and nuances in computer modelling of system.

UMA-310 Discrete Mathematics

COURSE OUTCOMES (CO)

- CO1:** Student has better idea about how to analysis the given data.
- CO2:** Student has better idea about basic operations.
- CO3:** Student has better idea about relation and function.

UCS-301 Web Technologies

COURSE OUTCOMES (CO)

- CO1:** Develop interactive Web pages using HTML/XHTML.
- CO2:** Present a professional document using Cascaded Style Sheets.
- CO3:** Construct websites for user interactions using JavaScript and JQuery.
- CO4:** Develop Web applications using PHP.

UCS-305 Computer Graphics

COURSE OUTCOMES (CO)

- CO1:** The students should be able to understand the various computer graphics hardware and display Technologies.
- CO2:** The students should be able to understand the various computer graphics 2D and 3D viewing Technologies.
- CO3:** The students should be able to understand the various computer graphics 2D and 3D objects Transformation techniques

UCS-306 Advanced Programming

COURSE OUTCOMES (CO)

Course Outcomes:

- CO1:** Upon successful completion of this course, students will be able to:
- CO2:** Basics of C, C++ and Java
- CO3:** Introduction to classes, methodologies, methods and classes.
- CO4:** Basics of Packages, Interfaces and Exception Handling.

UPD-301 PDP

COURSE OUTCOMES (CO)

CO1: Enhances logical thinking towards various problems and sharpens the thinking capability.

CO2: Better understanding of English language and increased awareness towards the urgency of Inculcating/honing their soft skills.

UCS-330 Artificial Intelligence and Expert Systems

COURSE OUTCOMES (CO)

CO1: Better equipped with the understanding of Artificial Intelligence and Logic Programming.

CO2: Introduction to Propositional Logic and Heuristic Search Techniques

CO3: Acquiring knowledge of various algorithms and expert Systems.

UCS-331 Business Intelligence

COURSE OUTCOMES (CO)

CO1: Identify the major frameworks of computerized decision support: decision support systems (DSS), data Analytics and business intelligence (BI).

CO2: Explain the foundations, definitions, and capabilities of DSS, data analytics and BI.

CO3: List the definitions, concepts, and architectures of data warehousing.

CO4: Demonstrate the impact of business reporting, information visualization, and dashboards.

UCS-332 Data Mining

COURSE OUTCOMES (CO)

CO1: Ability to understand the types of the data to be mined and present a general classification of tasks and primitives to integrate a data mining system.

CO1: Apply preprocessing methods for any given raw data.

CO2: Extract interesting patterns from large amounts of data.

CO3: Discover the role played by data mining in various fields.

CO4: Choose and employ suitable data mining algorithms to build analytical applications

CO5: Evaluate the accuracy of supervised and unsupervised models and algorithms

UCS-333 Information Retrieval

COURSE OUTCOMES (CO)

CO1: Better equipped with the understanding of Query optimization and Dictionary data Structures.

CO2: Introduction to Dictionaries and tolerant retrieval.

CO3: Acquiring know how of Naive Bayes model and Web Crawling.

UCS-304 Linux

COURSE OUTCOMES (CO)

CO1: Classify Linux on System Z, installation process and commands.

- CO2:** Analyse LVM and add-on products.
- CO3:** Understand the Kernel and its configuration of NFS and FTP.
- CO4:** Understand X Window system and LDAP.

UCS-303 Operational Research & Optimization

COURSE OUTCOMES (CO)

- CO1:** The methodology of Operations Research.
- CO2:** Linear programming: solving methods, duality, and sensitivity analysis.
- CO3:** Integer Programming, Network flows.
- CO4:** Multi-criteria decision techniques.
- CO5:** Decision making under uncertainty and risk.

UCS-322 Information Security Management

COURSE OUTCOMES (CO)

- CO1:** Contribute to managing information security
- CO2:** Co-ordinate responses to information security incidents
- CO3:** Install and configure information security devices
- CO4:** Contribute to information security audits

UCS-334 Big Data analytics

COURSE OUTCOMES (CO)

- CO1:** Explain the core concepts of the Virtualization on Mainframes: how and why this paradigm shift came about, the characteristics, advantages and challenges brought about by the various models and services in Virtualization on Mainframes.
- CO2:** Apply the fundamental concepts in datacentres to understand the trade-offs in power, efficiency and cost.
- CO3:** Discuss system virtualization and outline its role in enabling the cloud computing system model.
- CO4:** Analyze various cloud programming models and apply them to solve problems on the cloud.

UCS-338 Pattern Recognition

COURSE OUTCOMES (CO)

By the end of the course, you should able to:

- CO1:** understand pattern recognition
- CO2:** gain better understanding on machine learning
- CO3:** gain knowledge about statistical learning.

UCS-336 Data Handling and Visualization

COURSE OUTCOMES (CO)

- CO1:** Understand basics of Data Visualization
- CO2:** Implement visualization of distributions
- CO3:** Write programs on visualization of time series, proportions & associations

CO4: Apply visualization on Trends and uncertainty

UCS-337 Optimization Techniques

COURSE OUTCOMES (CO)

On completion of the course students will be able to

CO1: Explain the theoretical workings of the graphical, simplex and analytical methods for making effective decision on variables so as to optimize the objective function.

CO2: Identify appropriate optimization method to solve complex problems involved in various industries.

CO3: Demonstrate the optimized material distribution schedule using transportation model to minimize total distribution cost.

UCS-311 System software

COURSE OUTCOMES (CO)

On completion of the course students will be able to

CO1: Learn different system software tools.

CO2: Understanding importance of macros.

CO3: Understand the function of linker and loader.

UCS-312 Principles of Programming Language

COURSE OUTCOMES (CO)

On completion of the course students will be able to

CO1: Get the highlight's of programming history.

CO2: Basics of programming paradigms with different approaches.

CO3: Understand data control and sequence control methods.

UCS-335 Parallel Computing

COURSE OUTCOMES (CO)

CO1: Better understanding of parallelism and the interconnection networks.

CO2: Acquiring knowledge for parallel programming

CO3: Preparedness for skills used in various methodology of system interconnects and the enabling Technologies.

UCS-314 Advance Databases

COURSE OUTCOMES (CO)

CO1: Better understanding of query optimization.

CO2: Acquiring knowledge for reliability and protection of database.

CO3: Preparedness for skills used in various methodology of distributed database design.

UCS-308 Software Project Management

COURSE OUTCOMES (CO)

CO1: After learning this unit, student will be able to describe the meaning Assessment and different Evaluations

CO2: After learning this unit, student will be able to state the purposes, principles and characteristics of Quality assessment

CO3: After learning this unit, student will be able to classify the assessment based on purpose, scope, Attribute measured, nature of information gathered, nature of interpretation and context

UCS-315 Information Storage and Management

COURSE OUTCOMES (CO)

CO1: Better understanding of, how proper information management programs and systems can provide Security and accountability.

Explain the concepts and historical developments of information retrieval;

CO2: Explain the types of information storage and retrieval systems

Discuss the structure of an information storage and retrieval system

Demonstrate ability to develop and implement an information storage and retrieval system

CO3: Evaluate an information storage and retrieval system.

UCS-350 Theory of Automata & Computation

COURSE OUTCOMES (CO)

CO1: Better understanding of finite automata and regular expressions.

CO2: Acquiring knowledge for analysis of algorithms.

CO3: Understand the equivalence between Non-deterministic Finite State

CO4: Automata and Deterministic Finite State Automata.

UCS-351 INTRODUCTION TO INTERNET OF THINGS (IOT)

COURSE OUTCOMES (CO)

CO1: Understand the concept of IOT

CO2: Study IOT architecture and applications in various fields.

CO3: Study the security and privacy issues in IOT.

CO4: Understand various applications of sensor in Industrial, healthcare, commercial, and building Automation.

UCS-356 Mobile Application Development

COURSE OUTCOMES (CO)

CO1: By the end of the course, student will be able to write simple GUI applications

CO2: Able to use built-in widgets and components,

CO3: Ability to work with the database to store data locally, and much more.

CO4: Illustrate the android Wi-Fi features and advance android development

UCS-352 Blockchain

COURSE OUTCOMES (CO)

CO1: After successful completion of this course, students will be familiar with Blockchain

CO2: Gain knowledge about crypto currency concepts.

UPD-351 PDP

COURSE OUTCOMES (CO)

CO1: Enhances logical thinking towards various problems and sharpens the thinking capability.

CO2: Better understanding of English language and increased awareness towards the urgency of Inculcating/honing better speaking and listening skills.

UCS-371 Neural Networks

COURSE OUTCOMES (CO)

On completion of this course, the students will be able to

CO1: superior for cognitive tasks and processing of sensorial data such as vision, image- and speech recognition, control, robotics, expert systems

CO2: design single and multi-layer feed-forward neural networks

CO3: understand supervised and unsupervised learning concepts & understand unsupervised learning using Kohonen networks

CO4: Understand training of recurrent Hopfield networks and associative memory concepts.

UCS-372 Natural Language Processing

COURSE OUTCOMES (CO)

After the course, student will be able to:

CO1: appreciate the fundamental concepts of Natural Language Processing.

CO2: design algorithms for NLP tasks.

CO3: develop useful systems for language processing and related tasks involving text processing.

UCS-373 Cloud Computing

COURSE OUTCOMES (CO)

CO1: Significance and requirement of Cloud Computing

CO2: Analyze use of Hypervisor and Its Types

CO3: Understand Anatomy and Delivery Model of Cloud

CO4: Cloud Workload Management

UCS-353 Cyber Security

COURSE OUTCOMES (CO)

CO1: Basics of Authentication Applications and System Level Security

CO2: Knowledge of security attacks and how to prevent from getting attack from outside.

UCS-355 Mobile Communication Network Design

COURSE OUTCOMES (CO)

CO1: To make students familiar with various generations of mobile communications

CO2: To understand the concept of cellular communication

CO3: To understand the basics of wireless communication. Knowledge of GSM mobile communication Standard, its architecture, logical channels, advantages and limitations.

UCS-357 Security in Cloud

COURSE OUTCOMES (CO)

On completion of this module, students will be able to:

CO1: Understand Encryption/decryption in detail.

CO2: Basics of Authentication Applications and System Level Security

CO3: Detailed study of Data Encryption Standard

CO4: Study of security issues on cloud and solutions

UCS-359 Infrastructure Solution on Cloud

COURSE OUTCOMES (CO)

CO1: The students should be able to understand the various solutions for cloud computing.

CO2: The students should be familiar with Azure networking.

CO3: The students should be able to understand the Azure database.

UCS-375 Advance Artificial Intelligence

COURSE OUTCOMES (CO)

CO1: Better equipped with the understanding of Artificial Intelligence

CO2: Having virtual collaborating ability

CO3: Understand the fundamental principles of logic-based Knowledge Representation

UCS-376 Soft computing

COURSE OUTCOMES (CO)

CO1: Better understanding of fuzzy logic.

CO2: Acquiring knowledge for de-fuzzification techniques.

CO3: Preparedness for skills used in genetics algorithms

UCS-377 Text Mining

COURSE OUTCOMES (CO)

CO1: explain how text mining supports the development of semantic search systems

CO2: To explain the distributional hypothesis, and to compare with each other (1) count-based and (2) compositional distributional semantics models

CO3: To apply various evaluation measures (e.g., Kappa, recall, precision and F-score)

CO4: To investigate methods for social media content analysis

UCS-378 Distributed Database management system

COURSE OUTCOMES (CO)

On completion of the course students will be able to

CO1: Concept of databases and also comparison between old file system and RDBMS.

CO2: Practice SQL queries on database.

CO3: Understand the concurrency control and distributed data processing.

UCS-360 Agile Software Development

COURSE OUTCOMES (CO)

CO1: The students will be able to realize the importance of interacting with business stakeholders in determining the requirements for a software system

CO2: The students will be able to perform iterative software development processes: how to plan them, how to Execute them.

CO3: The students will be able to point out the impact of social aspects on software development success.

UCS-361 Advanced Statistical Analysis

COURSE OUTCOMES (CO)

CO1: Demonstrate their understanding of descriptive statistics by practical application of quantitative Reasoning and data visualization.

CO2: Demonstrate their knowledge of the basics of inferential statistics by making valid generalizations From sample data In terms of skills

CO3: Use R and Excel to conduct statistical analysis.

CO4: Recognize pitfalls in using statistical methodology.

UCS-363 UNIX Linux Administration

COURSE OUTCOMES (CO)

CO1: Better equipped with the understanding of UNIX and LINUX operating system concepts.

CO2: Introduction to shell and shell programming

CO3: Acquiring know how for various commands in UNIX and LINUX

UCS-366 Cloud Deployment Models

COURSE OUTCOMES (CO)

CO1: Explain the core concepts of the cloud computing paradigm: how and why this paradigm shift came about, the characteristics, advantages and challenges brought about by the various models and services in cloud Computing.

CO2: Apply the fundamental concepts in data centers to understand the trade-offs in power, efficiency and cost.

CO3: Discuss system virtualization and outline its role in enabling the cloud computing system model.

CO4: Analyze various cloud programming models and apply them to solve problems on the cloud.

UCS-431 Digital Image Processing

COURSE OUTCOMES (CO)

CO1: Review the fundamental concepts of a digital image processing system.

CO2: Analyze images in the frequency domain using various transforms and Interpret image Segmentation and representation techniques.

CO3: Evaluate the techniques for image enhancement and image restoration.

CO4: Categorize various compression techniques. **CO5:** Interpret Image compression standards.

UCS-432 Software Testing

COURSE OUTCOMES (CO)

By the end of the course, you should:

CO1: Have an ability to apply software testing knowledge and engineering methods.

CO2: Have an ability to design and conduct a software test process for a software testing project.

CO3: Have an ability to identify the needs of software test automation, and define and develop a test tool to Support test automation.

CO4: Have an ability understand and identify various software testing problems, and solve these problems by Designing and selecting software test models, criteria, strategies, and methods.

CO5: Have an ability to use various communication methods and skills to communicate with their teammates to conduct their practice-oriented software testing projects.

UPD-401 Personality Development Programme

COURSE OUTCOMES (CO)

CO1: Enhances logical thinking towards various problems and sharpens the thinking capability.

CO2: Better understanding of English language and increased awareness towards the urgency of Inculcating/honing their soft skills.

UCS-433 Human computer interaction

COURSE OUTCOMES (CO)

CO1: Having design thinking capability

CO2: Having virtual collaborating ability

CO3: Having an ability to use techniques, skills and modern engineering tools necessary forengineering practice

UCS-434 Virtual Reality and Augmented Reality

COURSE OUTCOMES (CO)

CO1: To understand fundamental computer vision, computer graphics and human-computer interaction techniques related to VR/AR.

CO2: To understand geometric modeling and Virtual environment.

CO3: To use various types of Hardware and software in virtual Reality systems.

UCS-435 Foundations of data science

COURSE OUTCOMES (CO)

CO1: Able to understand about the Introduction to Data Science, NoSQL

CO2: Able to understand about the Modeling methods of Unsupervised Learning (Clustering)

CO3: Able to understand about the Introduction to R Language, Probability Distribution

CO4: Able to understand about the Documentation and deployment, Introduction to graphical analysis

UCS-436 Parallel and distributed computing

COURSE OUTCOMES (CO)

CO1: Design and implement distributed computing systems.

CO2: Asses models for distributed systems.

CO3: Design and implement distributed algorithms.

CO4: Experiment with mechanisms such as client/server and P2P algorithms, remote procedure calls (RPC/RMI), and consistency.

CO5: Analyze the requirements for programming parallel systems and critically evaluate the strengths and weaknesses of parallel programming models.

CO6: Differentiate between the major classes of parallel processing systems.

CO7: Analyze the efficiency of a parallel processing system and evaluate the types of application for which parallel programming is useful.

UCS-403 High performance computing

COURSE OUTCOMES (CO)

CO1: Having a clear understanding of the subject related concepts and of contemporary issues

CO2: Having interest in lifelong learning

CO3: Having an ability to use techniques, skills and modern engineering tools necessary for engineering Practice

UCS-405 Multimedia

COURSE OUTCOMES (CO)

CO1: The students should be able to understand the various computer graphics hardware and display Technologies.

CO2: The students should be able to understand the various computer graphics 2D and 3D viewing Technologies.

CO3: The students should be able to understand the various computer graphics 2D and 3D objects Transformation Techniques.

UCS-406 Social and Web Analytics

COURSE OUTCOMES (CO)

CO1: Student will be able to understand Software Project Models and Software Management Concepts.

CO2: Student will be able to understand the various methods of Cost Estimation.

CO3: Student will be able to explore Software Quality Management.

CO4: Student will be able to use Software Metrics and to understand Project Evaluation.

UCS-437 Cryptography and Network Security

COURSE OUTCOMES (CO)

On completion of this course, the students will be able to

CO1. Learn about various security services, possible attacks and traditional ciphers.

CO2. Apply knowledge of symmetric cryptography like data encryption standards and advanced encryption.

CO3. Compute asymmetric cryptographic algorithms and key management algorithms.

CO4. Understand implementation of various security controls in computer networks.

UCS-438 Predictive and Advanced Analytics

COURSE OUTCOMES (CO)

CO1: Understand the process of formulating business objectives, data selection/collection, preparation and process to successfully design, build, evaluate and implement predictive models for a various business application.

CO2: Compare the underlying predictive modeling techniques.

CO3: Select appropriate predictive modeling approaches to identify cases to progress with.

UCS-439 Data Visualization

COURSE OUTCOMES (CO)

CO1: Better equipped with the understanding of data, information, text visualization.

CO2: better understanding of data representation, animation and cartography.

UCS-440 Large scale data processing

COURSE OUTCOMES (CO)

CO1: Define the characteristics of big data and explain the data science life cycle.

CO2: Differentiate between conventional and contemporary distributed framework and Characterize storage and processing of large data.

CO3: Implement and demonstrate the use of the Hadoop eco-system.

CO4: Compare scalable frameworks for large data.

CO5: Decompose a problem into map and reduce operations for implementation.

CO6: Design programs to analyze large scale text data.

CO7: Identify problems suitable for use of graph mining in large data processing.

UCS-416 Wireless and AD-Hoc Network

COURSE OUTCOMES (CO)

CO1: Describe and analyze the issues in ad-hoc networks

CO2: Describe current technology trends for the implementation and deployment of wireless ad-hoc Networks

CO3: Analyze the challenges in designing MAC, routing and transport protocols for wireless ad-hoc Networks.

UCS-417 XML Programming

COURSE OUTCOMES (CO)

CO1: The students will be able to create XML documents, transforming XML documents, and Validating XML documents.

CO2: The students will be able to transform XML documents into documents of other types using XSLT.

CO3: The students will be able to write valid XML documents based on a DTD.

CO4: Students also learn, (at an introductory level), about JavaScript Object Notation (JSON), which is an emerging alternative to XML

UCS-413 Business Process Management

COURSE OUTCOMES (CO)

CO1: It teaches us many interesting and instructive factors about man's behaviour when he is engaged in economic activity.

CO2: Economics brains the minds, Economic reasoning trains our mind.

CO3: It helps in understanding the economic system which is in functioning today.

CO4: It is very useful in any professions. It is helpful in banking, marketing, agriculture, and in industry.

In other words who knows economics, he can achieve success in his field, economics he can achieve success in his field.

UMG-476 Human Values and Professional Ethics

COURSE OUTCOMES (CO)

CO1: To make students familiar with various value education principles.

CO2: To understand the concept of human behaviour.

UEC-462 Biomedical Instrumentation

COURSE OUTCOMES (CO)

CO1: Understand the physiology of biomedical system

CO2: Measure biomedical and physiological information

CO3: Discuss the application of Electronics in diagnostics and therapeutic area.

UEC-463 Television Engineering

COURSE OUTCOMES (CO)

At the completion of this Course, student will have the basic skills:

CO1: Understand the fundamental concepts of television transmitter and receiver systems, the transmission of video signals and importance of television standards to effectively work with broadcasting applications, trouble shooting of television systems.

CO2: Understand different colour television systems used worldwide and its compatibility.

CO3: Understand principles of digital video and component video signal.

CO4: Understand advanced TV technology, MAC signals and DTH technology.

CO5: Describe and differentiate working principles of latest digital TV, HDTV, and WDTV.

UEE-403 Energy Management

COURSE OUTCOMES (CO)

CO1: An ability to understand different types of energy conservation.

CO2: To get familiar with energy auditing.

CO3: To get an idea about energy efficient technology.

UEE-452 Non-Conventional Electrical Power Generation

COURSE OUTCOMES (CO)

CO1: Student will understand about wind and solar energy.

CO2: Student will understand different types of mini hydro power plants.

UCE-312 Advance Construction Techniques and Project Management

COURSE OUTCOMES (CO)

At the end of this course the student will be conversant with

CO1: Properties and application of admixture

CO2: Mix Design

CO3: Properties of concrete

CO4: Awareness of modern technology

CO5: Knowledge of special type of concrete

UCE-365 Advanced Environmental Engineering

COURSE OUTCOMES (CO)

At the end of this course the student will be conversant with

CO1: The introduction of Waste Water and their treatment

CO2: Advanced Treatments for Air and Water Pollution

UME-410 Basic Manufacturing Technology

COURSE OUTCOMES (CO)

CO1: Metal Casting Processes, Sand mold making procedure, Patterns and Cores.

CO2: Special Casting Processes, Metal forming Processes, hot working and cold working.

CO3: Extrusion and other processes, Sheet metal operations.

UME-411 Measurement Techniques

COURSE OUTCOMES (CO)

After the end of this course:

CO1: To understand Basic Standards of Measurement

CO2: To understand measuring principles involved, like Lever method, Vernier method

CO3: To understand Interchange ability and means of Linear & Angular Measurement

UPD-451 Personality Development Programme

COURSE OUTCOMES (CO)

CO1: Enhances mathematical ability and logical thinking towards various problems and sharpens the thinking capability.

CO2: Better understanding of English language and increased awareness towards the urgency of inculcating/honing their soft skills.

UCS-461 Speech Recognition and understanding

COURSE OUTCOMES (CO)

CO1: Students who have successfully completed this course will have full understanding of the Natural language processing research arena.

CO2: They will be able to understand and work on various NLP tasks such as, POS tagging, syntactic parsing.

CO3: It will also work on NLP applications such as, Information Retrieval systems and Machine translation system.

UCS-462 Logic and Knowledge Representation

COURSE OUTCOMES (CO)

CO1: Develop an understanding of theoretical and practical issues in symbolic knowledge representation and reasoning, in general.

CO2: Develop an understanding of the capabilities of specific knowledge representation formalisms for specific tasks.

CO3: Learn techniques specific to specific knowledge representation problems and formalisms

UCS-463 Predictive Modeling with R

COURSE OUTCOMES (CO)

CO1: Better understanding of prediction and visualization.

CO2: Acquiring knowledge about different models using R.

UCS-464 Advanced Data Visualization Techniques

COURSE OUTCOMES (CO)

CO1: Identify the different data types, visualization types to bring out the insight.

CO2: Relate the visualization towards the problem based on the dataset to analyze and bring out valuable insight on large dataset.

CO3: Design visualization dashboard to support the decision making on large scale data.

UCS-465 Ethical Hacking

COURSE OUTCOMES (CO)

Upon completion of the course students should be able to:

- CO1:** Plan a vulnerability assessment and penetration test for a network.
- CO2:** Execute a penetration test using standard hacking tools in an ethical manner.
- CO3:** Report on the strengths and vulnerabilities of the tested network.
- CO4:** Identify legal and ethical issues related to vulnerability and penetration testing.

UCS-466 Mobile Analytics

COURSE OUTCOMES (CO)

- CO1:** Student will be able to use different tool for capturing data from various resources
- CO2:** Perform Mobile Application analysis using different tool and techniques.
- CO3:** Analysis report generation and presentations.

UCS-467 DataWarehouse and Data Mining

COURSE OUTCOMES (CO)

- CO1:** Technical know how of the Data Mining principles and techniques for real time applications.

UCS-468 Domain Specific Predictive Analytics

COURSE OUTCOMES (CO)

- CO1:** Recognize challenges in dealing with data sets in domains such as finance, risk and healthcare.
- CO2:** Identify real-world applications of machine learning in domains such as finance, risk and healthcare.
- CO3:** Make choices for a model for new machine learning tasks based on reasoned argument

UCS-469 Social and Information Network Analysis

COURSE OUTCOMES (CO)

- CO1:** Develop semantic web related applications.
- CO2:** Represent knowledge using ontology.
- CO3:** Visualize social networks.

UCS-470 ANN and Deep Learning

COURSE OUTCOMES (CO)

- CO1:** Understand basic Neural Network architectures
- CO2:** Apply fundamental principles, theory and approaches for learning with deep neural networks

UCS-471 Data Science Applications of NLP

COURSE OUTCOMES (CO)

CO1: Understand the mechanics of language - the sound system, word structure, sentence structure, and meaning

CO2: Understand how to formulate NLP tasks as learning and inference tasks, and address the computational challenges involved

CO3: Apply text processing at syntactic, semantic, and pragmatic levels

UCS-472 Advance Databases

COURSE OUTCOMES (CO)

CO1: Better understanding of query optimization.

CO2: Acquiring knowledge for reliability and protection of database.

CO3: Preparedness for skills used in various methodology of distributed database design.

UCS-473 Introduction to Intelligent Process Automation

COURSE OUTCOMES (CO)

CO1: gain knowledge about UI path.

CO2: Understand robotic process automation.

CO3: Understand the Excel and PDF automation.

UCS-474 IT Applications and Open Standards

COURSE OUTCOMES (CO)

CO1: Demonstrate a clear understanding of the concepts related to open source and open standards.

CO2: Analyse the evolution of open source software by peeking into the history.

CO3: Analyse the working of various open source communities and their development process.

CO4: Gain the knowledge of accelerating drivers for adoption of open source.

UCS-475 Wireless Sensor Networks

COURSE OUTCOMES (CO)

CO1: Understand the concepts, network architectures and applications of Adhoc and Wireless Sensor Networks

CO2: Analyze the protocol design issues of Adhoc and Sensor networks

CO3: Implement routing protocols for Adhoc and Wireless Sensor Networks with respect to some protocol design issues

CO4: Evaluate the QoS related performance measurements of Adhoc and Sensor networks and understanding of different kinds and types of sensor for deployment

UMG-450 Entrepreneurship Development & Enterprise Management

COURSE OUTCOMES (CO)

CO1: At the end of this course the student will be conversant with

CO2: The introduction of Entrepreneurship Development & Enterprise management.

CO3: understand the concepts and fundamentals of Entrepreneurship

UEC-464 Satellite Communication

COURSE OUTCOMES (CO)

At the completion of this Course, student will have the basic skills:

CO1: Understand principle, working and operation of various sub systems of satellite as well as the earth Station.

CO2: Apply various communication techniques for satellite applications

CO3: Analyze and design satellite communication link

CO4: Learn advanced techniques and regulatory aspects of satellite communication

CO5: Understand role of satellite in various application.

UEC-465 Digital Signal Processing & Applications

COURSE OUTCOMES (CO)

CO1: Upon successful completion of this course, students will be able to:

CO2: Basic of Digital signal processing.

CO3: Understanding of various transforms and how they work.

UEE-457 Transformer Engineering

COURSE OUTCOMES (CO)

CO1: Student will understand different types cooling mechanism, ventilation.

CO2: Student will understand about transformer design, machine design.

UEE-411 Direct Energy Conversion

COURSE OUTCOMES (CO)

CO1: Student will understand about fuel cells.

CO2: Student will understand about MHD generation.

UCE-311 Advance Concrete Technology

COURSE OUTCOMES (CO)

At the end of this course the student will be conversant with

CO1: Properties and application of admixture

CO2: Mix Design

CO3: Properties of concrete

CO4: Awareness of modern technology

CO5: Knowledge of special type of concrete

UCE-409 Geographic Information Systems for Resources Management

COURSE OUTCOMES (CO)

CO1: Understanding concepts of geographic information system

CO2: Learning about ArcGIS software

CO3: Learning special data analysis

UME-464 Renewable Energy Sources

COURSE OUTCOMES (CO)

CO1: To understand the Elements of hydropower scheme and wind energy production.

CO2: To learn about the types of Hydraulic turbines and Wind turbines.

CO3: To learn the calculation of Wind turbine loads and wind energy conversion systems.

UME-466 Automation & Robotics

COURSE OUTCOMES (CO)

CO1: To learn about Automation, Fluid Control Components.

CO2: To have a basic introduction to Robotics: Basic Concepts, Transfer Device, Feeders & Material Handling, Automated Inspection & Testing, Control Systems, Transfer Device, Feeders & Material Handling , Automated Inspection & Testing , Industrial Applications.

CO3: To understand the concept of Sources and Sensors, Manipulators, Actuators and Grippers

UMG-475 Total Quality Management

COURSE OUTCOMES (CO)

CO1: Upon successful completion of this course, students will be able to:

CO2: Understanding the basics of total quality assurance.

CO3: Understanding of various terms and its future scope.

UEC-466 Optical Fiber Communication

COURSE OUTCOMES (CO)

CO1: Upon successful completion of this course, students will be able to:

CO2: Understanding the basics of optical Communication.

CO3: Understanding its various terms and its future scope.

UEC-467 Principles of Digital Communication

COURSE OUTCOMES (CO)

CO1: Upon successful completion of this course, students will be able to:

CO2: Basic of communications

CO3: Understanding of how to transmit the data and modulations

UEC-476 Disaster Management

COURSE OUTCOMES (CO)

Students will be able to understand,

CO1: Behavior of building during earthquake

CO2: Able to find the critical element of building

CO3: Knowledge of repair of critical element

UEC-412 Building Project and Estimates

COURSE OUTCOMES (CO)

On successful completion of this course students will:

CO1: Estimate various types of structures

CO2: Able to make bill of various works

UEE-456 Hydro Power Station Design

COURSE OUTCOMES (CO)

CO1: On successful completion of this course students will:

CO2: Estimate various types of turbines

CO3: Able to make bill of various works

UEE-408 Illumination Engineering

COURSE OUTCOMES (CO)

CO1: Student will understand about color mixing.

CO2: Student will understand different types of lighting system

UME – 459 Engineering In Industry & Entrepreneurship

COURSE OUTCOMES (CO)

On successful completion of this course students will:

CO1: Understanding the basic knowledge of entrepreneurship development.

UME – 458 Emerging Automotive Technologies

COURSE OUTCOMES (CO)

On successful completion of this course students will:

CO1: Understanding the basic knowledge of Emerging Automotive Technologies

Electronics and Communication
Engineering

Programme Outcomes (POs), Programme Specific
Outcomes (PSOs) & Course Outcomes (COs)
B.Tech (2022-2023)

Electronics and Communication Engineering

Programme Outcomes (POs):

On the completion of the B.Tech (ECE) degree the Electronics and Communication graduates will be able to

PO1: Apply the fundamental concept of Electronics and Communication Engineering to design a variety of components and systems for applications including signal processing, Communication, Networking, Embedded systems, VLSI and control system.

PO2: Select and apply cutting-edge engineering hardware and software tools to solve complex Electronics and Communication Engineering problems.

PO3: Ability to analyze Electronics and Communication engineering problems, interpret data and arrive at meaningful conclusions involving mathematical inferences.

PO4: Ability to understand and solve complex Electronics and Communication engineering problems by conducting experimental investigations

PO5: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO6: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO7: Formulate and evaluate the applications in the field of Intelligent Embedded and Semiconductor technologies.

Course Outcomes (COs):

B.Tech- Electronics & Communication Engineering:

Principle of Electronics Engg.

CO1: To study basics of semiconductor & devices and their applications in different areas.

CO2: To study different biasing techniques to operate transistor, FET, MOSFET and operational amplifier in different modes.

CO3: Analyze output in different operating modes of different semiconductor devices.

CO4: Compare design issues, advantages, disadvantages and limitations of basic electronics.

Electronic Devices and Circuits

- CO1:** Acquire a basic knowledge in solid state electronics including diodes, BJT.
- CO2:** Develop the ability to analyze and design analog electronic circuits using discrete components.
- CO3:** Observe the amplitude and frequency responses of common amplification circuits
Assessment.
- CO4:** Understand the current voltage characteristics of semiconductor devices.
- CO5:** To evaluate frequency response to understand behavior of Electronics circuits.

Digital Electronics

- CO1:** Analyze semiconductor digital circuits
- CO2:** Analyze, design and implement combinational logic circuits.
- CO3:** Analyze, design and implement sequential logic circuits

Circuit Theory

- CO1:** Apply concepts of electric network topology, nodes, branches, loops to solve circuit problems including the use of computer simulation.
- CO2:** Understand the basic concepts of graph and analyze the basic electrical circuits using graph theory.
- CO3:** Understand various functions of network and also the stability of network.
- CO4:** Learn the various parameters and their interrelation ship, able to solve numerical with series, cascade, and parallel connection using two port parameters.

Communication Theory

- CO1:** Understand about various types of signals and systems, classify them, analyze them, and perform various operations on them.
- CO2:** Observe the effect of various properties and operations of signals and systems
- CO3:** Observe basic notions of information and channel capacity.

Principles of Engineering Economics and Management

CO1: It teaches us many interesting and instructive factors about man's behavior when he is engaged in economic activity.

Numerical Analysis & Computer Programming

CO1: Be able to apply various techniques in numerical analysis

CO2: Understand and do calculations about truncation errors and round off errors that can occur in numerical methods.

CO3: Understand and be able to use the basics of matrix analysis.

CO4: Be able to use Matlab functions for solving numerical analysis problems.

Electronic Logic Circuit Design

CO1: Build, test and troubleshoot digital circuits with logic devices and electronics test Equipment

CO2: Implement and optimize logic functions using Boolean Algebra and Karnaugh Maps.

CO3: Design and implement logic circuits to solve practical problems

(Sequential/Combinational and Synchronous/Asynchronous)

Electromagnetic Field Theory

CO1: Define and recognize different co-ordinate systems to describe the spatial variations of the physical quantities dealt in electromagnetic field theory as they are functions of space and time. Apply different techniques of vector calculus to understand different concepts of electromagnetic field theory.

CO2: Explain fundamental laws governing electromagnetic fields and evaluate the physical quantities of electromagnetic fields (Field intensity, Flux density etc.) in different media using the fundamental laws.

CO3: Determine the electromagnetic force exerted on charged particles, current elements, working principle of various electric and electromagnetic energy conversion devices are based on this force.

CO4: Design electromagnetic energy storage devices like capacitor, inductor which are frequently used in electrical systems and choose suitable materials required to assemble such electromagnetic energy storage devices.

CO5 : Deduce and justify the concepts of electromagnetic waves, means of transporting energy or information, in the form of radio waves, TV signals, radar beams and light rays.

CO6: Generalize the concepts of guided structures like transmission line, means of transporting energy or information, commonly used in power distribution and communication.

Communication Systems – I

CO1: Understand different blocks in communication system and how noise affects communication using different parameters

CO2: Distinguish between different amplitude modulation schemes with their advantages, disadvantages and applications

CO3: Analyze generation and detection of FM signal and comparison between amplitude and angle modulation schemes.

CO4: Identify different radio receiver circuits and role of AGC

CO5: Differentiate between different pulse modulation and demodulation techniques and signal

Linear Integrated Circuits & Applications

CO1: Understand the fundamentals and areas of applications for the integrated circuits

CO2: Analyze important types of integrated circuits.

CO3: Demonstrate the ability to design practical circuits that perform the desired operations

CO4: Understand the differences between theoretical, practical & simulated results in integrated circuits.

CO5: Select the appropriate integrated circuit modules to build a given application

Computer Architecture

CO1: Understand the Concept of Parallel Processing and its applications

CO2: Implement the Hardware for Arithmetic Operations.

CO3: Analyze the performance of different scalar Computers.

CO4: Develop the Pipelining Concept for a given set of Instructions

Operating System

CO1: Better equipped with the understanding of various operation system concepts

CO2: Knowledge of distributed system and its components.

CO3: Acquiring knowhow for various types of operating system and their working.

Personality Development Program

CO1: Develop and exhibit and accurate sense of self.

CO2: Develop and nurture a deep understanding of personal motivation.

CO3:Develop an understanding of and practice personal and professional responsibility.

CO4:Demonstrate knowledge of personal beliefs and values and a commitment to continuing personal reflection and reassessment.

Microprocessor Theory & Applications

CO1: Students will have knowledge to program using 8085.

CO2: Better understanding of how to program in assembly language

CO3: Students know how to interface 8085 with different Peripherals

CO4: Better equipped for intelligent decision making applications

CO5: Understand and realize the Interfacing of memory & various I/O devices with 8085 microprocessors

CO6: Understand and classify the instruction set of 8085 microprocessor and distinguish the use of different instructions and apply it in assembly language programming.

Microelectronics

CO1: Better understanding about the IC fabrication processing steps and techniques

CO2: Recognition of different masking pattern generation

CO3: Understanding of IC manufacturing

CO4: Understanding of Wafer preparation from Silica

CO5: Knowledge about Area optimization achievement in IC Design.

Communication System-II

CO1: Understand the basics of information theory, source coding techniques and calculate Entropy of source.

CO2: Describe and determine the performance of line codes and methods to mitigate inter symbol interference.

CO3: Learn the generation and detection of base band system.

CO4: Understand the generation, detection signal space diagram, spectrum, bandwidth efficiency, and probability of error analysis of different band pass modulation techniques

CO5: Describe and determine the performance of different error control coding schemes for the reliable transmission of digital representation of signals and information over the channel.

Control Systems

CO1: Develop some expertise with the state space modeling/analysis/design approach, learning to see dynamical systems in a new way with new concepts, vocabulary, tools, and insights.

CO2: See linear algebra in a new light, where matrices are representations of linear operators, and these operators have simple geometry and corresponding insights.

CO3: Understand how applications of this theory can be limited by inaccuracy in system models

CO4: Understand the concept of stability of a dynamic system. Understand the concept of frequency response and the related concepts of bandwidth,

Electronic Measurement & Measuring Instruments

CO1: To get basic idea of measurements and errors associated with measurement.

CO2: To explain the instrumentation principles and techniques

CO3: To describe the principle of operation and application of various transducers

CO4: Measure various electrical parameters with accuracy, precision, resolution

CO5: Use Signal Generator, frequency counter, CRO and digital IC tester for appropriate measurement

Antenna and Wave Propagation

CO1: Explain how an antenna radiates and capture radio wave energy from the concepts of radiation by dynamic currents and charges, and retarded potentials

CO2: Distinguish the properties and parameters of antenna such as radiation pattern, radiation impedance, directivity, antenna gain, effective area

CO3: Apply the Friss transmission expression and reciprocity principle effectively to predict the receive power in a system consisting of transmit and receive antenna.

CO4: Design an antenna system, including the shape of the antenna, feed property, the requirement on the arrangement of the radiating elements in an array, given the radiation parameters such as radiation pattern, gain, operating frequency, transmit /receive power.

Digital Signal Processing

CO1: Ability to compute various transform analysis of Linear Time Invariant System

CO2: Ability to apply engineering problem solving strategies to DSP problems

CO3: Ability to Design and test signal processing algorithms for various applications.

CO4: Ability to Design and simulate digital filters

CO5: Ability to recover information from signals

CO6: Ability to understand various applications of DSP such as multi rate signal processing, telecommunication.

B.Tech POs, PSOs& COs 2022-23

Program Objectives (POs):

The graduate will achieve:

- I.** Understanding the knowledge of mathematics, science and engineering and use it for modeling, analyzing and solving electrical engineering problems.
- II.** Ability to identify, formulate and analyze real-life electrical engineering problems.
- III.** Ability to design and develop sophisticated equipment and experimental systems for carrying out detailed investigation to multifaceted electrical Engineering problems.
- IV.** An ability to develop and conduct appropriate experimentation analyzes and interprets data, and use engineering judgment to draw conclusions.
- V.** Dedication to work as an electrical engineer who is capable of identifying solutions to various local and global problems faced by the Industry.
- VI.** Ability to design and develop modern systems for the upkeep of pollution free environment.
- VII.** Ability to design and develop solutions for real-life electrical engineering Problems.
- VIII.** Ability to establish a portfolio of up-to-date skills, abilities, and accomplishments that distinguish them from the competition.

Program Outcomes (POs):

PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes (PSOs)

B.Tech:

Bachelor of Technology is a 4 year course which includes the specification, design, implementation and testing of engineering systems to professional standards and within a code of ethics. All students get an opportunity to consolidate their knowledge of the fundamentals, as well as to specialize in various areas. After the completion of Bachelor of Technology degree, Students can work in the field of IT industries, telecommunication, power generation and transmission multimedia, automobile and Mechanical Industries, etc.

Programme Specific Outcomes

B.Tech -Electrical Engineering:

On completion of the B.Tech (Electrical Engineering) degree the graduates will be able to

PSO.1 The application of fundamental knowledge to identify, formulate and investigate various real time problems of Electrical Machines, Power Electronics, Control System, Instrumentation System, Power System and Power Electronic systems.

PSO.2The application of recent techniques along with modern software tools (like MATLAB, MULTISIM etc.) for designing, simulating and analyzing electrical systems as well as electronic system to engage in lifelong learning.

PSO.3The utilization of knowledge regarding project management techniques and sustainable technologies for developing projects related to Smart Power Grid, Automatic Controllers, Advanced Power System Protection, Wireless System, Power Quality, Energy Saving, Embedded Systems etc.

Course Outcomes (COs):

PRINCIPLES OF ELECTRICAL ENGINEERING (UEE-105)

CO1: Student will learn how to solve DC and AC circuits.

CO2: Different method of solving simultaneous equation will help the student to solve any engineering problems.

CO3: Learn about basic electrical machines.

POWER ELECTRONICS-I (UEE-201)

CO1: Student will learn the operation of rectifiers, converters and their uses

CO2: Student will learn about AC to DC converters, DC to DC converter.

CIRCUIT THEORY (UEE-202)

CO1: Identify the various parameters that are measurable in electronic instrumentation.

CO2: Employ appropriate instruments to measure given sets of parameters.

CO3: Practice the construction of testing and measuring set up for electronic systems.

CO4: To have a deep understanding about instrumentation concepts this can be applied to control systems.

CO5: Relate the usage of various instrumentation standards.

ELECTRICAL MACHINES-I (UEE-203)

CO1: The student will be able to learn about basic machines.

CO2: The student will be able to learn about the application of machines.

TRANSMISSION & DISTRIBUTION OF ELECTRICAL POWER (UEE-250)

CO1: An ability to apply knowledge of power transmission and distribution in power systems.

CO2: Knowledge about different types of transmission and distribution system.

CO3: Knowing about various cables used in transmission and distribution.

POWER ELECTRONICS-II (UEE-251)

CO1: An ability to understand working principle of various types of inverters.

CO2: To get familiar with AC voltage controller.

CO3: To get an idea about drives, their characteristics, braking methods of drives.

CO4: To know about AC and DC drives and to study various methods for controlling the speed of the drives.

ELECTRICAL MACHINES-II (UEE-252)

CO1: An ability to understand working principle of various types of ac motors & generators.

CO2: To get familiar with AC motor starters.

CO3: To get an idea about ac motor speed controllers.

CO4: To know about 1- Φ AC motors.

ELECTRICAL AND ELECTRONICS MEASUREMENTS & MEASURING INSTRUMENTS (UEE-255)

CO1: An ability to apply general concept of instrumentation system to practical engineering problems.

CO2: An ability to understand the concept of error and its role in different types of measurement tasks.

CO3: Knowledge of using important instruments (Ammeter, Voltmeter, Wattmeter, etc.) for ac and dc signals.

ELECTRICAL POWER GENERATION (UEE-301)

CO1: An ability to apply knowledge of power generation.

CO2: Knowledge about different types of power generation.

CO3: Knowing about various power plants.

HIGH VOLTAGE ENGINEERING (UEE-303)

CO1: An ability to understand discharge mechanism of gases

CO2: To get familiar with high voltage testing

CO3: To get an idea about high voltage measurements.

CO4: To know about HVDC.

LINEAR CONTROL SYSTEM (UEE-304)

CO1: To understand about different types of control system.

CO2: An ability to understand the concept of time domain and frequency domain analysis.

CO3: To learn about compensator design.

ELECTROMAGNETIC FIELD THEORY (UEE-302)

CO1: Students will be able understand about magnetic fields and transmission theory.

CO2: To Ability to solve the problems in different EMfields.

CO3: Ability to design a programming to generate EM waves subjected to the conditions.

CO4: Applications of EM Waves in different domains and to find the time average power density.

SWITCHGEAR AND PROTECTION (UEE-351)

CO1: An ability to understand working principle of various types of relays.

CO2: To get familiar with C.T. and P.T.

CO3: To get an idea about different types of circuit breakers.

BIOMEDICAL ENGINEERING (UEE-352)

CO1: An ability to understand different types on medical instruments.

CO2: To get familiar with medical recorders and transducers.

CO3: To get an idea about X ray.

CO4: To know about radiology.

POWER SYSTEM OPERATION AND CONTROL (UEE-353)

CO1: To understand the characteristic of power generation.

CO2: An ability to understand the concept of economic load dispatch.

CO3: To learn about control.

COMPUTER APPLICATIONS TO POWER SYSTEM ANALYSIS (UEE-401)

CO1: Knowledge about different types of faults.

CO2: Knowledge about different types of load flow analysis.

CO3: Knowing about various components of power system.

DIGITAL SIGNAL PROCESSING (UEE-402)

CO1: An ability to understand the application of Z transformation.

CO2: To get familiar with DFT.

CO3: To get an idea about design of filters.

ELECTRICAL ENERGY UTILIZATION (UEE-404)

CO1: To understand the concept of electric traction.

CO2: An ability to understand the concept of electric heating and welding.

