

Programme: B.Tech

Computer Science & Engineering

Scheme and Syllabi

w.e.f. Academic Session 2020-21



BUEST

SCHOOL OF ENGINEERING & EMERGING TECHNOLOGIES

(Common Curriculum for B. Tech I year – All Branches)**Semester - I****(Group-A)**

Sr.No	Code	Course Title	L	T	P	Credit
1	UMA-101	Engineering Mathematics I	3	1	0	3.5
2	UPY-101	Engineering Physics	3	1	2	4.5
3	XXX-XXX	Department Elective-1	-	-	-	-
4	UHU-101	Communication and Professional Skills in English	3	0	2	4.0
5	UEC-105	Principles of Electronics Engineering	3	1	2	4.5
6	UME-105	Principles of Mechanical Engineering	3	1	2	4.5
7	UPD-101	Personality Development Programme	0	0	2	1.0
Department Elective – 1						
1	UCS-103	Fundamentals of Computers & C Programming	3	1	2	4.5
2	UCS-104	Programming in C	3	1	2	4.5
Total			18	5	12	26.5

Total Hours: 35**(Group-B)**

Sr.No	Code	Course Title	L	T	P	Credit
1	UMA-101	Engineering Mathematics I	3	1	0	3.5
2	UCH-101	Engineering Chemistry	3	1	2	4.5
3	XXX-XXX	Department Elective-1	-	-	-	-
4	UEE-105	Principles of Electrical Engineering	3	1	2	4.5
5	UEG-101	Engineering Graphics Drawing	0	0	6	3
6	UEN-101	Environmental Science	3	0	0	3
7	UWP-110	Workshop Practice	0	0	3	1.5
Department Elective – 1						
1	UCS-103	Fundamentals of Computers & C Programming	3	1	2	4.5
2	UCS-104	Programming in C	3	1	2	4.5
Total			15	4	15	24.5

Total Hours: 34**(Common Curriculum for B. Tech I year – All Branches)****Semester - II****(Group-A)**

Sr.No	Code	Course Title	L	T	P	Credit
1	UMA-102	Engineering Mathematics II	3	1	0	3.5
2	UCH-101	Engineering Chemistry	3	1	2	4.5
3	UEE-105	Principles of Electrical Engineering	3	1	2	4.5
4	UEG-101	Engineering Graphics Drawing	0	0	6	3
5	UEN-101	Environmental Science	3	0	0	3
6	UWP-110	Workshop Practice	0	0	3	1.5
7	XXX-XXX	Department Elective-2	-	-	-	-
Department Elective – 2						
1	IBM-102	Introduction to PHP using IDE	3	1	2	4.5
2	UCS-102	Advanced C Programming	3	1	2	4.5
Total			15	4	15	24.5

Total Hours:34

(Group-B)

Sr.No	Code	Course Title	L	T	P	Credit
1	UMA-102	Engineering Mathematics II	3	1	0	3.5
2	UPY-101	Engineering Physics	3	1	2	4.5
3	UHU-101	Communication & Professional skills in English	3	0	2	4
4	UEC-105	Principles of Electronics Engineering	3	1	2	4.5
5	UME-105	Principles of Mechanical Engineering	3	1	2	4.5
6	UPD-101	Personality Development Programme	0	0	2	1.0
7	XXX-XXX	Department Elective-2	-	-	-	-
Department Elective – 2						
1	IBM-102	Introduction to PHP using IDE	3	1	2	4.5
2	UCS-102	Advanced C Programming	3	1	2	4.5
		Total	18	5	12	26.5

Total Hours:35

SUMMER BREAK

Sr.	Code	Subject	L	T	P	Credit
1.	UTR- 201	Industrial Training	0	0	0	4

SEMESTER –III

Sr.No	Code	Course Title	L	T	P	Credit
1	UCS-251	Relational Database Management System	3	1	2	4.5
2	UEC-201	Digital Electronics	3	1	2	4.5
3	UCS-200	Data Structure & Algorithms with C	3	1	2	4.5
4	UCS-201	Computer Architecture & Organization	3	1	0	3.5
5	UCS-250	Object