CO3: To learn about energy lights.

ELECTRICAL POWER QUALITY (UEE-451)

CO1: Student will understand about harmonics.

CO2: Student will understand about power quality.

NEURAL NETWORKS AND FUZZY LOGIC (UEE-450)

CO1: Knowledge about fuzzy logic and fuzzy control.

CO2: Knowledge about genetic algorithms.

CO3: Knowing about neural networks.

ADVANCED POWER ELECTRONICS (UEE-458)

CO1: An ability to understand working principle of various types of inverters.

CO2: To get familiar with AC voltage controller.

CO3: To get an idea about drives, their characteristics, braking methods of drives.

CO4: To know about AC and DC drives and to study various methods for controlling the speed of the drives.

ADVANCED ELECTRICAL MACHINES (UEE-307)

CO1: The student will be able to learn about basic machines.

CO2: The student will be able to learn about the application of machines.

POWER SEMICONDUCTOR DEVICES (UEE-308)

CO1: Student will learn the operation of rectifiers, converters and their uses

CO2: Student will learn about AC to DC converters, DC to DC converter.

SMART GRID TECHNOLOGY (UEE-309)

CO1: Student will learn the controlling of grid using PLC and SCADA.

CO2: It helps students to understand benefits of smart meters and smart grid applications.

FLEXIBLE AC TRANSMISSION SYSTEM (UEE-350)

CO1: Knowledge about different types of FACTS devices.

CO2: Knowledge about different types of compensators.

CO3: Knowing about various controllers.

SOLAR POWER (UEE-356)

CO1: Student will understand about wind and solar energy.

CO2: Student will understand different types of mini hydro power plants.

ELECTRIC DRIVES (UEE-357)

CO1: An ability to understand working principle of various types of inverters.

CO2: To get familiar with AC voltage controller.

CO3: To get an idea about drives, their characteristics, braking methods of drives.

CO4: To know about AC and DC drives and to study various methods for controlling the speed of the drives.

POWER ELECTRONIC CONTROL OF AC DRIVES (UEE-358)

CO1: An ability to understand working principle of various types of inverters.

CO2: To get familiar with AC voltage controller.

CO3: To get an idea about drives, their characteristics, braking methods of drives.

ENERGY MANAGEMENT (UEE-403)

CO1: An ability to understand different types of energy conservation.

CO2: To get familiar with energy auditing.

CO3: To get an idea about energy efficient technology.

DIRECT ENERGY CONVERSION (UEE-403)

CO1: Student will understand about fuel cells.

CO2: Student will understand about MHD generation.

ADVANCED CONTROL SYSTEM (UEE-405)

CO1: To understand about different types of control system.

CO2: An ability to understand the concept of time domain and frequency domain analysis.

CO3: To learn about compensator design.

ILLUMINATION ENGINEERING (UEE-408)

CO1: Student will understand about color mixing.

CO2: Student will understand different types of lighting system.

SOFT COMPUTING (UEE-412)

CO1: Knowledge about different types of faults.

CO2: Knowledge about different types of load flow analysis.

CO3: Knowing about various components of power system.

POWER SYSTEM STABILITY (UEE-410)

CO1: Student will understand about voltage stability.

CO2: Student will understand about modeling of power system.

POWER ELECTRONICS FOR RENEWABLE ENERGY SYSTEMS (UEE-455)

CO1: Student will understand about wind and solar energy.

CO2: Student will understand different types of mini hydro power plants.

NON CONVENTIONAL ELECTRICAL POWER GENERATION (UEE-452)

CO1: Student will understand about wind and solar energy.

CO2: Student will understand different types of mini hydro power plants.

HYDRO POWER STATION DESIGN (UEE-456)

CO1: Student will understand different types of dam.

CO2: Student will understand different types of hydro power design.

TRANSFORMER ENGINEERING (UEE-457)

CO1: Student will understand different types cooling mechanism, ventilation.

CO2: Student will understand about transformer design, machine design.

Scheme & Syllabi -2018

M.Tech.

(Power Electronics & Drives)

Session 2022-23



BUEST

Program Objectives (POs):

- I. To produce electrical power electronics postgraduates, who are employable in public and private industries /institutes /organizations or pursue higher education.
- II. To prepare postgraduates who have the ability to identify and address current and future problems in the domain of power systems, power electronics and electrical machines.
- III. To inculcate research attitude and lifelong learning among postgraduates.

Program Outcomes (POs):

- i. Acquire in-depth knowledge in the domain of power electronics and drives.
- ii. Ability to critically analyze various power electronics components, models and their operation.
- iii. Ability to apply fundamentals and concepts to analyze, formulate and solve complex problems of electrical power systems and its components.
- iv. Apply advanced concepts of electrical power engineering to analyze, design and develop electrical components, apparatus and systems to put forward scientific findings at national and international levels.
- v. Ability to use advanced techniques, skills and modern scientific and engineering tools for professional practice.
- vi. Preparedness to lead a multidisciplinary scientific research team and communicate effectively.

Course Outcomes (Cos):

Advances in Power Electronics

CO1. It help to learn about all power electronics converter with their control techniques.

CO2. It help to understand the power

Advances in Electrical Machines

CO1. Formulation of electrodynamic equations of all electric machines and analyse the performance characteristics.

CO2. Knowledge of transformations for thedynamic analysis of machines.

Microcontroller & Microprocessor

CO1. Design and implement 8051 microcontroller based systems.

CO2. The program prepares students to successfully compete for employment in Electronics, Manufacturing and Embedded fields.

Advances in Electrical Drives

CO1. Students will learn about the concept of drives with power electronics fed converter.

Modelling and Analysis of Electrical Machines

CO1.Student will understand machine modeling.

CO2.Student will understand dynamic and small signal modeling.

FACTS & Power Quality

CO1. It will help to know about the *FACTS* compensators, and their usage for power flow and stability improvement.

Digital Signal Processing

CO1.Student will learn about Analysis of discrete time systems

CO2.Student will learn about Fourier series and Fourier transform of continuous time and discrete time signals

CO3.Student will learn about basic structures for IIR and FIR systems.

Advances Power System Protection

CO1.Students will understand the concept of different protection scheme used in power system protection.

CO2. It will help to understand the protection scheme used for different machines & transmission lines.

PLC DCS AND SCADA

CO1.Student will learn about SCADA.

CO2.Student will learn about PLC.

RENEWABLE ENERGY RESOURCES

CO1.Student will learn about the renewable energy production and efficiency.

CO2. Make interpretation about the energy sources.

CO3. Comprehend the energy and energy types.

DIGITAL CONTROL SYSTEMS

CO1. Student will learn to determine the poles of a second-order system based on the system's transient response.

CO2. Student will learn to determine the stability of a closed-loop system (both continuous time and discrete time systems).

SPECIAL ELECTRICAL MACHINES

CO1. Students will learn about construction, principle of operation of linear induction drive for electric traction and permanent magnet motors.

CO2. Students will able to explain the control aspect of special electrical machines.

CO3. Students will able to understand the features of electric motors for traction applications.

INTELLIGENT CONTROL

CO1.Student will analyze Genetic Algorithm system through case study.

CO2. Student will use and apply engineering tools to simulate various intelligent system.

POWER QUALITY IN POWER SYSTEM

CO1. Student will get knowledge and understanding of *electrical system* regulations.

CO2. Student will understand the fundamentals of power quality.

MODERN CONTROL THEORY

CO1. Student will learn the methods for analyzing the behavior of nonlinear control system, optimal Control Theory.

CO2. Student will learn about the state space and state feedback in modern control.

POWER SEMICONDUCTOR DEVICES

CO1. Student will learn about the different power electronics switches.

CO2. It also help to learn about the characteristics performance of different power electronics switches.

SWITCHED MODE POWER CONVERSION

CO1. To understand various modes of operation of DC-DC Converter.

CO2. To analyze control aspects of converter.

POWER SYSTEM PLANNING

CO1. Students will learn about generation *planning*, bulk power *supply* systems, production costing analysis and load forecasting.

CO2. Students will learn about Dispersed generation, Electric power system reliability and stability.

POWER ELECTRONIC CONTROL OF AC DRIVES

CO1. Student will be able to select an appropriate power semiconductor device and design a power converter for the required application.

CO2. Student will be able to determine the power circuit configuration needed to fulfill the required power conversion with applicable constraints.

CO3. Student will be able to design the control circuit and the power circuit for a given power converter.

STATIC CONTROL OF DC DRIVES

CO1. Student will learn to implement synchronous motor drives with fixed frequency and variable frequency sources.

CO2. Students will also able to analyze the power electronics converter through simulation.

ANALYSIS OF CONVERTERS

CO1. Students will learn about the converter and their controlling methods for output voltage control.

CO2. It will also help to learn different controlling scheme like PWM and space vector control for out control.

SOFT COMPUTING

CO1. Introduce students to fuzzy systems, fuzzy logic and its applications.

ENERGY AUDITING, CONSERVATION

CO1. To enable the students to develop managerial skills to assess feasibility of alternative.

FLEXIBLE AC TRANSMISSION SYSTEMS

CO1. It will help to know about the *FACTS* compensators, and their usage for power flow and stability improvement.

Solar Power

knowledge of solar system

CO1. The most important thing is that solar energy is a truly renewable energy source.

CO2. It reduces the electricity bills.

CO3. It has a low maintenance cost.

Advanced Optimization Techniques

Upon completion of the subject, students will be able to:

CO1: Explain the fundamental knowledge of Linear Programming and Dynamic Programming problems.

CO2: Use classical optimization techniques and numerical methods of optimization.

CO3: Describe the basics of different evolutionary algorithms.

CO4: Enumerate fundamentals of Integer programming technique and apply different techniques to solve various optimization problems arising from engineering areas.

Research Methodology

Upon the completion of this course, the students will be able to:

CO1: Create, simulate and analyze elementary probability models.

CO2: apply fundamental concepts in exploratory data analysis.

CO3: understand industrial strength by statistical analysis.

CO4: predict the inference of the sample statistics on the population.

Programme: B.Tech

Programme Outcome and Course Outcome of B.Tech

Mechanical Engineering

w.e.f. Academic Session 2022-23



BUEST

SCHOOL OF ENGINEERING & EMERGING TECHNOLOGIES



Program Objectives (PO's) for B. Tech. Mechanical Engineering Program

The objectives of the Mechanical Engineering undergraduate program are:

1. To demonstrate the ability to analyse, formulate and solve/design engineering/real life problems based on their solid foundation in applied sciences and engineering.
2. To prepare graduates to have the knowledge/skills and competency for careers in and related to mechanical engineering viz., industry, technical/professional fields, research and higher education/academia with creativity, commitment and social realization.
3. To impart professional development of the undergraduates through professionalism, communication skills, team work, ethical attitude, multidisciplinary approach and an ability to relate engineering issues to a broader social context.

Program Outcomes:

On successful completion of B.Tech Mechanical Engineering program, the students will be able to:

1. Recognize, Formulate, examine/ analyse and apply the concept of mathematics, sciences and engineering fundamentals to the solution of complex engineering problems.
2. Design/develop solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the general health and safety, and the social, cultural, and environmental considerations.
3. Use research/projects based knowledge and apply appropriate methods/techniques, resources, and modern engineering/designing tools including prediction and modelling to complex Engineering activities with an understanding of the limitations/restrictions.
4. Apply reasoning informed by the contextual knowledge to assess societal, health/safety, legal and cultural issues and the consequential responsibilities relevant to the professional engineering practice.
5. Apply ethical principles and oblige to professional ethics and responsibilities as well as understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge and the need for sustainable developments
6. Communicate viably on complex engineering exercises with the engineering community and with society everywhere, such as, having the option to appreciate and compose compelling reports and structure documentation, make effective introductions, and give and get clear directions.
7. Impart knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and pioneer/leader in a team/group, to manage projects and in multi-disciplinary situations.

8. Perceive/recognize the need for, and have the planning and capacity to take part in autonomous and life-long learning in the broadest context of technological/innovative change.

Program Specific Outcomes (PSO's):

1. **PSO1:** Apply the fundamentals of mathematics, science and engineering knowledge to identify, formulate, design, investigate and solve complex engineering problems of machines & mechanisms, kinematics and dynamics, mechanical components & systems and realize the dream of India to establish world class manufacturing facility having computer-based design, analysis, simulation and fabrication with best quality practices.
2. **PSO2:** Apply appropriate techniques and modern engineering hardware and software tools in the design and integration of mechanical system, to engage in lifelong learning for the advancement of technology and its adaptation in multi-disciplinary environments.
3. **PSO3:** Implementation of professional engineering solutions for the betterment of society keeping the environmental context in mind, be aware of professional ethics and be able to communicate effectively.

Course Outcome (CO's)

Engineering Mathematics-I

- CO1. Student will able to solve the problems of differentiation of functions of one/two variables and know about the maximization and minimization of functions and also familiarize with the concept of analytic function, C-R equations and its uses.
- CO2. Come to know the applications of double and triple integration in finding the area and volume and also Know about qualitative applications of Gauss , Stoke's and Green's theorem.
- CO3. Student will able to apply knowledge in various engineering complex problems.

Engineering Physics

- CO1.Student will have basic understanding of the engineering physics concepts such as optics, industrial application of optical fiber, industrial and scientific applications of LASER, relativistic mechanics and quantum mechanics and its applications
- CO2.Student will be able to know the limits of classical physics & to apply the ideas in solving the problems in their parent streams.
- CO3.Student will have knowledge to apply concepts in various engineering problems.

Fundamentals of Computer & C programming:

- CO1. Students will be able to understand the working of computer system.
- CO2 Will be able to identify situations where computational methods and computers would be useful.
- CO3 Students will be able to write the program for a desired output in programming languages

Communication and Professional Skills In English

- CO1. Improvement in language competence and Acquisition of language inside and outside the classroom
- CO2. Students will learn removal of barriers between languages; and between languages and subjects.
- CO3. Better understanding of socio-cultural codes resulting in individual, aesthetic and moral growth

Principles of Electronics Engineering

- CO1. Students will be able to understand the fundamental principles of electronic components.
- CO2. Students will be able to apply this knowledge to troubleshoot/repair electronic circuits/ instruments and to perform practicals.
- CO3. Students will have knowledge to solve complex circuit problems

Principles of Mechanical Engineering

- CO1. Students will develop an understanding of the fundamental principles of mechanical engineering.
- CO2. Students will be able to apply this knowledge to solve engineering problems of thermodynamics, refrigeration, and strength of materials, internal combustion engine, fluid machines, and automobile engineering.
- CO3. Students will have basic idea to perform practicals.

Personality Development Programme

- CO1. Enhances mathematical ability and logical thinking towards various problems and sharpens the thinking capability.
- CO2 Better understanding of English language and increased awareness towards the urgency of inculcating/honing their soft skills.

Engineering Mathematics-II

- CO1. Students will be able to develop a mathematical model of linear differential equations. And also students learn about how to find the solution of designed model.
- CO2. Know about Fourier series initial conditions and its applications to different engineering models
- CO3. Further students know about nth order differential equations and their transformations and solutions through methods.

Engineering Chemistry

- CO1. Students will be able to develop innovative methods to produce soft water for industrial use and potable water at cheaper cost.
- CO2. Students will have knowledge to substitute metals with conducting polymers and also produce cheaper biodegradable polymers to reduce environmental pollution
- CO3. Students will be able to apply their knowledge for protection of different metals from corrosions.

Advanced C Programming

- CO1. Will be able to design and develop Computer programs, analyzes, and interprets the concept of pointers, declarations, initialization, operations on pointers and their usage.
- CO2. Able to implement the algorithms and draw flowcharts for solving Mathematical and Engineering problems
- CO3. Preparedness for skills used in various fields of computers.

Principles Electrical Engineering

- CO1. Students will be able to apply the concept of electromagnetism to understand transformer operation and interpret the relationship between charge and electric fields with its application.
- CO2. Students will be able to analyze A. C. circuits, interpret relationship between voltage, current and power, examine concept of resonance, and analyze balanced three phase circuits.
- CO3. Students will be able to calculate cost of energy consumption.

Engineering Graphics Drawing

- CO1. Students will be able to understand the conventions and the method of engineering drawing and will have knowledge to construct basic and intermediate geometry.

CO2. Students will be able to apply their improved visualization skills in developing new products

CO3. Students will have technical communication skills in the form of communicative drawings

Environmental Science

CO1. Understand fundamental physical and biological principles that govern natural processes.

CO2. Understand fundamental concepts from the social sciences and the humanities underlying environmental thought and governance.

CO3. Communicate integrated perspectives on complex environmental problems in the form of written and oral argument to both professional and lay audiences.

CO4. Design and conduct independent research that contributes to environmental thought and/or problem solving.

Workshop Practice

CO1. Students will understand how different objects can be made from the given raw material by using different mechanical tools

CO2. Will be able to read and use a manufacturing drawing as a definition for the manufacturing of a part

CO3. Understand fundamental operations of mechanical work and will obtain practical skills.

Numerical Analysis and Computer Programming

CO1. Students will interpolate numerical data.

CO2. Students will learn Program in computer languages to solve the numerical problems.

CO3. Learn different types of errors in the numerical data and how to control these errors.

Principles of Engineering Economics and Management

CO1. Students will understand the concept of breakeven analysis

CO2. Students will be able to forecast the demand of the product

CO3. Students will understand the SQC and Production planning techniques.

Applied Thermodynamics-I

CO1. Understand the basic knowledge of cycles of thermodynamics, principles, laws and their applications.

CO2. Study the different laws of thermodynamics and its applications

CO3. Understand the principle and working of compressors.

Strength of Materials-I

CO1. Students will be able to recognize, understand the behaviour of materials under various type of loading and moments.

CO2. Students will be able to understand the action of forces and their effects on structural and machine element.

CO3. Students will understand the concept of theory of elastic failure.

Machine Drawing

CO1. Students will read and understand drawing of mechanical components.

CO2. Students will be familiar with types of gears and their application.

CO3. Students will understand the construction of various types of engineering joints.

Fluid Mechanics

CO1. Calculate pressure with help of pressure measuring instruments, forces acting on curves surfaces.

CO2. Check possible case of flow and its analysis, calculation of rate of flow.

CO3. Establish relationship between dependent variable and independent variables.

Personality Development Programme

CO1. Enhances mathematical ability and logical thinking towards various problems and sharpens the thinking capability

CO2. Better understanding of English language and increased awareness towards the urgency of inculcating/honing better speaking and listening skills.

Metrology and Interchangeability

CO1. Students will understand Basic Standards of Measurement

CO2. Students will understand measuring principles involved, like Lever method, Vernier method

CO3. Students will understand Interchangeability and means of Linear & Angular Measurement

Manufacturing Technology – I

CO1. Knowledge of Metal Casting Processes, Sand mould making procedure, Patterns and Cores.

CO2. Knowledge of Special Casting Processes, Metal forming Processes, hot working and cold working.

CO3. Knowledge of Extrusion and other processes, Sheet metal operations.

Strength Of Materials – II

After completion of course students will able to understand:-

CO1. The behaviour of materials under various type of loading and moments.

CO2. The action of forces and their effects on structural and machine elements.

CO3. The design of springs and thick vessels.

Advanced Maths And Computer Programming

After completion of course students will able :-

CO1. To understand concept of tensor.

CO2. To represent components of stresses.

CO3. To construct the various programs using C++.

Applied Thermodynamics-II

After completion of course students will able to understand:-

CO1. The steam and its formation, h-s, t-s, p-v, p-t, diagrams for steam. Enthalpy, Entropy and internal energy of steam. Use of steam Table and Mollier Diagram.

CO2. Boilers and their classification, Constructional and operational details of various boilers.

CO3. Vapour Power Cycles, effect of operating conditions on thermal efficiency of cycles.

Material Science & Engineering

After completion of course students will able to understand:-

CO1. The various materials and their compositions.

CO2. The various materials by different processes to use them under different conditions.

CO3. The phenomenon of creep and corrosion process.

Manufacturing Practice

After completion of course students will able to understand:-

CO1. Metal Casting Processes, Sand mold making procedure, Patterns and Cores.

CO2. Special Casting Processes, Metal forming Processes, hot working and cold working.

CO3. Extrusion and other processes, Sheet metal operations.

Personality Development Programme

- CO1. Enhances mathematical ability and logical thinking towards various problems and sharpens the thinking capability
- CO2. Better understanding of English language and increased awareness towards the urgency of inculcating/honing better speaking and listening skills.

Theory Of Machines-I

After completion of course students will able :-

- CO1. To understand the basics and working of Cams , Belts, and Ropes, Gears, Gear Trains and Flywheel.
- CO2. To understand the basics and applications of Kinematic synthesis of Mechanisms.
- CO3. To learn the design methods and procedure of various mechanisms and machinery.

Machine Design – I

After completion of course students will able :-

- CO1. To understand about the Scope and meaning of design with special reference to machine design.
- CO2. To learn the criteria of selection of materials.
- CO3. To understand the design procedure and applications of Cotters Joints, Shafts, connecting Rod, rigid and flexible couplings, Welded and Riveted Joints.

Internal Combustion Engines

After completion of course students will able :-

- CO1. To know about the I.C.Engines and their classification.
- CO2. To understand the basics and working of Carburetion and Fuel Ignition Systems
- CO3. To analyse and study the Engine Testing and Performance and Combustion Process.

Manufacturing Technology – II

After completion of course students will able :-

- CO1. To understand the Mechanism of Metal Cutting.
- CO2. To gain knowledge of Cutting Tool Materials and Cutting Fluids.
- CO3. To learn the process of Gear Manufacturing and Unconventional Machining Processes

Operation Research

After completion of course students will able :-

- CO1. To understand and analyze the Definition of models, Transportation models, Assignment model, Sequencing models, Replacement Models And Network Models.
- CO2. To learn the Linear Programming and Simulation Techniques.
- CO3. To understand the need and application of Operation Research techniques in day-to-day life.

Personality Development Programme

- CO1. Enhances mathematical ability and logical thinking towards various problems and sharpens the thinking capability
- CO2. Better understanding of English language and increased awareness towards the urgency of inculcating/honing better speaking and listening skills.

Fluid Machines

- CO1. To study about the Impact of free jets.
- CO2. To study and understand the construction and working of Impulse Turbines, Francis Turbines, Propeller and Kaplan turbines, Reciprocating Pump , Centrifugal Pumps,
- CO3. Understand the basics of Dimensional Analysis and Model Similitude

Mechanical BehaviourOf Materials

After completion of course students will able:-

- CO1. To understand concepts of elasticity in metals and polymers.
- CO2. To learn about the concept of Stress intensity factor, fracture toughness, cost basis and service requirements.
- CO3. To understand the nature of engineering polymers, smart materials and their applications.

Advanced Welding Technology

After completion of course students will able:-

- CO1. To understand process of Advanced Welding Techniques in detail.
- CO2. To learn the concept of Quenching theory and weldind techniques for certain specific materials.
- CO3. To understand the Thermal and Metallurgical Consideration in advanced welding techniques.

Advanced Foundry Technology

After completion of course students will:-

- CO1. Get knowledge of casting and moulding processes.
- CO2. Understand the concept of technology of moulding and core making.
- CO3. Learn the technology of metal mould casting Processes.

Manufacturing Processes-III

After completion of course students will able:-

- CO1. Knowledge about the cutting tools ,chip formation and energy consideration in machining
- CO2. Able to learn about special purpose machines , Forces and power consumption

Theory Of Machines-II

After completion of course students will able:-

- CO1. To learn about static and dynamic force analysis.
- CO2. To understand the concept and calculation methods used in balancing of rotating components and reciprocating parts.
- CO3. To understand the construction, working and applications of different types of Gyroscope, Dynamometers and Governors.

Machine Design-II

After completion of course students will able:-

- CO1. To understand the concept of design of Gears and Bearings.
- CO2. To understand the uses and design methods of Clutches& Brakes, Flywheel.
- CO3. To learn the types and design procedure of Springs, Belts, rope and chain drives.

Measurement and Control

After completion of course students will able:-

- CO1. To learn about Measurement and Instrumentation, Static and Dynamic characteristics of Instruments
- CO2. To understand the calculation procedure of Error in Measurement and characteristics of measurement.
- CO3. To get knowledge of different types of functional elements.

Industrial Automation & Robotics

After completion of course students will able:-

CO1. Learn about Automation, Fluid Control Components.

CO2. Have knowledge of basics of control system, transfer devices material handling and robotics.

CO3. Understand the concept of Sources and Sensors, Manipulators, Actuators and Grippers.

Heat Transfer

After the end of this course the student will:

CO1. Get to know about Steady State Heat Conduction and Steady State Conduction with Heat Generation.

CO2. Learn the concept of Transient Heat Conduction, Convection, Forced convection and Radiation.

CO3. Understand the construction, working and types of Heat Exchangers and Heat Transfer with change of Phase.

Personality Development Programme

CO1. Enhances mathematical ability and logical thinking towards various problems and sharpens the thinking capability

CO2. Better understanding of English language and increased awareness towards the urgency of inculcating/honing better speaking and listening skills.

Machine Tools

After the end of this course the student will:

CO1. Understand about Machine Tools and Centre Lathe.

CO2. Get knowledge of Milling Operations and Abrasive Processes.

CO3. Learn procedure and programming of Numerical Control of Machine Tools.

Design and Manufacturing Of Composite Materials

After the end of this course the student will:

CO1. Understand the concept of composite materials, their composition and types.

CO1. Learn about the Manufacturing Processes and Mechanics and Performance of Composite materials.

CO1. Learn Failure Analysis and Design of composite materials.

Quality Concepts in Design

After the end of this course the student will:

CO1. Learn about the Frequency distributions and Histograms.

CO2. Understand the Basic methods and Design of experiments.

CO3. Learn the concept of Quality Function Deployment.

Renewable Sources Of Energy

After the end of this course the student will:

CO1. Understand the Elements of hydropower scheme and wind energy production.

CO2. Learn about the types of Hydraulic turbines and Wind turbines.

CO3. Learn the calculation of Wind turbine loads and wind energy conversion systems.

Cryogenic Engineering

After the end of this course the student will:

CO1. Get knowledge of cryogenic engineering.

CO2. Able to deal with cryogenic gases.

CO3. Get knowledge about insulation and transportation. about insulation and transportation

Time & Work Study

After the end of this course the student will:

CO1. Get knowledge about Time recording techniques in time study.

CO2. Able to understand principles of motion economy and sampling process.

CO3. Understand the basic procedure of work-study.

Automobile Engineering

After course completion the learners will be able to:

CO1. Get knowledge about the Automotive developments in Electricals, Power Transmission,

CO2. Develop skill to deal with Suspension Systems

CO3. Understand the Automotive Brakes and Tires-Wheels

Refrigeration And Air Conditioning

After course completion the learners will be able to:

CO1. Get knowledge about the various Refrigeration Systems

CO2. Able to calculate Load for different Air- Conditioning systems

CO3. Get aware about the Psychometry of Air & Air Conditioning Processes

Mechatronics

After course completion the learners will be able to:

- CO1. Get awareness about the recent technologies.
- CO2. Enhancement the knowledge about the concepts of synergistic integration of mechanical, electrical, electronics and computer systems.
- CO3. How mechatronics integrates knowledge from different disciplines
- CO4. In order to realize engineering and consumer products that are useful in everyday life.

Industrial Engineering & Entrepreneurship

After course completion the learners will be able:

- CO1. To solve the production planning and inventory control related problems.
- CO2. To understand Organizational structure and roles of worker at their level.
- CO3. To understand project management.
- CO4. To understand the JIT, MRP management tools.
- CO5. To understand concept about small scale industries.

Personality Development Programme

- CO1. Enhances mathematical ability and logical thinking towards various problems and sharpens the thinking capability
- CO2. Better understanding of English language and increased awareness towards the urgency of inculcating/honing better speaking and listening skills.

Mechanical Vibrations

After course completion the learners will be able to:

- CO1. Understand the Concepts of vibrations, Single Degree of Freedom Systems
- CO2. Know about the Undamped Free Vibrations, Damped Free Vibrations, Forced Vibrations
- CO3. Know Two Degree of Freedom Systems, Undamped Free Vibrations, Applications, Multi- Degree/Several degree of Freedom Systems, Continuous Systems

Design of Thermal Systems

After course completion the learners will be able:

- CO1. Get knowledge about Modelling of Thermal Systems
- CO2. Able to calculate the Acceptable Design of a Thermal System
- CO3. Understand the Problem Formulation for Optimization with search methods

Flexible Manufacturing Systems

After the end of this course the student will:

CO1. Able to know about Flexible Manufacturing System,

CO2. Understand the Group Technology, Automated assembly systems ,Automation and Robot application

CO3. Able to get knowledge about the Robotic technology and Robot programming

Material Handling And Plant Layout

After the end of this course the student will:

CO1. Get knowledge general concepts of plant layout and economics

CO2. Get aware about line balancing and its types

CO3. Understand the material handling and its equipment's

Gas Turbines And Jet Propulsion

After the end of this course the student will:

CO1. Imparts knowledge about rocket science.

CO2. Knowledge about development of high speed and high thrust engines.

CO3. Able to understand the various systems used in turbines and jet propulsion.

Design Planning And Control Of Production Systems

After the end of this course the student will:

CO1. Get to know about Materials requirement

CO2. Able to deal with Planning of production and

CO3. Understand the Design of production system

Machine Tool Design

After the end of this course the student will:

CO1. Understand about the Kinematics of Different Types of Machine Tools

CO2. Understand about the Design of Feed Drives and design of Machine Tool Structures

CO3. Understand about the Design of Special Purpose Machines

Design Of Heat Exchangers

After the end of this course the student will:

CO1. Get knowledge about the Heat Exchangers

CO2. Understand about Basic design methods of heat exchanges

CO3. Able to deal with condensers and evaporators

Power Plant Engineering

After the end of this course the student will:

- CO1. Impart knowledge about different power plants
- CO2. Know about the power plants economics
- CO3. Understand the non conventional power generation

Design Of Air Conditioning Systems

After the end of this course the student will:

- CO1. Impart knowledge about Application of air conditioning and Psychometry
- CO2. Make understanding about load, system and equipment design of air conditioning
- CO3. know about equipment design and controls.

Simulation andModelling

After the end of this course the student will:

- CO1. Introduce students with Physical modeling and computer system simulation
- CO2. Understand the probability concepts in simulation
- CO3. Know about the system dynamics modelling

Emerging Automotive Technologies

After the end of this course the student will:

- CO1. To make student aware about fuel cell technology adopted by automotive industry
- CO2. To introduce latest engine technology features and 42 volt system
- CO3. To give knowledge about Hybrid Vehicles Integrated Starter Alternator and X-By Wire Technology

Personality Development Programme

- CO1. Enhances mathematical ability and logical thinking towards various problems and sharpens the thinking capability
- CO2. Better understanding of English language and increased awareness towards the urgency of inculcating/honing better speaking and listening skills.

Modern Manufacturing Processes

After the end of this course the student will:

- CO1. To make students aware about Ultrasonic Machining Electrochemical and Chemical Metal Removal Processes
- CO2. To give knowledge about Thermal Metal Removal Processes

CO3. To introduce student about Electron beam Machining (EBM) and Plasma arc Machining (PAM)

Computer Aided Design

After the end of this course the student will:

CO1. Get knowledge of Various terms related to Computer Graphics.

CO2. Able to know about different types of backend calculation used in software modeling

CO3. Understand the different techniques of wireframe modeling , surface modeling, solid modeling and to generate any mathematical entity in computer screen and to generate any mathematical entity in computer screen

Pumps, Blowers and Compressors

After the end of this course the student will:

CO1. Get knowledge about Fans and Propeller Fans,

CO2. Understand to deal with Blowers, Compressors, and Axial Flow Compressors

CO3. Able to know about Pumps

Experimental Stress Analysis

After the end of this course the student will:

CO1. Get knowledge about Basic Laws of Stress transformation

CO2. Develop skill to deal with Three Dimensional Photo Elasticity

CO3. Understand the Electric Resistance strain Gauges and Brittle Coatings

Software Project Management

CO1: After learning this unit, student will be able to describe the meaning Assessment and different evaluations

CO2: After learning this unit, student will be able to state the purposes, principles and characteristics of quality assessment

CO3: After learning this unit, student will be able to classify the assessment based on purpose, scope, attribute measured, nature of information gathered, nature of interpretation and context

Distributed Operating System

CO1: Better understanding of MACH and communication in MACH.

CO2: Acquiring knowledge for communication in distributed systems.

CO3: Preparedness for skills used in various methodology of distributed file

Biomedical Instrumentation

- CO1: Understand the physiology of biomedical system
- CO2: Measure biomedical and physiological information
- CO3: Discuss the application of Electronics in diagnostics and therapeutic area.

Television Engineering

- CO1: Understand the fundamental concepts of television transmitter and receiver systems, the transmission of video signals and importance of television standards to effectively work with broadcasting applications, trouble shooting of television systems.
- CO2: Understand different colour television systems used worldwide and its compatibility.
- CO3: Understand principles of digital video and component video signal.
- CO4: Understand advanced TV technology, MAC signals and DTH technology.
- CO5: Describe and differentiate working principles of latest digital TV, HDTV, and WDTV

Energy Management

- CO1: An ability to understand different types of energy conservation.
- CO2: Get familiar with energy auditing.
- CO3: Get an idea about energy efficient technology.

Non Conventional Electrical Power Generation

- CO1: Student will understand about wind and solar energy.
- CO2: Student will understand different types of mini hydro power plants.

Advanced Environmental Engineering

- CO1: Get Introduction of Waste Water and their treatment
- CO2: Advanced Treatments for Air and Water Pollution

Advance Construction Techniques and Project Management

- CO1: Properties and application of admixture
- CO2: Mix Design
- CO3: Properties of concrete
- CO4: Awareness of modern technology

CO5: Knowledge of special type of concrete

Human Values and Professional Ethics

CO1: Student will understand harmony in human being.

CO2: Student will understand concept of value education.

Satellite Communication

CO1: Understand principle, working and operation of various sub systems of satellite as well as the earth station.

CO2: Apply various communication techniques for satellite applications

CO3: Analyze and design satellite communication link

CO4: Learn advanced techniques and regulatory aspects of satellite communication

CO5: Understand role of satellite in various application.

Grid Computing

CO1: Better equipped with the understanding of Grid Architecture and its relationship to other Distributed technologies.

CO2: Introduction to Grid Resource Management Systems.

CO3: Acquiring know how of Security Issues in Grids and Grid Middleware and Programming Model.

Software Reliability

CO1: Better equipped with the understanding of Grid Architecture and its relationship to other distributed technologies.

CO2: Introduction to Grid Resource Management Systems.

CO3: Acquiring know how of Security Issues in Grids and Grid Middleware and Programming model.

Digital Signal Processing & Applications

CO1: Comprehend adaptive system and functions.

CO2: Understand the design criteria for a linear adaptive processor.

CO3: Develop different adaptive modelling systems.

CO4: Understand the properties of Kalman filtering.

Transformer Engineering

CO1: Student will understand different types cooling mechanism, ventilation.

CO2: Student will understand about transformer design, machine design.

Direct Energy Conversion

CO1: Student will understand about fuel cells.

CO2: Student will understand about MHD generation.

Advance Concrete Technology

CO1: Properties and application of admixture

CO2: Mix Design

CO3: Properties of concrete

CO4: Awareness of modern technology Knowledge of special type of concrete

Geographic Information Systems For Resources Management

CO1: Understand the Components and structure of GIS

CO2: Able to know Spatial data formats

CO3: Map Projection

Entrepreneurship Development & Enterprise Management

CO1: Able to understand the process of development, social determinants of Entrepreneurship growth.

CO2: Able to understand the Managing growth & transition, the organization life cycle, chasing Entrepreneurship roles

CO3: Able to understand the Incentive & subsidies available for Entrepreneurship growth. Guidance for project report preparation

Data Warehousing and Data Mining

CO1: Design a Data warehouse system and perform business analysis with OLAP tools.

CO2: Apply suitable pre-processing and visualization techniques for data analysis

CO3: Apply frequent pattern and association rule mining techniques for data analysis

CO4: Apply appropriate classification and clustering techniques for data analysis

E-Commerce & Erp

CO1: To demonstrate a clear and relevant understanding of the definitions, importance, potential business values, and relevant technologies of ERP systems;

CO2: To demonstrate the ability in learning the applications of ERP and using the up-to-date ERP systems (such as SAP) for business.

CO3: To demonstrate a clear understanding of the life-cycle model of the process that a firm goes through with ERP system

Optical Communication

CO1: Realize basic elements in optical fibers, different modes and configurations

CO2: Analyze the transmission characteristics associated with dispersion and polarization techniques

CO3: Design optical sources and detectors with their use in optical communication systems

CO4: Construct fiber optic receiver systems, measurements and coupling techniques.

CO5: Design optical communication systems and its networks

Principles of Digital Communication

CO1: Understand the basics of information theory, source coding techniques and calculate Entropy of source.

CO2: Describe and determine the performance of line codes and methods to mitigate inter symbol interference.

CO3: Learn the generation and detection of base band system.

CO4: Understand the generation, detection signal space diagram, spectrum, bandwidth efficiency, and probability of error analysis of different band pass modulation techniques

CO5: Describe and determine the performance of different error control coding schemes for the reliable transmission of digital representation of signals and information over the channel.

Hydro Power Station Design

CO1: Student will understand different types of dam.

CO2: Student will understand different types of hydro power design

Illumination Engineering

CO1: Student will understand about color mixing.

CO2: Student will understand different types of lighting system.

Urban Transportation Planning

CO1: Understand the principle of traffic and Digital Signalling

CO2: Understand the principles of LOS

Disaster Management

CO1: Behaviour of building during earthquake

CO2: Able to find the critical element of building.

CO3: Knowledge of repair of critical element.

Total Quality Management

CO1: Total quality management refers to an integrated approach by management to focus all the functions

CO2: Total quality management has become very important for improving a firm's processing capabilities in order to sustain competitive advantages.

Doctor of Philosophy

P.hd

POs1

To demonstrate a thorough knowledge of the literature and a comprehensive understanding of methods and techniques applicable to their own research, discover, interpret and communicate new knowledge through original research of publishable quality which satisfies peer review.

POs 2

Research students should have shown evidence of being able to work collaboratively enable with all stakeholders learners to create benefit society and the economy.

POs 3

To develop the knowledge, skill and attitude to creatively and systematically apply the principles and practices of management, accountancy, finance, business law, statistics, HR, operations and IT to management problems.

POs 4

To demonstrate the critical thinking mindset and the ability to identify and formulate research problems, research literature, design tools, analyze and interpret data, and synthesize the information to provide valid conclusions and contextual approaches across a variety of subject matter.

POs 5

Exhibit self-confidence and awareness of general issues prevailing in the society and communicate effectively with the accounting, commerce, management, business, professional fraternity and with society at large through digital and non-digital mediums and using a variety of modes such as effective reports & documentation, effective presentations, and give and receive clear instructions.

POs 6

The programme imparts knowledge and fosters attitudes essential for the growth of students into competent, responsible managers. The course has an evolving programme content and is constantly updated to be in tune with the emerging trends.

International HRM

Objective: The course seeks to look at HRM in a broader, comparative and international perspective to deal with complex issues and manifold risks

COS 1: Knowledge and Understanding Obtain, through elective courses, an in-depth knowledge of specific IHRM-related theories, skills and practices

COS 2: Appreciate the implications of increasing globalization for the management of human resources, with particular reference to IHRM in multinational corporations

COS 3: After studying this subject the students will be able to understand the cultural dimension of international HRM, shift in cultures and ethics in cross – cultural management

Research Methodology

Objective: To create scientific attitude towards solving a management problem and impart knowledge about tools available for carrying out research.

Learning Outcomes: After studying this subject the students will be able to select problem, the appropriate research design for solving that problem, various sources of data collection and effectively handling the research queries in various fields of the organization.

COS1: Develop understanding on various kinds of research, objectives of doing research, research process, research designs and sampling.

COS2: Have adequate knowledge on measurement & scaling techniques as well as the quantitative data analysis

COS3: Have basic awareness of data analysis-and hypothesis testing procedures

Bachelor of Business Administration

BBA

PO1

To develop sound knowledge of the entrepreneurial process and inculcate creativity and innovation among students

PO2

To develop the knowledge, skill and attitude to creatively and systematically apply the principles and practices of management, accountancy, finance, business law, statistics, HR, operations and IT to management problems.

PO3

To help work effectively in modern day business and non-business organizations.

PO4

To develop fundamental in-depth knowledge and understanding of the principles, concepts, values, substantive rules and development of the core areas of business such along with the tools such as Tally, MS Excel, MS Office, etc.

PO5

To demonstrate the critical thinking mindset and the ability to identify and formulate research problems, research literature, design tools, analyse and interpret data, and synthesize the information to provide valid conclusions and contextual approaches across a variety of subject matter.

PO6

Exhibit self-confidence and awareness of general issues prevailing in the society and communicate effectively with the accounting, commerce, management, business, professional fraternity and with society at large through digital and non-digital mediums and using a variety of modes such as effective reports & documentation, effective presentations, and give and receive clear instructions.

PO7

Function effectively as an individual, and as a member or leader in teams, and in multidisciplinary settings by demonstrating life skills , coping skills and human values.

Financial Accounting

Objective: To familiarize the students with computer and its applications in the relevant fields and expose them to some functions of Microsoft office and with its utility.

COS 1- To make the students familiar with general entries.

COS 2- To make the students familiar with general accounting principles.

COS 3- To make the students familiar with its principles for utilization in their business organization.

Micro Economics

Objective: To provide a through introduction to economic theory and areas of microeconomics concerned with individual businesses/industries, individual consumers, and individual products.

COS 1- To explore the students with limited resources.

COS 2- To explore the students how can obtain the maximum satisfaction possible for society.

COS 3- To explore the students with basic concepts of economics.

Business Organization and Management

Objective: To provide fundamental knowledge and exposure to the concepts, theories, and practices in the field of management. It focuses on the basic roles, skills, and functions of management, with special attention to managerial responsibility for effective and efficient achievement of goals.

COS 1- To facilitate the students in appreciating the significance and application of various managerial functions.

COS 2- To facilitate the students to know about different culture and the benefits of its diversity.

COS 3- To facilitate the students to recognize how employee personality and attitude affects the organization fit.

Business Mathematics

Objective: To prepare students for the mathematical and analytical application required in subsequent business and economics courses.

COS 1- To prepare students how to use of percentages, ratios and proportions for business applications.

COS 2- To prepare students to explored to basic mathematical processes and techniques currently used in the fields of business and finance.

COS 3- To prepare students how to differentiate which math methods should be used for different problems.

Environmental Science

Objective: To highlight the importance of the environmental issues coming up in day to day business activities and recognize the role students can play as future decision makers in protecting the environment.

COS 1- To prepare students so that they should be able to measure environmental variables and interpret results.

COS 2- To help students to describe threats to global biodiversity, their implications and potential solutions.

COS 3- To prepare students to evaluate local, regional and global environmental topics related to resource use and management.

English Language

Objective: To improve the language competency of the students in English and to equip the students to study other academic subjects with greater facility through the theoretical and practical components of the English syllabus; to break the language barriers and make them linguistically efficient so that they can confidently fit themselves in the professional world.

COS 1- To prepare students for improving them in language competence.

COS 2- To prepare students for the acquisition of language inside and outside the classroom.

COS 3- To help students for the removal of barriers between languages; and between languages and subjects.

Organizational Behavior and HRM

Objective: To provide an understanding of basic concepts, theories and techniques in the field of human behavior at the individual, group and organizational levels in the changing global scenario. The course must be taught using case study method.

COS 1- Students will be familiar with the importance of human capital in the organization. It gives an insight regarding individual and group behavior in any organization.

COS 2- Analyze individual and group behavior and understand the implications of organization behavior on the process of management.

COS 3- To identify the different motivational theories and evaluate motivational strategies used in a variety of organizational settings.

Macro Economics

Objective: To provide students with a unified framework that can be used to analyze macroeconomic issues such as flow to income and expenditure, , national income, consumption function, theory of investments, interest rates determinants, inflation, monetary and fiscal policy.

COS 1- Students will be explored to the unified framework of an economy and the related macroeconomics issues.

COS 2- Students will be able to demonstrate an understanding, usage and application of basic economics principles.

COS 3- Describe and apply the methods for analyzing consumer behavior through demand and supply, elasticity and marginal utility.

Business Law

Objective: To develop an understanding of the essential elements of contract law, law of partnership and the various negotiable instruments.

COS 1- The students will learn the basics of business laws and their application in business.

COS 2- To develop the ability to apply concepts, principles and theories to understand simple business laws.

COS 3- To develop the global prospective awareness of the different business laws.

Business Statistics

Objective: Business statistics is helpful in framing suitable policies in a large number of diversified fields covering natural, physical and social sciences. It will enable the students to know statistics, how and when to apply statistical techniques to decision making situations and how to interpret the results.

COS 1- The course consists of instruction in the fundamentals of statistics applied to business situations. The course includes the study of statistical tools used for the purpose of decision making.

COS 2- Produce appropriate graphical and numerical descriptive statistics for different type of data.

COS 3- Apply probability rules and concepts relating to discrete and continuous random variables to answer questions within a business context.

Business Ethics and Corporate Social Responsibility

Objective: The basic objective of this course is to make the students realize the importance of values and ethics in business and acquaint them with the latest trends in corporate social responsibility.

COS 1- The students will learn the importance of ethical conduct in business and understand the roles and responsibilities of corporate in social systems.

COS 2- Justify the importance of ethics and CSR to business and corporate organizations.

COS 3- Evaluate how decisions are actually made in business ethics.

Business Communication-I

Objective: The main aim of this course is to develop the reading, listening, and writing and presentation skills of the students. The students should be able to act with confidence, should be clear about their own personality, character and future goals.

COS 1- The main aim of this course is to develop the reading, listening, writing and presentation skills of the undergraduate students. The students should be able to act with confidence, should be clear about their own personality, character and future goals.

COS 2- To provide an outline to effective organization communication.

COS 3- To impart the correct practices of the strategies of effective business writing.

Marketing Management

Objectives: The course aims at making students understand concepts, philosophies, processes, and techniques of managing the marketing operations of a firm in turbulent business environment.

COS 1- The objective of the course is to introduce students to the fundamental principles and concepts of marketing.

COS 2- To provide them with a structure to apply marketing in decision making framework.

COS 3- To apply the knowledge, concepts, tools necessary to overcome challenges and issues of marketing in a changing technological landscape.

Productions and Operations Management

Objective: The syllabus aims at making the students understand the whole process of manufacturing a product or a service by enhancing their creativity and business skills, to make them future entrepreneurs. Most importantly, it will help them in focusing on the concept of optimum utilization of resources and minimization of costs.

COS 1- This course will help the students to understand the importance of understand the whole process of manufacturing a product or a service, focusing on the concept of optimum utilization of resources and minimization of costs.

COS 2- gaining the knowledge of about managing production process.

COS 3- Better understanding of quality management.

Advertising and Sales Management

Objective: The course aims at providing fundamental knowledge and exposure to the concepts, theories, and practices in the field of management. The course will help students learn rules and

techniques of effective advertising and to understand the sales management process and sales force management.

COS 1- The course will help students learn rules and techniques of effective advertising and to understand the sales management process and sales force management.

COS 2- to explain the students what marketing is and how it's used.

COS 3- To identify the primary marketing activities of an organization.

Tax Laws and Provisions

Objective: To make students comfortable with the basic provisions of tax so that they should have understanding of some of the practical aspects of taxation.

COS 1- Students will be familiar with the concept of direct and indirect tax, its computation, deduction and input tax credit.

COS 2- Students will understand the exercise of proper professional and ethical responsibilities to clients and the legal system.

COS 3- Students will possess knowledge and understanding of substantive and procedural laws.

Computer Applications

Objective: This is a basic paper of IT to familiarize the students with computer and its applications in the relevant fields and exposes them with its utility. The students will learn fundamentals of computers, different software of computer, computer network and communication.

COS 1- This is a basic paper of IT to familiarize the students with computer and its applications in the relevant fields and exposes them with its utility.

COS 2- Demonstrate a basic understanding of computer hardware and software.

COS 3- Demonstrate the basics understanding of network principles.

Business Communication-II

Objective: The course aims at providing fundamental knowledge and exposure to the concepts, theories and practices in the field of communications. Student will be able to write memorandum, office orders and reports. Non-verbal communications and business etiquettes will also be taught to students.

COS 1- To make students conversant with the basic forms, formats and techniques of business communication and exposure of all relevant communication theories.

COS 2- To develop the effective interpersonal communications.

COS 3- To develop the research approaches and information collections.

Financial Management

Objective: Students will equip themselves with topics in finance management in business houses and their reflections on the fundamental decisions to be taken within the corporate finance world. They will get the understanding how the finances are managed in short and long run and how timely decisions are taken keeping in mind all the constraints.

COS 1- Students will equip themselves with topics in corporate finance, how the finances are managed and their reflections on the fundamental decisions to be taken by the corporate and finance world.

COS 2- Demonstrate an understanding of the overall role and importance of the finance function.

COS 3- Demonstrate the basics finance management knowledge and communicate effectively using the standards business terminology.

Business Environment

Objective: This course is intended to make students understand various social, political, legal and economic and other factors that influence business in India so as to enable them appreciate associated opportunities, risks and challenges and their relevance for managerial decisions.

COS 1- This course is intended to make students understand various social, political, legal and economic and other factors that influence business in India.

COS 2- To enable them appreciate associated opportunities, risks and challenges and their relevance for managerial decisions.

COS 3- To know about the importance of external and internal business environment.

Cost and Management Accounting

Objective: To make the students understand the costing system and activity based costing, activity management, and implementation issues in modern costing system.

COS 1- To familiarize students with basic knowledge of cost and management accounting.

COS 2- To equip students with problem solving skills.

COS 3- To enable students to apply knowledge in decision making.

Research Methodology

Objective: The course aims at equipping students with an understanding of the research process, tools and techniques in order to facilitate managerial decision making.

COS 1- The course aims at equipping students with an understanding of the research process, tools and techniques in order to facilitate managerial decision making.

COS 2- To compare and contrast quantitative and qualitative research paradigms.

COS 3- To demonstrate the knowledge of research processes.

E-Commerce

Objective: The subject aims to familiarize the student with the basic concept of e-commerce and to provide him/her with the knowledge of planning, scheduling and controlling a successful e-business. Students will learn electronic payment system, its security issues and solutions to security issues. Legal and ethical issues in e-commerce will also be taught to students.

COS 1- This course aims at enabling students to understand the various concepts of e-commerce.

COS 2- Analyzing branding and pricing strategies.

COS 3- Using and determine the effectiveness of market research.

Business Etiquette and Professionalism

Objective: The objective this course is to equip the students with the fundamentals of business etiquette and teach them to build relationship, create a professional appearance, develop positive relationship with co-workers, and practice cubicle and office etiquette.

COS 1- The course will teach students the appropriate behavior and etiquette when using internet, in daily communications, and in meetings.

COS 2- Students also learn how to handle ethical dilemmas and personal issues, become a good conversationalist, and are courteous when communicating.

COS 3- Students also examine the appropriate etiquette for business meals and functions, as well as how to be a courteous traveler at home or abroad.

Project Management

Objective: To acquaint the students with the steps involved in planning, implementation and control of projects.

COS 1- Introduction to Project Management examines the field of project management in Theory and practice.

COS 2- The course also addresses the role of project managers in the current world of rapid change, increased competitive forces, and increased expectations for the successful delivery of projects in organizations.

COS 3- To know about the steps involved in planning, implementation and control of projects.

Company Law

Objective: The course aims at providing fundamental knowledge and exposure to the concepts and practices in the field of company law.

COS 1- The course aims at providing fundamental knowledge and exposure to the concepts and practices in the field of company law.

COS 2- Demonstrate comprehensive knowledge and understanding of social and economic policy considerations arising in this areas.

COS 3- Read and study primary and secondary sources of company laws.

Quality Management

Objective: This is a basic paper of quality management to familiarize the students with its applications in the relevant fields and exposes them with its utility.

COS 1- This is a basic paper of quality management familiarize the students with Quality control Management and its applications in the relevant fields and exposes them with its utility.

COS 2- Explain the different meaning of the quality concepts and its influence.

COS 3- Describe, distinguish and use the several techniques and quality management tools.

Introduction to Service Marketing

Objective: The basis objective of this course is to provide understanding to the students with the features and types of services and positioning a service in the market.

COS 1- To familiarize students with basic knowledge of international business.

COS 2- To equip students with problem solving skills.

COS 3- To enable students to apply knowledge in decision making.

Principles of Insurance

Objective: To make students understand the application of various insurance operations in a business enterprise.

COS 1- To enable the students to understand the importance of the subject of general insurance & life insurance.

COS 2- To make students understand the application of various insurance operations in a business enterprise.

COS 3- To know about various risk and risk management techniques.

International Business

Objective: The basis objective of this course is to provide understanding to the students with the global dimensions of management. The Objective is to impart knowledge and skill of analysis of operational processes of business between two or more nations.

COS 1- To familiarize students with basic knowledge of international business.

COS 2- To equip students with problem solving skills.

COS 3- To enable students to apply knowledge in decision making.

Management Information System

Objective: To identify the major components of computer system including hardware, software, operating system and basic information system concepts as applied to business operations and management.

COS 1- Students will be able to know information system, software development models and computer operations and programming.

COS 2- To identify the major components of computer system including hardware, software, operating system and basic information system concepts as applied to business operations and management.

COS 3- To develop the effectively communicate strategic alternatives to facilitate decision making.

Corporate Strategy

Objective: This course will help them to understand various corporate and business strategies and the relationship amongst goals, objectives, strategies, tactics, plans, programs, procedures, rules etc. and to learn different methods of company, environment and strategic analysis.

COS 1- The course aims at providing fundamental knowledge and exposure to the strategies at corporate and business level.

COS 2- This course will help them to understand various corporate and business strategies and the relationship amongst goals, objectives, strategies, tactics, plans, programs, procedures, rules etc.

COS 3- To learn different methods of company, environment and strategic analysis.

Consumer Protection

Objective: This course will help them to understand the concepts of consumer protection act and MRTP act and to know the means of protection.

COS 1- The objective of the course is to acquaint the students with the importance of consumer protection act.

COS 2- Students will be aware of the basics procedures for handing consumer disputes.

COS 3- Students will be conversant with major international instruments on consumer protection.

Financial Services

Objective: This course will help them to understand the concepts of various financial services and its role.

COS 1- The objective of the course is to acquaint the students with the types of various financial services and their utilization.

COS 2- Demonstrate broad and coherent knowledge of the theoretical and professional disciplines of banking and finance.

COS 3- Describe the dimension of performance and risk relevant to financial services companies.

Consumer Behavior

Objective: This course aims at enabling students to understand the various aspects of consumer behaviour, the external and internal factors that influence consumer behaviour and to apply this understanding to the development of marketing strategy.

COS 1- The objective of the course is to acquaint the students with the consumer needs and consumer behavior.

COS 2- It enabling students to understand the various aspects of consumer behaviour, the external and internal factors that influence consumer behaviour and to apply this understanding to the development of marketing strategy.

COS 3- It helps to use the most appropriate techniques to apply market solutions.

Disaster Management

Objective: This course aims at enabling students to understand the various disasters and its management.

COS 1- After studying the subject, students will be able to understand natural, man made and national disasters and their management.

COS 2- To ensure skills and ability to design, implement and evaluate research on disasters.

COS 3- To ensure skills and abilities to analyze potential effects of disaster and of the strategies and methods to deliver public health response to avert these affects.

Managing Across Culture

Objective: This course will help students to understand various cultures and they will learn to manage cross cultures differences.

COS 1- The objective of the course is to acquaint the students to understand different cultures and respect cross culture differences.

COS 2- Enables students to develop the knowledge, skills and capabilities required to work and manage across culture.

COS 3- Provide opportunities to apply the knowledge and understanding gained through experiential and problem based learning.

Entrepreneurship

Objective: To familiarize students with the different aspects of managing human resources in the organization through various phases, the roles and responsibilities of HR professionals.

COS 1- Students will learn policy incentive for entrepreneurial growth small scale Industrial Policy, the benefits & opportunities of small business ownership.

COS 2- Students master oral and visual presentation skills and establish a foundation of confidence in the skills necessary to cause others to act.

COS 3- Students with the different aspects of managing human resources in the organization through various phases, the roles and responsibilities of HR professionals.

Bachelors of Commerce

B.COM

POs1

To impart knowledge of the fundamentals of Management theory and its application in problem solving.

POs 2

To develop capabilities in students to select and apply appropriate tools for decision making required for solving complex managerial problems.

POs 3

To develop capabilities in students to independently conduct theoretical as well as applied research.

POs 4

To develop sound knowledge of the entrepreneurial process and inculcate creativity and innovation among students

POs 5

To produce industry ready graduates having highest regard for Personal & Institutional Integrity, Social Responsibility, Teamwork and Continuous Learning

POs 6

To facilitate the learners to gain knowledge and understanding of management theories, models, frameworks and real world practices in general management and functional areas emphasizing the sector specific contexts

POs 7

To provide avenues for the development of professional & life skills that equip learners to engage in successful career pursuits covering a broad spectrum of areas in both corporate and non-corporate sectors.

POs 8

To sensitize learners to issues of social relevance that managers & leaders must address, including business ethics, cultural diversity, and environmental concerns and introduce them to professional ethics and practices.

Financial Accounting

Objective: To familiarize the students with computer and its applications in the relevant fields and expose them to some functions of Microsoft office and with its utility.

COs 1- To make the students familiar with general entries.

COs 2- To make the students familiar with general accounting principles.

COs 3- To make the students familiar with its principles for utilization in their business organization.

Micro Economics

Objective: To provide a through introduction to economic theory and areas of microeconomics concerned with individual businesses/industries, individual consumers, and individual products.

COs 1- To explore the students with limited resources.

COs 2- To explore the students how can obtain the maximum satisfaction possible for society.

COs 3- To explore the students with basic concepts of economics.

Business Organization and Management

Objective: To provide fundamental knowledge and exposure to the concepts, theories, and practices in the field of management. It focuses on the basic roles, skills, and functions of management, with special attention to managerial responsibility for effective and efficient achievement of goals.

COS 1- To facilitate the students in appreciating the significance and application of various managerial functions.

COS 2- To facilitate the students to know about different culture and the benefits of its diversity.

COS 3- To facilitate the students to recognize how employee personality and attitude affects the organization fit.

Business Mathematics

Objective: To prepare students for the mathematical and analytical application required in subsequent business and economics courses.

COS 1- To prepare students how to use of percentages, ratios and proportions for business applications.

COS 2- To prepare students to explored to basic mathematical processes and techniques currently used in the fields of business and finance.

COS 3- To prepare students how to differentiate which math methods should be used for different problems.

Environmental Science

Objective: To highlight the importance of the environmental issues coming up in day to day business activities and recognize the role students can play as future decision makers in protecting the environment.

COS 1- To prepare students so that they should be able to measure environmental variables and interpret results.

COS 2- To help students to describe threats to global biodiversity, their implications and potential solutions.

COS 3- To prepare students to evaluate local, regional and global environmental topics related to resource use and management.

English Language

Objective: To improve the language competency of the students in English and to equip the students to study other academic subjects with greater facility through the theoretical and practical components of the English syllabus; to break the language barriers and make them linguistically efficient so that they can confidently fit themselves in the professional world.

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COS 3- To help students for the removal of barriers between languages; and between languages and subjects.

Organizational Behavior and HRM

Objective: To provide an understanding of basic concepts, theories and techniques in the field of human behavior at the individual, group and organizational levels in the changing global scenario. The course must be taught using case study method.

COS 1- Students will be familiar with the importance of human capital in the organization. It gives an insight regarding individual and group behavior in any organization.

COS 2- Analyze individual and group behavior and understand the implications of organization behavior on the process of management.

COS 3- To identify the different motivational theories and evaluate motivational strategies used in a variety of organizational settings.

Macro Economics

Objective: To provide students with a unified framework that can be used to analyze macroeconomic issues such as flow to income and expenditure, , national income, consumption function, theory of investments, interest rates determinants, inflation, monetary and fiscal policy.

COS 1- Students will be explored to the unified framework of an economy and the related macroeconomics issues.

COS 2- Students will be able to demonstrate an understanding, usage and application of basic economics principles.

COS 3- Describe and apply the methods for analyzing consumer behavior through demand and supply, elasticity and marginal utility.

Business Law

Objective: To develop an understanding of the essential elements of contract law, law of partnership and the various negotiable instruments.

COS 1- The students will learn the basics of business laws and their application in business.

COS 2- To develop the ability to apply concepts, principles and theories to understand simple business laws.

COS 3- To develop the global prospective awareness of the different business laws.

Business Statistics

Objective: Business statistics is helpful in framing suitable policies in a large number of diversified fields covering natural, physical and social sciences. It will enable the students to know statistics, how and when to apply statistical techniques to decision making situations and how to interpret the results.

COS 1- The course consists of instruction in the fundamentals of statistics applied to business situations. The course includes the study of statistical tools used for the purpose of decision making.

COS 2- Produce appropriate graphical and numerical descriptive statistics for different type of data.

COS 3- Apply probability rules and concepts relating to discrete and continuous random variables to answer questions within a business context.

Business Ethics and Corporate Social Responsibility

Objective: The basic objective of this course is to make the students realize the importance of values and ethics in business and acquaint them with the latest trends in corporate social responsibility.

COS 1- The students will learn the importance of ethical conduct in business and understand the roles and responsibilities of corporate in social systems.

COS 2- Justify the importance of ethics and CSR to business and corporate organizations.

COS 3- Evaluate how decisions are actually made in business ethics.

Business Communication-I

Objective: The main aim of this course is to develop the reading, listening, and writing and presentation skills of the students. The students should be able to act with confidence, should be clear about their own personality, character and future goals.

COS 1- The main aim of this course is to develop the reading, listening, writing and presentation skills of the undergraduate students. The students should be able to act with confidence, should be clear about their own personality, character and future goals.

COS 2- To provide an outline to effective organization communication.

COS 3- To impart the correct practices of the strategies of effective business writing.

Computer Applications

Objective: This is a basic paper of IT to familiarize the students with computer and its applications in the relevant fields and exposes them with its utility. The students will learn fundamentals of computers, different software of computer, computer network and communication.

COS 1- This is a basic paper of IT to familiarize the students with computer and its applications in the relevant fields and exposes them with its utility.

COS 2- Demonstrate a basic understanding of computer hardware and software.

COS 3- Demonstrate the basics understanding of network principles.

Business Communication-II

Objective: The course aims at providing fundamental knowledge and exposure to the concepts, theories and practices in the field of communications. Student will be able to write memorandum, office orders and reports. Non-verbal communications and business etiquettes will also be taught to students.

COS 1- To make students conversant with the basic forms, formats and techniques of business communication and exposure of all relevant communication theories.

COS 2- To develop the effective interpersonal communications.

COS 3- To develop the research approaches and information collections.

E-Commerce

Objective: The subject aims to familiarize the student with the basic concept of e-commerce and to provide him/her with the knowledge of planning, scheduling and controlling a successful e-business. Students will learn electronic payment system, its security issues and solutions to security issues. Legal and ethical issues in e-commerce will also be taught to students.

COS 1- This course aims at enabling students to understand the various concepts of e-commerce.

COS 2- Analyzing branding and pricing strategies.

COS 3- Using and determine the effectiveness of market research.

Business Etiquette and Professionalism

Objective: The objective this course is to equip the students with the fundamentals of business etiquette and teach them to build relationship, create a professional appearance, develop positive relationship with co-workers, and practice cubicle and office etiquette.

COS 1- The course will teach students the appropriate behavior and etiquette when using internet, in daily communications, and in meetings.

COS 2- Students also learn how to handle ethical dilemmas and personal issues, become a good conversationalist, and are courteous when communicating.

COS 3- Students also examine the appropriate etiquette for business meals and functions, as well as how to be a courteous traveler at home or abroad.

Management Information System

Objective: To identify the major components of computer system including hardware, software, operating system and basic information system concepts as applied to business operations and management.

COS 1- Students will be able to know information system, software development models and computer operations and programming.

COS 2- To identify the major components of computer system including hardware, software, operating system and basic information system concepts as applied to business operations and management.

COS 3- To develop the effectively communicate strategic alternatives to facilitate decision making.

Disaster Management

Objective: This course aims at enabling students to understand the various disasters and its management.

COS 1- After studying the subject, students will be able to understand natural, man made and national disasters and their management.

COS 2- To ensure skills and ability to design, implement and evaluate research on disasters.

COS 3- To ensure skills and abilities to analyze potential effects of disaster and of the strategies and methods to deliver public health response to avert these affects.

Entrepreneurship

Objective: To familiarize students with the different aspects of managing human resources in the organization through various phases, the roles and responsibilities of HR professionals.

COS 1- Students will learn policy incentive for entrepreneurial growth small scale Industrial Policy, the benefits & opportunities of small business ownership.

COS 2- Students master oral and visual presentation skills and establish a foundation of confidence in the skills necessary to cause others to act.

COS 3- Students with the different aspects of managing human resources in the organization through various phases, the roles and responsibilities of HR professionals.

Company Law and Secretarial Practices

Objective: To provide an insight of various Secretarial practices and the essential elements of Indian Companies Act that plays a vital role for the proceedings of a company.

COS 1- The course will develop understanding of the essential elements of Indian Companies Act.

COS 2- This course is intended to make students understand various company proceedings

COS 3- The course will make students aware about duties and liabilities of company secretary.

Corporate Accounting-1

Objective: To familiarize the students with the basic accounting concept used in companies and their statement preparation

COS 1- To develop student's knowledge of accountancy, particularly in relation to company accounts through a more in-depth and broader study of its contents

COS 2- The course will develop understanding about shares and debentures.

COS 3- The students will know about goodwill.

UBC 204- Operation Research

Objective: To familiarize students with the basic knowledge of concepts of Operations research, the methodology used and its significant role and application in day-to-day business.

COS 1- The course will acquaint the students with the applications of the operations research to business and industry.

COS 2- It will help them to grasp the significance of analytical approach to decision making.

COS 3- It will help students in understanding the mathematical tools that are needed to solve optimisation problems

Indian Economy: Challenges and Scenario

Objective: To acquaint students of the Indian economy, present and future of Indian economics, and how the Indian economy is influencing the business environment in India context.

COS 1- students will be familiar with all the problems and challenges related to our economy and resources utilization.

COS 2- Student will develop ideas of the basic characteristics of Indian economy, its potential on natural resources

COS 3- Students will understand the importance, causes and impact of population growth and its distribution, translate and relate them with economic development.

Corporate Accounting –II

Objective: To familiarize the students with the basic concepts of corporate accounting, techniques and construction of related financial statements.

COS 1- It will make the students aware of some of the important technical issues of corporate accounting.

COS 2- Students will have a solid foundation in accounting and reporting requirements of the Companies Act and relevant Indian Accounting Standards

COS 3- students will understand the regulatory environment in which the companies are formed and operate

Indirect Tax Laws

Objective: To provide an understanding regarding the existence of various indirect tax laws in India. The course will make student understand correct, complete and timely reporting of indirect tax returns.

COS 1- To gain knowledge of Indirect Taxes and to understand the applications of provisions in different circumstances.

COS 2- Students should be able to understand various terms related to Goods and Service **tax**(GST).

COS 3- To make students understand the concept of forward charge mechanism, reverse charge mechanism, composite supply, mixed supply and various exemptions under the new Goods and Service **tax** regime.

COs t Accounting

Objective: To familiarize the students with the basic COs t concepts, allocation and control of various COs ts and methods of COs ting.

COS 1- Students will develop the skill of decision making to have COs t competitiveness.

COS 2- Students will be able to explain the relationships between COs t and financial accounting

COS 3- Students will gain knowledge of recent developments in COs ting methods and emerging concepts.

Introduction to Research Methodology

Objective: The course aims at equipping students with an understanding of the research process, tools and techniques in order to facilitate managerial decision making.

COS 1-The course aims at equipping students with an understanding of the research process, tools and techniques in order to facilitate managerial decision making

COS 2- It will demonstrate the ability to choose methods appropriate to research aims and objectives

COS 3- Students will understand the limitations of particular research methods.

Income Tax –I

Objective: To make students comfortable with the basic provisions of income tax so that they should have understanding of some of the practical aspects of taxation.

COS 1- To impart basic knowledge and equip students with application of principles and provisions of Income-tax Act, 1961 as amended up-to-date.

COS 2- Understand the concept of exempted incomes

COS 3- Identify and comply with the relevant provisions of the Income Tax Act as it relates to the income tax of individuals

Management Accounting

Objective: To build potential to use appropriate accounting tools and techniques of financial accounting & management accounting for preparing and analyzing financial statements.

COS 1- To enable the students to understand the importance of the subject through analysis and interpretation of financial statements, calculation of ratios and their analysis.

COS 2- Apply management accounting and its objectives in facilitating decision making

COS 3- Preparation of funds flow and cash flow statement with a view to prepare management reports for decision making

Financial management

Objective: To provide an understanding of the functions, the roles, goals of the corporate financial management covering the sourcing of finances and their issues in investment and operations

COS 1- Students will equip themselves with topics in corporate finance, how the finances are managed and their reflections on the fundamental decisions to be taken by the corporate and finance world

COS 2- To create an awareness about capital structure and theories of capital structure

COS 3- To provide knowledge about dividend policies and various dividend models.

Financial Services

Objective: The objective of the course is to acquaint the students with the importance of the working capital and the techniques used for effective working capital management.

COS 1- Students will learn the types of financial services and their utilization.

COS 2- To give an idea about fundamentals of financial services and players in financial sectors

COS 3- To create an awareness about merchant banking, issue management, capital markets and role of SEBI.

Banking and Insurance

Objective: Service sector is contributing maximum in India's GDP. Banking and insurance sector constitute important part of service sector. The course has been designed to give students insight into the operations of banking and insurance.

COS 1- To enable the students to understand the importance of the subject of general insurance & life insurance

COS 2- To help to gather knowledge on banking and financial system in India

COS 3- To provide knowledge about commercial banks and its products

Business Finance

Objective: : To provide the students with the tools to understand and solve the basic financial problems confronting business today.

COS 1- To develop students' knowledge of Business Finance to help them understand the basics of the subject.

COS 2- To familiarize the students about various sources of finance.

COS 3- To create an interest in investment habit keeping its wide scope

Income Tax –II

Objective: To make students comfortable with the basic provisions of income tax so that they should have understanding of some of the practical aspects of taxation

COS 1- To impart basic knowledge about administrative structure of IT Department. and equip students with relevant provisions of Income-tax Act, 1961 as amended up-to-date about Return of income, TDS etc.

COS 2- In order to familiarize the different know-how and heads of income with its components

COS 3- Enabling the students to have a fair idea on set-off and carry forward of losses.

Indian Financial System

Objective: The objective of the course is to acquaint the students with the importance of the financial system markets & commercial banks used for effective management.

COS 1- The objective of the course is to acquaint the students with the importance of the financial system markets & commercial banks used for effective management.

COS 2- Illustrate the functioning of financial market and government security market in the development of Indian financial system.

COS 3- Evaluate the functioning of different financial institutions.

Auditing

Objective: To know the concept of auditing, to understand the concept of internal check – internal control, to understand verification and valuation of assets and to understand Preparation of clean and qualified audit report.

COS 1- Students will understand the concept of auditing and internal check,

COS 2- Students will be able to understand Preparation of clean and qualified audit report.

COS 3- Students will understand the concept of internal control, verification and valuation of assets.

Principles of Marketing

Objective: The purpose of this course is to develop an understanding of underlying concepts, strategies and issues involved in marketing of products.

COS 1- Students will be familiar with the concept of marketing, planning and development of product.

COS 2- Students can identify how consumer behaves differently

COS 3- Students will be able to describe the customer segmentation, target marketing and positioning.

Fundamentals of Investment

Objective: To familiarize the students with different investment alternatives, introduce them to the framework of their analysis and valuation and highlight the role of investor protection.

COS 1- Students will be familiar with different investment alternatives, investor protection, awareness and activism.

COS 2- Students will come to know about shares and debentures.

COS 3- Understand different investment alternatives in the market.

Executive MBA

POs 1

To inculcate among the learners the ability & aptitude for life-long learning by emphasizing the philosophy to continuously learn, innovate and apply /create knowledge for personal professional development and for the benefit of the society at large.

POs 2

To enable learners to create entrepreneurial ventures by equipping them with the necessary entrepreneurial skills.

POs 3

To develop the knowledge, skill and attitude to creatively and systematically apply the principles and practices of management, accountancy, finance, business law, statistics, HR, operations and IT to management problems.

POs 4

To demonstrate the critical thinking mindset and the ability to identify and formulate research problems, research literature, design tools, analyse and interpret data, and synthesize the information to provide valid conclusions and contextual approaches across a variety of subject matter.

POs 5

Exhibit self-confidence and awareness of general issues prevailing in the society and communicate effectively with the accounting, commerce, management, business, professional fraternity and with society at large through digital and non-digital mediums and using a variety of modes such as effective reports & documentation, effective presentations, and give and receive clear instructions.

POs 6

The programme imparts knowledge and fosters attitudes essential for the growth of students into competent, responsible managers. The course has an evolving programme content and is constantly updated to be in tune with the emerging trends.

POs 7

Equip students with the required conceptual and interpersonal skills and sense of social purpose for managerial decision-making.

POs 8

Develop leadership capabilities to act as change agents and be a source of motivation in the organizations they work in.

Organization Behaviour & Managerial Effectiveness

Objectives-

The course aims to provide an understanding of basic concepts, theories, and techniques in the field of human behavior at the individual, group, and organizational levels in the changing global scenario. The course must be taught using the case study method.

Learning Outcomes:

COS1: The purpose of this course is to help the students understand management functions

COS2: Familiarize them with the practice of management, to develop an understanding of the behavioral process of the organizations as a whole

COS3: To cultivate insight into individual behavior at the workplace.

COS4: Exhibit a deep understanding of the intricacies of human behavior in an organization and apply the same to solve day-to-day managerial issues

Operations Management

Objectives-

After completing the course, students should have an understanding of the basic concepts of Operations Management. More specifically, the student should understand the important role played by the Operations function in a business and its relation to the other functional areas, and the student should be able to analyze a range of Operations decision situations and apply appropriate decision-making techniques.

Learning Outcomes-

COS1: Provide you with language, concepts, insights

COS2: 2 Tools to deal with these issues to gain competitive advantage through operations.

COS3: Familiarize students with the problems and issues confronting Operations Managers,

COS4: They will understand the quality measure and waste management techniques

Accounting for Managers

Objectives-

The objective of this course is to prepare, comprehend and analyze corporate financial statements. The students will be sensitized to the usefulness of financial information for decision-making and will be equipped with tools to analyze the financial performance of companies.

Learning Outcomes:

COS1: Understand the financial statements-Balance Sheet, Statement of Profit & Loss, and Cash Flow Statement.

COS2: Analyze financial statements from shareholders' perspectives, lenders' perspectives, and management's perspectives.

COS3: Analyze earnings quality concerning choice of accounting policies.

COS4: Compare the firm and industry financial performance analysis

Corporate Communication

Objectives-

The aim is to develop students' ability to communicate correctly and effectively on matters having relevance to day-to-day business operations. This course will make student conversant with the fundamentals of communication, help them hone oral, written, and non-verbal communication skills, and transform their communication abilities.

Learning Outcomes:

COS1: To equip the students with the necessary techniques and skills of communication to inform others,

COS2: Inspire them to enlist their activity and willing cooperation in the performance of their jobs.

Talent Management

Objectives-

The course will introduce the students to practices and techniques of evaluating performance, structuring teams, coaching and mentoring people, and performing the wide range of human-related duties of a manager in today's increasingly complex workplace. The course will establish an understanding of the role that human resource management plays in business administration and improve your ability to think about how HRM should be used as a strategy execution tool.

Learning Outcomes:

COS1: Synthesize information regarding the effectiveness of recruiting methods and the validity of selection procedures and make appropriate staffing decisions;

COS2: Design a training program using a useful framework for evaluating training needs and evaluating a company's implementation of a performance-based pay system; Align HR systems with the strategic business objectives of the firm

COS3: Understand the requirements of being an effective professional and leader and also understand the nuances of becoming an effective team player and being able to work with people from different backgrounds, skill sets, traits, and cultures.

COS4:Exhibit a deep understanding of the intricacies of human behavior in an organization and apply the same to solve day-to-day managerial issues.

Marketing Management

Objectives-

This course intends to introduce the basic concepts related to familiarizing with the basic concepts, and techniques of marketing management, understanding the behavior of consumers, creating awareness of marketing mix elements, and analyzing and solving marketing problems in the complex and fast-changing business environment.

Learning Outcomes-

COS1:Understand the importance of marketing as a function of business,

COS2:Appreciate how organizations study the environment and take appropriate decisions affecting the marketing mix,

COS3:Analyze the marketing approaches as used by various organizations in India across the globe,

COS4:They will learn how to do Channel and promotion decision

Research Methodology

Objectives-

The course introduces the research concepts and basic methodologies. It also emphasizes the applications of various research tools and techniques that aid decision-making in complex business situations.

Learning Outcomes:

COS1:Understand the research process and apply it in formulating and conducting research projects.

COS2:Learn to perform various qualitative and quantitative research techniques including fieldwork/ survey and data collection.

COS3:Learn the test procedures for parametric and non-parametric followed by other tests and report writing.

COS4:Apply various analytical tools and develop research report writing skills

Statistics for Managers

Objective: The objective of this paper is to acquaint the students with various statistical tools and techniques used in business decision-making. The course aims to provide fundamental knowledge and exposure to the students to use various statistical methods to understand, analyze and interpret data for decision-making.

Learning Outcomes:

COS1: The learning outcome of this course is to enable candidates to develop a knowledge

COS2: Understanding of some basic statistical techniques

COS3: Ability to apply this knowledge and understanding in solving business problems.

COS4: They will also use the analysis techniques followed by regression analysis.

Business Strategy

Objectives-

The Strategic Management course focuses on identifying and understanding the sources of superior firm performance. The course introduces theoretical concepts and frameworks useful for analyzing the business environment of the firm. Guiding the formulation and execution of different types of strategies for achieving competitive advantage.

Learning Outcomes:

COS1: Understand principal concepts in strategy theory and practice;

COS2: Analyze the major forces influencing the business environment and incorporate this knowledge into their strategic planning processes;

COS3: Develop strategic and financial objectives and formulate appropriate strategies and programs/ action plans to address the strategic;

COS4: Deal with the challenges in strategy implementation/ execution.

Economics for Managers

Objectives-

The objective of this course is to equip the students with the concepts, tools, and techniques of economic analysis that practicing managers use in the formulation of business policies and effective decision-making involving the efficient use of an organization's scarce resources.

The objective of this course is to equip the students with macroeconomic analysis to understand the context in which businesses operate. It also focuses on the impact of macro variables that influence the economy.

Learning Outcomes:

COS1: Apply the economic way of thinking to individual and business decisions, understand the free market mechanism, and the consequences of government intervention,

COS2: Adopt the model-building approach for demand analysis and forecasting and analyze the different cost concepts, production functions, short & long run decisions, and derive the equilibrium conditions for cost minimization and profit maximization,

COS3: Comprehend the four basic market models of perfect competition, monopoly, monopolistic competition, and oligopoly,

COS4:Articulate macroeconomic concepts and the functioning of an economy and understand the role of economic policies in economic growth.

Leadership Essentials

Objectives-

1. To give students an understanding of good Leadership Behaviors and gain insight into their Patterns, Beliefs, and Attitude.
2. To give students hands-on experience in Empowering, Motivating, and inspiring others and Leading by Example.

Learning Outcomes:

COS1:After studying the subject, students will be able to understand good Leadership Behaviours,

COS2:Gaining insight into their Patterns, Beliefs, and Attitude,

COS3:Deal with the challenges in strategy implementation/ execution,

COS4:They will be able to make an organization a good learning place.

Project Management

Objectives-

This course is aimed at providing both basic and some advanced exposure to PM, to enable the manager of tomorrow to complete sophisticated projects within the constraints of capital, time, and other resources. This course will explore the dimensions and elements of project management; concepts, methodologies, strategies, and structures.

Learning Outcomes:

COS1:Define the nature of the project, the organization, the industry, the environment, the need for project management, and the form of appropriate project management;

COS2:Identify the scope of the study project, do a work definition and work breakdown structure (WBS), and undertake time estimation and schedule preparation of the study project, using single-time PERT, three-time PERT, and CPM;

COS3:Prepare a financial appraisal project report to enable them to build cost estimates and budget for the study project;

COS4:Perform project monitoring and control, using the schedule variance analysis and the cost variance analysis; to perform earned value analysis.

Business Laws

Objectives-

To provide understanding, interpretation, and application of the various business laws and their implications for corporate management issues.

Learning Outcomes:

COS1:Develop an understanding of the formation, implementation of contracts, and the remedies available against nonperformance.

COS2:Appreciate the nature of the contract of sale of goods, implied conditions and warranties, and remedies of the unpaid seller against non-receipt/receipt of defective goods.

COS3:Be able to understand the formation and nature of the company, and the difference between private and public Ltd co and partnership.

COS4:Understand the nature and characteristics of negotiable instruments and the main provisions of the Factories Act and Industries (Development and Regulation) Act.

Entrepreneurial Ventures

Objectives-

This course aims to facilitate the development of skills and a knowledge base that will enhance the student's ability to more effectively understand, interpret and implement entrepreneurial acts and new venture creation. The objective is to prepare MBA students to start and nurture their businesses

Learning Outcomes:

COS1:After studying this subject the students will be able to understand the steps to be followed for becoming a successful entrepreneur

COS2:Role of government and various agencies in promoting entrepreneurship.

COS3:They will be able to plan and analyze the business,

COS4:And also will be able to raise capital for their business.

Human Resource Analytics

Objectives-

To enable the students to understand the concepts, principles, and process of training and development) To develop an understanding of how to assess training needs and design training programmers in an Organizational setting.

Learning Outcomes:

COS1:The students will be able to know the levels, tools, and techniques involved in the evaluation of training effectiveness.

COS2:Exploring the ADDIE model and learning to evaluate ROI

COS3:They will learn assertive training in depth

COS4Concept of L & D in depth.

Industrial Relations and Labour Laws

Objectives-Basic knowledge of various acts and their need in various organizations.

Learning Outcomes:

COS1:To acquaint the students with basic Acts about social security and labor welfare as applicable in India.

COS2:Followed by the Industrial disputes act, of 1947

COS3:Workmen's compensation act, 1923,

COS4:Factories Act, 1948s

Compensation Management

Objectives-The major challenge facing compensation professionals is aligning an organization's pay system with their organization's strategic direction. The focus of this course is to identify the choices to be made to develop and implement a strategically designed reward system

Learning Outcomes:

COS1:The students will be able to analyze, integrate and apply the knowledge to solve compensation-related problems in organizations.

COS2:The students will be able to make strategic compensation planning

COS3:And also conduct wage and salary surveys,

COS4:They will be able to learn incentive schemes and will be able to use them.

Enterprise Resource Planning

Objectives-This course gives special emphasis on the different re-engineering and ERP implementation approaches used by organizations. It also touches upon certain critical contemporary issues during the implementation of ERP and how to resolve them effectively and efficiently

Learning Outcomes:

COS1:Describe the role of Enterprise Resource Planning (ERP) systems in the context of organizational performance and competitive advantage.

COS2:Decide on an effective ERP design and implementation approach based on the requirements and organizational constraints by mapping business requirements with package functionalities through customization and process re-engineering.

COS3:Appreciate the applicability of ERP packages by navigating through different modules in an ERP package.

COS4:Comprehend and effectively resolve the contemporary issues encountered by organizations in an ERP implementation across varied business environments (large scale vs. SME)

Supply Chain Management

Objectives-This course aims at developing the skilled individuals who can design, execute, and manage their organizational supply chains. For these individuals, skill development begins with having a solid foundation of knowledge in supply chain management concepts and principles and by engaging students in case studies based on real world logistics and supply chain decisions.

Learning Outcomes:

COS1:Identify the key elements and processes of a supply chain and how they should interact with system boundaries

COS2:Utilize Mathematical tools to analyze strategic, tactical, and operational decisions including demand forecasting, facility location, inventory management and transportation modelling.

COS3:Demonstrate understanding about the dynamic behavior of supply chains and be able to analyze performance metrics.

COS4:Understand the electronic supply chain management followed by supply chain design, performance measure,

Technology and Innovation Strategy

Objectives-The objective of this course to provide an insight into how technology and innovation can lead to economic dividends for organizations of all kinds? The course draws upon strategic management and discusses its technology dimension in detail.

Learning Outcomes:

COS1:Analyse technological environment of a firm and its relationship with firm's strategy

COS2:Assess technological resources and capabilities of a firm and its implication in achieving competitive advantage.

COS3:Identify technological trends and ecosystems leading to technology based competitive advantages.

COS4:They will have the knowledge of Economy, globalization and IPR.

Integrated Marketing Communication & Brand Management

Objective- The objective of the course is to build competence in the students towards the ways in which companies communicate about themselves and their offerings to the market. The course exposes the students to the concepts of promotion-mix and positioning. It focuses on the role of advertising, sales promotion, public relations, personal selling and interactive marketing for promoting the offerings of an organization. It makes the students aware of how the organizations communicate with their markets.

Learning Outcomes:

COS1: Possess understanding of the various elements of the promotional mix

COS2: Comprehend the fundamental marketing decisions for communicating with the market

COS3: Demonstrate an ability to assess the effectiveness of Advertising and its importance

COS4: Possess understanding of fundamental concepts of Brand Management

COS5: Articulate the various brand management strategies from a local and global aspect

Sales & Distribution Channel Management

Objectives-The objective of the course is to develop in the students and understanding of the ways in which organizations sell and distribute their offerings. The course exposes the students to various sales force management techniques and practices. It also focuses on the distribution systems and channel structures. It makes the students appreciate the effectiveness and efficiency required in managing the selling and distribution activities.

Learning Outcomes:

COS1: Understand the importance of managing the sales and distribution functions effectively in an organization to reach the target market

COS2: Appreciate how organizations supervise and motivate their sales force and the channel partners

COS3: Analyse the sales structure and distribution systems of various organizations in the Indian and international context.

COS4: Suggest how organizations can improve their selling and distribution efforts.

Consumer Behaviour and Digital Marketing

Objectives-The objective of the course is to develop in the students an appreciation of the concept of digital marketing. The course exposes the students to a strategic approach to digital marketing and various techniques used in it. It focuses on the digital environment, online buying

behavior and the social media. It makes the students aware of marketing programs and strategies in the era of online relationship marketing

Learning Outcomes:

COS1: Understand the relevance of studying consumer buying decision process and behaviour, appreciate the pre purchase processes from the point of view of consumers and marketer.

COS2: Analyse the consumer behaviour during purchase and its implications on marketers.

COS3: Understand the importance of an integrated approach towards offline and digital marketing.

COS4: Analyse how organizations formulate and implement digital marketing strategies and contemporary issues of digital marketing: Neuro-marketing.

Financial Analytics

Objectives-To build potential to use appropriate tools and techniques of financial statements and analysis.

Learning Outcomes:

COS1: To enable the students to understand the importance of the subject through analysis and interpretation of financial statements.

COS2: It will help students to calculate of ratios, and their analysis.

COS3: Students will be able to prepare funds flow and cash flow statement.

COS4: It will help students to calculate do break even analysis and cost benefit analysis.

Security Analysis and Portfolio Management

Objectives-To acquaint the students with the working of security market and principles of security analysis; and to develop the skills required for portfolio management so as to be able to judge the competitive position of firm in capital market to support investment decisions

Learning Outcomes:

COS1: They will understand modes of investment, avenues for investment,

COS2: Learn the analysis of securities, risk and return followed by Porter Five factors model and theories of security analysis,

COS3: They will also learn the portfolio analysis followed by different portfolio models,

COS4: The portfolio revision and performance measurement strategies.

Working Capital Management

ObjectivesThe basic objective of this course is to acquaint the students with the concept of working capital, its overall management, the various constituents of working capital and their management, determining and financing working capital requirements.

Learning Outcomes-

COS1:To understand the concept of working capital,

COS2:Use the techniques used for effective working capital management,

COS3:They will be able to manage effectively receivables cash and current liabilities,

COS4:Cash planning and receivable management

Pharmaceutical Regulatory Affairs :Patents and Dra / Intellectual Property Rights (IPR)

Objectives-The course is specifically designed so that students can understand various issues in global intellectual property regime. Also specifically with WTO TRIPS agreement there is compliance of member countries Patent and IPR laws and accordingly the industry need to make their strategy. Proper understanding of the subject will give student an insight to prepare the product development strategy.

Learning Outcomes:

COS1: Students will be able to understand the various issues in global intellectual property regime,

COS2:They will know how to prepare the product development strategy,

COS3:Enforcing the patents and some specific patent issues in pharmaceutical industry,

COS4:They will learn the term of patents and some issues of it in pharmaceutical industry.

Pharmaceutical Quality Assurance

Objectives-The objective of this course is to make the students understand in-depth about various issues relating to quality control and management of various drugs in Pharmaceutical sector.

Learning Outcomes:

COS1:After studying this subject, students will be able to understand the various issues relating to quality control and management of various drugs

COS2:Along with their good manufacturing and laboratory practices in Pharmaceutical sector.

COS3:They will learn the in-process quality control followed by different strategies to do that,

COS4:Also, good laboratory practices and test control articles.

Production Management and Inventory Control

Objectives-The objective of this course is to make the students understand a systematic view of operations and to understand the conversion of inputs into outputs with various technologies.

Learning Outcomes:

COS1:They will understand operations in production houses,

COS2:All the procedures related to inventory and facility management in pharmaceutical concerns,

COS3:They will also learn inventory management with its analysis techniques,

COS4:Drugs store management and inventory control followed by purchase and inventory control.

Master of Business Administration

MBA

POs1

To inculcate among the learners the ability & aptitude for life-long learning by emphasizing the philosophy to continuously learn, innovate and apply /create knowledge for personal professional development and for the benefit of the society at large.

POs 2

To enable learners to create entrepreneurial ventures by equipping them with the necessary entrepreneurial skills.

POs 3

To develop the knowledge, skill and attitude to creatively and systematically apply the principles and practices of management, accountancy, finance, business law, statistics, HR, operations and IT to management problems.

POs 4

To demonstrate the critical thinking mindset and the ability to identify and formulate research problems, research literature, design tools, analyse and interpret data, and synthesize the information to provide valid conclusions and contextual approaches across a variety of subject matter.

POs 5

Exhibit self-confidence and awareness of general issues prevailing in the society and communicate effectively with the accounting, commerce, management, business, professional fraternity and with society at large through digital and non-digital mediums and using a variety of modes such as effective reports & documentation, effective presentations, and give and receive clear instructions.

POs 6

The programme imparts knowledge and fosters attitudes essential for the growth of students into competent, responsible managers. The course has an evolving programme content and is constantly updated to be in tune with the emerging trends.

POs 7

Equip students with the required conceptual and interpersonal skills and sense of social purpose for managerial decision-making.

POs 8

Develop leadership capabilities to act as change agents and be a source of motivation in the organizations they work in.

Economics for Managers

Objective: To provide students with an understanding of basic economic principles of production and exchange-essential tools in making business decisions in today's global economy. The objective is to make the student understanding how the economy works, covering microeconomic description of business applications, including pricing for profit maximization, price elasticity, market structures and modeling of business in varying economic climates.

COS1: After studying this subject the students will be familiar with the basic issues pertaining in micro and macroeconomics,

COS2: Design competition strategies, including costing, pricing, product differentiation, and market environment according to the natures of products and the structures of the markets.

COS3: Make optimal business decisions by integrating the concepts of economics, mathematics and statistics.

Business Environment and Analysis

Objective: This course is intended to make students understand various social, political, legal and economic and other factors that influence business in India so as to enable them appreciate associated opportunities, risks and challenges and their relevance for managerial decisions.

COS1: After studying this subject the students will be able to understand the concept of globalization and trends prevailing in India and international market and also understand its implications to business.

COS2: Familiarize with the nature of business environment and its components.

COS3: The students will be able to demonstrate and develop conceptual framework of business environment and generate interest in international business

Accounting for managers

Objective: The objective of this course is to acquaint the students regarding various accounting concepts and its application in managerial decision making. The course attempts to build potential to use appropriate accounting tools and techniques of financial accounting and management accounting for preparing and analyzing financial statements.

COS1: Understand the nature and role of the four principal financial statements (i.e., the Income Statement, the Statement of Financial Position, the Statement of Cash Flows, and the Statement of Changes in Equity)

COS 2: Understand the role of budgets in organisations, their limitations and the behavioural issues to consider when developing and using budgets for planning and control

COS 3: Develop an awareness of the need to consider ethical, social and other relevant issues, in addition to financial information, in the management decision-making process

Business Communication

Objective: This course is designed to give students a comprehensive view of communication, its scope and importance in business, the role of communication in establishing a favorable image of the organization. The aim is to develop students' ability to communicate correctly and effectively on matters having relevance to day-to-day business operations. This course will make student conversant with fundamentals of communication, help them honing oral, written and non-verbal communication skills and to transform their communication abilities.

COS1: To equip the students with the necessary techniques and skills of communication to inform others, inspire them enlist their activity and willing cooperation in the performance of their jobs.

COS1: By the end of the course students should be able to apply business communication theory to solve workplace communication issues.

COS2: Demonstrate the communication skills required in the workplace.

Business Statistics

Objective: The objective of this paper is to acquaint the students with various statistical tools and techniques used to business decision making. . The course aims at providing fundamental knowledge and exposure to the students to use various statistical methods in order to understand, analyze and interpret data for decision making.

COS1: Students can explain probability theory and probability distributions in relation to general statistical analysis

COS2: Analyse and contrast techniques and biases of quantitative methods within the context they are to be applied

COS3: Evaluate sampling methodologies and their associated analysis.

Management Concepts and Applications

Objective: This course presents a thorough and systematic coverage of management theory and practice. The course aims at providing fundamental knowledge and exposure of the concepts, theories and practices in the field of management. It focuses on the basic roles, skills and functions of management, with special attention to managerial responsibility for effective and efficient achievement of goals.

COS1: Evaluate the global context for taking managerial actions of planning, organizing and controlling. COS2: Assess global situation, including opportunities and threats that will impact management of an organization.

COS3: Integrate management principles into management practices.

Organizational Behavior

Objective: The course aims to provide an understanding of basic concepts, theories and techniques in the field of human behaviour at the individual, group and organizational levels in the changing global scenario. The course must be taught using case study method.

COS1: to analyze and compare different models used to explain individual behaviour related to motivation and rewards.

COS2: to identify the processes used in developing communication and resolving conflicts.

COS3: to explain group dynamics and demonstrate skills required for working in groups (team building)

Business Computing

Objective: The objectives of this paper are to develop skills in handling computer and use it as a strategic resource in management.

COS1: Work with simple design and development tasks for the main types of business information systems

COS2: Students locate, understand, and interpret written information in prose and in documents such as manuals, graphs, and schedules

COS3: Work with simple design and development tasks for the main types of business information systems.

Human Resource Management

Objective: The objective of the paper is to make student aware of the various functions and importance of the HR department in any organization. It is basically concerned with managing the human resources, whereby the underlying objective is to attract retain and motivate the human resources in any organization, which is the most challenging and daunting look for any organization today.

COS1: To have an understanding of the basic concepts, functions and processes of human resource management

COS2: To be aware of the role, functions and functioning of human resource department of the organizations.

COS3. To Design and formulate various HRM processes such as Recruitment, Selection, Training, Development, appraisals and reward Systems, Compensation Plans and Ethical Behavior.

Financial Management

Objective: To provide an understanding of the function, the roles, the goals and the processes of corporate financial management, covering the sourcing of finances and their issues in investment and operations. Problem-solving methodology will be used to illustrate the theories and tools in financial decision making.

COS1: Demonstrate understanding of the goals of the finance manager

COS2: Identify the basic financial environment and institutions

COS3: Perform analytical reviews of financial results, proposals, and plans

Marketing Management

Objective: The course aims at making students understand concepts, philosophies, processes and techniques of managing the marketing operations of a firm in turbulent business environment. This course will provide better understanding of the complexities associated with marketing functions, strategies and provides students with the opportunity to apply the key concepts to practical business situations.

COS1: Interpret complex marketing issues and problems using relevant theories, concepts and methods with regard to ethical conduct.

COS2: Apply contemporary marketing theories to the demands of business and management practice.

COS3: Find and generate information/data needed to inform problem solving in marketing using appropriate methodology.

Production and Operation Management

Objective: It is a subject where a student learns various steps of product design, development, production, plant location, storage, production planning and control. The students are motivated to apply concepts and principles of management to become more effective professional

COS1: Have an understanding of the development of manufacturing and service operations management as a subject and be able to outline the strategic concerns involved in operations decisions;

COS2: Be able to demonstrate the links between operations strategy, corporate strategy and organisation performance;

COS3: Understand quality management and the evolution of practice; assess the relationship between quality and capability, and between quality and competitiveness;

Business Legislation

Objective: This course aims to survey contemporary issues in selected areas of law. It introduces pivotal areas of law, so that students begin to anticipate legal problems, analyze how to avoid them, and realize how legal principles can be employed to add value in their chosen fields.

COS1: On completion of this course, learners will be able to: appreciate the relevance of business law to individuals and businesses and the role of law in an economic, political and social context.

COS2: Understand the legal and fiscal structure of different forms of business organizations and their responsibilities as an employer.

COS3: Acquire problem solving techniques and to be able to present coherent, concise legal argument.

Total Quality Management

Objective: **Objective:** The course is designed to develop a sound understanding of how the application of TQM assists the pursuit of business excellence and provide skills and strategies in

human dimensions of quality and in the tools and techniques applicable to TQM and business excellence.

COS1: know business excellence models and be able assess organization's performance making reference to their criteria;

COS2: know the principles of total quality management and peculiarities of their implementation;

COS3: be able to use quality management methods analyzing and solving problems of organization

Research Methodology

Objective: To create scientific attitude towards solving a management problem and impart knowledge about tools available for carrying out research.

Learning Outcomes: After studying this subject the students will be able to select problem, the appropriate research design for solving that problem, various sources of data collection and effectively handling the research queries in various fields of the organization.

COS1: Develop understanding on various kinds of research, objectives of doing research, research process, research designs and sampling.

COS2: Have adequate knowledge on measurement & scaling techniques as well as the quantitative data analysis

COS3: Have basic awareness of data analysis-and hypothesis testing procedures

Emotional, Intelligence & Managerial, Effectiveness

Objective: To equip students with individual and group learning methods, understand intelligence and develop emotional competence and to develop understanding and competence for personal and managerial effectiveness.

COS1: Interpret and manage your emotions in any situation

COS2: Master tools to regulate and gain control of your own emotions

COS3: Articulate your emotions using the right verbal and non-verbal language

Computer Aided Personal Productivity Tool Lab

Objective: The objective of this subject is to give students mastery of MS Office and to enhance personal productivity through advanced features of MS Word, MS Excel & MS PowerPoint

COS1: The learning outcome of this subject is to enhance personal productivity through advanced features of MS Word, MS Excel & MS PowerPoint.

COS2: To impart skills of using MS Outlook and basic social networking tools.

COS3: Students will be able to turn presentation into a video, Embed or link to a video from presentation.

Entrepreneurship

Objective: The purpose of this paper is to prepare a ground where the students view Entrepreneurship as a desirable and feasible career option.

COS 1: Explain the nature of entrepreneurship

COS 2: Discuss the entrepreneurial opportunities and challenges in a changing environment

COS 3: Discuss the various types of entrepreneurs and identify motivators and rewards of entrepreneurship careers

Operation Research

Objective: The objective of the syllabus is to acquaint the students with the knowledge of various tools and techniques which helps in optimal utilization the scarce resources of an organization.

COS 1: Discuss concepts and principles in operations strategy

COS 2: Formulate and solve problems as networks and graphs

COS 3: Determine the best choice using decision tree

Strategic Management

Objective: The objective of the subject is to make students conversant with a set of management guidelines which specify the firm's product, market position, the directions in which the firm seeks to grow and change the competitive tools it will employ

COS 1: Explain the importance, scope and concept of strategy and strategic management process

COS 2: Prepare vision, mission statements and define goals, objectives for organization

COS 3: Differentiate between tactics, strategies and planning and importance of each component in strategic management

Business Ethics and Corporate Governance

Objective: The course aims to provide a brief background of ethical, moral and value based issues in evaluation of society and its impact on business relationship

COS 1: Explain and evaluate the importance of corporate and professional responsibility and ethical behaviour

COS 2: Apply diagnostic skills when examining and assessing CSR and environmental and social reporting

COS 3: Demonstrate an ability to write and debate about aspects of business ethics and corporate governance in a manner that is analytical, logical and critical

Advertising Management

Objective: The aim of the paper is to acquaint the students with concepts, techniques and give experience in the application of concepts for developing an effective advertising programme

COS 1: Demonstrate an understanding of how an advertising agency operates

COS 2: Identify and understand the various advertising media

COS 3: Demonstrate and understanding of advertising strategies and budgets

Consumer Behaviour

Objective: An understanding of the needs and behaviours of consumers is an intrinsic component of the development and implementation of successful marketing actions

COS 1: Identify the major influences in consumer behaviour

COS 2: Distinguish between different consumer behaviour influences and their relationships

COS 3: Implement appropriate combinations of theories and concepts

Retail Management

Objective: This course is aimed at providing students with a comprehensive understanding of the theoretical and applied aspects of retail management

COS 1: Learn about the ever-changing retail landscape

COS 2: Identify different types of retail businesses

COS 3: Identify key retail terms and Learn about the retail industry's growth and career opportunities

Logistics and Supply Chain Management

Objective: The objective of this course is to provide the students with a good knowledge on logistics and supply chain management and how these topics can be related with the organization and their business needs

COS 1: Develop a sound understanding of the important role of supply chain management in today's business environment

COS 2: Become familiar with current supply chain management trends Understand and apply the current supply chain theories, practices and concepts utilizing case problems and problem-based learning situations

COS 3: Develop and utilize critical management skills such as negotiating, working effectively within a diverse business environment, ethical decision making and use of information technology

Product and Brand Management

Objective: To create understanding among students for concepts, process, techniques of product and brand management

COS 1: Apply the fundamental concepts of product and brand development and management

COS 2: Use the brand positioning framework to develop a brand, keep it relevant, expand a brand internationally, and reposition a brand

COS 3: Apply an understanding of the product manager's role in product pricing, sales, and promotion

Internet Marketing

Objective: The digital revolution affects every aspect of daily life, and marketers need to get to grips with trend in order to stay in touch with the needs of their customers

COS 1: Analyse the confluence of marketing, operations, and human resources in real-time delivery

COS 2: Demonstrate cognitive knowledge of the skills required in conducting online research and research on online markets, as well as in identifying, assessing and selecting internet market opportunities

COS 3: Investigate and evaluate issues in adapting to globalised markets that are constantly changing and increasingly networked

Marketing of Services

Objective: This course aims at creating understanding among the students to apply service marketing concepts and strategies to the create customer value in today's highly competitive environment

COS 1: Examine the nature of services, and distinguish between products and services

COS 2: Identify the major elements needed to improve the marketing of services

COS 3: Develop an understanding of the roles of relationship marketing and customer service in adding value to the customer's perception of a service

International Marketing

Objective: The course aims at acquainting students with the concepts and procedures for international marketing and trains them to develop and implement plans and strategies for entering international markets and managing overseas operations

COS 1: Have developed an understanding of major issues related to international marketing

COS 2: Have developed skills in researching and analysing trends in global markets and in modern marketing practice

COS 3: Be able to assess an organization's ability to enter and compete in international markets

Sales and Distribution Management

Objective: The objective of this course is to make students understand about the recruitment, selection and training of sales force in the organization for better decision making

COS 1: Understanding of the various roles, responsibilities and policies of sales function

COS 2: Overview the issues of power and conflict in the organization

COS 3: Understanding to manage, motivate, and lead sales force

Digital Marketing

Objective: The role of digital marketing is to help students better understand Digital marketing and its working

COS 1: Analyse the confluence of marketing, operations, and human resources in real-time delivery

COS 2: Explain emerging trends in digital marketing and critically assess the use of digital marketing tools by applying relevant marketing theories and frameworks

COS 3: Investigate and evaluate issues in adapting to globalised markets that are constantly changing and increasingly networked

Rural and Agriculture Marketing

Objective: The objective of this course is to explore the students to the Agriculture and Rural Marketing environment so that they can understand consumers and marketing characteristics of the same for understanding and contributing to the emerging challenges in the upcoming global economic scenario

COS 1: Learn the markets and market structure

COS 2: Imparting knowledge of the marketing efficiency and agricultural prices

COS 3: Gain skills to analyse marketing functions, market information and intelligence

Customer Relationship Management

Objective: At the end of the course students will have understanding of what CRM means to businesses, plus why and the how of putting a CRM Program into action

COS 1: Evaluate CRM implementation strategies

COS 2: Formulate and assess strategic, operational and tactical CRM decisions

COS 3: Plan and conduct an investigation on an aspect of CRM, and communicate findings in an appropriate format

Security Analysis and Portfolio Management

Objective: To acquaint the students with the working of security market and principles of security analysis; and to develop the skills required for portfolio management so as to be able to judge the competitive position of firm in capital market to support investment decisions.

COS1

After studying this subject the students will be able to understand modes of investment, avenues for investment, analysis of securities, risk and return.

COS2

Student will be able to know the functioning of securities market in India.

COS3

After studying this subject the students will learn the Portfolio revision strategies.

Management Control System

Objective: The objective of this course is to make students understand control systems in the organization for better decision making.

COS1

After studying this subject the students will learn the different approaches and design to management control system

COS2

The outcome of the course is to make student learn about the organizational climate, Budgetary planning and its relevance within the organization.

COS3

The outcome of the course is to make student learn about the reward system and variance analysis with reference to management control system.

Indian Financial System

Objective: This course is aimed at providing the basic understanding of financial markets that how the markets are inter-linked, structured and regulated. The course also provides an overview of various financial services, their emerging role, regulations and as to the performance related issues.

COS1

This course is aimed at providing the basic understanding of financial markets that how the markets are inter-linked, structured and regulated.

COS2

After studying the subject, students will be able to learn the components, deficiencies and recent developments of Financial System.

COS3

This course is aimed at providing the basic understanding of Investment Bankers, their role, performance and Recent Developments.

Working Capital Management

Objective: The basic objective of this course is to acquaint the students with the concept of working capital, its overall management, the various constituents of working capital and their management, determining and financing working capital requirements.

COS1

After studying the subject students will learn the working capital, nature, types and working capital policy.

COS2

After studying this subject the students will be able to understand the importance of the working capital and the techniques used for effective working capital management.

COS3

They will be able to manage effectively receivables cash and current liabilities.

Principles of Banking and Insurance

Objective- The objective of this course is to provide the basic idea of the concept of banking and insurance.

COS1

After studying the subject students will learn the various components of electronic banking.

COS2

After studying the subject students will learn the various aspects and types of insurance.

COS3

This course is aimed at providing basic understanding of re-insurance vs. double insurance, policy servicing and claim settlements.

Strategic Financial Management

Objective: The objective of this course is to help students to understand the strategies and contemporary issues relating to finance.

COS1

This course is aimed at providing basic understanding of success factors leading strategic financial management, investment decisions under risk and uncertainty, corporate strategies .

COS2

After studying this subject the students will be able to do financial analysis along with preparation of financial statements.

COS3

After studying this subject the students will be able to do forecasting of financial statements.

International Financial Management

Objective: The objective of this paper is to help students to understand finance in global settings and be aware of international aspects of financial management.

COS1

After studying this subject the students will be able to understand international monetary system, international financial market.

COS2

Students will be able to take short term and long term investment decisions.

COS3

After studying the subject students will learn international monetary system, gold standard and Bretton Wood System.

Management of Financial Services

Objective- The course provides an understanding of the financial services environment and a foundation in the economic principles of supply, demand, and market competition COS1

After studying this subject the students will be able to understand the latest emerging trends in financial services, legal frame work, management of risk in financial services and credit rating agencies.

COS2

Course focuses on developing successful careers in or related financial services by Learning through visits to various financial service providers.

COs2

Students will practice and apply the skills needed for careers in investments and financial services by exploring the fund based and fee based financial services.

COS3

The course aims at understanding of management of risks in financial services.

Merger Acquisition and Amalgamation

Objective-The purpose of this course is to sensitize the students about the need for corporate restructuring for achieving fast growth and maximize shareholders value in the context of ever increasing competition thrown up by liberalization and globalization of Indian economy.

COS1

After pursuing this course the students will be able to develop competencies in identifying opportunities/areas for mergers, demergers, amalgamations and takeovers etc., carrying out valuations involved therein, building up strategies for them and evaluating the post restructuring performance of the enterprise.

COS2

After studying this subject the students will be able to understand that how mergers, acquisitions and corporate restructuring is implemented, various regulations for take over and defense and bid strategies of mergers.

COS3

After pursuing this course the students will be able to understand the concept of valuation, valuation models modes of valuation.

Financial Engineering

Objective- This course aims at enabling the students to understand and analyze financial problems and developing their skills for the solutions of these problems with the help of innovative financial processes, instruments and strategies.

COS1

After studying this paper a students will be able to understand and analyze financial problems and developing their skills for the solutions of these problems

COS2

The course aims at understanding the tools used in financial engineering.

COS3

After studying this paper students will be able to understand the determinations of value of financial instruments and products.

Project Management

Objective: The course addresses the role of project managers in the current world of rapid change, increased competitive forces, and increased expectations for the successful delivery of projects in organizations.

COS1

After studying this subject the students will be able to understand process of generating and screening process idea, analysis of project.

COS2

After studying this paper students will be able to understand the estimation and measurement of risk.

COS3

Course focuses on concept of project planning, scheduling and project scheduling methods.

Credit Management

Objective- The objective of this course is to provide an understanding and application of credit management in financial sector along with awareness to various credit management practices and policies with respect to various organizations with a special emphasis on banking sector.

COS1

After studying this subject the students will be able to understand the credit process and credit policies.

COS2

Course focuses on concept of advances against securities and various norms given by Basel and CIBIL.

COS3

After studying this subject the students will be able to understand the consumer credit and commercial credit law.

Industrial Relations and Labour Legislation

Objective: Understanding of the legal framework is important for the efficient decision making relating to human resource management and industrial relations. The course aims to provide an understanding, application and interpretation of the various labour

COS 1: Students should able to elaborate the concept of Industrial Relations

COS 2: The students should able to illustrate the role of trade union in the industrial setup

COS 3: Students should able to outline the important causes & impact of industrial disputes

Human Resources Development and Training

Objective: To create understanding among students for need, importance and implementation of training so as to achieve employee development

COS 1: To develop the understanding of the concept of human resource management and to understand its relevance in organizations

COS 2: To develop necessary skill set for application of various HR issues

COS 3: To analyse the strategic issues and strategies required to select and develop manpower resources

Organizational Change and Development

Objective: The objective of the subject is to blend theory, concepts and applications in a comprehensive and clear presentation

COS 1: How to change and develop organizations

COS 2: Better understanding of the change management model

COS 3: Skills needed to develop an action plan for the development process. Better understanding of change resistance and how to handle it

Competency and Performance Management System

Objective: The objective of the course is to apprise the students about the importance of Performance Management in organizations and impart an understanding of the process of managing performance to achieve the organization's current and future objectives

COS 1: Explain Concept, Need, Linkages with Strategic Planning, Management Control and Operational Control

COS 2: Explain Concept of Responsibility Centers, Revenue Centre, Expense Centre - Engineered and Discretionary costs – Committed costs, Profit Centre, Investment Centers

COS 3: Explain Concept, Need, Process of Capital Budgeting

Behavioural Testing and Counselling

Objective: This Course will aid the students in having a clear understanding about the concepts, methods and techniques and issues involved in Behavior testing and counselling and a comprehensive learning of using various behavior tests in organizations and counselling skills to deal with employees

COS 1: After studying this subject student will be able to test the behaviour of employees with the tools designed in behaviour testing

COS 2: Psychological testing, counselling in order to decrease employee grievances

COS 3: Dealing with problem employees

Interpersonal and Group Processes

Objective: The purpose of this course is to advance understanding regarding interpersonal and group processes and help the student to examine and develop process facilitation skills mainly through laboratory and other experience-based methods of learning

COS 1: This course prepares students for the advance understanding regarding interpersonal and group processes

COS 2: Develop process facilitation skills mainly through laboratory and other experience-based methods of learning

COS 3: Success story of today's global and Indian leaders

International HRM (MBA SEMESTER IV)

Objective: The course seeks to look at HRM in a broader, comparative and international perspective to deal with complex issues and manifold risks

COS 1: Knowledge and Understanding Obtain, through elective courses, an in-depth knowledge of specific IHRM-related theories, skills and practices

COS 2: Appreciate the implications of increasing globalisation for the management of human resources, with particular reference to IHRM in multinational corporations

COS 3: After studying this subject the students will be able to understand the cultural dimension of international HRM, shift in cultures and ethics in cross – cultural management

Strategic Human Resource Management

Objective: The objective of this course is to appreciate how human resource is emerging as a key resource for competitive advantage and understanding the role of HRM in organizational performance

COS 1: Analyse problems and develop managerial solutions to employment relations problems at both national and workplace level

COS 2: Communicate knowledge of SHRM and employment relations in both written and verbal formats reactive to both audience and purpose

COS 3: Apply critical thinking skills in analysing theoretical and applied perspectives of strategic HRM

Compensation Management

Objective: The course is designed to promote understanding of issues related to the compensation or rewarding human resources in the corporate sector, public services and other forms of organizations

COS 1: Recognize how pay decisions help the organization achieve a competitive advantage

COS 2: Analyze, integrate, and apply the knowledge to solve compensation related problems in organizations

COS 3: Design rational and contemporary compensation systems in modern organizations

Industrial Psychology

Objective: This course will introduce you to the major aspects of industrial psychology. You will learn how industrial psychologists' study and apply psychological principles and research methods to a variety of personnel issues

COS 1: After studying this course the students will be able to understand the major aspects of industrial psychology, attitudes and human engineering, studies for boosting employee morale

COS 2: Students will be able to understand the major aspects of training and learning process

COS 3: The students will be able to understand characteristics of workplace

Managing Negotiations and Conflict Management

Objective: The objective of this course is to help students develop the skills of conflict avoidance, resolution and negotiation in organization

COS 1: judge and select methods of negotiation and alternative dispute resolution

COS 2: define and critically evaluate the different types of strategies employed to become effective negotiators

COS 3: apply skills to be more effective in their roles within an organisation by negotiating and managing conflict

Human Resource Planning and Auditing

Objective: The objective of this course is to make students aware about the importance of manpower planning specially in today's dynamic environment with emphasis on effective recruitment and selection

COS 1: To equip the students with the necessary techniques and skills for Human resource planning and auditing

COS 2: Students will be able to understand audits of business goals and plans

COS 3: They will be able to understand about human resource accounting concept, development and role of HR in accounting

Retail and Store Operations Management

Objective: This course will enable students to critically understand and analyze the retail store environment within which operations and the functions are performed

COS 1: Students will be able to realize the cross functional nature of the operations process

COS 2: This will help to create a better retail outlet

COS 3: Recognize supportive processes and manage the operations of retail store

Logistics and Supply Chain Management

Objective: The objective of this course is to provide the students with a good knowledge on logistics and supply chain management and how these topics can be related with the organization and their business needs

COS 1: Develop a sound understanding of the important role of supply chain management in today's business environment

COS 2: Become familiar with current supply chain management trends Understand and apply the current supply chain theories, practices and concepts utilizing case problems and problem-based learning situations

COS 3: Learn to use and apply computer-based supply chain optimization tools including the use of selected state of the art supply chain software suites currently used in business

Retail and Brand Management

Objective: The Course aims to create ability to design, implement and evaluate Branding Strategies, to describe and identify all the components of brand equity

COS 1: Students will able to describe and identify all the components of brand management

COS 2: Also attain the knowledge of retailing

COS 3: Students will be able to understand the role & concept of branding

Franchising Management

Objective: The objective of this course is to make students understand the basic concept of mall management, its operations and important decisions in mall management

COS 1: You will be able to understand the meaning of the term 'franchising'

COS 2: Describe the different franchising methods Identify the various advantages and disadvantages of franchising

COS 3: Discuss how prospective franchising can evaluate a franchisor and franchising opportunity

Buying and Merchandise

Objective: The objective of this course is to make students understand about buyer's behaviour in retailing, merchandise management and implementing effective merchandising plans

COS 1: After studying this subject student will be able to understand the types of customers

COS 2: Students will be able to understand the types of operation management, strategic retailing management

COS 3: Understand the concept of merchandising and merchandise control

Promotion and Customer Relationship Management

Objective: The objective of this course is to make students understand about the power of publicity, role of e-commerce, concept of relationship marketing and role of IT as a promotion tools and creating relationship

COS 1: Discuss how organizations use CRM systems for targeted marketing communication

COS 2: You'll learn about the role of CRM systems in helping marketers deliver the right types of marketing campaigns and interaction opportunities to the right people at the right time

COS 3: Students will be able to understand the emerging concepts and issues in marketing communications

E-Retailing: Retail Information System

Objective: The objective of this course is to enable students to understand the concept of e-retailing, utility of e retailing and customer loyalty in the age of e-retailing

COS 1: Students will be able to understand e-retailing, payment systems and security challenges in e-retailing

COS 2: They will be able to understand customer loyalty in the age of e-retailing

COS 3: Understand the concept of Promotional strategies of e-retail business

Franchising and Global Retailing

Objective: The objective of this course is to make students understand the evolution, trends and distribution methods in global retailing

COS 1: Students will be able to know the concept of franchising,

COS 2: Will be able to understand evolution, types of franchising

COS 3: Understand the concept of global retailing and international retail divestment

HR Legal Issues in Retail

Objective: This course will enable students to understand HR practices in retail in India. The course aims to provide inputs for the motivation in retail and legal aspects in retail in India

COS 1: Students will be able to understand HR environment of retailing

COS 2: Understand the concept of motivation and leadership in retail

COS 3: Will be able to understand the notion of laws and regulations related to retailing

Strategic Issue in Retailing and Rural Retailing

Objective: The objective of this course is to make students understand the basics of strategic issues in retailing with reference to banking sector and rural areas

COS 1: The students will be able to learn the current scenario of retailing sector

COS 2: Will be able to learn the role of information technology in rural market and financial service sector

COS 3: Able to understand rural and export marketing strategies role of information technology in rural retail markets

Interactive Marketing

Objective: The objective of this course is to make students understand the basics of online marketing campaign, direct marketing media and role of consumer database in planning

COS 1: Analyse the confluence of marketing, operations, and human resources in real-time delivery

COS 2: Demonstrate cognitive knowledge of the skills required in conducting online research and research on online markets, as well as in identifying, assessing and selecting digital market opportunities

COS 3: students will be able to understand the various promotional tools relating to interactive marketing and direct marketing media

Visual Merchandising and Vendor Management

Objective: The objective of this course is to make students understand the basics of visual merchandising, and the managing relations with the suppliers

COS 1: Students will be able to understand the concept of visual merchandizing with special reference to store planning and supplier relation management

COS 2: Will be able to learn about vendor management risk mitigation actions, action plans, initial solutions

COS 3: Able to understand regarding the basics of visual merchandising

Strategic Issues in Pharmaceutical Marketing

Objective: The objective of this course is to create in-depth understanding of various corporate strategies, their formulation, implementation and process of change in strategies

COS 1: Will be able to ensure customer focus throughout product development

COS 2: Students will understand the various corporate strategies, decisions regarding marketing mix

COS 3: Will also gain knowledge about their formulation and implementation in pharmaceutical sector

Introduction to Pharmacy Business Environment

Objective: The objective of the subject is to provide an insight to the participants about the changes that are taking place in the Pharma sector, the effect of these changes on business and the demand placed on managers regarding national and global business environment

COS 1: Students will understand the changing dimensions of corporate environment, economic trends and various forms of foreign investments that affect pharmaceuticals industry

COS 2: Will be able to learn about Social responsibility of business, consumerism in India

COS 3: Will be able to understand concept of globalization and (FDI) foreign direct investment

Pharmaco Economics

Objective: To provide students with an understanding of basic economic principles of production and exchange-essential tools in making business decisions in today's global economy

COS 1: Students will understand the basic economic principles of demand, production and price

COS 2: Will be able to apply the various aspects of pharmaco economics in the practical

COS 3: Will be able to learn the various policies relating to pharmaceutical industry

Consumer Behavior In Pharmaceuticals

Objective: The course will also help students to understand the various factors affecting consumer behavior and to understand the process of consumer buying for pharmaceutical industry

COS 1: Students will be able to understand the various factors affecting consumer behavior and the process of consumer buying in pharmaceutical industry

COS 2: Further they will be able to apply the various approaches of marketing research for measurement of sales and demand in the sector

COS 3: Students will be able to learn about applications of marketing research in pharmaceutical industry

New Product Launch and Brand Building in Pharmaceuticals

Objective: The objective of this course is to enrich the students about various essentials of brand management including brand identity, brand image, brand awareness, brand equity and brand extension and to ignite the interest in the area of Brand Management

COS 1: Students will be able to understand various essentials of brand management including brand identity, brand image, brand awareness, brand equity and brand extension

COS 2: They will be able to understand the valuation of pharmaceutical brand & relevance of brand valuation to the pharmaceutical industry

COS 3: Will be able to learn about various strategies for successful launch of new pharmaceutical products in emerging markets

Production Management and Inventory Control

Objective: The objective of this course is to make the students understand a systematic view of operations and to understand the conversion of inputs into outputs with various technologies

COS 1: Students will be able to understand operations in production houses

COS 2: Will be able to learn all the procedures related to inventory and facility management in pharmaceutical concerns

COS 3: Will be able to define various factors that affect inventory management

International Marketing In Pharmaceuticals

Objective: The objective of this course is to make student learn about marketing concepts, marketing strategies and marketing trends in relation to International Pharmaceuticals Industry

COS 1: students will be able to understand marketing strategies

COS 2: Also, will able to understand, challenges and environment in international context for pharmaceutical concerns

COS 3: Will able to learn about market segmentation on the basis of pharmaceutical marketing

Pharmaceutical Quality Assurance

Objective: The objective of this course is to make the students understand in-depth about various issues relating to quality control and management of various drugs in Pharmaceutical sector

COS1: After studying this subject, students will be able to understand the various issues relating to quality control and management of various drugs along with their good manufacturing and laboratory practices in Pharmaceutical sector

COS 2: To understand the scope of quality certifications applicable to pharmaceutical industries

COS 3: To understand the responsibilities of QA departments

Pharmaceutical Regulatory Affairs: Patents and Dra / Intellectual Property Rights (IPR)

Objective: The course is specifically designed so that students can understand various issues in global intellectual property regime

COS 1: Students will be able to understand the various issues in global intellectual property regime

COS 2: Students will know how to prepare the product development strategy

COS 3: Will be able to learn about some specific patent issues with pharmaceuticals industry

Logistics And Supply Chain Management For Pharmaceuticals

Objective: The objective of this course is to explore the students to the better and more practical understanding of Supply Chain Management, with a focus on developing SCM for Pharmaceutical sector

COS 1: Understanding of logistics and supply chain management

COS 2: The student should be able to apply the concepts and technology to improve the supply chain management in industry

COS 3: Will be able to learn about key enablers in supply chain improvement

Medical Pharmacology

Objective: The objective of the course is to make students familiar with main molecules (drugs) available in the market for various ailments and to introduce them to the brands of those drugs

COS 1: Students will be able to understand the main molecules (drugs) available in the market for various ailments and to the brands of those drugs

COS 2: Students will be able to learn to understand the pharmacodynamics in drug development

COS 3: Students will be able to learn to understand the concept of anti-inflammatory drugs, analgesics

Pharmaceuticals Management Information System

Objective: the main purpose of teaching this subject is to make students aware about need of MIS and to make them understand methodologies and techniques

COS 1: Students will be able to understand the management and controlling the MIS function with respect to pharmaceutical industry

COS 2: Students will be able to understand the MIS function

COS 3: Able to understand about business data processing and procedure for acquiring hardware and software with respect to pharmaceutical industry

Search Engine Optimization

Objective: The objective of this paper is to provide knowledge of search engine optimization, website designs and market research

COS 1: Students will be able to learn to understand about Google Analytics and tools and techniques of SEO

COS 2: Students will be able to learn to understand the basic Knowledge of SEO and types of SEO Techniques.

COS 3: Students will be able to learn to understand the website Design SEO Guidelines

Search engine marketing

Objective: The objectives of this paper are to provide the information regarding Ad writing techniques, Bid management plan and Decipher user technology

Students will be able to learn

COS 1: Students will be able to learn to understand the knowledge of Ad writing techniques

COS 2: Students will be able to learn to understand the bidding strategy

COS 3: Students will be able to learn to understand the reporting & Analysis by using Decipher user technology

Web analytics

Objective: The objectives of this paper are to teach the students regarding web analytics, e-commerce and tools of web analytics

COS 1: Students will be able to learn to understand the business analysis of Small, Medium and large-scale organizations.

COS 2: Students will be able to learn to understand the ecommerce tracking.

COS 3: Students will be able to learn to understand the tools and techniques of web analysis.

INBOUND DIGITAL MARKETING

Objective: The objectives of this paper understand the methods of attracting potential customers, audience aggregation and Patterns for Engaging Website Visitors

COS 1: Students will be able to learn to understand the engagement magnets and right set of engagement magnets.

COS 2: Students will be able to learn to understand the online Persuasion.

COS 3: Students will be able to learn to understand the patterns for Engaging Website Visitors

Website planning and creation

Objective: The objective of this paper is to provide the students information regarding web planning, types of web server and building of website

COS 1: Students will be able to learn the process of creation of website.

COS 2: Students will be able to learn to understand the web server and web hosting.

COS 3: Students will be able to learn to understand the building website using CMS.

Digital Display Advertising and online reputation management

Objective: The objectives of this paper are to teach students online display advertising, payment modules and online reputation management

COS 1: Students will be able to learn to understand the online advertising process.

COS 2: Students will be able to learn to understand the payment modules and online solution tracking

COS 3: Students will be able to learn to understand the methods of creating positive brand image

Social media marketing

Objective: The objectives of this paper are to provide knowledge of social media marketing, creation of social media marketing and video marketing

COS 1: Students will be able to learn to understand the social Media paradigms & psychology

COS 2: Students will be able to learn to understand the how to market through face book and LinkedIn

COS 3: Students will be able to learn to understand the video marketing and uploading of videos

Email marketing

Objective: The objectives of this paper are to introduce email marketing, email design and functionality

COS 1: Students will be able to learn to understand the E-mail foundation and email marketing

COS 2: Students will be able to learn to understand the Email Design and Functionality

COS 3: Students will be able to learn to understand the Email Optimization and Testing

Internet marketing

Objective: The objectives of this paper are to introduce students with the concept of internet marketing and tell them how to use business to business relationships to grow your business

COS 1: Students will be able to learn to understand the business advantages to Internet Marketing

COS 2: Students will be able to learn to understand the how to use personal network to expand internet marketing

COS 3: Students will be able to learn to understand the how to use business to business relationships to grow business

E- business

Objectives: The course imparts understanding of the concepts and various application issues of e-business like Internet infrastructure, security over internet, payment systems and various online strategies for e-business

Students will be able to -

COS 1: Students will be able to learn to understand the models and types of Electronic Commerce.

COS 2: Students will be able to learn to understand the security Threats to e-business Security

COS 3: Students will be able to learn to understand the electronic Payment System and its types

Mobile marketing

Objective: The objectives of this paper are to understand the students advanced mobile marketing, mobile marketing campaign and proximity marketing

COS 1: Students will be able to learn the advanced Mobile Marketing and its tools

COS 2: Students will learn how to Develop a Mobile Marketing Campaign.

COS 3: Students will be able to learn the proximity Marketing Rules and Ethics of Mobile Marketing.

Integrating digital media and branding

Objective: This course aims to provide candidates with a good understanding of the fragmented nature of media management

COS 1: Students will be able to learn to evaluate the importance of integrating diverse media in communication.

COS 2: Students will be able to learn to analyse the challenges of integrating communications via digital and offline media

COS 3: Students will understand the role of social media and networks in communication

Programme: B.Sc (Hons) Agriculture

School of Agricultural Sciences

Scheme and Syllabi



W.e.f. Academic Session 2022-23

BUEST

School of Agricultural Sciences

ANNEXURE-III(a)

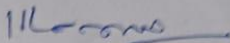
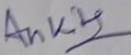
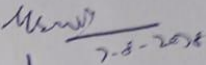
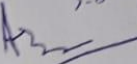
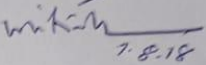
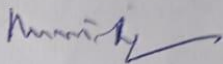
BADDI UNIVERSITY OF EMERGING SCIENCES & TECHNOLOGY
 Proceedings of the Board of Studies for the Academic Session 2018-19

No - BU/ST/Agri/18-19/104

School-SOAS
 Department- Agricultural Sciences

Date- 7-8-2018


PRESENT

Name	Designation	Signatures
Prof. J.K. Sharma	Chairman	
Dr. (Ms) Ankita Sood	Member	
Dr. (Ms) Urvi Sharma	Member	
Dr. (Ms) Aradhana Dohru	Member	
Dr. Nitish Kumar	Member	
Dr. Munish Kumar	Member	

Proceedings

At the outset, Board appreciated the efforts of the Faculty of B.Sc. (Hons.) Agriculture in designing the scheme and syllabus for Under-Graduate Course for B.Sc. (Hons.) Agriculture alongwith **Choice Based Credit System** for the academic session 2018-2021 as per ICAR guidelines and UGC requirement.

Item No.	Particulars
1	New Scheme of B.Sc. (Hons.) Agriculture program for the academic session 2018-2021 for semester I-VIII.
2	Syllabus of B.Sc. (Hons.) Agriculture and Choice Based Credit System.
3	Panel of External papers setters


 Dean 7-8-18

Program Specific Objectives for B.Sc (Hons) Agriculture

Program Educational Objectives (PEOs)

- PEO 1 Imparting comprehensive knowledge of theory as well as practical of the subjects and establishing organic linkage between the theory and practical solutions.
- PEO 2 Fostering all round growth of the students, building their self confidence and critical abilities to take on the real life challenges.
- PEO 3 Inspiring deep interest in the agricultural sciences encompassing research, teaching and extension aspects.
- PEO 4 Preparing the students for practical application of the skills learned for solving real life problems of agricultural sectors.

Programme Outcomes (POs)

- PO 1 To achieve professional excellence with all round personality development of the students, in order to meet, the emerging challenges of the dynamic agricultural scenario.
- PO 2 To evolve appropriate and sustainable technologies for successful hill agriculture amidst conservation of biodiversity as well as, for a multitude of professions across different sectors and geographies.
- PO 3 To create a breed of qualified, innovative and dynamic professionals for agricultural sectors, agro- based industries, academic and research institutions, and for taking up self employment ventures.
- PO 4 To meet the new challenges of fast evolving agricultural production systems which necessarily entail a complete metamorphosis of teaching, research and extension segments.

1st Semester (First Year)

Sr.No.	Name of Course	Course No.	Cr. Hr.
1.	Fundamentals of Horticulture	Hort.111	2 (1+1)
2.	Fundamentals of Soil Science	Soils 111	3(2+1)
3.	Introduction to Forestry	FTY 111	2 (1+1)
4.	Comprehension & Communication Skills in English	Eng. 111	2(1+1)
5.	Fundamentals of Agronomy	Agron.111	4(3+1)
6.	Introductory Biology	Bio.111	2(1+1) *
	Elementary Mathematics	Math 111	2(2+0)*
7.	Agricultural Heritage	Agron. 112	1(1+0) *

8.	Rural Sociology & Educational Psychology	Ext. 111	2(2+0)
9.	Human Values & Ethics	Soc.111	1(1+0) **
10.	Environmental Studies and Disaster Management	Env. 111	3(2+1)
11.	Orientation	ORT 111	1(1+0) **
12.	NSS		2(0+2) **
	Total		18+03+03

2nd Semester (First Year)

Sr.No.	Name of Course	Course No.	Cr. Hr.
1.	Fundamentals of Genetics	GP 121	3 (2+1)
2.	Agricultural Microbiology	Ag. Micro. 121	2(1+1)
3.	Soil and Water Conservation Engineering	Ag. Engg. 121	2 (1+1)
4.	Fundamentals of Agricultural Economics	Ag. Econ. 121	2(2+0)
5.	Fundamentals of Plant Pathology	Pl. Path. 121	3(2+1)
6.	Fundamentals of Entomology	Ento. 121	3(2+1)
7.	Fundamentals of Agricultural Extension Education	Ext. 122	3(2+1)
8.	Communication Skills and Personality Development	Ext. 123	2(1+1)
9.	Plant Biochemistry	PB 121	2(1+1)
10.	Production Technology for Vegetables and Spices	VSF 121	2(1+1)
11.	NSS**		2(0+2)**NC
	Total		24+02(NC)

Course Outcomes (CO)

SEMESTER 1

Course Code: Hort.111

Name of Course-Fundamentals of Horticulture

Credit Hours: 2 (1+1)

CO 1 Students will acquire knowledge about the vegetative structures of different horticultural crops.

- CO 2** Students will have an insight into the propagation-techniques, propagating structures and also learn the principles of orchard establishment.
- CO 3** Students will recognize the importance of horticulture in the economy and its relationship with the environment.
- CO 4** Student will learn about the growing and sustainability of horticultural plants-cultural practices including harvesting operations.

Course Code: Soils 111

Name of Course-Fundamentals of Soil Science

Credit Hours: 3 (2+1)

- CO 1** To study pedological concepts of soil, soil genesis, soil forming rocks and minerals, soil profile, components of soil, weathering and factors and processes of soil formation.
- CO 2** To learn physical properties of soil, like soil texture, density, soil porosity, soil color, consistence, plasticity, etc. besides, soil reaction-pH, soil acidity and alkalinity, effect on nutrient availability etc.
- CO 3** To impart elementary knowledge of soil taxonomy, classification of soils of India.
- CO 4** To study soil colloids- inorganic and organic, sources of charge ion exchange, cation exchange capacity, organic matter; composition, properties and its influence on soil properties.
- CO 5** To learn about soil organisms- macro and micro organisms, their beneficial and harmful effects, besides learning about soil pollution, behavior of pesticides and inorganic contaminants, mitigation of soil pollution.

Course Code: FTY 111

Name of Course-Introduction to Forestry

Credit Hours: 2(1+1)

- CO 1** The student is acquainted with the basic concepts of forestry, salient features of Indian forest ecosystem.
- CO2** The student learns about natural forests and manmade forests, forest regeneration, policies of the government regarding conservation and management of forest wealth.

CO 3 The student will be able to use the silvicultural practices learned, for achieving the national objectives or for compliance with the forest policies

CO 4 The students can appreciate the role of efficient forest management in biodiversity conservation as well as in mitigating or moderating the adverse effects of climate change.

Course Code: Eng. 111

Name of Course-Comprehension &Communication Skills in English

Credit Hours: 2(1+1)

CO 1 Students can distinguish the action, interaction and transaction models of communication.

CO 2 Students will be aware of the importance of communication skills .They will be able to know the common misconceptions about communication and the reasons, people use language.

CO 3 Students will able to analyze basic communication skills, intercultural communication skills.

CO 4 Students will learn the writing skills, paragraph writing, precis writing, report writing and proposal writing.

Course Code: Agron. 111

Name of Course-Fundamentals of Agronomy

Credit Hours: 4(3+1)

CO 1 The student will understand the importance of the basic principles and practices of agronomy. Besides manners and fertilizers, plant-water relationships are dealt with.

CO 2 Demonstrate the concepts of crop rotation and its principles, adaptation and distribution of crops, crop management technologies in problematic areas, harvesting and threshing of crops.

CO 3 This course helps to gain knowledge of the sowing method, irrigation method, weed control and location specific technologies suitable for different situations.

CO 4 The course examines crop rotation and its principles, plant ideotypes, growth and development of crops.

Course Code: Bio. 111* (Remedial)*

Name of Course-Introductory Biology

Credit Hours: 2(1+1)

CO 1 Students will acquire knowledge about the living world, Evolution and Eugenics, binomial nomenclature and classification cell and cell division.

CO 2 Student will learn about the morphology of flowering plants, seed and seed germination.

CO 3 This course also deals with of the plant systematics- viz; Brassicaceae, Fabaceae, and Poaceae and role of animals in agriculture.

Course Code: Math 111 * (Remedial)*

Name of Course- Elementary Mathematics

Credit Hours: 2(2+0)

CO 1 The student will be exposed to applied concepts of mathematics, matrix algebra, calculus differential equations and concepts of analytical geometry.

CO 2 To demonstrate an understanding of the foundation of mathematics and to execute computations in higher mathematics.

CO 3 The students will learn to develop and maintain problem-solving skills and to use mathematical ideas to model real-world problems.

Course Code: Agron.112* (Remedial)*

Name of Course- Agricultural Heritage

Credit Hours: 1(1+0)

CO 1 The students will learn about agricultural heritage, status of farmers in society.

CO 2 The students will also learn the ancient agricultural practices & its relevance to modern agriculture.

CO 3 This course provides an account of Indian civilization and agriculture by travellers from China, Europe and United States, our journey in agriculture, green revolution and its impact and concerns, vision for the future.

CO 4 This course also contains detailed information about the traditional technical education in India

Course Code: Ext.111

Name of Course- Rural Sociology & Educational Psychology

Credit Hours: 2(2+0)

CO 1 To learn the definition and scope of sociology, rural sociology and educational psychology and their role in agricultural extension education.

CO 2 To understand the characteristics of rural society, how it differs from urban society, social values and the concept of social stratification.

CO 3 To study social groups, rural social organizations and institutions.

CO 4 To understand social change, factors affecting social change; social control; culture and cultural lag.

CO 5 To learn about the concepts of emotions, intelligence, personality development, leadership types and learning situations and their relevance o agricultural extension.

Course Code: Soc. 111 (Non- gradial course)* ***

Name of Course- Human Values & Ethics

Credit Hours: 1(1+0)

CO 1 To study human valves and their relevance in real life situations and the concept of professional ethics.

CO 2 To understand the philosophy of happiness; concept of success and failure self exploration, self-awareness, self satisfaction.

CO 3 To understand the goal and mission of life.

CO 4 To learn about motivation and theories of motivation.

CO 5 To study concepts of spirituality; body mind soul, attachment, detachment, determination of spiritual quotient.

Course Code: Env. 111

Name of Course- Environmental studies and Disaster

Credit Hours: 3(2+1)

CO 1 To understand the multidisciplinary nature of environmental studies, its scope and meaning, and nature of natural disasters, their effects and management.

CO 2 To study natural resources, their types and associated problems, equitable use of resources for sustainable lifestyles.

CO 3 To learn the concept of ecosystems, their components, structure and functions, ecological succession, especially in-depth study of the forest, grassland, desert and aquatic ecosystems.

CO 4 To investigate scientifically biodiversity, its importance, causes and consequences of depletion and measures for conservation at local national and global levels. Ozone layer depletion, global warming are other issues covered.

CO 5 To study the structure and functions of atmosphere and its components; causes and effects of environmental pollution like air pollution, water pollution and issues related to climate change, other burning issues such as environmental health, food and agriculture, energy, solid waste disposal management, efficient management of water resources, watershed management, control of water born diseases, etc.

CO 6 To examine social issues vis-à-vis environment, urban problems related to energy, manmade disasters, and role of NGOs community based organizations and media, disaster management at local, national and global levels.

SEMESTER 2

Course Code: GP 121

Name of Course- Fundamentals of Genetics

Credit Hours: 3(2+1)

CO 1 To study the concepts of Mendelian heredity and multi factorial inheritance.

CO 2 To study cell division, chromosomes, structural and numerical changes in chromosomes.

- CO 3** To learn about gene interactions, multiple alleles, pleiotropism and pseudoalleles.
- CO 4** Determination of linkage and crossing over analysis, sex determination and sex linkage.
- CO 5** To examine various concepts/processes like epistatic interactions, genetic disorder, protein synthesis, gene structures, function and regulation, mutation and methods of inducing mutation.

Course Code: Ag. Micro. 121

Name of Course- Agricultural Microbiology

Credit Hours: 2(1+1)

- CO 1** To study different microbes- prokaryotic and eukaryotic types.
- CO 2** To understand bacteria, cell structure, growth, genetic recombination, transformation, conjugation etc.
- CO 3** To study role of microbes in soil fertility, nitrogen fixation, carbon cycle etc.
- CO 4** To understand the growth processes and useful bacteria, their application in agriculture and industry.

Course Code: Ag. Eng. 121

Name of Course- Soil and water Conservation Engineering

Credit Hours: 2(1+1)

- CO 1** The students learn about soil and water conservation, soil erosion, agents of soil erosion and control measures.
- CO 2** The students also learn about soil loss estimation by universal loss soil equation and soil loss the measurement techniques.
- CO 3** Wind erosion and control measures to check wind erosion are also dealt with in this course.
- CO 4** The student will also study various agronomic practices such as bench terracing contouring, strip cropping to mitigate soil erosion.

Course Code: Crop. Physiol. 121

Name of Course- Fundamentals of crop Physiology

Credit Hours: 2(1+1)

- CO 1** To learn the basic principles of plant physiology and to understand various physiological functions and process involved in plant growing.

- CO 2** To understand the role of plant physiology in crop health and crop productivity.
- CO 3** To Study nutrient uptake mechanisms and nutrient deficiency symptoms in crop plants.
- CO 4** To investigate the metabolic and synthetic pathways of biomolecules.
- CO 5** To understand light and dark reactions of photosynthesis, C3, C4 and CAM plants, besides study of metabolic pathways namely glycolysis, TCA cycle and electron transport chain.
- CO 6** To understand the role of growth hormones in agriculture.

Course Code: Ag. Econ. 121

Name of Course- Fundamentals of Agricultural Economics

Credit Hours: 2(2+0)

- CO 1** Agricultural Economics helps the students to understand the solution of the problems related to agriculture and agricultural Business
- CO 2** Agricultural Economics provides the solution to know that how the commodities are produced and marketed in line with the consumption needs
- CO 3** It is an applied field of economics in which principles of choices are applied for the use of scarce resources such as land, labour, capital and management which in farming are allied activities.
- CO 4** understanding the macroeconomics aspects of the economy as they affect the agriculture sector.

Course Code: Pl. Path 121

Name of Course- Fundamentals of Plant Pathology

Credit Hours: 4(3+1)

- CO 1** The students learn about concepts of various plant pathogens, major disease causing organisms (Bacteria, viruses, fungi) and their etiology.
- CO 2** Demonstrate the role of Biotechnology in Plant Pathology, nature, chemical combination, classification, mode of action and formulations of fungicides and antibiotics.
- CO 3** To provide specific knowledge about host pathogen interactions and give specific knowledge about environment and disease development.

CO 4 To study of phanerogamic plant parasites and principles and methods of plant disease management.

Course Code: Ento. 121

Name of Course- Fundamentals of Entomology

Credit Hours: 4(3+1)

CO 1 Students will get to know about the insects, their binomial nomenclature and the various factors affecting their abundance on earth.

CO 2 Students would acquaintize with the placement of class Insecta in the classification of Phylum Arthropoda and know about the orders and families of agricultural importance in class Insecta.

CO 3 Students will be able to identify the insects in the field based on the morphological and physiological knowledge obtained after learning about the types of insect antennae, legs, mouth parts or wing venation modifications.

CO 4. Students will know about the methods of insect collection and preservation (adults and immature stages) and will be able to dissect and separate the digestive system and reproductive system of male and female insects (grasshoppers)

Course Code: Ext. 122

Name of Course- Fundamentals of Agricultural Extension Education

Credit Hours: 3(2+1)

CO 1 To learn about the principles of extension education processes and steps in extension program planning.

CO 2 To examine the extension systems in pre-independence and post independence eras.

CO 3 The students will learn about the various extension/agriculture development program launched by ICAR/Govt. of India like IADP, IRDP,NATP etc.

CO 4 The students will be familiarized concepts of rural development, rural extension machinery, leadership etc. The students will be exposed to new extension concepts like cyber extension, e-extension, and privatization of extension.

CO 5 The students will be thorough with the extension teaching methods, monitoring and evaluation of different program, etc.

Course Code: Ext. 123

Name of Course- Communication skills and Personality Development

Credit Hours: 2(1+1)**CO 1** The course helps develop communication skills including writing, speaking skills.**CO 2** The students will learn the interpersonal and intercultural communication skills.**CO 3** The students are trained in various tools and models of communication to hone their public speaking skills.**CO 4** The students are introduced to the art of scholarly writing skills and presentation.**3rd Semester (Second Year)**

Sr.No.	Name of Course	Course No.	Cr. Hr.
1.	Crop Production Technology-I (Kharif Crops)	Agron. 233	2(1+1)
2.	Fundamentals of Plant Breeding	GP 232	3(2+1)
3.	Agricultural Finance and Cooperation	Ag. Econ. 232	3(2+1)
4.	Principles of Food Science and Nutrition	FST 231	2(1+1)
5.	Farm Machinery and Power	Ag. Engg. 232	2(1+1)
6.	Crop Physiology	Crop Physiol. 231	2(1+1)
7.	Fundamentals of Plant Biotechnology	Biotech. 231	2(1+1)
8.	Introductory Nematology	Ento. 232	2(1+1)
9.	Statistical Methods	Stat. 231	2(1+1)
10.	Livestock and Poultry Management	LPM 231	3(2+1)
11.	NSS**		2 (0+2) NC
	Total		23+02 (NC)

4th Semester (Second Year)

Sr.No.	Name of Course	Course No.	Cr. Hr.
1.	Crop Production Technology-II (Rabi Crops)	Agron. 244	2 (1+1)
2.	Production Technology for Ornamental Crops, MAP and Landscaping	VSF 242	2(1+1)
3.	Renewable Energy and Green Technology	Ag. Engg. 243	2(1+1)
4.	Problematic Soils and their Management	Soils 242	2(2+0)
5.	Production Technology for Fruit and Plantation Crops	Hort. 242	2(1+1)
6.	Principles of Seed Technology	GP 243	3(2+1)
7.	Farming System and Sustainable Agriculture	Agron. 245	1(1+0)
8.	Agricultural Marketing Trade and Prices	Ag. Econ. 243	3(2+1)
9.	Introductory Agro-meteorology & Climate Change	Agron. 246	2(1+1)
10.	Insect Ecology and integrated Pest Management	Ento. 243	2(1+1)
11.	Commercial Plant Breeding/ Agri-Business Management	GP 244/ Ag. Econ. 244	3(1+2)/ 3(2+1)
12.	NSS**		2(0+2)NC
	Total		24+02(NC)

Course Code: Agron. 233

Name of Course- Crop Production Technology-I (Kharif Crops)

Credit Hours:

- CO 1** To study Origin, geographical distribution, economic importance, soil and climatic requirements of *Kharif* crops
- CO 2** To learn varieties, cultural practices and yield of Kharif crops; Cereals, oilseeds, fibre crops and forage crops
- CO 3** The student learn about sowing methods and effect of seed size on germination and seedling vigour of *Kharif* crops
- CO 4** To learn about yield contributing characters and yield calculation of *Kharif* crops,

Course Code: Gp-232

Name of Course- Fundamentals of Plant Breeding

Credit Hours: 3(2+1)

- CO 1** The students will learn about the breeding procedures to be employed in self and cross pollinated crops.
- CO 2** Students will acquire knowledge about the basic principles of plant breeding.
- CO 3** This course helps the students to understand exploitation of heterosis for its use in plant improvement programmes.
- CO 4** To study the fundamentals of mutation, polyploidy and wide hybridization and their role in crop improvement.

Course Code: Ag.Econ.232

Name of Course- Agricultural Finance and Cooperation

Credit Hours: 3(2+1)

- CO 1** The study of Agricultural Finance is important for the Agricultural Development of the country as a whole.
- CO 2** This subject helps the students to understand the farm business and use of scare resources in agricultural sector.
- CO 3** With farm financial investments, we can increase the farm income levels and can raise the standard of living of rural population.

CO 4 It also helps the students to learn how to create the supporting infrastructure for adoption of new technology.

Course Code: FST 231

Name of Course- Principles of Food Science and Nutrition

Credit Hours: 2(1+1)

CO 1 The student is acquainted with the basic concepts food science its composition, functions, sources and deficiencies.

CO2 The student learns about food microbiology and principles, and methods of food processing and preservation

CO 3 The student will be able to understand the classification and functions of Food Additives

CO 4 The students can appreciate the role of nutraceutical and healthy foods

Course Code: Ag.Engg.232

Name of Course- Farm Machinery and Power

Credit Hours: Ag.Engg.232

CO 1 To understand the status and sources of farm power in India.

CO 2 To study engines and its systems, like air cooling system, fuel system and various components of the engine.

CO 3 Familiarization with power transmission system, clutch, gear box, differential and final drive of a tractor.

CO 4 To know about various farm machinery like tractors, threshers, tillers etc., and familiarization with their use.

Course Code: Crop Physiol. 231

Name of Course- Crop Physiology

Credit Hours: 2(1+1)

CO 1 To educate students on physiological aspects of growth and development.

CO 2 To train students on physiological growth parameters.

Course Code: Biotech. 231

Name of Course- Fundamentals of Plant Biotechnology

Credit Hours: 2(1+1)

CO 1 To train students on concepts and applications of plant biotechnology especially organ culture, embryo culture, etc.

CO 2 To educate students on micropropagation techniques.

CO 3 To impart skill development on micropropagation technique and PCR techniques.

Course Code: Ento. 232

Name of Course- Introduction Nematology

Credit Hours: 2(1+1)

CO 1 Students will learn about the history and economic importance of phytonematology and the general characteristics of plant parasitic nematodes.

CO 2 Students will acquaintize with the classification of nematodes on the basis of parasitism and know about the biological aspects of agriculturally important plant parasitic nematode species like *Meloidogyne*, *Heterodera Aphelenchoides*, *Pratylenchus* spp. etc.

CO 3 Students will be able to diagnose the nematode damage symptoms in the field and can timely manage the nematode problem by adopting the proper management techniques.

CO 4 Students will get to know about the collection and preservation methods of nematodes and would be able to identify the nematode species based on the symptoms produced in the field conditions.

Course Code: Stat. 231

Name of Course- Statistical Methods

Credit Hours: 2(1+1)

CO 1 The students will learn that Statistical methods are essential and vital tool in scientific research.

CO 2 The students understand how to design experiments, analyse and interpreting data.

CO 3 Statistical methods is a mean to study the result of other research.

CO 4 The subject provide knowledge how we make decisions based on data and make predictions.

Course Code: LPM 231

Name of Course- Livestock and Poultry Management

Credit Hours: 3(2+1)

CO 1 To learn about reproduction of animals and poultry and how to delovep sustainable production and management systems.

- CO 2** To study different breeds of cattle, buffalos, sheep, goat, swine and poultry including exotic breeds, for improvement of farm animals.
- CO 3** The students will be able to understand the nutrition requirements of the animals and the nutrients ingredients in the feedstuffs.
- CO 4** To enable the students take up commercial animal breeding farms and poultry enterprises.
- CO 5** To hone the skills of students in different issues relating to animal sciences for effective extension work.

Course Code: Agron. 244

Name of Course- Crop Production Technology- II (Rabi Crops)

Credit Hours: 2(1+1)

- CO 1** To study Origin, geographical distribution, economic importance, soil and climatic requirements of *Rabi* crops
- CO 2** To learn the varieties, cultural practices and yield of *Rabi* crops; cereals, oilseeds, sugar crop and other crop- potato, forage crops-berseem, Lucerne, oat and **rye grass**.
- CO 3** To study the sowing methods of wheat and sugarcane and identification of weeds in *Rabi* crops,
- CO 4** To understand the morphological characteristics, study of yield contributing characters of *Rabi* crops

Course Code: - VSF 242

Name of Course- Production Technology for Ornamental Crops, MAP and Landscaping

Credit Hours: 2(1+1)

- CO 1** To study importance and scope of ornamental crops , medicinal and aromatic plants and landscaping
- CO 2** To familiarize the students with principles of landscaping and uses of trees, shrubs and climbers
- CO 3** To study the production technology of important cut flowers and important medicinal plants

CO 4 To know about the processing and value addition in ornamental crops and MAPs produce

ELECTIVE COURSES

Course Code: Ag. Engg. 243

Name of Course- Renewable Energy and Green Technology

Credit Hours: 2(1+1)

CO 1 To learn about different renewable energy sources and their contribution in agriculture sector.

CO 2 To study bio-fuel production and familiarize with biogas plant gasifiers etc. and their utilization as a bio-energy resource.

CO 3 To understand the application of solar energy and solar gadgets.

Course Code: Soils 242

Name of Course- Problematic Soils and their Management

Credit Hours: 2(2+0)

CO 1 The students will know the distribution of problem soils in India and how to identify them.

CO 2 The students will study the processes of deterioration of soil their physical and chemical properties and how to reclaim and manage the degraded soils.

CO 3 The students will also learn about irrigation water quality and standards and utilization of saline water in agriculture.

CO 4 Students will also learn the use of remote sensing and GIS in diagnosis and management of problem soils.

Course Code: Hort. 242

Name of Course- Production Technology for Fruit and Plantation Crops

Credit Hours: 2(1+1)

CO 1 Students will acquire knowledge about the importance and scope of fruit and plantation crop industry in India

CO 2 Student will learn about the high density plantation and use of rootstocks.

CO 3 This course also deals with of the plant production technologies for the cultivation of major fruits-mango, banana, citrus, grape, guava, litchi, papaya, apple, pear, peach, plum, apricot, cherry, kiwi and minor fruits.

Course Code: GP 243/ SST 241

Name of Course- Principles of Seed Technology

Credit Hours: 3(2+1)

CO 1 Students will get the thorough knowledge about the basic principles related to seed science and technology aspects in relation to Seed Act.

CO 2 To study about the different classes of seed and maintaining genetic purity during seed production.

CO 3 Understanding the various concepts of quality seed production of different field and vegetable crops.

CO 4 To learn about seed certification procedure, seed drying, processing, cleaning, testing, storage, marketing, etc.

Course Code: Agron. 245

Name of Course- Farming System and Sustainable Agriculture

Credit Hours: 1(1+0)

CO 1 To study Farming System-scope, importance and concept, Farming system components and their maintenance.

CO 2 To learn Cropping system and pattern, multiple cropping system, Efficient cropping system and their evaluation, Allied enterprises and their importance.

CO 3 The student learn about sustainable agriculture- indicators of sustainability, adaptation and mitigation, conservation agriculture strategies in agriculture, HEIA, LEIA and LEISA and its techniques .

CO 4 To examine Integrated farming system-historical background, objectives and characteristics and resource use efficiency and optimization techniques, Resource cycling and flow of energy in different farming system.

Course Code: Ag. Econ. 243

Name of Course- Agricultural Marketing Trade and Prices

Credit Hours: 3(2+1)

CO 1 Agricultural Marketing is the part of production system of agriculture

CO 2 It helps us to understand that how we can optimize the resource use and output management.

CO 3 It helps us to increase the farm income and widening of markets.

CO 4 It helps us to know that how we can develop agricultural based industries.

Course Code: Agron. 246

Name of Course- Introductory Agro-meteorology & Climate Change

Credit Hours: 2(1+1)

CO 1 The students will learn about Earth atmosphere- its composition, structure and weather variables; Atmospheric pressure, its variation with height; Wind, types of wind, cyclone, anticyclone, land breeze and sea breeze;

CO 2 The students will also learn Nature and properties of solar radiation, solar constant, thermal radiation, net radiation, albedo; Atmospheric temperature, temperature inversion, lapse rate

CO 3 This course provides information regarding Energy balance of earth; Atmospheric humidity, concept of saturation, vapor pressure, process of condensation, process of precipitation, types of precipitation, cloud formation and classification; Artificial rainmaking.

CO 4 This course also contains detailed information about Monsoon- mechanism, weather hazards - drought, floods, frost, tropical cyclones and extreme weather conditions such as heat-wave and cold-wave.

CO 5 To study the modifications of crop micro-climate, climatic normals. Weather forecasting- types of weather forecast and their uses. Climate change, causes of climate change and its impact on Agriculture.

Course Code: Ento. 243

Name of Course- Insect Ecology and integrated Pest Management

Credit Hours: 2(1+1)

CO 1 Students will learn about the terminology of insect ecology, its components and effect of various biotic and abiotic factors on insect ecology

CO 2 Students will get to know the concept of Integrated Pest Management, its principles, scope, tools and limitations alongwith the other aspects of biotic potential, balance of nature, pest forecasting and pest outbreak etc.

CO 3 Students will obtain the thorough knowledge about the different insect control methods (host plant resistance, cultural, mechanical, physical, legislative, biological, transgenics, chemical control etc) alongwith the discussion on recent methods of insect pest control adopted now a days like repellents, antifeedants, hormones, attractants, sterilization techniques etc.

CO 4 Students will perform the calculations on IPM economics, doses and concentration of different insecticidal formulations and assess the extent of crop losses due to insects in various crops.

Course Code: GP 244

Name of Course- Commercial Plant Breeding

Credit Hours: 3(2+1)

CO 1 Students will know about the utilization of male sterility and other methods for hybrid seed production and its use in commercial plant improvement.

CO 2 Understanding about the alternative strategies for the development of the line and cultivars.

CO 3 The students will learn about the floral biology of self and cross pollinated species and their selfing and crossing techniques.

CO 4 Students will acquire knowledge about the maintenance breeding and line development.

Course Code: Hort. 243/VSF 243

Name of Course- Hi-tech. Horticulture

Credit Hours: 3(2+1)

CO 1 To understand the multidisciplinary nature of nursery management and mechanization.

CO 2 To study micro propagation of horticultural crops.

CO 3 To learn the protected cultivation: advantages, controlled conditions, method and techniques, Micro irrigation systems and its components

CO 4 To acquire knowledge about components of precision farming: Remote sensing, Geographical Information System (GIS), Differential Geo-positioning System (DGPS), Variable Rate applicator (VRA), application of precision farming in horticultural crops.

Course Code: Biotech.242

Name of Course- Micro. Propagation Technology

Credit Hours: 3(2+1)

CO 1 To make awareness for students on tissue culture and the culture media required for their *in vitro* micropropagation.

Co 2 To appraise students on synthetic seeds and their procedure as well as requirements for crop production.

Co 3 To educate students on callus production for further regeneration of whole ornamental, vegetable and fruit plants.

Co 4 To transfer useful genes from one cell to the other for defense generation in agricultural plants.

Course Code: Agron. 247

Name of Course- Weed Management

Credit Hours: 3(2+1)

CO 1 To Study the characteristics of weeds their harmful and beneficial effects on ecosystem.

CO 2 Students will acquire knowledge about the classification, reproduction and dissemination of weeds

CO 3 Students will also learn about concept of adjuvant, surfactant, herbicide formulation and their use, concept of herbicide mixture and utility in agriculture.

CO 4 To understand the term allelopathy and its application for weed management and also about Bio-herbicides and their application in agriculture.

Course Code: Ag.Econ. 245

Name of Course-Agri. Business Mangement

Credit Hours:

CO 1 The students learn the importance of Agri-business management as it has emerged as a field of prime importance in developing country India.

CO 2 Agri-business Management is an area that involves the processing, warehousing, distribution, marketing and retailing of products used in agriculture.

CO 3 Agri-business covers a significant number of careers globally like in livestock, farming, food production etc.

CO 4 This subject helps to understand how to streamline farming operations so that the prices remain at equilibrium.

5th Semester (Third Year)

Sr.No.	Name of Course	Course No.	Cr. Hr.
1.	Principles of Integrated Disease Management	Pl. Path. 352	3(2+1)
2.	Manures, Fertilizers and Soil Fertility Management	Soils 353	3(2+1)
3.	Pests of Crops and Stored Grain and their Management	Ento. 354	3(2+1)
4.	Diseases of Field and Horticultural Crops and their Management-I	Pl. Path. 353	3(2+1)
5.	Crop Improvement-I (Kharif Crops)	GP 355	2(1+1)
6.	Protected Cultivation and Secondary Agriculture	Ag. Engg. 354	2(1+1)
7.	Geoinformatics, Nano-technology and Precision Farming	Agron. 358	2(1+1)
8.	Practical Crop Production-I (Kharif Crops)	Agron. 359	2(0+2)
9.	Intellectual Property Rights	GP 356	1(1+0)
10.	Landscaping Protected Cultivation	VSF 353 VSF 354	3 (2+1) 3 (2+1)
11.	NSS**		2 (0+2) NC
	Total		24+02 (NC)

6th Semester (Third Year)

Sr.No.	Name of Course	Course No.	Cr. Hr.
1.	Rainfed Agriculture and Watershed Management	Agron. 3610	2 (1+1)
2.	Entrepreneurship Development and Business Communication	Ext. 364	2(1+1)
3.	Diseases of Field and Horticultural Crops and their Management-II	Pl. Path. 364	3(2+1)
4.	Post-harvest Management and Value Addition of Fruits and Vegetables	Hort. 364	2(1+1)
5.	Management of Beneficial Insects	Ento. 365	2(1+1)
6.	Crop Improvement-II (Rabi Crops)	GP 367	2(1+1)
7.	Principles of Organic Farming	Agron.3611	2(1+1)
8.	Practical Crop Production-II(Rabi Crops)	Agron. 3612	2(0+2)
9.	Farm Management, Production & Resource Economics	Ag. Econ. 365	2(1+1)
10.	Agri-Informatics	Ag. Info. 361	2(1+1)
11.	Micro propagation Technologies/ Commercial Vegetable Production	Biotech. 362/ VSF 365	3(1+2)/ 3(2+1)
12.	NSS**		2(0+2)NC
	Total		24+02(NC)

SEMESTER 5

Course Code: Pl. Path 352

Name of Course- Principles of Integrated Disease Management

Credit Hours: 3(2+1)

- CO 1** Students will be acquainted with principles of an Integrated approach to plant disease management to become familiar with the basic principles involving fungal ,bacterial,phytoplasma and viral based diseases in plants
- CO 2** The course emphasizes the importance and need of the integrated management of plant diseases within the integrated pest management approach with the least possible disruption to the agro-ecosystem and least hazard to people, animals and environment.
- CO 3** The course emphasizes the most successful plant protection strategies by physical, genetic,cultural, chemical and biological means.
- CO 4** Students will be acquainted with the knowledge of the use of predictive models.

Course Code: Soils 353

Name of Course- Manures, Fertilizers and Soil Fertility Management

Credit Hours: 3(2+1)

- CO 1** The students will learn the concept of integrated nutrient management and importance of organic manures in improving soil health.
- CO 22** The students will be able to classify the available fertilizers on the basis of their chemical composition and properties and hence will gain the skill in their effective application.
- CO 3** The students would know about the essential plant nutrients, their role, deficiency and toxicity symptoms and nutrient use deficiency under different soil conditions.
- CO 4** The students will be imparted the necessary skills in calibrating the analytical instruments in the laboratory as well as in estimation of amount of essential nutrients like N P K Ca Mg etc. in the soil and crop plants.

Course Code: Ento. 354

Name of Course- Pests of Crops and Stored Grain and their Management

Credit Hours: 3(2+1)

- CO 1** Students will study about the nature of damage caused by different insect species and the damage symptoms produced in various plants and plant parts under the field conditions.

- CO 2 Students will get to learn about the biology and bionomics of individual insect species along with the knowledge obtained on the adoption of suitable management practice for the control of different insect pest species
- CO 3 Students will learn about the stored grain pests (insects, mites, birds, rodents micro-organisms etc.) storage structures and their management practices along with the various factors affecting losses of stored grains.
- CO 4 Students will identify the various insect pests attacking different crops in the field and stored conditions with reference to their damage symptoms and biological characteristics.

Course Code: Pl. Path 353

Name of Course- Diseases of Field and Horticultural Crops and their Management-I

Credit Hours: 3(2+1)

- CO 1 In this course students will be able to know the symptoms, involved pathogens, disease cycle, best possible management practices available and able to resolve the problem of yield reduction in crops
- CO 2 Student will be able for isolation of culture, techniques, identification and biology of pathogens in the laboratory
- CO 3 Students will be able to demonstrate the crop fields.
- CO 4 Students will apply different fungicides and antibiotics on the basis of nature of pathogen, manage crops disease

Course Code: GP 355

Name of Course- Crop Improvement-I (Kharif Crops)

Credit Hours: 2(1+1)

- CO 1 Students will understand the botanical description, origin, distribution and different breeding approaches to be used for the development of varieties/hybrids in various *Kharif* field and horticultural crops.
- CO 2 To learn about the plant genetic resources and their importance.
- CO 3 To study about the influence of Genotype X Environment interaction on crop yield and its performance.
- CO 4 Understanding the emasculation and hybridization techniques to be utilized in different *Kharif* crops.

Course Code: Ag. Engg. 354

Name of Course- Protected Cultivation and Secondary Agriculture

Credit Hours: 2(1+1)

- CO 1** The student is acquainted with the basic concepts of protected cultivation its importance and scope.
- CO 2** The student learns about different type of protected structure and basic principles of protected cultivation, cladding material involved in greenhouse/ poly house, greenhouse designs, environment control, artificial lights, automation.
- CO 3** The student will be able to learn about the soil preparation and management, substrate management, nursery management, types of benches and containers, irrigation and fertigation management.
- CO 4** The students will acquire knowledge of greenhouse cultivation of important horticultural crops.

Course Code: Agron. 358

Name of Course- Geoinformatics, Nano-technology and Precision Farming

Credit Hours: 2(1+1)

- CO 1** To study Precision agriculture; concepts and techniques; Geo-informatics- definition, concepts, tool and techniques, their use in Precision Agriculture.
- CO 2** To understand the soil mapping; fertilizer recommendation using geospatial technologies; Spatial data and their management in GIS
- CO 3** To understand the Geodesy and its basic principles; Remote sensing concepts and application in agriculture, Global positioning system (GPS), components and its functions;
- CO 4** To learn about Nanotechnology, definition, concepts and techniques, brief introduction about nano scale effects, nano-particles, nano-pesticides, nano-fertilizers, nano-sensors, Use of nanotechnology in tillage, seed, water, fertilizer, plant protection for scaling-up farm productivity.
- CO 5** To study use of nanotechnology in tillage, seed, water, fertilizer, plant protection for scaling-up farm productivity.

Course Code: Agron. 359

Name of Course- Practical Crop Production-I (Kharif Crops)

Credit Hours: 2(0+2)

CO 1 The student will understand about raising field crops in multiple cropping systems:
Field preparation, seed, treatment, nursery raising

CO 2 This course helps to gain knowledge sowing, nutrient, water and weed management and management of insect-pests and diseases of crops,

CO 3 The course examines harvesting, threshing, drying, winnowing, storage and marketing of produce. The emphasis will be given to seed production, mechanization, resource conservation and integrated nutrient, insect-pest and disease management technologies

Course Code: GP 356

Name of Course- Intellectual Property Rights

Credit Hours: 1(1+0)

CO 1 To learn the concept and meaning of intellectual property and its types.

CO 2 Understanding about the various treaties for IPR protection like Berne Convention, Budapest treaty, etc.

CO 3 To study about the various IPR Acts like Patents Act, PPV&FR Act of India, etc. for protection and registration of plant varieties.

CO 4 To get the acquaintance with the traditional knowledge and rights of TK holders.

Course Code: VSF 354

Name of Course- Landscaping

Credit Hours:

CO 1 Students will acquire knowledge about the principles of landscaping, garden styles and types, terrace gardening, vertical gardening, garden components, adornments, rockery, water garden, walk-paths, bridges, other constructed features

CO 2 Students will have an insight into the trees, shrubs, climber, creeper, annuals and herbaceous perennials: selection, propagation, planting schemes and canopy management

CO 3 Students will recognize the importance of landscaping of urban and rural areas, Peri-urban landscaping, Landscaping of schools, public places like bus station, railway station, townships, river banks, hospitals, play grounds, airports, industries and institutions

CO 4 Student will familiar with importance of beautification of highways and avenues in hilly areas and principles and management of Bonsai

Course Code: Agron. 359/Soils 355

Name of Course- Agricultural waste Management

Credit Hours:

CO 1 To reduce the cost of agriculture by studying the methods of making the remaining waste useful in agricultural work.

CO 2 The student acquires knowledge of various waste management methods like MBO, land filling, composting and incineration. They also investigate environmental impacts of traditional farming and agriculture.

CO 3 Examining the benefits of waste management in the fields and ensuring the maximum profit from agriculture.

CO 4 Students are aware of the definition of waste management and fundamentals like RRR.

Course Code: Soils 365/Ento. 355

Name of Course- Biopesticides & Biofertilizers

Credit Hours:

CO 1 The students are introduced to the concept of bio-pesticides and bio-fertilizers and their significance in agricultural system of India.

CO 2 The students will learn the mass production technologies, methods of their application and limitations in production of bio-pesticides and bio-fertilizers.

CO 3 The students will be familiarized with different bio-fertilizers (bacterial, mycorrhiza, Cyanobacteria and Nitrogen-fixing bacteria, etc.) and equipped with the information of quality control criteria of FCO for bio-fertilizers.

CO 4 The students will be able to isolate the strains of, Azospirillum, Azotobacter, Rhizobium and Cyanobacteria in the laboratory. The students also get practical exposure by visiting the production units.

Course Code: VSF 355/AG.Engg.354/Ag. Hort. 354

Name of Course- Protected Cultivation

Credit Hours:

- CO 1** The student is acquainted with the basic concepts of protected cultivation, its importance and scope.
- CO 2** The student will learn about irrigation systems used in greenhouses as well as the concept of fertigation.
- CO 3** The student will study protected structures and basic principles of protected cultivation, cladding material involved in greenhouse/ poly house, greenhouse designs, environment control, artificial lights, automation.
- CO 4** The student will be able to learn about the soil preparation and management, substrate management, nursery management, types of benches and containers.
- CO 5** The students will acquire knowledge of greenhouse cultivation of important horticultural crops.

SEMESTER 6**Course Code: Agron. 3611****Name of Course- Rainfed Agriculture and Watershed Management****Credit Hours: 2(1+1)**

- CO 1** The students will acquire knowledge of types and history of rainfed agriculture and watershed in India.
- CO 2** To study about soil and climatic conditions prevalent in rainfed areas, drought types, effect of water deficit on physio-morphological characteristics of plants.
- CO 3** The student will study mechanism of crop adaptation under moisture deficit condition, water harvesting techniques.
- CO 4** The student will be able to learn about the concept, objective, principles and components of watershed management, factors affecting watershed management.

Course Code: Ext. 364**Name of Course- Entrepreneurship Development and Business Communication****Credit Hours: 2(1+1)**

- CO 1** Entrepreneurship education helps students from all socioeconomic backgrounds to nurture their skills.

CO 2 Entrepreneurship education helps students to be more creative and self confident in whatever they undertake and to act in a socially responsible way.

CO 3 Entrepreneurship education teaches students crucial life skills such as how to work in a team and how to prepare effective presentation.

CO 4 Students will learn how effective business communication is essential for success and growth of every organization.

Course Code: Pl. Path. 364

Name of Course- Diseases of Field and Horticultural Crops and their Management-II

Credit Hours: 3(2+1)

CO 1 This course will help the students to identify diseases in farmer field.

CO 2 Students will gain knowledge about recommendation of management practices and minimizing the loss.

CO 3 Students will learn diseases of various field crops and horticultural crops.

CO 4 This course will develop the skill about detection and diagnosis of plant diseases and application of pesticides.

Course Code: Hort. 364

Name of Course- Post-harvest Management and Value Addition of Fruits and Vegetables

Credit Hours: 2(1+1)

CO 1 To learn the importance of fruits and vegetables, extent and possible cause of pre and post harvest losses

CO 2 To understand the role of pre-harvest factors affecting post-harvest quality; Maturity, ripening and change occurring during ripening; Respiration and factor affecting respiration and affecting respiration rate

CO 3 To study role of ethylene; Post-harvest disease and disorders; Heat, chilling and freezing injury; Harvesting and field handling; Storage of commercial crops

CO 4 To understand food quality and its role in food industry; Storage and transportation of fresh and processed food products; Food standards and specifications

Course Code: Ento. 365

Name of Course- Management of Beneficial Insects

Credit Hours: 2(1+1)

- CO 1** Students will get an insight of importance of beneficial insects in human life (honeybee, silkworm, lac insect, crop pollinators, and natural enemies like parasitoids predators, weed killers or insect scavengers)
- CO 2** Students will obtain the detailed information about honeybee-its different species, seasonal management, pasturage, bee enemies and diseases along with the commercial methods of honeybee rearing.
- CO 3** Students will also study about the biological attributes of silk worm species and lac insect; cultivation practices of silkworm species and lac production technology along with the management practices of insect enemies and diseases.
- CO 4** Practical exposure will also be conducted for students by visiting to research and training institutions devoted to beekeeping, sericulture, lac culture and natural enemies (parasitoids and predators).

Course Code: GP 367

Name of Course- Crop Improvement-II (Rabi Crops)

Credit Hours: 2(1+1)

- CO 1** Students will understand the botanical description, origin, distribution and various breeding approaches to be used for the development of varieties/hybrids in various *Rabi* field and horticultural crops.
- CO 2** To learn about the various approaches for development of hybrids and varieties for tolerance to biotic and abiotic stresses.
- CO 3** To get acquaintance with the ideotype concept for the development of climate resilient crop varieties for future.
- CO 4** Understanding the emasculation and hybridization techniques to be utilized in different crops.*Rabi*

Course Code: Agron.3611

Name of Course- Principles of Organic Farming

Credit Hours: 2(1+1)

- CO 1** The students will be acquainted with the knowledge of concept and principles of organic production technology and Role of organic farming in National economy.

- CO 2** The students will learn about selection of crops and varieties of cereals, pulses and commercial crops for organic farming and increase production of organic products.
- CO 3** The students will be provided detailed knowledge on Indigenous technology knowledge about the quality analysis of organic inputs and products; Relative economics of organic production programmes Socio-economic impacts.
- CO 4** To study and get practical knowledge of vermicompost production methodology; harvesting.

Course Code: Agron. 3612

Name of Course- Practical Crop Production-II(Rabi Crops)

Credit Hours: 2(0+2)

- CO 1** To study the origin, geographical distribution, economic importance, soil and climatic requirements of *Rabi* crops.
- CO 2** To learn the varieties, cultural practices and yield of *Rabi* crops; cereals, oilseeds, sugar crop and other crop- potato, forage crops-berseem, Lucerne, oat and rye grass.
- CO 3** To study the sowing methods of wheat and sugarcane and identification of weeds in *Rabi* crops.
- CO 4** To understand the morphological characteristics, study of yield contributing characters of *Rabi* crops.

Course Code: Ag. Econ. 365

Name of Course- Farm Management, Production & Resource Economics

Credit Hours: 2(1+1)

- CO 1** The study of Farm management help students how to realize maximum profits from various enterprises.
- CO 2** Farm management principle helps in selection of combination and execution of enterprises which are consistent to a sound agricultural policy.
- CO 3** It help students to understand farmers production goals, farmers decision making process and farm problems.
- CO 4** It provides information on the impact of govt. policies and price changes on farm productivity as well as farm income.

Course Code: Ag. Info. 361

Name of Course- Agricultural Informatics

Credit Hours: 2(1+1)

- CO 1** To impart the basic knowledge of computers including memory concepts and units of memory.
- CO 2** The students will learn operating systems, application of MS office.
- CO 3** The students will also learn about data presentation, tabulation, graph creation, etc.
- CO 4** The course also covers e-agriculture, concepts, design and development, use of IT in agriculture and learn about application of computer controlled devices in agriculture.
- CO 5** The students will be exposed to the decisions support system and soil information system etc. for supporting farm plans.

Course Code: FSN 362

Name of Course- Principles of Food Science and Nutrition

Credit Hours: 2(2+0)

- CO 1** To develop students by educating them on food composition, food microbiological aspects, food processing and preservatives.
- CO 2** To train students on nutraceuticals and health foods.
- CO 3** To give students education on balanced diets.

Course Code: Agron. 3612

Name of Course- Agrochemicals

Credit Hours: 3(2+1)

- CO 1** To study agrochemicals, their types and role in agriculture. The effect of agrochemicals on the environment, human and animal health is also studied.
- CO 2** To learn about major classes of herbicides, fungicides and other pesticides including plant biopesticides, their properties, merits and limits.
- CO 3** To understand various types of fertilizers their applications optimum, use for sustainable agriculture.
- CO 4** To students will acquire better skills at determining the compatibility and different chemicals to minimize their interaction adverse effects on environment.

Course Code: FSN 363

Name of Course- Food Safety Issues**Credit Hours:**

- CO 1** To study the importance, scope and factors affecting food safety and concepts of food storage.
- CO 2** To impart elementary knowledge of hazards and risks, types of hazards - biological, chemical, physical hazards and management of hazards.
- CO 3** To study hygiene and sanitation in Food Service Establishments and sources of contamination and their control.
- CO 4** To learn about food safety management tools and important food laws and standards like food regulatory regime- FSSA and global scenario of CAC.

Name of Course-NSS/NCC

- CO 1** To inculcate in the students qualities of leadership, decision making, discipline and fellowship.
- CO 2** To enable the students imbibe the virtues of selfless service, empathy and courage.

7th Semester (Fourth Year)**Rural Agricultural Work Experience and Agro-Industrial Attachment (RAWE & AIA)**

S. No.	Activities	No. of weeks	Credit Hours
1.	General orientation & on campus training by different faculties	1	14
2.	Village attachment	8	
3.	Unit attachment in Univ./College/KVK/Research Station Attachment	5	
4.	Plant clinic	2	02
5.	Agro-Industrial Attachment	3	04
6.	Project Report Preparation, Presentation and Evaluation	1	
	Total weeks for RAWE & AIA	20	20

8th Semester (Fourth Year)**Experiential Learning Programme (ELP)**

Sr. No.	Activities	Credits
1	Mushroom Production	0+10

	Technology	
2	Seed Production Technology	0+10
Total Credits for ELP		0+20

Semester-VII

Rural Agricultural Work Experience and Agro-industrial Attachment (RAWE &AIA)

Component-1: Rural Agricultural Work Experience (RAWE)

CO 1 Rural awareness

CO 2 Field experience

CO 3 Knowledge on field based research and extension methodologies

CO 4 Exposure to administration and management issues in context of rural and agricultural development

CO 5 Acquainted with recent advancement in research and extension

CO 6 Updating and collecting information through different methods

CO 7 Understanding rural life

CO 8 Learning of bottom-up approach in planning

CO 9 Learning the techniques of stakeholders' participation in developmental programmes

CO 10 Understanding local institutions and their need

CO 11 Conflict management and negotiation skill

CO 12 Management of different components of farming system

CO 13 Impact of rural and agricultural development on rural livelihood

CO 14 Knowledge on gender mainstreaming in agriculture

Component:2 Agro-industrial Attachment (AIA)

CO 1 Acquaintance with industry and staff

CO 2 Study of structure, functioning, objective and mandates of the industry

CO 3 Study of various processing units and hands-on trainings under supervision of industry staff

CO 4 Ethics of industry

CO 5 Employment generated by the industry

CO 6 Contribution of the industry promoting environment

CO 7 Learning business network including outlets of the industry

CO 8 Skill development in all crucial tasks of the industry

Semester-VIII

Seed Production and Technology (ELP/M—02)

CO 1 Start a seed production program for fill full the requirement of quality seed in market and increase the income.

CO 2 Storage the pure variety seed to avoid the availability crises of pure variety seed due to adverse environmental conditions.

CO 3 To supply the disease free seed in the market to get the environment friendly cultivation of crops.

CO 4 To increase the farm income by producing high yielding disease free quality seed and decrease the cost of cultivation also.

CO 5 Production of hybrid seed of different crops to increase the farm income.

Mushroom Cultivation Technology (ELP/M—03)

CO 1 Students will know about identification and nomenclature of mushroom.

CO 2 Identify edible types of mushroom.

CO 3 Gain the knowledge of cultivation of different types of edible mushrooms and spawn Production.

CO 4 Manage the diseases and pests of mushrooms.

CO 5 Learn a means of self-employment and income generation.

School of Sciences (SOS)

Programme Outcomes (POs),

Programme Specific Outcomes (PSOs)
& Course Outcomes (COs)

B.Sc. Chemistry (Honors)

Programme Outcomes (POs):

After the completion of three-year degree program in B.SC. Chemistry, student will be able to:

PO1: To supply the comprehensive understanding of descriptive Chemistry.

PO2: To communicate the basic analytical and technical skills to work effectively in the various sectors of chemistry.

PO3: To motivate critical thinking and analysis skills to solve complex chemical problems such as analysis of data, spectroscopy etc.

PO4: To demonstrate, solve and an understanding of major concepts among all disciplines of chemistry.

PO-5: To explore critical thinking and the scientific knowledge to design, carry out, record and analyze the results of various chemical reactions.

PO6: To develop skills in quantitative modeling of static and dynamic chemical systems.

PO7: To develop laboratory expertise in relating chemical structure to spectroscopic topic.

PO8: To validate the ability to synthesize, separate and characterize compounds using reactions, protocols, laboratory equipment and instrumentation.

PO9: To provide the knowledge and skill in Chemical Sciences.

PO10: To enable the students to undertake research in emerging areas of Chemistry and convert the findings for the profit of the society.

PO11: To supply collaboration with industrial sectors and research Institutes to endorse joint research projects.

PO12: To instruct the scientific temperament among students and outside scientific community.

Programme Specific Outcomes (PSOs):

PSO1. To gain the knowledge of Chemistry by theory and practical.

PSO2. To understand the good laboratory practices and safety.

PSO3. To use modern chemical apparatuses, Models, Chem-draw, Charts.

PSO4: To apply the knowledge of biology to identify the plants and animals taxonomically, along with the methods of conservation and utilization of flora and fauna;

PSO5: Students can pursue their carrier as microbiologist, biophysicist, zoologist, botanist and biochemist.

Course Outcomes (COs)

Inorganic Chemistry USCH-101:

CO1: Understand the Bohr's theory and its limitations, Aufbau and Pauli exclusion principle, Hund's multiplicity rule electronic configurations of the elements, effective nuclear charge

CO2: Solve the numerical problem on Schrodinger wave equation and significance of ψ and ψ^2

CO3: Know the meaning of VSEPR theory, Valence bond theory and its limitations, directional characteristics of covalent bond

CO4: Understand the Periodic Table and Periodic Properties.

USCH-102: Organic Chemistry:

CO1: Understand the Structure, Bonding and Hybridization.

CO2: Solve the numerical problem on Schrodinger wave equation and significance of ψ and ψ^2

CO3: Study the Stereochemistry of Organic Compounds

CO4: Understand the D & L and R & S systems of nomenclature, Geometric isomerism, Newman projection and Sawhorse formulae.

CO5: Study the Paper, thin layer, column and gas chromatographic techniques and criteria of purity of organic substances

CO5: Study various organic reactions.

USCH-103: Physical Chemistry

CO1: Understand the Gaseous State Maxwell's distribution law of velocities and energies. Root mean square velocity, average velocity and most probable velocity and their relationship.

CO2: Analyze the Surface Chemistry and Colloidal States.

CO3: Liquid State Intermolecular forces, structure of liquids.

CO4: Determination of crystal structure of NaCl, KCl, CsCl by law's and pander's method.

USCH-104: Mathematics in Chemistry

CO1: Understand the theory of probability.

CO2: Solve the numerical problem on Determinants and Matrices.

CO3: Understand the logarithmic functions and exponential functions, differentiation of implicit functions.

CO4: Study the Integral Calculus and Integration as an inverse of differentiation.

USCH-105: Biology in Chemistry

CO1: Understand the Carbohydrates, lipids, proteins and nucleic acids.

CO2: Study the epithelial tissues, connective tissues, muscle tissue, nervous tissue and plant tissue: meristematic tissue

CO3: Know about DNA and RNA system.

CO4: Study the Whittaker's systems of classification and their role in living organism.

USCH-106: Physics

CO1: Study the Electric Charges and Fields.

CO2: Able to understand the Stoke's theorem and Gauss's divergence theorem and its application, Green's Theorem.

CO3: Know about Electric Potential Electric Currents.

CO4: Study the Rowland's experiment, Hall Effect.

USCH-107: Practicals

CO1: Perform the Acid base titrations reactions.

CO2: Understand the Oxidation reduction titrations using KMnO_4 and $\text{K}_2\text{Cr}_2\text{O}_7$.

CO3: Determine the enthalpy of neutralization of strong acid vs strong base, weak acid vs. strong base.

CO4: Know about the sublimation of camphor and phthalic acid, decolonization of brown sugar, (sucrose) with animal charcoal.

CO4: Understand the Differential extraction method.

USCH-108 Practicals:

CO1: Brainstorming of the potential problems pertaining coefficient of viscosity by Stoke's method and Solar-Cell characteristics.

CO2: To impart knowledge about galvanometer into ammeter. and voltmeter.

CO3: Able to perform the Anderson's bridge and Capacitance experiment.

CO4: Understand the half wave and full wave rectification technique.

USCH-151: Inorganic Chemistry

CO1: Explore the Qualitative and Quantitative Inorganic Analysis.

CO2: Understand the s-Block and p- Block Elements,

CO3: To impart the boosted knowledge about theory of Precipitation.

CO4: Know about chemical properties of the noble gases, chemistry of xenon, structure and bonding in xenon compounds.

USCH-152: Organic Chemistry

CO1: Learn the properties of chloroform, carbon tetrachloride and methods of formation of aryl halides.

CO2: Understand the nuclear and side chain reactions.

CO3: To impart the knowledge about Poly Nuclear Hydrocarbons.

CO4: Know about Coal, petroleum and petrochemicals.

CO5: Differentiate between S_N2 and S_N1 reactions with energy profile diagrams.

CO6: Differentiate between E_1 . and E_2 mechanism, substitution vs. elimination.

USCH-153: Physical Chemistry

CO1: Brainstorming of the potential problems of chemical Kinetics.

CO2: To impart knowledge about Kohlrausch's law, Arrhenius theory of electrolyte dissolution and its limitations.

CO3: Able to perform Debye-Huckel onsager equation for strong electrolytes.

CO4: Understand the Thermochemistry and chemical energetics.

CO5: Provide the deep knowledge about the Kirchoff's equation and Spontaneous processes.

USCH-154 & 155: Physics-1 and II

CO1: Brainstorming of the Special Theory of Relativity.

CO2: To impart knowledge about Simple Harmonic Free Vibrations and damped Simple Harmonic Vibrations.

CO3: Able to apply the knowledge of Collisions and scattering in day to day life.

CO4: Understand the Waves in Physical Media and Maxwell's equations and their significance.

CO5: Provide the knowledge about the Doppler effect.

CO6: Study about special theory of relativity and Lorentz transformation

USCH-156 Practicals

CO1: To find out the solubility of different salts (benzoic Acid) and determination of heat of dissolution and heat of dissolution

CO2: Learn the Viscosity and Surface tension experiment.

CO3: Understand the synthesis of various organic compounds.

USCH-201: Inorganic Chemistry

CO1: To learn about Co-ordination compound chemistry.

CO2: To impart knowledge about Oxidation and Reduction reaction.

CO3: To learn the non-aqueous solvents.

CO4: Provide the deep exploration about d-block elements.

USCH-202: Organic Chemistry

CO1: Student get acquainted with Monohydric alcohols, Dihydric alcohols and Trihydric alcohols.

CO2: Understand the various reactions of Phenols, Ethers and Epoxides.

CO3: To impart the boosted knowledge about Carboxylic Acids & their derivatives.

CO4: To know about the Ultraviolet (UV) absorption spectroscopy and their role in industrial sectors.

USCH-203 & USCH-204: Physical Chemistry

CO1: Student get acquainted with Thermodynamics and their application.

CO2: Understand the Le-chatelier principle and Law of mass action.

CO3: To impart the knowledge about Classius - Claperon equation and its application.

CO4: To know about the Nernst distribution law and Thermodynamic derivation of Nernst distribution law.

CO5: To learn about the laser physics, Polarization and Diffraction techniques.

USCH-205 Physics-2

CO1: Student get acquainted with Statistical Physics & Maxwell-Boltzmann Statistics.

CO2: Understand Entropy and Carnot's Engine.

CO3: To impart the knowledge about Maxwell's Thermodynamic.

CO4: To know about the Nernst distribution law and Thermodynamic derivation of Nernst distribution law.

CO5: To differentiate between Bose-Einstein and Fermi-Dirac Statistics.

USCH-206: English

CO1: To be familiar with different types of interviews and Writing Skills are also introduced such as: Resume Writing, Letter Writing, Essay Writing, Report Writing,

CO2: To improve language competency and ensure intellectual, aesthetic and personal growth.

CO3: To equips the students with numerous skills such as Speaking skills: Non Verbal communication, Presentation, Paper reading, Extempore, Self-introduction, Dialogues, debates, role-play, Quizzes, Group Discussion.

CO4: To enhance the ability to understand and use English language for effective communication in their professional work.

USCH-251: Inorganic Chemistry

CO1: Student get acquainted with Arrhenius, Bronsted- Lowry acid-base concept.

CO2: Understand the aqueous chemistry of Mo and W(VI).

CO3: To impart the knowledge Lanthanide elements and their properties.

CO4: To know about the General principles of metallurgy, calcinations, roasting, smelting and bessimerization technique.

CO5: To differentiate between Lanthanide and Actinides Elements.

USCH-252: Organic Chemistry

CO1: To learn the Infrared (IR) absorption spectroscopy.

CO2: Understand the various reactions and properties of amines group.

CO3: To impart the advanced knowledge of aldehyde and ketone.

USCH-253: Physical Chemistry

CO1: Understand and apply principles of Thermodynamics.

CO2: Study of Chemical Kinetics conductometric, potentiometric , optical method ,polarimetry and spectrophotometer.

CO3: Know the pH. Determination of pH using hydrogen, quinhydrone and glass electrode by potentiometric method.

CO4: Student will calculate the Nernst equation for a reversible electrode and cell.

CO5: Calculation of thermodynamic quantities.

USCH-254 & USCH-255 Physics

CO1: Know the Wave Mechanics and calculate the numerical problems.

CO2: To study the problem based on Schrodinger equation in one and three dimension.

CO3: Know the Frank Hertz experiment, Line structure, Normal Zeeman effect.

CO4: Student will understand the Solids and Crystal Structure.

CO5: Study the band Theory: Bloch functions, Kronig-Penney model.

USCH-256 Environmental Science

CO1: Know the natural ecosystems and flow of energy in ecosystem.

CO2: To study the Human Population & Environment.

CO3: Know the Multi disciplinary nature of environmental studies.

CO4: Student will understand the Solids and Crystal Structure.

CO5: Differentiate between Renewable & Non Renewable resources.

CO5: Understand the basic topic such as climate change, global Warming, acid rain, ozone layer depletion wrt environment degradation.

USCH-257 Practical's

CO1: Student get practical hand on Volumetric & Gravimetric Analysis.

CO2: Know about Estimation of phenol and aniline.

CO3: To determine the refractive index of given liquid and calculation of specific and molar refractivity.

CO4: Student will Determine the pH of a solution.

CO5: Student get familiar with Electrochemical Cell.

USCH-301 & USCH-302: Inorganic Chemistry

CO1: Know the Medicinal aspects of some metal complexes.

CO2: To study the Organometallic Chemistry.

CO3: Know the Magnetic Properties of Transition Metal complexes and Metal - ligand Bonding.

CO4: Student will understand the Bio- Inorganic Chemistry.

CO5: Study the Ziegler - Natta polymerization of ethylene and propylene.

USCH-303: Organic Chemistry-I

CO1: Learn about Carbohydrates, detailed classification and their nomenclature.

CO2: To study the PMR spectrum and chemical shift of various organic compound.

CO3: Know the instrumentation, mass spectrum, determination of molecular formula, parent peak and base peak.

CO4: Student will understand the Bio- Inorganic Chemistry.

CO5: Study the Organometallic Compounds and their role in medicinal field

USCH-304: Organic Chemistry-II

CO1: Student acquainted with Heterocyclic Compounds.

CO2: To study the Synthetic Dyes and their harmful effects.

CO3: Know the various organo phosphorus compounds.

CO4: Student will understand and apply knowledge gained from the Amino Acids, Peptides, Proteins and Nucleic Acids.

CO5: Study the Organometallic Compounds and their role in medicinal field.

USCH-305 & USCH-306: Physical Chemistry:

CO1: Understand the rotational spectroscopy and Born-Openheimer approximation.

CO2: To study the Photo Chemistry.

CO3: Know the Grothus, Drapper law Stark Einstin law, Lambert law, Beer's law. Jablonski diagram.

CO4: Student will understand the various collective - properties.

CO5: Differentiate between quantum yield and photosensitized reactions.

CO5: Differentiate between Ideal and Non-ideal solution.

CO6: Acquire the knowledge about Nuclear Chemistry and Radioactivity.

CO7: Explain the various concept involved in Statistical Thermodynamics.

USCH-307 Inorganic Chemistry Lab

CO1: To verify Beer-Lambert law for $\text{KMnO}_4/\text{K}_2\text{Cr}_2\text{O}_7$ and determine the concentration of the given $\text{KMnO}_4/\text{K}_2\text{Cr}_2\text{O}_7$ solution.

CO2: To perform the synthesis of various inorganic compounds.

CO3: Student will have acquainted with Colorimetry and Solvent extraction technique.

USCH-308 Organic Chemistry Lab

CO1: Student perform the Steam distillation and Column chromatography experiments.

CO2: Student will understand TLC technique.

CO3: Student will be able to determine Iodine number and Saponification value.

USCH-309 Physical Chemistry Lab

CO1: Student will perform the Conductometric Titration.

CO2: Student will understand the Potentiometric Titration.

CO3: Understand the Distribution Law.

USCH-351 & USCH-352: Inorganic Chemistry

CO1: Know the different analytical techniques.

CO2: To understand different types of separation techniques.

CO3: To give an extended knowledge about chromatographic techniques used for separation of amino acids

CO4: Discuss the problem based on distribution coefficient and extraction techniques.

CO5: Know the principles of common ion effect and solubility product.

CO5: Study the Voltammetry and Polarography as an analytical tool

CO6: Measure the absorbance of atoms by AAS.

USCH-353: Organic Chemistry-I

CO1: Know the Fermentation process.

CO2: To understand different types of enzymes, co-enzymes derived from niacin and thiamine.

CO3: Students get acquainted with drugs and their preparation.

CO4: Understand the glycolysis and tricarboxylic acid cycle

USCH-354: Organic Chemistry-II

CO1: Know the essential oils, classification of terpenes, isolation, isoprene rule.

CO2: To understand different types of Vitamins.

CO3: Discuss the problem based on Testosterone, Progesterone, Estrogens and Cortison.

CO4: Difference between harmones and vitamins

CO5: Study the Natural pesticides: Nicotinides, Pyrethroids, Rotenoide, Sabodilia, Ryania, Synthetic pesticides.

USCH-355: Physical Chemistry-I

CO1: Know the Electronic Spectra of various compounds.

CO2: To understand Photoelectric effect and De-Broglie equation.

CO3: Discuss the problem based on quantum mechanics.

CO4: Difference between harmones and vitamins.

CO5: Study the Dual nature of matter and light.

USCH-356: Physical Chemistry-II

CO1: Know the different analytical techniques.

CO2: To understand Black Body Radiation and Molecular orbitals theory.

CO3: To give an extended knowledge about chromatographic techniques used for separation of amino acids.

CO4: Discuss the Homogeneous and Heterogeneous catalysis.

CO5: Know the principles of Chromatography.

M. Sc Chemistry

Programme Outcomes:

After successful completion of two year program in chemistry a student should be able to;

PO1: To demonstrate the ability to perform detailed quantitative measurements with an understanding of contemporary chemical instrumentation theory and use, to interpret experimental results, to perform calculations on these results and to draw fair, precise conclusions.

PO2: Develop laboratory skills to link chemical structure to spectroscopic phenomena

PO3: To demonstrate the ability to use reported reactions, procedures, standard laboratory equipment, and current instrumentation to synthesize, isolate and characterize compounds.

PO4: Collaborate with industry and research institutes in order to facilitate collaborative research ventures.

PO5: To provide the information needed in Chemical Sciences for all science programs.

PO6: To demonstrate an ability to perform experiments using core chemical instrumentation and modeling methods in the above sub-disciplines with mastery of relevant techniques and competence.

PO7: To promote logical thinking and analytical skills to solve complex chemical issues, such as data analysis, synthetic logic, spectroscopy, structure and modeling, team-based problem solving, etc.

PO8: Create laboratory skills to link chemical structure to spectroscopic phenomena.

Programme Specific Outcomes:

PSO1. Know the arrangement of molecules/ions and their bonding and foresee the Molecule/ions composition.

PSO2. Understand and apply principles of Organic Chemistry for understanding the scientific phenomenon in Reaction mechanismsy.

PSO3. Understand good laboratory practices and safety.

PSO4: Study of free radical, bicyclic compound, conjugate addition of Enolates and pericyclic reactions

PSO5: Carry out experiments in the area of organic analysis, estimation, separation, derivation process, conduct metric and potentiometric analysis.

PSO6: Gathers attention about the physical aspects of atomic structure, various energy transformation, molecular assembly in nanolevel and significance of electrochemistry.

PSO7: Make aware and handle the sophisticated instruments/equipment's.

PSO-8. Enhance students' ability to develop mathematical models for physical systems.

PSO-9. Students will be able to discover new scientific areas in the fields of science and technology, both in chemistry and in allied fields. The central role of chemistry in our society will be understood by students and used as a framework for ethical actions in chemists' problems, including an appreciation of the responsible handling of chemicals, environmental concerns and key issues facing our society in energy, health and medicine.

PSO-10. In the fundamentals and application of present chemical and scientific hypotheses, including those of analytical, inorganic, organic and physical chemistry, students would have a solid basis.

Course Outcomes (COs):

PCH-111 INORGANIC CHEMISTRY –I

CO1: Know the Metal Ligand Bonding and Spectra.

CO2: To understand the Lanthanides and Actinides.

CO3: Discuss the problem based on d- π and p- π bonds.

CO4: Difference between borazines and phosphazene.

PCH-112 ORGANIC CHEMISTRY –I

CO1: Know the Supramolecular chemistry.

CO2: Difference between Aliphatic Electrophilic and Aliphatic Nucleophilic Substitution types reaction.

CO3: Difference between SN2 and SN1 reaction.

CO4: Discuss the problem based on Free Radical Reactions.

CO5: Difference between SE2 and SE1 mechanism.

CO5: Study the naming reaction of Carbon-Heteroatom Multiple Bonds.

PCH-113 PHYSICAL CHEMISTRY-I

CO1: Know the use of simple models for predictive understanding of physical phenomena associated to chemical thermodynamics and kinetics.

CO2: To understand the concepts in thermodynamics, different thermodynamic quantities such as heat and work and how they are measured.

CO3: Discuss the use of simple models for predictive understanding of physical phenomena associated to chemical thermodynamics and kinetics.

CO4: Able to discuss the Debye – Huckel Limiting Law.

CO5: Difference between F.D. statistics and Bose Einstein's statistics.

. PCH-114 MATHEMATICS IN CHEMISTRY

CO1: Solve the problem on Matrix Algebra and Vectors.

CO2: To understand the Differential and Integral Calculus.

CO3: Discuss the problem based on the Trigonometry.

CO4: Able to discuss the Debye – Huckel Limiting Law.

CO5: Difference between Determinants and Matrices.

PCH-115 BIOLOGY IN CHEMISTRY

CO1: Understand the Organization of Life.

CO2: To understand the role the genetics in our life.

CO3: Discuss the Carbohydrate metabolism.

CO5: Discuss the classification of Carbohydrates.

PCH-116 & PCH-165 INORGANIC CHEMISTRY PRACTICALS

CO1: Perform the Qualitative Analysis of inorganic compound.

CO2: Able to synthesize the Hg [Co(SCN)₄], Prussian Blue and Turnbull's blue, [Ni(NH₃)₆]Cl₂ compounds..

CO3: Difference between Quantitative and Qualitative Analysis.

PCH-117 & PCH -166 ORGANIC CHEMISTRY PRACTICALS

CO1: Able to determine the composition of phenol and aniline.

CO2: To understand the Systematic identification and separation of organic compounds.

CO3: Discuss the Determination of the molecular weight of acid by titration and by the silver salt method.

CO4: Able to discuss the fractional crystallization fractional distillation, steam distillation, sublimation and extraction.

PCH-118 & PCH-167 PHYSICAL CHEMISTRY PRACTICALS

CO1: Determine the mol.wt. of high polymer by viscosity measurements.

CO2: Perform the Conductometry experiments.

CO3: Discuss the Potentiometry, Refractometry, Polarimetry and pH meter.

CO4: Able to discuss the fractional crystallization fractional distillation, steam distillation, sublimation and extraction.

CO5: Discuss the Thermo chemical Measurements.

PCH-161 INORGANIC CHEMISTRY –II

CO1: Discuss the kinetics of octahedral substitution.

CO2: Understand the Nuclear reactions: fission and fusion reactions.

CO3: Discuss the Symmetry and Group Theory.

CO4: Able to discuss the Reaction Mechanism of Transition Metal Complexes.

CO5: Discuss the Nuclear and Radiochemistry.

PCH-162 ORGANIC CHEMISTRY –II

CO1: Discuss the Aromatic Nucleophilic Substitution reaction.

CO2: Understand the Nuclear reactions: fission and fusion reactions.

CO3: Discuss the Angular Momentum and MOT.

CO4: Able to discuss the Stereochemistry and their mechanism.

CO5: Discuss the Oxidation and Reduction process.

PCH-163 PHYSICAL CHEMISTRY-II

CO1: Discuss the Quantum Chemistry and their problem.

CO2: Understand the Nuclear reactions: fission and fusion reactions.

CO3: Discuss the Lindmans theory of unimolecular reaction.

CO4: Able to discuss the Clausius and Clapeyron equation and its application thermodynamic derivation of phase rule.

PCH-164 CHEMISTRY OF ADVANCED MATERIALS

CO1: Able to determine the Liquid Crystals and Glasses and Composites.

CO2: To understand the PTC and Polymer supported reagents.

CO3: Discuss the cryptands, cyclophanes, crown ethers.

CO4: Able to discuss the Nanomaterials.

PCH-211 SPECTROSCOPIC TECHNIQUES

CO1: Able to understand the Nuclear Magnetic Resonance (NMR) Spectroscopy.

CO2: To understand the Ultraviolet and Visible Spectroscopy.

CO3: Discuss the Mass spectroscopy and Electron Spin Spectroscopy.

CO4: Able to discuss Infrared and Raman Spectroscopy.

PCH-212 ANALYTICAL CHEMISTRY

CO1: Able to determine the Cyclic voltammetry and its applications.

CO2: To understand the coulometric titrations, apparatus and applications.

CO3: Discuss the Atomic absorption spectroscopy and Flame Photometry.

CO4: Able to discuss the Quenching and stabilization processes of coordination compounds.

PCH-213 INORGANIC CHEMISTRY SPECIAL-I

CO1: Discuss the compounds of Transition Metal-Carbon Multiple Bonds.

CO2: To understand the Fluxional organometallic compounds.

CO3: Discuss the Transition Metal Complexes.

CO4: Able to discuss the Homogeneous Catalysis.

. PCH-214 ORGANIC CHEMISTRY SPECIAL-I

CO1: Discuss the Antibiotics and Antiinfective Drugs.

CO2: To understand the Drug Design, penicillin G and penicillin V.

CO3: Discuss the Terpenoids and Carotenoids.

CO4: Able to discuss the Anticancer and chemotherapeutic agents.

CO5: To understand Natural Product.

PCH-215 PHYSICAL CHEMISTRY SPECIAL-I

CO1: Discuss the Symmetry and group theory.

CO2: Explain the Electronic properties and Band Theory

CO3: Discuss the Terpenoids and Carotenoids.

CO4: Able to discuss the Molecular Photochemistry.

CO5: Chemical and geometrical structure of polymers and Polymerization.

CO6: The Franck Condon Principle and radiative transitions.

PCH-216 & PCH-266 INORGANIC CHEMISTRY PRACTICALS

CO1: Quantitative analysis of elements or groups in the complexes

CO2: Perform the Potentiometric titrations and Spectrophotometric determinations

CO3: To prepare the various inorganic compounds.

PCH-261 BIOINORGANIC AND ENVIRONMENTAL CHEMISTRY

CO1: Discuss the Environmental Chemistry.

CO2: Understand the Biological N₂ fixation, molybdenum nitrogenase.

CO3: Discuss the Biochemistry of Iron.

CO4: Able to discuss the hemocyanins and hemerythrin..

PCH-262 ORGANIC SYNTHESIS

CO1: Discuss the Molecular orbital symmetry.

CO2: Understand the Laws of photochemistry and Franck-Condon principle.

CO3: Discuss the Photochemistry of Aromatic compounds.

CO4: Able to discuss the Organic Reagents and their mechanism.

CO5: Learn the α and β - cleavage reactions of cyclic and acyclic carbonyl compounds.

CO6: Claisen, Cope and aza-Cope rearrangement. Fluxional tautomerism and Ene reaction

PCH-263 INORGANIC CHEMISTRY SPECIAL-II

CO1: Able to determine the TGA, DTA, DTG and DSC.

CO2: To understand the Mossbauer Spectroscopy.

CO3: Discuss the UV-Vis and X-ray photoelectronic spectroscopy.

CO4: Able to discuss the Nuclear Quadruple Resonance Spectroscopy.

PCH-254 ORGANIC CHEMISTRY SPECIAL-II

CO1: Able to understand the Heterocyclic compounds.

CO2: To understand the Hantzsch-Widman system.

CO3: Discuss the six membered Heterocyclic with one and two heteroatoms.

CO4: Able to discuss the Oxetane, thitanes and Azetidines.

PCH-265 PHYSICAL CHEMISTRY SPECIAL-II

CO1: Discuss the Krammers Degeneracy.

CO2: To understand the Radiation Chemistry.

CO3: Discuss the Electron Spin Resonance Spectroscopy.

CO4: Able to discuss the Vibrational Spectroscopy.

CO5: Able to discuss the Flash photolysis.

M.Sc.Microbiology

Programme Outcomes (POs):

After the completion of two years' degree program in M.SC. Microbiology, student will be able to:

PO-1: To provide adequate, basic understanding about Microbiology subject.

PO-2: This program will enable students to understand and demonstrate the basics and Fundamentals of the subject such as types of microorganisms, their life cycle, and diseases Caused by pathogens.

PO-3: To apply the knowledge of molecular biology, genetics, instrumentation, Biochemistry and environmental microbiology to derive solutions to various environmental problems.

PO-4: To Demonstrate their theoretical learning into practical skills and to work effectively.

PO-5: The students will be able to get a practical skill in isolating and handling pathogenic organisms and their safe disposal.

PO-6: To derive knowledge of industrially important microbes and their applications in various industries, this would enhance their chances of employability.

Programme Specific Outcomes (PSOs):

PSO1: Students after completing their graduation would be able to pursue their career in hospitals, pathology labs and quality control section of dairy, pharmaceutical industries etc.

PSO2: To understand the good laboratory practices and safety.

PSO3: To apply the knowledge of biology to identify the plants and animals taxonomically, along with the methods of conservation and utilization of flora and fauna;

PSO4: Students can pursue their carrier as microbiologist, biophysicist, zoologist, botanist and biochemist.

Course Outcomes (COs)

General Microbiology PMI-101

CO-1: The objective of this course is to enable students to understand the history and developments in the field of microbiology.

CO-2: They will learn the different methods of sterilization, plating and staining techniques.

CO-3: They will be able to understand the principles of classification of viruses, fungi, bacteria, algae, protozoa and their economic importance.

CO-4: They will be able to understand the various diseases caused by these organisms their life-cycle, symptoms and methods of prevention.

Bacteriology PMI-102

CO-1: Students will be able to acquire knowledge about Cell Theory, Cellular organelles, Transport of nutrients, Cell Cycle, Apoptosis.

CO-2: They will be able to understand the concepts of Mendel's laws of genetics, Gene Types, Fine structure of gene, Regulation of gene expression in Prokaryotes and Eukaryotes, Mutation Types.

CO-3: The objective of this course is to enable students to understand the concept of Microbial Evolution, Prokaryotic cells: Structure and function, Microbial Growth, Metabolic Diversity among Microorganisms like Archae, bacteria, viruses etc.

CO-4: Students will be able to learn the basic concept of Principles of thermodynamics, Analytical techniques in biochemistry and biophysics, classification and separation of Proteins, lipids, nucleic acids etc.

Virology PMI-103

CO-1: The objective of this course is to enable students to understand the concept of Viruses

CO-2: Students are able to know the life cycle of viruses.

CO-3: They will be able to understand the structure, replication and transmission of viruses in plants.

Microbial Metabolism and Biochemistry PMI-104

CO-1: They will be able to understand the classification and properties of carbohydrates, proteins, lipids and amino acids.

CO-2: They will have knowledge of types, structure, function and replication of DNA.

CO-3: They will be able to understand the properties and classification of enzymes and their kinetics. They will be able to understand various metabolic pathways, photosynthesis and growth of bacteria.

CO-4: Brief account of bacterial growth phases, plasma membrane structure and different transport systems across the membrane.

PMI-105 & PMI-106: Practicals:

CO1. Students are able to perform Staining Techniques (Simple staining, Gram's staining, Spore staining, Capsule staining, Acid fast staining).

CO2. Students are very well known Media preparation and its sterilization.

CO-3. Know Isolation and enumeration of bacteria from soil by serial dilution and agar plating method.

CO-4. To know morphology of bacteria isolated from soil sample.

CO--5. Isolation and enumeration of bacteriophage from sewerage water

CO6.To study symptoms of viral infection in plants

CO-7.To check the purity of DNA using UV-Vis spectrophotometer

CO-8. Demonstration of agarose gel electrophoresis.

CO-9.To study the effect of temperature on the growth of bacteria/ yeast.

CO-10.To study the effect of pH on the growth of bacteria/ yeast.

PMI-201: Immunology

CO-1: General Concept, history and Development of Immune system and immunity, Organization of Immune system, Antigen - Antibody and its types.

CO-2: Basic concepts of food spoilage and food borne infections and waste water and treatment types will be discussed.

CO-3: Study of Types of cells involved in immune system, their Basic structure and function, Cytokines, Cell mediated immunity, Interferons, Hypersensitivity.

CO-4: Discussion of Antigen - antibody interactions, Immunohaematology, Blood group system, Rh factor, medical applications of blood grouping.

PMI-202: Genetic Engineering & Molecular Biology

CO-1: Students will be able to acquire knowledge about the structure of plasma membrane and transport systems, differentiation and replication of chromosome in bacteria.

CO-2: Basic knowledge about primary and secondary metabolism will be provided.

CO-3: Students will acquire basic knowledge of structure and properties of bacterial plasmids and bacteriophages, their life cycles, genetic recombination and DNA repair.

CO-4: Study of the mechanism of antibiotic resistance and spread of antibiotic resistance,

Transposition; Structure of bacterial transposons, types of bacterial transposons.

PMI-203: Industrial Microbiology

CO-1: Students will be able to understand the aerobic and anaerobic respiration mechanisms of various microorganisms, fermentation process of glucose and biosynthesis of bacterial structures, microbial photosynthesis and nitrogen metabolism.

CO-2: Students will be able to understand the basics of fermentation biotechnology, fermentation kinetics, types of bio-reactors, their design and instrumentation, industrial production of microbial biomass, scale up, instrumentation, control and applications of biosensors.

CO-3: Students will be able to understand the distribution and ecology of microorganisms, concept and components of different ecosystems- concept of aquatic ecosystems, waste water disposal and reclamation, micro flora of various soil types, composting, biodeterioration, GMO and their impact.

CO-4: Students will be able to understand the existence and microbiology of normal microbial flora of human body, their source of infection for man, classification of pathogenic bacteria, general properties of viruses, viruses -host interactions, Human Immuno Deficiency viruses, different aspects of mycology, Human mycotic infections, Basics of parasitology.

PMI-204 Food Microbiology:

CO-1: Students will have a knowledge of microbial flora of fresh foods.

CO-2: basics of canning.

CO3: Processing for heat treatment.

CO4: Role of microorganisms in beverages like beer, wine and vinegar.

CO5: Roles of microorganisms in the food industry, food borne outbreak, laboratory testing procedures, prevention measures, food sanitation in manufacture and retail.

PMI-301: Mycobiotechnology & Phycobiotechnology:

CO-1: Knowledge related to structure and characteristic features of the different biofertilizer organisms.

CO-2: Biofertilization processes, major biogeochemical cycles and the organisms. Biopesticides.

CO-3: Microbial diseases of crop plants including bacterial, fungal and viral diseases will be provided to the students.

PMI-302: Medical & Diagnostic Microbiology:

CO-1: Students are knows Host parasite interaction and establishment of disease, Iceberg concept of disease, kind of diseases: infectious and non- infectious.

CO-2: Disease process (Sign, symptoms and syndromes, types of infectious diseases, stages of infection).

CO-3: Normal microbial residents of human body, Characteristics of normal flora, distribution and occurrence of normal flora: skin, respiratory tract, gastrointestinal tract, urinary tract.

PMI-303: Environmental Microbiology:

CO-1: Knowledge of air, soil and aquatic microbiology will be disseminated to the students. They will be able to acquire knowledge about types and use of bio fertilizers.

CO-2: Basic concepts of food spoilage and food borne infections and waste water and treatment types will be discussed.

CO-3: Study of Physical and chemical characteristics and micro flora of various soil types, rhizosphere, phyllosphere Brief account of microbial interactions.

CO-4: Discussion of Potability of water, microbial assessment of water quality and brief account of water borne diseases.

CO-5: Knowledge of Xenobiotics, bioaccumulation, biopesticides and deterioration and General concept of industrial microbiology and their applications.

PMI-304: Techniques in Microbiology:

CO-1: Study of different techniques like Radioisotopes techniques, Autoradiography, Spectroscopy, Electrophoresis, Centrifugation, Colorimeter, Chromatography, ELISA etc.

CO-2: Students will be able to understand the principles and instrumentation of techniques like colorimetry, spectrophotometry, chromatography, centrifugation and microscopy.

CO-3: Discussion of basics of tissue culture techniques, Principal and requirements of animal tissue culture, Decontamination, sterilization and disinfection.

CO-4: Study of fundamentals of Electrophoreses and enzyme purification techniques.

PMI-305&PMI-306 Practical's:

Students are able to how to perform various test:

CO-1: Characterization of normal micro-flora of human body parts

CO-2: MIC determination for potential pathogen

CO-3: Antibiotic sensitivity assay

CO-4: ELISA

CO-5: WIDAL test

PMI-401 Computers & Bioinformatics:

CO-1: The objective of this course is to enable students to understand the history and developments in the field of biotechnology. To introduce the classification of Carbohydrates and Lipids.

CO-2: Explanation of Amino acids and Proteins, classification of Enzymes, their mechanism, Immobilization of enzyme and their applications.

CO-3: They will be able to understand the basics of plant and animal hormones, metabolism of carbohydrates, proteins and lipids.

PMI-402 Biostatistics

CO-1: The students will have a better understanding of Biostatistics, methods of Collection of data, sampling techniques, Processing and Presentation of data.

CO-2: They will have a understanding of Concept of Hardware and Software, Input and Output Devices and Application of computers in the field of biotechnology.

PMI-403 Recent Advances in Microbiology:

CO-1 :Students are able to know how to isolation of DNA &RNA &Proteins.

CO-2: They know PCR amplication.

CO-3: Recent developments in neutraceuticals, pharmaceutic and bioactive potential of microbes.

CO-4: Genetically Engineered Microbes and their applications in medicine, industry and agriculture.

PMI-404 Practical's

Students are able to know how to perform and knowledge about these

CO-1: Representation of Statistical data by

a) Histograms b) Ogive Curves c) Pie diagrams

CO-2: Determination of Statistical averages/ central tendencies.

a) Arithmetic mean b) Median c) Mode

CO-3: Determination of measures of Dispersion

a) Mean deviation b) Standard deviation and coefficient of variation c) Quartile deviation

CO-4: Tests of Significance-Application of following

a) Chi- Square test b) t- test c) Standard error

PMI-405: Project

CO-1: Learn the research methodology.

CO-2: Understand the research output.

CO-3: Know the different area of research in microbiology.

CO4: Learn the various types of instrumental handling.

CO-5: Able to search the literature based on research.

M.Sc.(Physics)

Programme Outcomes (Pos):

After successful completion of two year degree program in physics a student should be able to;

PO1: Apply the skill and knowledge in the design and development of electronic circuits to fulfill the needs of small scale electronic industry.

PO2: The program will develop student skills in analysis, interpretation of complex information of Physics and its applications in a technology-rich, interactive environment to meet the industrial needs.

PO3: Create an awareness of the impact of Physics on the society, and development outside the scientific community.

PO4: Become professionally trained in the area of electronics, material science, lasers and nonlinear circuits

Programme Specific Outcomes

PSO1: Understand and apply principles of physics for understanding the scientific phenomenon in classical and quantum physics.

PSO2: Understand and apply statistical methods for describing the quantum and classical a particles phenomenon in various physical systems.

PSO3: The students will get trained to apply their knowledge and skill in the design and development of Electronics circuits to cater to the needs of Electronic Industry They will excel in the research related to Physics and Materials characterization.

Course Outcomes (Cos):

PPY -101: Mathematical Physics

CO1: Students will learn important mathematical functions such as the function of Bessel, the polynomial of Legendre, the function of Greens, etc., their basic physics properties and applications, so that in various courses they need to understand theoretical treatment.

CO2: The goal of the course is to provide for the M.Sc. Students with the mathematical techniques he/she needs in this class to understand theoretical treatment in various courses taught and to develop a good history if he/she decides to pursue research as a career in physics.

PPY -102: Classical Mechanics

CO1: In the Lagrangian and Hamiltonian formalisms, the course will prepare students to the degree that they can use these in modern fields such as Quantum Mechanics, Quantum Field Theory, Condensed Matter Physics, Astrophysics, etc.

CO2: Upon successful completion of the course, students will be able to describe and understand the

movements of discrete and continuous mechanical systems, describe and comprehend the planar and spatial motion of a rigid body, and use Lagrange-Hamilton formalism to describe and understand the movement of a mechanical system.

PPY -103 & PPY-153: Quantum Mechanics-I & II

CO1: The goal of the course is to equip students with angular momentum, perturbation theory, scattering theory and quantum field theory techniques so that they can use them according to their requirements in different branches of physics.

CO2: Student will learn the application of Time- independent Perturbation Theory, understand the WKB approximation and also know the application and validity of Born Approximation

PPY-104: Electronic Circuit and Devices

CO1: Student will learn transducers strain gauge, thermostat, magneto resistive sensor and signal Conditions data acquisition & conversion.

CO2: This course covers semiconductor physics, computer physical concepts and their basic applications, passive and active filter analysis, OPAMP-based analog circuits, and introduction to different communication techniques and students will introduce integrated circuit technology basics, 8085 microprocessor design, instruction set, memory and I/O device interfacing.

PPY-105, PPY-155 & PPY-205: Physics Laboratory – I, II & III

CO1: Student will know about the variation of count rate with applied voltage and thereby determine the plateau, the operating voltage and slope of plateau (G M Counter).

CO2: With labs, student will know the practical knowledge of physics applications.

PPY-151 & 201: Condensed Matter Physics-I &II

CO1: After the completion of this course, students will be Capable of correlating the X-ray diffraction pattern based on the corresponding reciprocal lattice for a given crystal structure.

CO2: Able to explain how the predicted electronic properties of solids differ in the classical free electron theory, quanta free electron theory and the nearly free electron model.

CO3: Capable of explaining various magnetic phenomena and defining the different kinds of magnetic ordering based on the interaction of the exchange.

PPY-152: Statistical Mechanics

CO1: This course develops the idea of classical thermodynamic laws and their applications and learns statistical interpretation of micro canonical, canonical and grand canonical ensembles of thermodynamics.

CO2: This course will equip the students with Ensemble theory techniques so that they can use them

to consider the macroscopic properties of the bulk of matter in terms of its microscopic components.

PPY-154: Electrodynamics

CO1: Students will be able to use fundamental mathematical methods to solve problems in electrodynamics and to achieve proficiency in electrostatics and magneto statics after completion of this course.

CO2: Students will learn about TM, TE and TEM modes in waveguides and get command on four-vector and tensor notes after the completion of this course.

PPY-202 & 252: Nuclear & Particle Physics-I & II

CO1: Students will know the properties of the nucleus such as binding energy, magnetic dipole moment and CO-2 electric quadruple moment and study the achievement and limitations of nuclear physics models.

CO2: Students will have an idea of how particles interact with matter and will understand the elementary particles' nature, interaction, etc.

CO3: In nuclear models and nuclear reactions, students will be taught the basic aspects of nuclear physics such as static properties of nuclei, radioactive decays, nuclear forces and relatively advanced topics so that they understand the specifics of the underlying aspects so that they are prepared with the methods used to research these things.

PPY-203: Atomic and Molecular Physics

CO1: This course will provide the students with a platform for the various aspects of spectroscopy and their fundamental theory in order to benefit from this course in competitive examination and pursue this emerging field of research as a career.

CO2: Students will have knowledge of the rotational, vibrational and Raman spectroscopy of molecules after the completion of this course, and will be able to understand the instrumentation techniques used in various spectral regions.

PPY-204: Numerical Methods and Computational Physics

CO1: Students should be able to predict errors when solving equations after completion of the course and use techniques such as matrix inversion, Gauss reduction and LU decomposition effectively to solve linear equations.

CO2: Students should be able to numerically distinguish and combine expressions after completion of the course and solve physics equations such as heat equation, diffusion equation, etc. numerically.

PPY-251: Physics of Nanomaterials

CO1: Students will have achieved the ability to explain the effects of quantum confinement on the electronic structure and corresponding physical and chemical properties of materials at nanoscale.

CO2: Students would have the ability to compare the properties of nanostructures with their characteristics of scale, form and surface and understand the improved sensitivity of sensors based on nanomaterials.

PPY-272: Fibre optics & optical communication

CO1: Recognize and classify optical fiber structures and forms and address the impairments of the channel, such as losses and dispersion.

CO2: Analyze and classify the optical sources and detectors and discuss their principle of multiple coupling losses.

PPY-274: Physics of Lasers

CO1: Explain operating concepts and laser construction and specify optical components that can be used to customize the laser's properties.

CO2: relate the laser operation principles to atom and molecular physics, solid state physics, quantum mechanics and physical optics.

PPY-276: Optoelectronics

CO1: This course will introduce students to the basics of the demanding optical fibre research area.

CO2: Understanding basic light properties and operating principles of basic optical components and demonstrating a mastery of basic light generation mechanisms (including lasers) through a comprehensive understanding and review of operating principles, functionality, design architectures and trade-offs Lasers with semiconductors.

PPY-277: Environmental Physics

CO1: After the course, the student is expected to consider how it is possible to apply mathematics and physics to environmental areas.

CO2: This course acquired a basic understanding of the process used and has basic meteorological, hydrological and geophysical skills.

PPY-278: Astrophysics

CO1: Understanding the celestial phenomena associated with the origin of the universe, galaxies, stars and planetary systems, together with the stellar and primordial nucleosynthesis synthesis of elements.

CO2: This course includes a fundamental knowledge of astronomical methods, an understanding of the existence and composition of the cosmos, from earthly planets to galaxies, and an analysis of the possible evolution of the universe.

PPY-279: Science of Renewable Energy Sources

CO1: Interpret the sources of electricity, understand the forms of energy and energy, and interpret solar energy.

CO2: Explain the plants for solar energy and the collectors of solar energy.

CO3: Interpreting geothermal energy and describing the development of geothermal fluid electricity.

PPY-156 & 206: Seminar-I & II

CO1: The seminars help the students to build their confidence and how to faced audience.

CO2: It enables students to identify analogies between the work of absorbing and creating complex content—for instance, by reading and study investigation.

PPY-253: Project

CO1: This course is located at M.Sc. Semester 4th. This course will introduce the students to preliminaries and methods of study. It may consist of review of some research papers, creation of a laboratory experiment, fabrication of a system, working out some issue, participation in some ongoing research activity, analysis of data, etc. In the thrust as well as non- thrust research areas of the department, project work could be in experimental physics or theoretical physics.

M.Sc.(Mathematics)

Programme Outcomes (Pos):

The aims of the M.Sc (Mathematics) program consist of developing students with the following skills:

PO1: To provide students with knowledge, expertise and insight into mathematics and programming techniques in order to be able to work as professionals in mathematics.

PO2: To provide advanced mathematical and computer skills to students who Prepares them to undertake higher research and conduct research.

PO3: Educate learners through knowledge of mathematics and scientific computational methods to deal with the problems faced by the software industry.

PO4: To provide students with knowledge and ability to formulate and evaluate real life applications in mathematical models.

PO5: To improve the self-confidence of students to perform research individually or within a team.

Programme Specific Outcomes

The successful completion of this program will make it possible for the Students in order to:

PSO1: Demonstrate the capacity to independently conduct research and undertake higher studies in mathematics and computing towards a Ph.D. degree.

PSO2: Carry out development work and take up challenges in the developing manufacturing sectors.

PSO3: Demonstrate expertise in modeling, formulating and solving real life applications using mathematical and computational skills.

PSO4: Gain in-depth knowledge of various mathematical and analytical disciplines to apply for the

NET/GATE test.

Course Outcomes (Cos):

PMA-101& PMA-102: Real Analysis- I & II

CO1: Understand the basic properties of \mathbb{R} , such as its complete and ordered field characterization, the Archimedean property, the \mathbb{Q} and $\mathbb{R} \setminus \mathbb{Q}$ density, and the uncountability of each interval.

CO2: Categorize and clarify open and closed sets, boundary points, convergent and Cauchy sets, convergent sets, complete spaces, compactness and uniform continuity etc. in a metric space.

CO3: Realize how, from the real line to metric spaces, completeness, continuity and other notions are generalized.

PMA – 102 & PMA - 152: Complex Analysis – I & II

After completion of this course, the student would be able to:

CO1: understand the algebraically and geometrically symbolic form of complex numbers.

CO2: Describes and analyzes limits and continuity for complex vector functions.

CO3: Comprehension of the equations of Cauchy-Riemann, empirical functions, whole functions, including the fundamental algebra theorem.

PMA – 103: Ordinary Differential Equations

After finishing the course, students should be able to:

CO1: The basic principles of ordinary differential equations and partial differential equations and the fundamental computational methods for their resolution are applied.

CO2: Using numerical methods to solve problems and applications of Ordinary Differential Equations and Partial Differential Equations.

PMA – 104 & PMA - 154: Advanced Algebra – I & II

CO1: Explore groups, subgroups, including symmetric groups, permutation groups, cyclic groups, regular subgroups, and quotient groups properties.

CO2: Explore the properties of rings, sub-rings, ideals such as integral domain, ideal domain theory, Euclidean ring and Euclidean domain, and consider the definitions between rings of homomorphism and isomorphism.

PMA – 105: Analytical Mechanics

CO1: Understand the dynamics of a single particle, such as projectile motion, basic harmonic motion, motion of the pendulum, and associated problems.

CO2: Use different combinations of generating functions to obtain canonical equations and then develop the Hamilton Jacobi method to solve motion equations.

CO3: Apply the definition of particle system in the discovery of moment inertia, directions of particle system Principle axes and hence the dynamic equations of Euler to analyze rigid body motions.

PMA – 153 & PMA-252: Operation Research – I & II

The student would be able to: Upon completion of this course,

CO1: Formulate some real life concerns into the problem of linear programming.

CO2: To find an optimum vector for the regular linear programming problem and the corresponding dual problem, use the simplex method.

CO3: Demonstrate the condition of optimality for potential vectors for the problem of linear programming and dual linear programming.

CO4: Using Lagrange multiplier and using Kuhn Tucker conditions overcome nonlinear programming problems.

PMA – 155: Solid Mechanics

CO1: Understand the elasticity principle, including the relationships between strain/displacement and Hooke's law;

CO2: Using classical methods and energy methods to analyze solid mechanics problems;

CO3: In bars and thin walled members to solve torsion problems;

CO4: The resolution of beam stresses and deflections under unsymmetrical loading;

PMA – 201: Topology

CO1: Understand the construction of topological spaces from metric spaces and the use of general neighborhood properties, open sets, close sets, foundations and sub-bases.

CO2: In deriving the facts of different theorems, apply the properties of open sets, close sets, interior points, aggregation points and derived sets.

CO3: Experience of the notions of countable spaces and separable spaces.

PMA – 202: Partial Differential Equations

Once students have successfully completed this course, they will be able to:

CO1: the use of partial differential equation (PDE) information, modeling, general solution structure, and analytical and numerical solution methods.

CO2: Using environmental laws to formulate physical concerns as PDEs.

CO3: understanding analogies in physics and engineering between mathematical representations of various phenomena.

PMA –203: Functional Analysis

Upon completion of this course, the student would be able to:

CO1: Understand the regular linear spaces, the space of Banach and the dual spaces

CO2: Know the spaces of the internal product, orthogonality and Hilbert spaces.

CO3: differentiate between dimensional spaces that are finite and infinite.

CO4: in the formulation of differential and integral equations, apply linear operators.

PMA – 251: Probability and Statistics

After completion of this course, the student would be capable to:

CO1: compute the probabilities of composite events using the basic rules of probability.

CO2: demonstrate understanding the random variable, expectation, variance and Deliveries.

CO3: understand the idea of a statistic's sampling distribution, and explain the behavior of the mean sample behavior in particular.

PMA – 253: Numerical Methods

This course will provide the students

CO1: Understand and evaluate the efficacy of any numerical algorithms by understanding the errors, the cause of error and its effects on any numerical computations.

CO2: learn how to achieve nonlinear equation numerical solution using methods of bisection, secant, Newton and fixed-point iterations, and convergence analysis of these methods Methodologies.

CO3: numerically solve linear and nonlinear systems of equations.

B.Sc.(Non-Medical)

Programme Outcomes (Pos):

After successful completion of three year degree program a student should be able to;

PO1: Strong base in the fundamentals and application, including those in Analytical, Inorganic, Organic and Physical & Biological Chemistry, of established chemical and scientific theories.

PO2: Understanding the secure handling of chemicals, environmental concerns and key oil, health and medicine issues facing our community.

PO3: Enabling students to plan and conduct experimental experiments and to document and interpret the outcomes of such experiments accurately.

Programme Specific Outcomes

PSO1: The three-year Bachelor of Science degree programme is split into six semesters. Students are exposed to the fundamentals of synthesis, study and instrumentation in physics, chemistry and mathematics. To grasp the structure, functions and composition of the pure and applied sciences, students are taught Physics, Chemistry and Mathematics.

PSO2: For a comprehensive understanding of the concepts and applications of physics, chemistry and mathematics, knowledge of these basic subjects is necessary, which will help students understand the fundamental laws of nature that are essential to understanding the principles of technology.

PSO3: The students are well educated in mathematics, physics and chemistry after completing the course. In fruitful decision-making, students will be able to examine real world issues and will have knowledge of physical, chemical and mathematical laws.

Course Outcomes (Cos):

UBMA - 103: Plane Geometry

CO1: It will help to learn the main elements of straight lines, rectangle, circle, conics. Student will become familiar with the study of elementary properties of algebraic curves like circle ellipse and hyperbola in real and complex projective plane.

CO2: Students will be able to understand geometrical terminology for angles, triangles, quadrilaterals and circles, use geometrical results to determine unknown angles, recognize line and rotational symmetries, find the areas of triangles, quadrilaterals and circles and shapes based on these.

CO3: Student will be able to apply the geometrical skills to solve simple real-world problems. The subject could develop technical skills in sketching and drawing.

UBMA – 104: Calculus – I

Upon finishing the course, students will be able to—

CO1: Students learn how to evaluate multivariate positions, consistency, and differentiability.

CO2: Know the principles of various integrals and their application to areas and volumes.

CO3: Students develop knowledge in the limit, continuity, differentiation of vector functions

CO4: Using different approaches to solve integral problems of functions valued by vectors.

UBMA - 105: Algebra

CO1: Enables learners to understand a set's different properties and different kinds of relationships between different sets of types.

CO2: It strengthens the critical approach and generates the ability of students to think.

UBCH -101: Physical chemistry - I

CO1: Students should be able to describe the characteristic of the three states of matter and also should be able to describe the different physical properties of each state of matter.

CO2: Students should be able to determine the difference between solids, liquids and gases and will be able to define what matter is and where you can find it. Students will be able to give examples of solids, liquids and gases.

CO3: Students will describe the relationship between partial pressures and total pressure as described in Dalton's Law of partial pressure and also will be able to explain the quantitative relationship between T, V, n & P as described by kinetic molecular theory.

UBCH - 102: Organic chemistry - I

CO1: Recognize and draw constitutional isomers, stereoisomers, including enantiomers and diastereomers, racemic mixture and meso compounds and know the fundamental principles of organic chemistry and predict outcomes and derive mechanism of various types of organic reactions.

CO2: Understand various types of reactive intermediates and factors affecting their stability and understand the nomenclature, synthesis, isomerism and physical properties of alkanes and cycloalkanes

CO3: To understand the core concepts of organic chemistry i.e. resonance, hyper conjugation, inductive effect etc. and their application and to study about the isomerism and types of isomerism. Student will be able to understand optical isomerism, geometric isomerism and conformational isomerism and to acquire basic knowledge of reactive intermediates and mechanism of organic reactions.

UBCH -103: Inorganic chemistry - I

CO1: Able to write electronic configuration of given atomic number and to tell the name of orbital's by recognizing shapes of orbital's and to calculate bond order of different molecules. 4.

CO2: Able to draw MO diagrams of different molecules and also able to draw structures of different ionic solids and to calculate effective nuclear charge using Slater's Rule.

CO3: To understand how to draw energy diagrams and how to calculate bond order. To understand how to calculate lattice energy through Born Haber Cycle.

UBCH -104: Chemistry lab -I

CO1: To understand the basic concepts of chemical kinetics, crystallization, quantitative analysis.

CO2: To understand concept of specific reaction rate of the hydrolysis of methyl acetate/ethyl acetate catalyzed by hydrogen ions.

UBPY-101: CLASSICAL MECHANICS

After successfully completed course, student will be able to

CO1: Define and understand basic mechanical concepts related to discrete and continuous mechanical systems.

CO2: Describe and understand the vibrations of discrete and continuous mechanical systems.

CO3: Describe and understand planar and spatial motion of a rigid body.

CO4: Describe and understand the motion of a mechanical system using Lagrange-Hamilton formalism.

UBPY-102: WAVES AND VIBRATIONS-I

On successful completion of this course students will:

CO1: Understand the concepts of mechanics, acoustics and the properties of matter.

CO2: Understand physical characteristics of SHM and obtaining solution of the oscillator using differential equations.

CO3: Calculate logarithmic decrement relaxation factor and quality factor of a harmonic oscillator.

CO4: Use Lissajous figures to understand simple harmonic vibrations of same frequency and different frequencies.

CO5: Solve wave equation and understand significance of transverse waves

CO6: Solve wave equation of a longitudinal vibration in bars free at one end and also fixed at both the ends

CO7: Obtain boundary conditions of a longitudinal vibration in bars free at one end and also fixed at both the ends

CO8: Gain knowledge on applications of transverse and longitudinal waves.

UBPY-103: ELECTRICITY AND MAGNETISM-I

On successful completion of this course students will:

CO1: Understand Fundamental laws and concepts in electricity and magnetism, especially with regard to Maxwell 'slaws.

CO2: Understand Electrical circuits and the most common components in such: resistors, capacitors, and inductors.

CO3: Understand the properties of static electric and magnetic fields and how they arise.

CO4: The properties of simple, time-dependent electric and magnetic fields and what kind of physical phenomena they generate.

CO5: Electromagnetic waves and their properties.

CO6: Important historical experiments in the field of electricity and magnetism.

UBMA-152: Ordinary Differential Equations

CO1: This course provides an understanding of differential equations, and to give methods for solving them.

CO2: Students will learn various techniques of getting exact solutions of solvable first order differential equations, linear differential equations of higher order and differential equations express relationships between changing quantities, this material is applicable to many fields, and is essential for students.

CO3: Student will have a working knowledge of basic application problems described by second order linear differential equations with constant coefficients. Show existence and uniqueness of solutions.

CO4: Formulate mathematical models in the form of ordinary differential equations to suggest possible solutions of the day to day problems arising in physical, chemical and biological disciplines.

UBMA - 154: Calculus-II

CO1: Student will have an understanding of Volume and areas of solids, Reduction formulae, hyperbolic functions, their double and triple integration and basic concepts of real analysis.

CO2: The student will learn about the basic principles of multi-variable calculus along with the proof.

CO3: Student will gain knowledge of fundamental concept of axiomatic study of real numbers, bounds, l.u.b. and g.l.b. Completeness property in \mathbb{R} , Archimedean property, Countable and uncountable sets, Neighborhood, Interior points, Limit points.

CO4: They learn about different type of sets and their properties and behavior which play a great role for a student who wants to optmaths for higher studies.

UBMA-155: Solid Geometry

CO1: Develop a deeper sense of some of the geometric relationships between various platonic solids such as sphere, to find power of a point w.r.t a sphere, Radical planes, radical axis, radical centre, coaxial family of spheres.

CO2: To explore some of their properties of lines and sphere by creating and manipulating these solids.

CO3: This course covers obtaining equation of Cone, enveloping cone, cylinder, right circular cylinder, enveloping cylinder, ellipsoids, hyperboloids and prove their results. Find equation of tangent plane, reciprocal cone of given cone.

CO4: It develops the mind for not just theoretically solving questions but also develops in other fields also which involve 3D figures.

UBCH -151: Physical chemistry - II

CO1: Student will able to learnt basic principles of electrochemistry. Mention and explain various methods for the determination of transport number and explain the concepts of electrolytic conduction and dilution

CO2: Understand rate of reaction and factors affecting it. Derive integrated rate expressions for zero order, first order, second order and third order reaction and to understand theories of reaction kinetics and differentiate them

CO3: To study the various factors which affect the rate of a chemical reaction such as concentration, temperature, solvent, and catalyst etc. and theories of chemical kinetics and to acquire basic knowledge of electrode conduction.

UBCH – 152: Organic chemistry - II

CO1: Recognize the basic practical skills for the synthesis of alkenes, alkynes, alkyl halides able to predict the reactivity of organic compound from its structure.

CO2: Able to understand the rules for naming different organic compounds and able to recognize mechanism for given chemical reaction.

CO3: To understand the nature of double and triple bonds for addition reactions. 3. To identify the difference between dienes and alkenes. To understand the mechanism of attack of electrophiles and nucleophiles and to understand the preparation methods for alkenes, alkynes, alkyl halides.

UBCH -153: Inorganic chemistry - II

CO1: The students will be able to design and carry out scientific experiments as well as accurately record and analyze the results of experiments. Students will be able to explain why chemistry is an integral activity for addressing social, economic and environmental problems. Students will be skilled in problem solving, critical thinking and analytical reasoning as applied to scientific problems.

CO2: The students will be able to describe the periodic table as a list of elements arranged so as to demonstrate trends in their physical and chemical properties. The students will able to state the principle resemblances of elements within each main group in particular alkali metals, alkaline earth metals, halogens and noble gases

CO3: Students will be able to understand general trends in the chemistry behind p-block elements. The students will be able to know the important compounds and important applications of compounds of boron and carbon.

UBCH-154: Chemistry lab - II

CO1: To understand the basic concepts of quantitative analysis, crystallization, viscosity, surface tension

CO2: Students also able to do the titrations

UBPY-151: Special Theory Of Relativity

After successfully completed course, student will be able to

CO1: Differentiate wrong general public ideas about the theory and what the theory is really about.

CO2: Understand time – special relations at the local and global levels

CO3: Understand the basis of Standard model

CO4: Understand the gravity as bending of space-time

CO4: Calculate the angle light bends under the influence of gravity

CO5: Calculate the increase of wavelength of light leaving Earth

CO6: Calculate time dilation corrections used in GPS satellites due to special and general relativity

UBPY-152: ELECTRICITY AND MAGNETISM-II

On successful completion of this course students will:

CO1: Gain Knowledge on the basic concepts of electric and magnetic fields.

CO2: Understand the concept of conductors, dielectrics, inductance and capacitance

CO3: Gain knowledge on the nature of magnetic materials.

CO4: Understand the concept of static and time varying fields.

CO5: Gain knowledge on electromagnetic induction and its applications

CO6: Gain knowledge on EM waves, propagation and their properties.

CO7: Understand the concept of basic electronics and applications of digital electronics

CO8: Obtain knowledge on oscillators, transistors and h-parameters.

UBPY-153: WAVES AND VIBRATIONS –II

On successful completion of this course students will:

CO1: Understand the concept of coupled oscillators, be able to derive and solve the equations of motion for simple systems and describe motion of coupled oscillators in terms of normal mode solutions;

CO2: understand a wave as a travelling oscillation; understand the concepts of, and the differences between, transverse and longitudinal waves; know the non-dispersive wave equation and be able to derive it for transverse waves on a string; understand superposition of waves, wave groups and harmonic waves;

CO3: understand and be able to calculate reflection and transmission coefficients of travelling waves.

CO4: understand refraction and know, and be able to derive and apply, Snells law.

CO5: understand the concept and consequences of wave dispersion and be able to identify normal and anomalous dispersion.

CO6: understand the concepts of phase and group velocities and be able to calculate these quantities.

UBMA -201: Advanced Calculus

CO1: After course completion the learners will be able to understand meaning of calculus and visualize 3D mathematical figures, how to differentiate and integrate one and more variables functions, also would be able to correlate 3D structured from real-life problems and applications mathematically.

CO2: B.Sc. Students with the mathematical techniques he/she needs in this mathematical world to apply theoretical treatment in higher mathematics,

UBMA -202: Partial Differential Equations

CO1: Students know that PDEs is an equation which imposes relations between the various partial derivatives of a multivariable function. They would apply them in real-life problems.

CO2: Upon successful completion of the course, students will be able to describe and understand that PDE are ubiquitous in mathematically-oriented scientific fields, such as physics and engineering. For instance, they are foundational in the modern scientific understanding of sound, heat, diffusion, electrostatics, electrodynamics, fluid dynamics, elasticity, general relativity, and quantum mechanics.

CO3: Students would also know that they also arise from many purely mathematical considerations, such as differential geometry and the calculus of variations; among other notable applications, furthermore, they are the fundamental tool in the proof of the Poincaré conjecture from geometric topology.

UBMA -203: Statics

CO1: Students would be able to learn the branch of mechanics which concerned with the forces that produce a state of equilibrium in a system of bodies, also they would know that statics could be defined as the knowledge of mechanics which is essential for studying biomechanics.

CO2: Student will apply them in the application of objects that are either at rest, or in constant motion, that is a motion with constant velocity as to its magnitude and direction.

UBCH-201: Physical chemistry - III

CO1: After the completion of the course Students will know about the various laws of thermodynamics, their applications in day to day life. Different derivations with their numerical aspects which helps them for various competitive exams.

CO2: Students will able to understand the concept of Free energy, Van't Hoff reaction isochore, Van't Hoff reaction isotherm. Le- Chatetier's principle and its applications claussus Clapeyron equation and its applications in different parts of equilibrium.

CO3: Upon successful completion of the course, students will be able to describe and understand the applications of distribution law in the: (i) Determination of degree of hydrolysis and hydrolysis constant of aniline hydrochloride. (ii) Determination of equilibrium constant of potassium tri-iodide complex and process of extraction even practically also.

UBCH-202: Organic chemistry – III

CO1: Students would be able to learn about Alcohols, aldehydes, ketones, carboxylic acids and esters. Hydrogen bonding, Acidic nature, Reactions of alcohols. Dihydric alcohols, nomenclature, methods of formation, chemical reactions.

CO2: Students will able to study about phenols Nomenclature, structure and bonding. Preparation of phenols, physical properties, Comparative acidic strengths of alcohols and phenols, Reactions of phenols and Mechanisms of various rearrangement reactions.

CO3: Students will able to study about to Epoxides its Synthesis, ring opening of epoxides, reactions of Grignard and organo lithium reagents with epoxides.

CO4: Upon successful completion of the course students will learn about the Applications of UV Spectroscopy in structure elucidation of simple organic compounds with its basic principle. With its practical knowledge students are also able to do good work in industry area which helps in their professional growth.

CO5: Students will learn about the Nomenclature, Preparation, Reactions, Mechanism and Relative stability Carboxylic Acids & Acid Derivatives

UBCH-203: Inorganic chemistry – III

CO1: Students will study about general characteristics & properties of d-block elements, ionic radii, oxidation state, magnetic and spectral properties and stereochemistry of the elements. Structures & properties of some compounds of transition elements.

CO2: Students will learn the main theory Werner's coordination theory which further helps them in understanding the various structures of inorganic compounds in higher classes also valence bond theory of transition metal complexes.

CO3: Students will know about Physical properties of a solvent, types of solvents and their general characteristics, reactions in non-aqueous solvents.

UBCH-204: Chemistry lab - III

CO1: Students will be able to understand the basic concepts of Gravimetric Analysis, enthalpy, melting point, boiling point and identification of functional groups.

UBPY-201: Quantum - I

On successful completion of the course, the students will:

CO1: Understand the intuitive ideas of the Quantum physics and Nuclear physics.

CO2: Derive Schrodinger time dependent and time independent wave equations.

CO3: To understand dual nature of matter

CO4: Gain knowledge on classification of various crystal systems

CO5: Understand the basics of crystallography, x-ray diffraction and Superconductivity.

CO6: Students will develop a comprehension of the current basis of broad knowledge in Modern physics.

UBPY-202: Statistical Physics-I

On successful completion of this course students will:

CO1: Gain knowledge in Kinetic theory of gases

CO2: Understand the process of thermal conductivity, viscosity and diffusion in gases.

CO3: Understand the nature of thermodynamic properties of matter like internal energy, enthalpy, entropy, temperature, pressure and specific volume.

CO4: Understand the efficiency of Carnot's engine.

CO5: Understand the significance of first law and second of thermodynamics

CO6: Understand implications of the second law of thermodynamics and limitations placed by the

second law on the performance of thermodynamic systems

CO7: Evaluate entropy changes in a wide range of processes and determine the reversibility or irreversibility of a process from such calculations.

CO8: Understand the interrelationship between thermodynamic functions and ability to use such relationships to solve practical problems.

UBPY-203: ATOMIC AND MOLECULAR PHYSICS

This course will enable the student to get familiar with quantum mechanics formulation.

CO1: an exposition of inadequacies of classical mechanics in explaining microscopic phenomena, quantum theory formulation is introduced through Schrodinger equation.

CO2: The interpretation of wave function of quantum particle and probabilistic nature of its location and subtler points of quantum phenomena are exposed to the student.

CO3: Through understanding the behavior of quantum particle encountering a i) barrier, ii) potential, the student gets exposed to solving non-relativistic hydrogen atom, for its spectrum and eigen functions.

CO4: Study of influence of electric and magnetic fields on atoms will help in understanding Stark effect and Zeeman Effect respectively.

UBMA -251: Vector Calculus

CO1: Student will be able to learn that vector analysis, is concerned with differentiation and integration of vector fields, primarily in 3-dimensional Euclidean space and it is sometimes used as a synonym for the broader subject of multivariable calculus, which includes vector calculus as well as partial differentiation and multiple integration.

CO2: Student will understand applications which play an important role in differential geometry and in the study of partial differential equations where it is used extensively in physics and engineering, especially in the description of electromagnetic fields, gravitational fields, and fluid flow.

CO3: Students would understand that vector fields are often used to model, for example, the speed and direction of a moving fluid throughout space, or the strength and direction of some force, such as the magnetic or gravitational force, as it changes from point to point.

UBMA -252: Special functions & Integral Transform

CO1: Students would know that in mathematics, an integral transform maps a function from its original function space into another function space via integration, where some of the properties of the original function might be more easily characterized and manipulated than in the original function space.

CO2: Students would learn applications which play an important role in daily life. Although centuries old, these subjects are under intense development, for use in pure and applied mathematics, physics, engineering and computer science.

UBMA -253: Dynamics

CO1: Student will understand that dynamics is the branch of mechanics concerned with the forces that change or produce the motions of bodies, statics and kinetics.

CO2: They would know that it is the science concerned with forces, that produce change in any field or system, like in music the various degrees of loudness called for in performance, also called: dynamic marks, dynamic markings, directions and symbols used to indicate degrees of loudness.

CO3: Students would learn the new concepts appearing in dynamics which extend the conceptual power of our civilization, and provide new understanding in many fields.

UBCH-251: PHYSICAL CHEMISTRY - IV

CO1: Students will know about the need for the law, Concept of entropy, Nernst heat theorem, statement of concept of residual entropy, evaluation of absolute entropy from heat capacity data. Gibbs and Helmholtz functions; Gibbs function (G) and Helmholtz function (A)

CO2: Students will be able to learn the basic concepts of Electrolytic and Galvanic cells, its measurement,). Determination of pH using Hydrogen electrode, Quinhydrone electrode and glass electrode which are useful in higher studies.

UBCH-252: ORGANIC CHEMISTRY - IV

CO1: Students will know about selection rules, characteristic absorptions of various functional groups and interpretation of IR spectra of simple organic compounds. Applications of IR spectroscopy in structure elucidation of simple organic compounds. Basic concept of hookes law.

CO2: Students will learn about the structure and nomenclature, physical properties of amines.

CO3: Students will learn about the Mechanism of diazotization and its reduction with its synthetic application.

CO4: Students would learn the nomenclature and structure of the carbonyl group, Synthesis of aldehydes and ketones with particular reference to the synthesis of aldehydes from acid chlorides, advantage of oxidation of alcohols with chromium trioxide (Sarett reagent), Mechanism of nucleophilic additions to carbonyl group.

UBCH-253: INORGANIC CHEMISTRY - IV

CO1: Students will learn about the Lanthanides Electronic structure, oxidation states and ionic radii and lanthanide contraction, complex formation, occurrence. Actinides General features and chemistry of actinides, chemistry of separation, Comparison of properties

C02: Students will know about the Chemistry of analysis of various groups, Chemistry of interference of acid radicals including their removal in the analysis of basic radicals. Theory of precipitation, co-precipitation, Post- precipitation, purification of precipitates.

UBCH-254: Chemistry lab - IV

C01: Students would be able to understand the basic concepts of colorimetric method, preparation of pure sample and detection of extra elements.

UBPY-251: QUANTUM-II

The course learning outcome (CLO) will follow the requirements of the teaching rubrics of the physics program. By the end of the course,

CO1: The students will be able to use the perturbation theory and variational approach to solve questions in atomic physics;

CO2: The students will learn the principles of adiabatic approximation and use these principles to explain time evolution in simple quantum systems;

CO3: The students will be able to conduct angular momentum operation and summation for orbital angular momentum and spin.

UBPY-252: STATISTICAL PHYSICS-II

On successful completion of this course students will:

CO1: Understand the concepts of microstate, macrostate, ensemble, phase space, thermodynamic probability and partition function.

CO2: Understand the combinatoric studies of particles with their distinguishably or indistinguishably nature and conditions which lead to the three different distribution laws e.g. Maxwell-Boltzmann distribution, Bose-Einstein distribution and Fermi-Dirac distribution laws of particles and their derivation.

CO3: Comprehend and articulate the connection as well as dichotomy between classical statistical mechanics and quantum statistical mechanics.

CO4: Learn to apply the classical statistical mechanics to derive the law of equipartition of energy and specific heat.

CO5: Understand the Gibbs paradox, equipartition of energy and concept of negative temperature in two level systems.

UBPY-253: LASER PHYSICS

This course will enable the student to get

CO1: Familiar with optical phenomena and technology.

CO2: Qualitative understanding of basic lasing mechanism, types of Lasers, characteristics of Laser Light, types of Lasers, and its applications in developing LED, Holography

CO3: The idea of propagation of electromagnetic wave in a nonlinear media – Fibre optics as an example will enable the student to practice thinking in a logical process, which is essential in science.

CO4: Experiments in this course will allow the students to discuss in peer groups to develop their cooperative skills and reinforce their understanding of concepts

UBMA-301: Sequence and Series

CO1: To Develop in students, the mathematical analysis to understand sequences.

CO2: Students will have been introduced to sequences. Students have learned the terminology used with sequences.

CO3: Students will have experimented with creating and representing sequences.

CO4: Students using specialized vocabulary and symbols, to express mathematical ideas precisely

UBMA -304: Linear Algebra

CO1: LA helps you understand geometric terms such as planes, in higher dimensions, and perform mathematical operations on them

CO2: analyze the solution set of a system of linear equations.

CO3: express some algebraic concepts (such as binary operation, group and field).

CO4: express a system of linear equations in a matrix form.

CO5: do the elementary row operations for the matrices and systems of linear equations.

CO6: investigate the solution of a system using guass elimination.

CO7: Apply Cramers rule for solving a system of linear equations ,if determinant of the matrix Sof coefficient of system is not zero

CO8: Linear Algebra allows us to start understanding basic linear systems with use of matrices and vectors. Lastly, for a purely computational reason, Linear Algebra gives you many tools for proving many key theorems.

UBMA -303: Numerical Analysis

CO1: Student will study the numerical methods for various mathematical operations and tasks, such as interpolation, differentiation, integration, the solution of linear and nonlinear equations, and the solution of differential equations.

CO2: Analyze and evaluate the accuracy of common numerical methods.

CO3: perform curve fitting and explain the least square method

CO4: find the determined function using least square method.

UBPY-301: CONDENSED MATTER PHYSICS - I

At the end of the course the student is expected to learn and assimilate the following.

CO1: A brief idea about crystalline and amorphous substances, about lattice, unit cell, miller indices, reciprocal lattice, concept of Brillouin zones and diffraction of X-rays by crystalline materials.

CO2: Knowledge of lattice vibrations, phonons and in depth of knowledge of Einstein and Debye theory of specific heat of solids.

CO3: At knowledge of different types of magnetism from diamagnetism to ferromagnetism and hysteresis loops and energy loss.

CO4: Secured an understanding about the dielectric and ferroelectric properties of materials.

CO5: Understanding above the band theory of solids and must be able to differentiate insulators, conductors and semiconductors.

CO6: Understand the basic idea about superconductors and their classifications. To carry out experiments based on the theory that they have learned to measure the magnetic susceptibility, dielectric constant, trace hysteresis loop. They will also employ to four probe methods to measure electrical conductivity and the hall set up to determine the hall coefficient of a semiconductor.

UBPY-302: NUCLEAR AND PARTICLE PHYSICS - I

At the end of the course the student is expected to learn and assimilate the following

CO1: Learn the ground state properties of a nucleus – the constituents and their properties, mass number and atomic number, relation between the mass number and the radius and the mass number, average density, range of force, saturation property, stability curve, the concepts of packing fraction and binding energy, binding energy per nucleon vs. mass number graph, explanation of fusion and fission from the nature of the binding energy graph.

CO2: Know about the nuclear models and their roles in explaining the ground state properties of the nucleus (i) the liquid drop model, its justification so far as the nuclear properties are concerned, the semi-empirical mass formula, (ii) the shell model, evidence of shell structure, magic numbers, predictions of ground state spin and parity, theoretical deduction of the shell structure, consistency of the shell structure with the Pauli exclusion principles.

Learn about the process of radioactivity, the radioactive decay law, the emission of α , beta and gamma rays, the properties of the constituents of these rays and the mechanisms of the emissions of these rays, outlines of Gamow's theory of alpha decay and Pauli's theory of beta decay with the neutrino hypothesis, the electron capture, the fine structure of alpha particle spectrum, the Geiger - Nuttall law, the radioactive series.

UBPY-303: ELECTRONICS AND SOLID STATE DEVICES -I

CO1: After the completion of the course the student will acquire necessary skills/ hands on experience /working knowledge on multi meters, voltmeters, ammeters, electric circuit elements, dc power sources, ac/dc generators, inductors, capacitors, transformers, single phase and three phase motors, interfacing dc/ac motors to control and measure, relays and basics of electrical wiring

UBCH -301: PHYSICAL CHEMISTRY - V

CO1: Students will be capable of significant quantum effect, predict chemical and physical property of the molecules. They also know nature of the particles and its behavior. The students also know about the photoelectric effect i.e. what is the effect of frequency of photon on the metal.

CO2: Students will be able to describe molecular vibration with the interaction of matter, and electromagnetic waves, they will be able to apply formalisms based on molecular symmetry to predict spectroscopic properties.

CO3: They will be able to solve problem related to the structure, purity and concentration of the chemicals and to study molecular interaction by choosing suitable spectroscopy

UBCH -302: ORGANIC CHEMISTRY - V

CO1: Student will know how the nuclear spin is affected by a magnetic field, and they will be able to explain what happens when radiofrequency radiation is absorbed. They will be able to predict the number of proton and carbon NMR signals expected from a compound given its structure.

CO2: Students will be able to distinguish between monosaccharides, disaccharides and polysaccharides and can identify several major functions of carbohydrates. They also know various structures and functions of carbohydrates.

UBCH -303: INORGANIC CHEMISTRY - V

CO1: The goal of the course is to know the limitations of VBT and CFT as a model for bonding interaction between transition metals and ligands.

CO2: also know the thermodynamic stability of the metal complexes and factors affecting the stability.

UBMA - 351: Real Analysis

CO1: Real Analysis describes the fundamental properties of the real numbers that underpin the formal development of real analysis.

CO2: RA demonstrates an understanding of the theory of sequences and series, continuity, differentiation and integration.

CO3: Recognize the basic properties of the field of real numbers a, b, e, m . Improve and outline the logical thinking.

CO4: Students will be able to effectively write mathematical solution in a clear and concise.

CO5: Demonstrate the ability to manipulate and use power series.

UBMA - 354: Groups and Rings

CO1: Demonstrate understanding of the idea of a group, a **ring** and an integral domain, and be aware of examples of these structures in mathematics.

CO2: Appreciate and be able to prove the basic results of **group** theory and **ring** theory.

CO3: Students will have a working knowledge of important mathematical concepts order of a finite group and order of an element.

CO4: Students will gain experience and confidence in proving theorems.

UBMA – 353: Probability

CO1: Probability is widely used in all sectors in daily life like sports, weather reports, blood samples, congenital disabilities, statics etc

CO2: Probability is the branch of mathematics concerning numerical descriptions of how likely an event is to occur, or how likely it is that a proposition is true.

CO3: Express the concept of factorial and the basic principle of counting.

CO4: Students solve the problems about permutation, combination and binomial theorem.

CO5: Probability is the study of random events .it is used to analyzing games of chance, genetics, whether prediction etc.

UBPY-351: CONDENSED MATTER PHYSICS - II

After finishing the course the student should be able to

CO1: Relate crystal structure and degree of ordering to atom binding and packing

CO2: classify condensed matter upon its degree of order, with emphasis on scattering experiments,

CO3: explain the thermal properties in solids in particular heat capacity,

CO4: Classify condensed matter upon its electrical and transport properties,

CO5: apply the obtained concepts to challenges in condensed matter physics.

UBPY-352: NUCLEAR AND PARTICLE PHYSICS-II

At the end of the course the student is expected to learn and assimilate the following

CO1: Learn the basic aspects of nuclear reactions, the Q-value of such reaction and its derivation from conservation laws, the reaction cross-sections, the types of nuclear reactions, direct and compound nuclear reactions, Rutherford scattering by Coulomb potential.

CO2: Learn some basic aspects of interaction of nuclear radiation with matter- interaction of gamma ray by photoelectric effect, Compton scattering and pair production, energy loss due to ionization, Cerenkov radiation.

CO3: Learn about the detectors of nuclear radiations- the Geiger-Mueller counter, the scintillation counter, the photo-multiplier tube, the solid state and semiconductor detectors.

CO4: The students are expected to learn about the principles and basic constructions of particle accelerators such as the Van-de-Graff generator, cyclotron, betatron and synchrotron. They should know about the accelerator facilities in India.

CO5: Gain knowledge on the basic aspects of particle Physics – the fundamental interactions, elementary and composite particles, the classifications of particles: leptons, hadrons (baryons and mesons), quarks, gauge bosons.

CO6: The students should know about the quantum numbers of particles: energy, linear momentum, angular momentum, spin, electric charge, color charge, strangeness, lepton numbers, baryon number and the conservation laws associated with them.

UBPY-353: ELECTRONICS AND SOLID STATE DEVICES - II

At the successful completion of the course the student is expected to master the following.

CO1: Metal oxide semiconductors, UJT, JFET, MOSFET, and Charge coupled Devices and Tunnel Diode.

CO2: Power Supply and the role of Capacitance and Inductance filters.

CO3: Difference between analog and digital circuits, Number systems, their inter conversions, Basic logic gates and combinational circuits to construct half adders, full adders, subtractors, 4 bit binary Adder -subtracter and synthesis of circuits using Boolean algebra.

CO4: Working of P and N type semiconductors, P-N junctions, Forward and Reverse biased junctions, LEDs, photodiode and solar cells, p-n-p, n-p-n transistors, different characteristics of CB, CE and CC configurations, load line, gain and biasing for CE amplifiers and classification of amplifiers

CO5: Operational amplifiers and its characterization, circuits using Op-Amp for making summing and subtracting circuits, differentiators and integrators

CO6: Criterion for Oscillations, Oscillators and evaluation of frequency of oscillators.

UBCH-351: PHYSICAL CHEMISTRY - VI

CO1: Student will be able to learn Franck Condon principle, Qualitative description of sigma and pi and n molecular orbital (MO) their energy level and interaction of radiation with matter, difference between thermal and photochemical processes.

CO2: students will know methods of expressing concentrations of solutions, activity and activity coefficient. Dilute solution, Colligative properties, Raoult's law

UBCH-352: ORGANIC CHEMISTRY - VI

CO1: Students will study Nomenclature, structural features, Methods of formation and chemical reactions of thiols, thioethers, sulphonic acids, sulphonamides and sulphaguanidine and aromatic characteristics of pyrrole, furan, thiophene and pyridine.

CO2: The goal of the course to know the Acidity of hydrogens, alkylation of diethyl malonate and ethyl acetoacetate. Synthesis of ethyl acetoacetate: the Claisen condensation. Amino Acids, Peptides & Proteins. Free radical vinyl polymerization, ionic vinyl polymerization, Ziegler-Natta polymerization and vinyl polymers.

UBCH-353: INORGANIC CHEMISTRY - VI

CO1: Students will be able to learn nomenclature and classification of organometallic compounds. Also will know Arrhenius, Bronsted – Lowry, the Lux – Flood, Solvent system and Lewis concepts of acids & bases.

CO2: Student will know Essential and trace elements in biological processes, metalloporphyrin with special reference to hemoglobin and myoglobin also Biological role of alkali. Silicones and phosphazenes as examples of inorganic polymers

- PO1 :** A systematic understanding of knowledge within the discipline and in related discipline/s, and a critical awareness of current problems and/or new insights informed by the forefront of their academic discipline.
- PO2 :** A working comprehension of how established techniques of research and inquiry are used to create and interpret knowledge in the discipline.
- PO3 :** Competence in applying an existing body of knowledge in the critical analysis of a new question or of a specific problem.
- PO4 :** Cognizance of the complexity of knowledge and of the potential contributions of other interpretations, methods, and disciplines.
- PO5 :** Acquiring and showing qualities and transferable skills necessary for employment: exercise of initiative, personal responsibility, intellectual independence and ethical behavior.
- PO6 :** Ability to communicate effectively in presenting ideas orally and in writing (oral communication; written communication).

M.A. English

Programme Outcomes (POs):

After the completion of two-year degree program M.A. English, student will be able to achieve the following:

Programme Specific Outcomes (PSOs) for M.A. English

- PSO1:** Read, interpret, and write about a diverse range of texts in English, for example literature, film, digital media, and popular culture
- PSO2 :** Demonstrate knowledge of the major texts and traditions of literature written in English in their social, cultural and historical context
- PSO3 :** Analyse instances of the variety of literary forms closely in terms of style, figurative language and convention

PSO4 : Identify the major theoretical schools of the past and present and apply those approaches to a variety of texts

COURSE OUTCOMES (COs)

Approaches to Literature-I COURSE CODE: PENG-101

- CO1 The students will be able to understand the history of English Literature.
- CO2 The students will be able to understand European as well as English Renaissance.
- CO3 They will learn about the origin of English drama.
- CO4 They will understand the different styles of poetry written during the Elizabethan age.
- CO5 They will examine the history of English literature from Medieval age to Elizabethan

English Literature up to 1900 (Drama) COURSE CODE: PENG-102

- CO1 The students will be able to demonstrate working knowledge of a range of ideas as found in the texts of Shakespeare and his contemporaries.
- CO2 It will also enable the students to make an analysis by understanding the historical context and characteristics of the drama.
- CO3 The students will also acquire appropriate terminology and concepts to discuss the plot, characterization, themes and linguistic devices used in various plays.
- CO4 The students will be able to compare the different styles of drama writing.

COURSE CODE: PENG-103 English Literature up to 1900 ((Poetry)

- CO1 The students will gain knowledge about the different phases of poetry from Chaucer to Pope along with different poetical forms like Sonnets, Ballads, Epics, Mock Heroic poems, etc.
- CO2 They will be able to distinguish among rhythm, meter and other musical aspects of poetry.
- CO3 The course familiarizes various technical aspects of poetry with special reference to Neo Classical Poetry which adheres to the Classical rules of poetry writing which gives students an understanding of the norms and nuances of poetry.
- CO4 The students will be able to understand the growth of English poetry as a genre from the historical and cultural perspectives from the beginning to the eighteenth century.

COURSE CODE: PENG-104

English Literature up to 1900 (Fiction)

- CO1 The students will acquire the knowledge necessary to comprehend the novels of the period.
- CO2 They will be equipped with the terminology necessary to discuss the thematic as well as technical aspects of the novel.
- CO3 The students will gain knowledge of the major writers of the age and their style of writing.
- CO4 They will be able to understand how the novelists of the period contributed in different ways to the development of the novel form.

COURSE CODE: PENG-105

Introduction to Linguistics

- CO1 The students will be able to know the development of English Language and linguistics.
- CO2 They will be able to understand appropriate pronunciation of English Language.
- CO3 They will be familiarized with the etymology of the words in English Language.
- CO4 They will be able to learn the different parameters of translation.

COURSE CODE: PENG-201

Approaches to Literature-II

- CO1 Students will be able to read and analyze literary texts with increased skill and insights; their integrated understanding of literature being a product of relevant cultural and historical contexts and perspectives would be enhanced.
- CO2 The students will be able to identify connections among the literary texts across genres, historical periods, and/or cultural contexts.
- CO3 They will be able to develop an appreciation and understanding of the historical and aesthetic development of British literature and culture of the twentieth century.
- CO4 They will be competent enough to discuss the vast range of themes and issues of the particular age, for instance, the impact of the French and American revolutions; the industrial revolution;
Expanded education; religious and scientific developments; shifting definitions of gender
etc.

COURSE CODE: PENG-202

English Literature after 1900 (Drama)

- CO1 The students will be able to learn the origin and development of various themes and forms of drama and styles in twentieth century.
- CO2 The students will be familiarized with the major developments in the field of drama and the existential philosophy.
- CO3 Realism is the significant quality of Modern English Drama which will prepare students to deal with real life problems, presented in the prescribed plays.
- CO4 The students will develop an understanding of sub-genres of drama – romantic comedy, poetic play and realistic drama through a detailed study of the technicalities of drama as a genre.

COURSE CODE: PENG-203

English Literature after 1900 (Poetry)

- CO1 The students will be able to know the meaning and scope of the concepts of the modern, modernity and modernism.
- CO2 They will be able to acquaint themselves with the tradition of modern European poetry.
- CO3 They will be able to reflect upon the great upheaval that the world has undergone during twentieth century.
- CO4 They will be able to interpret representative writings from twentieth century.
- CO5 The students will be able to develop strategies for identifying formal and thematic features of poetry in general and especially of the prescribed ones in particular.

COURSE CODE: PENG-204

English Literature after 1900 (Fiction)

- CO1 The students will be able to trace the broad developments in the Modern novel during the twentieth century.
- CO2 They will be able to identify important concerns of modern novelists and appreciate representative works of modern fiction by examining the impact of diverse themes of modern fiction.
- CO3 The students will be equipped to apply universal human values expressed in novels from around the world to formulate a comparative perspective of cross-cultural, socio-economic experiences.
- CO4 They will be adept to use literary analysis terminology by exploring literary elements used in the novels which will make them conversant with terminology and practices of literature and literary criticism with newly acquired knowledge.

COURSE CODE: PENG-205

English Language

- CO1 The students will be familiarized with the principles of ELT in India.
- CO2 They will be able to learn various teaching techniques and digital learning to enjoy reading, writing and teaching.
- CO3 They will be able to enrich their communicative skills.
- CO4 They will be familiarized with different approaches to analyse different genres of literature.

COURSE CODE: PENG-301

Literature Theory and Criticism- I

- CO1 The students will be familiar with the basic theories, knowledge areas and analytical tools of the field through a number of contemporary and historical schools of literary world.
- CO2 They will be able to explore the world, the text and the critic in modern criticism and theory.
- CO3 They will be able to learn and develop the works of literary and cultural criticism.
- CO4 They will be able to appreciate the diversity of literary and social voices through literary criticism and theories.
- CO5 The students will become aware about the perceptions of different critics regarding varied literary concepts like tragedy, poetics, criticism, etc., and will be able to critically respond to different writers and their works.

COURSE CODE: PENG-302

Indian Writing in English –I

- CO1 The students will be able to understand socio-cultural history reflected in Indian writing in English.
- CO2 They will be able to appreciate Indian women poets and their sensibility.
- CO3 They will be able to make distinction between pre and post - Independence Indian writing in English.
- CO4 They will be able to learn Reform Movements in India.

COURSE CODE: PENG-303

American Literature-I

- CO1** The students will be able to explore American Literature, culture and the Renaissance.
- CO2** They will be able to evaluate the changes in American literature.
- CO3** They will be able to analyse literary works of eminent American poets and novelists.
- CO4** They will be familiarized with the trends and the movements in American literature.

COURSE CODE: PENG-304

Literature and Gender- I

- CO1** The students will be able to learn the concepts like sex and gender; feminism; women and the canon of Gynocriticism etc.
- CO2** They will be able to evaluate sexual, social, class and national perspectives reflected in their writings.
- CO3** They will be able to know the developments, themes and narrative strategies of women writings.
- CO4** They will be able to analyse literary texts through the perspectives of gender.

COURSE CODE: PENG-305

Colonial and Post-Colonial Studies

- CO1** The students will be able to make use of the ideas and concepts to analyse cultural dimensions of the effects of colonialism in post-colonial world.
- CO2** They will be able to analyse the cultural, social, and political conditions in today's global world.
- CO3** They will be able to critique the specific meanings of the post-colonial condition.
- CO4** They will be able to examine how the notions of the 'post-colonial' negotiate among different histories.

COURSE CODE: PENG-306

World Literature

- CO1** The students will be able to contextualize the major themes in world literature and their applicability in the contemporary society.
- CO2** They will develop understanding about moral dilemmas, separation, honour, struggles, defeat, change, belonging, etc. – the human concerns that cross nationalities and borders and unite mankind.
- CO3** They will also acquire life skills to handle their issues positively.

- CO4 The students will be equipped to apply universal human values expressed in the texts from around the world to formulate a comparative perspective of cross-cultural, socio-economic-political experiences.

COURSE CODE: PENG-307

Literature and Philosophy-I

- CO1 The students will be able to understand the origin of arts.
CO2 They will be able to know the concept of Indian mysticism.
CO3 They will be able to comprehend the existence of man.
CO4 They will be able to evaluate the contributions to human knowledge and civilization.

COURSE CODE: PENG-401

Literature Theory and Criticism- II

- CO1 The students will be equipped to explore and understand numerous aspects through which literary theory is applied to texts and extended to day-to-day life.
CO2 They will be able to read and analyze literary texts through multiple perspectives and lenses in the light of literary theories prescribed in the course.
CO3 It will enable them to read, write and apply theories, and formulate the relationship between the author and the work.
CO4 They will be able to know the role of language in understating literature.

COURSE CODE: PENG-402

Indian Writing in English -II

- CO1 The students will be able to appreciate the artistic and innovative nuances of the English language used by the Indian English writers in addition to various issues taken up by them to sensitize Indian masses.
CO2 They will be able to learn by reading the poetry pieces of modern Indian English poets, about the upcoming issues encountered by the Indian society in recent times.
CO3 The students will be able to learn the effects of partition on the lives of people.
CO4 They will be able to analyse counter-discourse, subaltern and Identity movements.

COURSE CODE: PENG-403

American Literature-II

- CO1 The students will be able to learn about American dream, ethnicity, race realism and Multiculturalism.

- CO2 They will be able to understand the conceptions, generalizations, myths and beliefs about American culture and history.
- CO3 They will be able to know about the effects of Post-world war on literature.
- CO4 They will be able to compare and contrast American and English Romantics.

COURSE CODE: PENG-404

New Literature

- CO1 The students will be able to understand thematic trends in literature written in different continents.
- CO2 They will be able to understand treatment of ruling and ruled people in inter-continental writings.
- CO3 They will be able to know the colonial effects on the liberty of marginalized people.
- CO4 They will be able to learn the different ways and means of the segregation of culture and society.

COURSE CODE: PENG-405

African Literature

- CO1 The students will be familiarized with African literature written in English.
- CO2 They will be able to place a text in its socio-historical context and demonstrate an understanding of different contents, forms and contexts of African literature.
- CO3 They will understand African literary responses to colonialism, apartheid, negritude and slavery.
- CO4 The students will develop critical learning that moves away from dominant Eurocentric and Western perspectives.

COURSE CODE: PENG-406

Literature and Gender- II

- CO1 The students will be able to understand the concepts of Feminism, Femininity and Feminist.
- CO2 They will be able to understand the means and ways of marginalization.
- CO3 They will be able to evaluate culturally and historically specific constructions of gender.

CO4 They will be able to research in the field of gender and cultural studies.

COURSE CODE: PENG-407

Literature and Philosophy-II

- CO1 The Students will be able to compose and contrast the philosophical ideas or Graeco – Roman
- CO2 Philosophies.
- CO3 They will be able to analyse the idea of man in 17th -18th centuries.
- CO4 They will be able to comprehend the rich philosophical ideas of great philosophers.
- CO5 They will be able to understand the development and growth of philosophy and literature.

M. Sc Industrial Chemistry

Programme Outcomes:

After successful completion of two year program in Industrial chemistry a student should be able to;

PO1: Graduates will demonstrate proficiency in performing chemical analysis, evaluating experimental data, and utilizing modern analytical techniques to assess the composition and quality of industrial materials and products.

PO2: Students will acquire the ability to optimize industrial chemical processes, including synthesis and manufacturing methods, to enhance productivity, efficiency, and sustainability while adhering to safety protocols.

PO3: Graduates will be equipped with the skills to conduct research in industrial chemistry, designing experiments, analyzing results, and proposing innovative solutions to address industry challenges and advancements.

PO4: Students will understand the importance of adhering to environmental regulations and safety protocols in industrial settings. They will be capable of designing and implementing sustainable practices to minimize environmental impact.

PO5: Graduates will be able to apply their knowledge of chemistry to various industrial sectors such as pharmaceuticals, petrochemicals, polymers, and materials. They will use their expertise to solve real-world problems and contribute to advancements in the industry.

PO6: Students will develop strong communication skills to effectively present technical information, collaborate with multidisciplinary teams, and engage in professional discussions within the industrial context.

These outcomes ensure that graduates of the M.Sc. Industrial Chemistry program are well-prepared to contribute effectively to the chemical industry, drive innovation, and address the challenges faced by the sector.

Programme Specific Outcomes:

PSO-1: Demonstrate a comprehensive understanding of the core principles of chemistry and their applications in industrial processes and research.

PSO-2: Analyze and design chemical processes and techniques used in various industries, considering safety, environmental impact, and economic viability.

PSO-3: Exhibit proficiency in advanced laboratory techniques, instrumentation, and experimental methods used in industrial chemistry.

PSO-4: Develop the ability to identify and solve complex industrial chemistry-related problems using critical thinking, research skills, and data analysis.

PSO-5: Understand and implement quality control and assurance measures in industrial processes to ensure the production of high-quality products.

PSO-6: Assess the environmental impact of chemical processes and demonstrate knowledge of green chemistry principles to promote sustainable practices in industrial settings.

PSO-7: Apply innovative approaches and emerging technologies to improve industrial processes, optimize efficiency, and explore new avenues for chemical applications.

Course Outcomes (COs):

ICH-110 INORGANIC CHEMISTRY

CO1: Know the Metal Ligand Bonding and Spectra.

CO2: To understand the Lanthanides and Actinides.

CO3: Discuss the problem based on d- π and p- π bonds.

CO4: Difference between borazines and phosphazene.

ICH-111 ORGANIC CHEMISTRY

CO1: Know the Supramolecular chemistry.

CO2: Difference between Aliphatic Electrophilic and Aliphatic Nucleophilic Substitution types reaction.

CO3: Difference between SN2 and SN1 reaction.

CO4: Discuss the problem based on Free Radical Reactions.

CO5: Difference between SE2 and SE1 mechanism.

CO5: Study the naming reaction of Carbon-Heteroatom Multiple Bonds.

ICH-112 PHYSICAL CHEMISTRY

CO1: Know the use of simple models for predictive understanding of physical phenomena associated to chemical thermodynamics and kinetics.

CO2: To understand the concepts in thermodynamics, different thermodynamic quantities such as heat and work and how they are measured.

CO3: Discuss the use of simple models for predictive understanding of physical phenomena associated to chemical thermodynamics and kinetics.

CO4: Able to discuss the Debye – Huckel Limiting Law.

CO5: Difference between F.D. statistics and Bose Einstein's statistics.

ICH-113 MATHEMATICS FOR CHEMISTS

CO1: Solve the problem on Matrix Algebra and Vectors.

CO2: To understand the Differential and Integral Calculus.

CO3: Discuss the problem based on the Trigonometry.

CO4: Able to discuss the Debye – Huckel Limiting Law.

CO5: Difference between Determinants and Matrices.

ICH-114 BIOLOGICAL CHEMISTRY

CO1: Understand the Organization of Life.

CO2: To understand the role the genetics in our life.

CO3: Discuss the Carbohydrate metabolism.

CO5: Discuss the classification of Carbohydrates.

ICH-115 & ICH-122 INORGANIC CHEMISTRY PRACTICALS

CO1: Perform the Qualitative Analysis of inorganic compound.

CO2: Able to synthesize the Hg [Co(SCN)₄], Prussian Blue and Turnbull's blue, [Ni(NH₃)₆]Cl₂ compounds..

CO3:. Difference between Quantitative and Qualitative Analysis.

PCH-116 & PCH-123 ORGANIC CHEMISTRY PRACTICALS

CO1: Able to determine the composition of phenol and aniline.

CO2: To understand the Systematic identification and separation of organic compounds.

CO3:. Discuss the Determination of the molecular weight of acid by titration and by the silver salt method.

CO4:. Able to discuss the fractional crystallization fractional distillation, steam distillation, sublimation and extraction.

ICH-117 & ICH-124 PHYSICAL CHEMISTRY PRACTICALS

CO1: Determine the mol.wt. of high polymer by viscosity measurements.

CO2: Perform the Conductometry experiments.

CO3:. Discuss the Potentiometry, Refractometry, Polarimetry and pH meter.

CO4:. Able to discuss the fractional crystallization fractional distillation, steam distillation, sublimation and extraction.

CO5: Discuss the Thermo chemical Measurements.

ICH-118 INORGANIC CHEMISTRY

CO1: Discuss the kinetics of octahedral substitution.

CO2: Understand the Nuclear reactions: fission and fusion reactions.

CO3:. Discuss the Symmetry and Group Theory.

CO4:. Able to discuss the Reaction Mechanism of Transition Metal Complexes.

CO5: Discuss the Nuclear and Radiochemistry.

ICH-119 ORGANIC CHEMISTRY

CO1: Discuss the Aromatic Nucleophilic Substitution reaction.

CO2: Understand the Nuclear reactions: fission and fusion reactions.

CO3: Discuss the Angular Momentum and MOT.

CO4: Able to discuss the Stereochemistry and their mechanism.

CO5: Discuss the Oxidation and Reduction process.

ICH-120 PHYSICAL CHEMISTRY

CO1: Discuss the Quantum Chemistry and their problem.

CO2: Understand the Nuclear reactions: fission and fusion reactions.

CO3: Discuss the Lindmans theory of unimolecular reaction.

CO4: Able to discuss the Clausius and Clapeyron equation and its application thermodynamic derivation of phase rule.

ICH-121 Advanced Analytical Chemistry

CO1: Able to determine the Cyclic voltammetry and its applications.

CO2: To understand the coulometric titrations, apparatus and applications.

CO3: Discuss the Atomic absorption spectroscopy and Flame Photometry.

CO4: Able to discuss the Quenching and stabilization processes of coordination compounds.

ICH-210 SPECTROSCOPY FOR ORGANIC COMPOUNDS

CO1: Able to understand the Nuclear Magnetic Resonance (NMR) Spectroscopy.

CO2: To understand the Ultraviolet and Visible Spectroscopy.

CO3: Discuss the Mass spectroscopy and Electron Spin Spectroscopy.

CO4: Able to discuss Infrared and Raman Spectroscopy.

ICH-211 ENVIRONMENTAL POLLUTION AND MONITORING TECHNIQUES

CO1: Understand water properties, chemistry, and sources. Identify and recognize different types of water pollution and their impact on water quality.

CO2: Develop knowledge in water management and conservation. Learn about different water resources and safeguarding them from pollution.

CO3: Gain expertise in water purification techniques and analysis. Learn processes for impurity removal and contaminant elimination from water.

CO4: Become proficient in assessing water quality through chemical and physical examinations. Understand best practices for preventing water pollution and optimizing water usage sustainably.

ICH-212 CHEMISTRY OF INDUSTRIAL PROCESS-I

CO1: Material balance principles for chemical processes and energy balance calculations.

CO2: Equipment Design 2 - Focus on materials, mechanical properties, and design of industrial vessels.

CO3: Industrial Instrumentation 3 - Proficiency in temperature, pressure, vacuum, flow measurements, and liquid level indicators.

CO4: Industrial Waste Management 4 - Understanding waste classification, treatment, minimization, and effective management.

ICH-213 CHEMISTRY OF INDUSTRIAL PROCESS-II

CO1: Distillation principles, boiling, vapor-liquid equilibria, Raoult's law, Henry's law, fractional distillation, steam distillation, plate columns, and solid-liquid extraction.

CO2: Filter types, operation principles, sand filters, filter press, heat transfer, conduction, convection, radiation, heat exchangers, and filter aids.

CO3: Crystallization processes, crystal growth, nucleation, impurity effects, various crystallizers, drying principles, moisture content, and drying equipment.

CO4: Evaporators (jacketed, horizontal, vertical, forced circulation), scale formation challenges, gas absorption, liquid-gas equilibrium, solution criteria, tower packing comparisons.

ICH-214 COMMON CHEMICALS IN INDUSTRIES

CO1: Understanding milk composition, heat effects, and processing for butter, ghee, and clarified butter. Leather constituents and tanning processes, pollution control. Phosphoric acid, superphosphate, baking powder production. Sulphuric acid, urea, ammonium nitrate manufacturing.

CO2: Dyes classification, preparation, uses in food and natural dyes. Manufacturing fluorescent brightening agents, photosensitive dyes. Edible oil refining, soap, detergent production. Fatty acids, glycerol, greases, turkey-red oil.

CO3: Food classification, composition, nutrition, sensory evaluation. Preservation methods, additives, safety measures. Raw materials for glass production, types of glass. Refractory materials, clay pots, zeolites.

CO4: Organophosphorus pesticides, carbamates, pyrethroids in pest management. Insect pheromones, repellents in integrated pest management. Franck Codon Principle, radiative transitions.

ICH-215 INORGANIC CHEMISTRY PRACTICALS SPECIAL

CO1: Quantitative analysis of elements or groups in the complexes

CO2: Perform the Potentiometric titrations and Spectrophotometric determinations

CO3: To prepare the various inorganic compounds.

ICH-216 ORGANIC CHEMISTRY PRACTICALS SPECIAL

CO1: Develop analytical skills for organic compound analysis, separation, characterization, and structural confirmation with spectral data.

CO2: Acquire purification and separation techniques like TLC, vacuum distillation, and sublimation for isolating natural products.

CO3: Attain proficiency in quantitative analysis and colorimetric determination of functional groups and various organic compounds.

ICH-217 PHYSICAL CHEMISTRY PRACTICALS SPECIAL

CO1: Analytical Chemistry Techniques - Principles and applications of potentiometric methods, conductometric measurements, and pH-metry in analytical chemistry.

CO2: Chemical Kinetics and Reaction Rate Analysis - Determining reaction velocity constants, activation energies, and analyzing colorimetric and spectrophotometric experiments.

CO3: Dielectric Constant, Dipole Moment, and Organic Liquid Analysis - Understanding dielectric constants and dipole moments in organic liquids, and analyzing data to determine molecular polarity and composition of mixtures.

ICH-218 DISSERTATION

CO1: Showcase deep understanding of chosen chemistry research area, including theories and experimental techniques.

CO2: Conduct original research through experiments, simulations, or data analysis.

CO3: Comprehensive literature review to position work in context and address research gaps.

CO4: Demonstrate critical thinking, ethical considerations, time management, collaboration/independence, and contribute to the field.

ICH-219 PHARMACEUTICAL CHEMISTRY

CO1: Understand principles of drug design, SAR, drug receptors, and pharmacokinetics in drug development.

CO2: Analyze drug activity theories, drug metabolism, and the synthesis of therapeutic agents for various diseases.

CO3: Demonstrate knowledge of psychoactive drugs, antibiotics, and cardiovascular drugs synthesis for medicinal applications.

ICH-220 INDUSTRIAL INTERNSHIP/ SEMINAR

CO1: Develop advanced lab skills through hands-on experience in industrial chemistry experiments.

CO2: Gain industry insights, safety awareness, and learn to apply theoretical knowledge practically.

CO3: Enhance project management abilities by planning and executing tasks within time and budget constraints.

CO4: Cultivate critical thinking to solve challenges and devise innovative solutions in industrial settings.

ICH-221 DISSERTATION/ SEMINAR

CO1: Showcase deep understanding of chosen chemistry research area, including theories and experimental techniques.

CO2: Conduct original research through experiments, simulations, or data analysis.

CO3: Comprehensive literature review to position work in context and address research gaps.

CO4: Demonstrate critical thinking, ethical considerations, time management, collaboration/independence, and contribute to the field.

Ph.D Chemistry

Programme Outcomes (POs):

After the completion of Ph.D Chemistry, student will be able to:

PO-1: To explore critical thinking and the scientific knowledge to design, carry out, record and analyze the results of various chemical reactions.

PO2: To communicate the basic analytical and technical skills to work effectively in the various sectors of chemistry.

PO3: To motivate critical thinking and analysis skills to solve complex chemical problems such as analysis of data, spectroscopy etc.

PO4: To validate the ability to synthesize, separate and characterize compounds using reactions, protocols, laboratory equipment and instrumentation.

PO5: To enable the students to undertake research in emerging areas of Chemistry and convert the findings for the profit of the society.

Course Outcomes (COs)

Research Methodology DMG-101:

CO1: Students who complete this course will be able to understand and comprehend the basics in research methodology and applying them in research/ project work.

CO2: The Students will develop skills in qualitative and quantitative data analysis and presentation

CO3: Students will be able to demonstrate the ability to choose methods appropriate to research objectives.

CO4: With the help of this course, students will be able to take up and implement a research project/ study.

General Chemistry DSC-101:

CO1: To learn the Infrared (IR) absorption spectroscopy, Nuclear magnetic Resonance (NMR) and other spectroscopic techniques used in organic chemistry.

CO2: To understand synthesis and properties of Natural Product.

CO3: To understand the analytical techniques like XRD, TEM, XPES.

CO4: To learn the ESR of metal complex.

Research & Publication Ethics DRP-201:

- CO1:** Understanding of basics of philosophy of science and ethics
- CO2:** Knowledge of identifying research misconduct and predatory publications
- CO3:** Knowledge of research integrity
- CO4:** Understanding of publication ethics

Seminar Presentation DSR-202:

CO1: Establish motivation for any topic of interest and develop a thought process for technical presentation

CO2: Organize a detailed literature survey and build a document with respect to technical publications

CO3: Analysis and comprehension of proof-of-concept and related data

CO4: Make use of new and recent technology (e.g. Latex) for creating technical reports

School of Pharmacy and Emerging Sciences

Programme Outcomes (POs)
Programme Specific Outcomes
(PSOs)
Course Outcomes (COs)

PROGRAMME OUTCOMES (POS):

PhD:

PO1: Acquire effective knowledge of Drug Delivery, Pharmaceutical Processing and Material Science focuses on the novel applications of pharmaceutical excipients to target drugs to specific sites in the body; to solve problems related to solubility, stability, dissolution rate and bioavailability; and to utilize advanced processing technologies to design innovative drug delivery systems.

PO2: Develop ability to conduct investigations of complex problems.

PO3: Technical Knowledge of core subjects and applications of the subjects in pharmaceutical profession.

MASTER OF PHARMACY:

PO1: Acquire technical knowledge and training on equipment, instruments, and software used in the field of pharmaceutical sciences.

PO2: Acquire effective knowledge of pharmaceutical sciences leading to hold key position in the industry and health care sector.

PO3: Develop skills in qualitative and quantitative analysis of various pharmaceuticals.

PO4: Self-access and use of feedback effectively from others to identify learning needs and to satisfy these needs on ongoing basis.

PO5: Develop and recognize the need of lifelong learning in the broadest context of technological changes.

PO6: Develop ability to conduct investigations of complex problems.

BACHELOR OF PHARMACY:

PO1: Possess knowledge and comprehension of basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

PO2: Technical Knowledge of core subjects and applications of the subjects in pharmaceutical profession.

PO3: Practical training on sophisticated analytical instruments, biomedical devices, simulated software for animal studies, drug designing through CADD.

PO4: Knowledge about the Code of Conduct and Professional Integrity to practice the profession of Pharmacy.

PO5: Providing Pharmaceutical care to the consumers.

PO6: Reveal effective planning abilities including time management, resource management, delegation skills, and organizational skills.

PO7: Build up and implement plans and organize work to meet deadlines.

PO8: Develop the principles of scientific inquiry, thinking analytically while solving problems and making decisions during daily practice. Analyze, evaluate and apply information systematically.

PO9: Enhancement of Team spirit and leadership qualities.

PO10: Valuable Communication effectively with the pharmacy community and with society.

PO11: Brainstorming of the potential problems pertaining to scientific, cognitive and communicative skills.

PO12: Placement of Students/ Self-employment.

PO13: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PO14: Self-access and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

PO15: Develop Professional Identity and Understand, analyze and communicate the value of their professional roles to health care professionals, promoters of healthcare sector, educators, managers, employers, employees etc.

PO16: Develop and recognize the need of lifelong learning in the broadest context of technological changes.

PO17: Develop and recognize the conduit between prescriber, producer and patient with his vigilant approach.

DIPLOMA OF PHARMACY:

PO1: Technical Knowledge of core subjects of Pharmaceutical Science and applications of the subjects in pharmaceutical profession.

PO2: Knowledge about the Code of Conduct and Professional Integrity to practice the profession of Pharmacy.

PO3: Providing Pharmaceutical care to the consumers.

PO4: Self-access and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

PO5: Develop and impart acquaintance about prescription handling and patient counseling.

PO6: Providing knowledge of inventory control and Drug store management in the drug store/ Pharmacy of a hospital.

PO7: Brainstorming of the potential problems pertaining to technical, cognitive and communicative skills.

PO8: Placement of Students/ Self-Employment.

PROGRAMME SPECIFIC OUTCOMES (PSOS):

PhD:

Doctor of Philosophy (Pharmaceutics) degree program is considered to help the researcher gain an in-depth understanding of a specialized subject so that he/she

can forecast trends and, ultimately, make assistance in his/her area of expertise. Along with rigorous research and writing projects, the researcher will have the prospect to explore high level design issues, evaluate methods of maintaining security in distributed systems, develop a software process expansion plan for an organization and design, test and implement an experiment – including reporting on the results.

The students after Doctor of Philosophy (Pharmaceutics) have a wide array of options as below:

Bioinformatics: After PhD complete knowledge of CADD is most welcomed. This include work in Structural biology, genome annotations like that of human genome project ,computational chemistry, mathematics used in modeling complex structures or processes, bio computational specialists may learn to make simpler molecules that produce the same end results.

Quality control: After PhD they have to develop, apply, revise, and maintain quality standards for processing materials into partially finished or finished products. Helps in designing and implementing methods and procedures for inspecting, testing, and evaluating the precision and accuracy of products and prepares documentation for inspection testing procedures.

Professor and Readers: PhD in Pharmaceutics is most welcomed in this field. They can work as professor, later on selected as HOD after getting some experience.

Drug Discovery – After PhD they can opt for development of new chemical entity or molecule.

Receptor Biology- After PhD with experience in receptors and their ligands, and as Cell Biologists with experience in G protein-coupled receptors.

Cell Biology_- New fields of research in the cell therapy and tissue engineering sectors combine with the continuing need for mammalian cells as a production system for proteins.

Scientists: After PhD they can apply both in Govt research institutes and private companies for carrying out research and development, discovering new procedures, species drugs etc for the benefit of mankind.

MASTER OF PHARMACY:

Master of Pharmacy (M.Pharm) is a two year post graduate programme offered in different disciplines:

1. Pharmaceutics
2. Pharmacology
3. Pharmaceutical chemistry
4. Industrial Pharmacy
5. Analytical Chemistry

1. Pharmaceutics:

Post graduate program in Pharmaceutics is a four semester Specialist Program leads to a Master in pharmacy (Pharmaceutics), provide methodical training and research in a range of scientific disciplines defining the Pharmaceutical Sciences. Post Graduate students of Pharmaceutics have the opportunity to participate in a wide variety of collaborative programs and research activity in university and in industry. Internships are available for students interested in gaining experience in pharmaceutical companies or in global health placements

around the world. Our post graduates pursue various career opportunities in industry, government, and institutions.

2. Pharmacology

Postgraduate program in Pharmacology is a four semester Specialist Program leads to a Master in pharmacy (Pharmacology). This provides a detailed exposure to science of effects of drugs which enables the students to conduct pre-clinical and clinical trials. It explores the drug actions on living systems - where they act, how they are metabolized, and how they exert toxic effects. Understanding all of this requires studying drug actions at levels ranging from the single molecule to the whole organism.

3. Pharmaceutical chemistry

Postgraduate program in Pharmaceutical Chemistry is a four semester Specialist Program leads to a Master in pharmacy (Pharmaceutical Chemistry). The postgraduate's students receive a solid background in physical, organic and analytical chemistry and will also learn the fundamental aspects of the synthesis, manufacture, use and mode of action of drugs. Their education includes how a novel molecule can be designed, prepared and evaluation of their physical, chemical, and biological properties of the same. Qualified Post Graduates from this program are ideally prepared to work in the synthetic chemistry department of the drug industry and also in various government and academia.

4. Industrial Pharmacy

Postgraduate program in Industrial Pharmacy is a four semester Specialist Program leads to a Master in pharmacy (Industrial Pharmacy). This provides a

detailed Knowledge in manufacturing, development, marketing and distribution of drug products including quality assurance of these activities. Industrial pharmacists use the latest methods, technologies and processes to develop new medications, and may be involved in clinical drug trials. Internships are available for students interested in gaining experience in pharmaceutical companies or in global health placements around the world. Our post graduates pursue various career opportunities in industry, government, and institutions.

5. Analytical Chemistry

Postgraduate program in Analytical Chemistry is a four semester Specialist Program leads to a Master in pharmacy (Analytical Chemistry). The postgraduate's students receive a basic knowledge and understanding of essential chemical and physical principles for analytical chemistry. Their education includes basic analytical techniques and practical aspects of classical chemical analysis to solve problems related to chemical analysis and interpret analytical results. Qualified Post Graduates from this program are ideally prepared to work in the synthetic chemistry department of the drug industry and also in various government and academia.

The students after post graduating have a wide array of options as below:

a) Pharmaceutical Industry:

Students keen to make their career in a Pharmaceutical Industry have the following job profiles:

Research and Development: After M.Pharmacy students work as project assistant at research institute or as research fellows. They assist and work on a particular project this makes them gain experience and move ahead in research field.

Students work in R&D within pharmaceutical, biotech, agro and FMCG sectors.

Identifying new and more effective formulations (combinations of active drugs and other constituents) is as important as finding a new drug molecule.

Analytical R&D and Formulation Development (F&D)

Assay development and assay validation roles in pharmaceutical industries.

In corporate sector students with higher capabilities are selected for deserving positions e.g. Cadila, Glenmark, Dr.Reddy's Lab, Cipla, Fresenius Kabi and more. These companies also do campus recruitment where students get a better chance to demonstrate their skills.

Regulatory Affairs: Regulatory Affairs (RA) is a profession within regulated industries. Regulatory Affairs plays a crucial role in the pharmaceutical industry and is involved in all stages of drug development and also after drug approval and marketing.

Pharmacovigilance: Detection, assessment, understanding and prevention of adverse effects or any other drug-related problem.

Medical writing: Writing documents for regulatory agencies, seeking approval for devices, drugs and biologics. This includes clinical trial data, regulatory submission documents, post approval documents, etc.

Academia

After Post graduation they can work as Assistant professor. They have to give complete information of practical's and theory to students and developed encyclopedia between students.

Overseas career: They can choose to fly overseas and make their career bright. By scoring well in GRE, TOEFL, IELTS etc entrances they can pursue MBA, PhD and other pharmacy related courses in US, UK, Australia etc.

Clinical research: They can work as CP. They can coordinate and monitor the tasks in the laboratories, implementing data management plans designed to meet project and protocol deadlines, and consults in the design and development of clinical trials, protocols, and case report forms, analyzes and evaluation of clinical data, recognizes inconsistencies, and initiates the resolution of data problems.

Higher Education:

Students after M. Pharm. can pursue PhD in respective fields and find job opportunities in research, managerial and advisory options in Pharmaceutical industry or academic institutions.

Drug manufacturing units:

i) Production: As Production trainee, supervisors, executives, managers, etc.

ii) QC/QA: To assure whether the Active Pharmaceutical Ingredients (APIs) used in formulations and the manufactured formulations passes the required quality standards as per the norms of USFDA (United States Food and Drugs Administration) or FDA of Govt. of India.

iii) Microbiology: To assure that the production area is maintaining aseptic conditions.

To assure that the quality of air is in accordance with the norms of FDA.

To assure that the product manufactured is free from microbial contamination.

iv) Packaging and warehousing: Assure the quality of incoming packaging material and assure that the finished products are packed, labeled and stored for delivery as per the statutory norms.

v) Marketing: Job opportunities as sales representatives. Freshers are inducted as trainee in Marketing and as Sales Representatives. They are generally promoted as Area Sales Manager, Regional Sales Manager and Vice President etc.

VI) Business development: Job opportunities in business development team as executive and managers.

Hospital / Clinical / Community Pharmacy

In private and Government hospitals or dispensaries, Government Pharmacists in Defence, Police etc.

Analyst: As Government certified Analysts in Government Drug Testing Laboratories and Pharmaceutical industries.

Drugs Inspector: CDSCO appoints drug inspector. Every state also appoints Drugs inspector to inspect drug manufacturing premises, chemist retail and wholesale shops.

As Entrepreneur:

Own a Chemist/ Pharmacy Retail or Wholesale shop:

Students after post graduating apply for Registration as Pharmacist in the State Pharmacy Councils and after seeking the Registration Certificate; they can apply for the license to open Pharmacy Retail or Wholesale Shop through state licensing authorities.

Set up a Pharmaceutical Manufacturing Unit:

Students can apply to the licensing authorities of their state to get the license to set up a Pharmaceutical manufacturing unit.

They can produce:

- New drug molecule / Active Pharmaceutical Ingredients (API) / New Chemical Entity (NCE)
- Production of raw materials (excipients and other ingredients)
- Manufacturing and Production of new formulations
- Preparation of Biologicals
- Sub-Contracting for Manufacturing
- Sub-contracting for R&D – similar to CRO concept
- E-commerce – few students try it in the Pharmaceutical/Healthcare Industry as well (very few ventures in the market so far).

Set up a Contract Research Organization (CRO):

Students can set up their own CRO and get necessary approvals and certifications from the Government Accreditation/ Licensing Authorities to take up contract research projects.

BACHELOR OF PHARMACY:

Bachelor of Pharmacy is a four year degree undergraduate programme divided in eight semesters. The students are introduced to the basics of Organic, Physical, Inorganic and Medicinal Chemistry for the synthesis, analysis and instrumentation. Students are trained on Anatomy, Physiology and Biochemistry to understand the structure, functions and composition of the human body. Knowledge of these basic subjects is essential for thorough perceptive of the concepts. Learning of Pathophysiology, Pharmacology and Biopharmaceutics will help students to understand the fundamentals of Drug therapy and its nature. The detailed study of Pharmaceutics is essential in understanding the principles of the technology involved in the manufacturing and packaging of different dosage forms. Students can understand the physico-chemical properties, evaluation along with the sterilization techniques and microbiological assessment of formulations and active pharmaceutical ingredients (APIs) under aseptic conditions. They understand the stability studies and their importance in formulation of dosage forms. The knowledge of Pharmacognosy is useful to identify the medicinal plants taxonomically, along with the methods of extraction and isolation and identification of chemical constituents from plant sources. Pharmaceutical Jurisprudents provides the insight of the regulatory norms of the national drug regulatory bodies. Pharmaceutical Managements adds on the marketing and

managerial skills in the graduating Pharmacy Students to explore their career in Pharma marketing, sales and product Development Team of the Pharmaceutical Industry.

The students after graduating have a wide array of options as below:

As Entrepreneur:

Own a Chemist/ Pharmacy Retail or Wholesale shop:

Students after graduating apply for Registration as Pharmacist in the State Pharmacy Councils and after seeking the Registration Certificate; they can apply for the license to open Pharmacy Retail or Wholesale Shop through state licensing authorities.

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Higher Education:

Students after B. Pharm. can pursue M.Pharm in respective fields and find job opportunities in research, managerial and advisory options in Pharmaceutical industry or academic institutions.

Drug manufacturing units:

i) Production: As Production trainee, supervisors, executives, managers, etc.

ii) QC/QA: To assure whether the Active Pharmaceutical Ingredients (APIs) used in formulations and the manufactured formulations passes the required quality standards as per the norms of USFDA (United States Food and Drugs Administration) or FDA of Govt. of India.

iii) Microbiology: To assure that the production area is maintaining aseptic conditions.

To assure that the quality of air is in accordance with the norms of FDA.

To assure that the product manufactured is free from microbial contamination.

iv) Packaging and warehousing: Assure the quality of incoming packaging material and assure that the finished products are packed, labeled and stored for delivery as per the statutory norms.

v) Marketing: Job opportunities as sales representatives. Freshers are inducted as trainee in the Business Development Team or as Marketing and Sales Representatives. They are generally promoted as Area Sales Manager, Regional Sales Manager and Vice President etc.

VI) Business development: Job opportunities in business development team as executive and managers.

Hospital / Clinical / Community Pharmacy

In private and Government hospitals or dispensaries, Government Pharmacists in Defence, Police etc.

Analyst: As Government certified Analysts in Government Drug Testing Laboratories and Pharmaceutical industries.

Drugs Inspector: CDSCO appoints drug inspector. Every state also appoints Drugs inspector to inspect drug manufacturing premises, chemist retail and wholesale shops.

DIPLOMA OF PHARMACY:

Diploma in Pharmacy (D.Pharm) is a two-year academic program streamlined to give in-depth knowledge of science and technique behind the dosage forms of

pharmacy practice and medicines management. The program deeply provides an overview of the implication principles and practices concerned in the science of pharmacy including core subjects like Pharmaceutical Chemistry, Pharmacognosy, Pharmacology and Pharmaceutics. The students are introduced to the basics of Anatomy, Physiology and Biochemistry to understand the concepts and applications of these subjects in management of dosage forms. In Pharmaceutics, the students are trained on basics of writing and handling of prescription, manufacturing aspects of different dosage forms, sterilization techniques and microbiological assessment of different dosage forms. The knowledge of Pharmacognosy is useful to add knowledge about herbal drugs and herbal formulations. Pharmaceutical Jurisprudence provides the insight of the regulatory norms of the national drug regulatory bodies. Drug Store and Business Management explains the management of stock and inventory of the Drugs along with the Marketing and Managerial skills. In Hospital and Clinical Pharmacy, the students are taught to learn various skills of working in OPD, drug information, drug distribution, therapeutic drug monitoring and adverse drug reactions for patient care. In clinical/ community pharmacy, students get knowledge and learning of various skills such as dispensing of different dosage forms, responding to minor ailments by providing suitable safe medication, patient counseling for improved patient care.

The students after passing D. Pharm programme, have the following opportunities as below:

As Entrepreneur:

Own a Chemist/ Pharmacy Retail shop:

Students after graduating apply for Registration as Pharmacist in the State Pharmacy Councils and after seeking the Registration Certificate; they can apply for the license to open Pharmacy Retail or Wholesale Shop through state licensing authorities.

In manufacturing units:

In manufacturing units of different dosage forms they work as trainee in production area, packaging area, QC, QA, Warehouse and Microbiology area.

As Pharmacist:

In private and Government hospitals/ dispensaries, Government Pharmacists in Defence, Police etc.

b) Technician:

Universities or colleges, Pharmaceutical industries, Drug testing labs etc.

Higher Education:

After passing D. Pharmacy students can pursue Bachelor of Pharmacy (B. Pharm.).

COURSE OUTCOMES (COS):

PhD. (Pharmaceutics):

Research Methodology

CO1: This course will enable the Research Scholars to understand and apply basic research methods in their research study including research design, data analysis

and report findings for generalizing research conclusion apparently based on the parameters of particular research methods.

CO2: Methods of Literature survey, planning and designing a Research problem, Hypothesis, Research modeling, Research proposals, Plagiarism, Academic publishing and peer review, Research & Development.

CO3: Understanding application of various statistical techniques including probability, data collection, presentation, Measures of Central Tendency & Dispersion, graphical representations, Hypothesis testing, Co-relation & regression analysis, Common parametric & non parametric testing.

Advances in Industrial Pharmacy:

CO1: Understand development, distribution, and evaluation of the drug product; process of drug development; evaluation of drug efficacy, effectiveness, safety.

CO2: Pre formulation studies of pilot batches of pharmaceutical industry.

CO3: Formulate and evaluate various novel drug delivery systems.

CO4: Critically evaluate Biopharmaceutics studies involving drug product equivalency.

CO5: Need, concept, design and evaluation of various customized, sustained and controlled release dosage forms.

MASTER OF PHARMACY:

MASTER OF PHARMACEUTICS:

CO1: To Recognize the importance of modern instruments in the pharmaceutical analysis.

CO2: Principles and applications of UV-visible, IR, flame emission, atomic absorption, NMR and Mass spectroscopy.

CO3: Principles and applications of chromatographic, and electrophoresis separation techniques.

CO4: X-ray crystallographic methods and radio immunological assays.

CO5: To understand Instrumentation of the modern analytical techniques.

CO6: Different mechanisms and factors affecting ADME processes.

CO7: Concepts of bioavailability and bioequivalence with the methods of measurement.

CO8: Dissolution models for various novel drug delivery systems.

CO9: In vitro drug release profiles for different marketed products.

CO10: 5.To analyze various pharmacokinetic and pharmacodynamic parameters affecting bioavailability.

CO11: Structure computational modeling of drug disposition.

CO12: Applications of computer in preclinical development of pharmaceutical formulation.

CO13: To formulate and evaluate various cosmetic products.

CO14: To develop various delivery systems for herbal cosmetics.

CO15: Identify suitable polymers for specific controlled drug delivery systems.

CO16: Specific delivery systems for protein and peptide drugs.

CO17: Recent trends and advances in novel oral and parenteral controlled drug delivery systems.

CO18: Preformulation concepts in dosage form development.

CO19: cGMP and Industrial management principles in dosage form development.

CO20: Analyse and recommend formulation approaches and pharmaceutical processes for site specific drug delivery.

MASTER OF PHARMACOLOGY:

CO1: Elaborately learnt the recent advances in the drugs used for the treatment of various diseases.

CO2: Discussed the pathophysiology and pharmacotherapy of certain diseases.

CO3: To learn the adverse effects, contraindications and clinical uses of drugs used in treatment of diseases.

CO4: Pre-clinical evaluation of drugs and recent experimental techniques in the drug discovery and development.

CO5: Maintenance of laboratory animals as per the guidelines, basic knowledge of various in-vitro and in-vivo preclinical evaluation processes.

CO6: To study various screening methods involved in the drug discovery process.

CO7: Receptor signal transduction processes. Molecular pathways affected by drugs. They study the applicability of molecular pharmacology and biomarkers in drug discovery process.

CO8: Knowledge on the preclinical safety and toxicological evaluation of drug & new chemical entity.

CO9: They have studied the practical skills required to conduct the preclinical toxicity studies.

CO10: Importance of the role of genomics, proteomics and bioinformatics in drug discovery. Regulatory requirements for conducting clinical trials.

MASTER OF PHARMACEUTICAL CHEMISTRY:

CO1: General principles and theory of spectroscopy.

CO2: Basic instrumentation of HPTLC, HPLC, GC for identification, and characterization of compounds.

CO3: To learn the concept and instrumentation of Chromatographic techniques.

CO4: To identify organic compounds by –X-ray crystallography.

CO5: Learn general research methodology.

CO6: Understand the basic concepts of biostatistics.

CO7: To understand different organic intermediates involved in determining the reaction mechanism.

CO8: Learn different stages of drug discovery & Role of medicinal chemistry in drug research.

CO9: To understand the importance of natural compounds as lead molecules for new drug discovery.

CO10: Structural elucidation of organic and natural compounds by IR, NMR and MASS spectral data.

CO11: Understand the industrial safety process chemistry.

MASTER OF INDUSTRIAL PHARMACY

CO1: Possess the skills to use modern pharmaceutical tools, software, equipments to analyze & solve problems.

CO2: Demonstrate an adaptable, flexible and effective approach towards organizational development.

CO3: Acquire adequate scientific information regarding basic principles of pharmaceuticals including cosmetology and specialized drug delivery systems.

CO4: Trained on the practical aspects of formulation development, analysis and quality assurance of various pharmaceutical dosage forms.

CO5: Develop the ability to conduct, analyze and interpret data as per the needs of pharmaceutical industries

CO6: Different mechanisms and factors affecting ADME processes.

CO7: Concepts of bioavailability and bioequivalence with the methods of measurement.

CO8: Dissolution models for various novel drug delivery systems.

CO9: In vitro drug release profiles for different marketed products.

CO10: To analyze various pharmacokinetic and pharmacodynamic parameters affecting bioavailability.

CO11: Structure computational modeling of drug disposition.

CO12: Preformulation concepts in dosage form development.

CO13: cGMP and Industrial management principles in dosage form development.

CO14: Analyse and recommend formulation approaches and pharmaceutical processes for site specific drug delivery

MASTER OF ANALYTICAL CHEMISTRY

CO1: Understand the interaction of matter with electromagnetic radiations and its applications in drug analysis using various analytical instruments.

CO2: Develops ability to involve in the quantitative & qualitative chromatographic separation and analysis of drugs.

CO3: It facilitates the students to perform the thermal method of analysis of drugs using different instruments.

CO4: Understand the principles of NMR, Mass, X Ray Techniques and assays.

CO5: Able to do the statistical analysis using student T test, F test, chi-square test.

CO6: Learn general research methodology.

CO7: Understand the basic concepts of biostatistics.

CO8: To understand different organic intermediates involved in determining the reaction mechanism.

CO9: Learn different stages of drug discovery & Role of medicinal chemistry in drug research.

CO10: To understand the importance of natural compounds as lead molecules for new drug discovery.

BACHELOR OF PHARMACY:

Pharmaceutics:

CO1: To Understands the knowledge on preparatory pharmacy and professional way of preparing various conventional dosage forms.

CO2: To understand the basics pharmaceutical incompatibilities and pharmaceutical calculations.

CO3: To understand various physicochemical properties of drug molecules in the designing of the dosage forms along with principles of chemical kinetics and stability testing of formulations.

CO4: Students developed a good knowledge and skill in the development of different formulations and their evaluation characteristics.

CO5: To understand the concepts and applications of biopharmaceutics and pharmacokinetics and bioequivalence along with their significance.

CO6: Selection of suitable packaging material (container-closure) for the preparation.

Pharmaceutical Chemistry:

CO1: To study the correct use of various equipments and safety measures in Pharmaceutical Chemistry laboratory.

CO2: To comprehend the classification and nomenclature of organic compounds, s isomerism concept, important physico-chemical properties, reactions and synthesis of organic compounds.

CO3: To understand the qualitative analyses of inorganic mixtures. To know the sources of impurities and methods to determine the impurities in inorganic compounds and understand the medicinal and pharmaceutical importance of inorganic compounds.

CO4: To understand the principles of data handling and computation of results. Volumetric, electro chemical analysis and titrations. Students develop analytical skills for the Qualitative and Quantitative analysis.

CO5: To understand the chemistry of drugs with respect to their pharmacological activity, drug metabolic pathways, Structural Activity Relationship (SAR) of different class of drugs and synthesis of active pharmaceutical ingredients (APIs).

CO6: To understand the chromatographic methods of separation, analysis of drugs and development of analytical methods.

Pharmacology:

CO1: To comprehend the morphology, structure and functions of various organs of the Human body.

CO2: To understand the adverse effects, toxicity of different categories of drugs.

CO3: To understand the molecular levels of the chemical process associated with living cells along with the principles of metabolism of drug molecules in physiological and pathological conditions.

CO4: To understand the receptor and drug relationship along with passage of drug through the body.

CO5: Understand the concept of rational drug treatment during pregnancy and lactation, pediatric patients & in geriatric patients.

CO6: To understand the pharmacological actions of different categories of drugs for the prevention and treatment of various diseases.

Pharmacognosy:

CO1: To study the basics of microscopy of crude drugs along with plant cells and tissues.

CO2: To study the role of herbal drugs in traditional system of medicine.

CO3: To understand the taxonomic identification of medicinal plants along with isolation and identification of chemical constituents.

CO4: To understand the WHO guidelines for Good agricultural and collection practices of herbal raw materials and WHO and ICH guidelines for the assessment of herbal drugs.

Pharmaceutical Biotechnology:

CO1: To understand the concept of genetic engineering and monoclonal antibodies for the production and reliable effects of new drug molecules.

Pharmaceutical Quality Assurance:

CO1: Attain knowledge on various quality assurance systems, processes and current regulatory guidelines related to manufacturing and distribution.

CO2: To understand quality issues and provide solutions needed to attain Quality leadership in an environment of continual improvement.

CO3: Understand the importance of effective documentation.

CO4: To prepare professionally competent individuals with Quality concept being engrained to achieve global quality standards in pharmaceutical industries.

Pharmaceutical Management and Regulatory Science:

CO1: To understand the marketing concepts, techniques and their applications in the pharmaceutical industry. Marketing management in Sales of different dosage forms.

CO2: To know about the process of drug discovery and development, various regulatory Authorities and agencies governing the manufacture and sale of

pharmaceuticals, licensing authorities, regulatory approval process and their registration in Indian and international markets.

CO3: To study the brief of offences and penalties respective to various acts and laws.

Pharmacy Practice:

CO1: To be acquainted with various drug distribution methods in a hospital, pharmacy stores and inventory control management.

CO2: To monitor drug therapy of patient through medication chart review and clinical review, obtain medication history, interview and counsel the patients, identifying adverse drug reactions, detection and assessment of side effects.

Computer Applications in Pharmacy:

CO1: To understand the Database Management system, computer applications in clinical studies.

CO2: To study the use of MS Word to create questionnaires and other documentation related to pharmacy. Use of MS to modify the data bases created. Handle web and XML pages to export table, forms and queries.

Communicative Skills in Pharmacy:

CO1: To learn and practice verbal and non-verbal communication along with managerial skills.

CO2: To understand the importance of tone, body language and active listening as elements of effective communication. Demonstrate effective interview skills.

COURSE OUTCOMES (COS):

DIPLOMA OF PHARMACY:

Pharmaceutics:

CO1: To study the flow of materials in a manufacturing unit by studying the plant layout design.

CO2: To study the various processes and equipments used for synthesis of API and finished products in manufacturing units.

CO3: Handling of prescription, Pharmaceutical calculations involved in formulation.

Hospital and Clinical Pharmacy:

CO1: To know various drug distribution methods in a hospital and study of the pharmacy stores management and inventory control.

CO2: To do patient counseling in community pharmacy.

Pharmaceutical Chemistry:

CO1: To comprehend the classification and nomenclature of organic compounds, isomerism concept and important physico-chemical properties of organic compounds.

CO2: To understand the qualitative analyses of inorganic mixtures. To know the sources of impurities and methods to determine the impurities in inorganic compounds and understand the medicinal and pharmaceutical importance of inorganic compounds.

CO3: To comprehend the chemistry of drugs with respect to their pharmacological activity and synthesis of active compounds.

Pharmacology:

CO1: To understand the basic physiology and anatomy of human body.

CO2: To comprehend the pharmacological actions of different categories of drugs along with their mechanism of action, therapeutic/ prophylactic uses and adverse effects.

Pharmacognosy:

CO1: To study the role of herbal drugs in traditional system of medicine.

CO2: To understand the taxonomic identification of medicinal plants along with isolation and identification of chemical constituents.

CO3: To study the morphology and microscopy of crude drugs.

Drug Store and Business Management:

CO1: Legal requirements to open up a retail/wholesale drug store.

CO2: Knowledge and understanding about Drug house management.

CO3: Knowledge about basic concepts of accountancy and Maintenance of records.

CO4: Drug distribution, stock maintenance, store management and inventory control in a hospital.

Communicative Skills in Pharmacy:

CO1: To understand the importance of tone, body language and active listening as elements of effective communication. Demonstrate effective interview skills.

CO2: To learn and practice verbal and non-verbal communication skills.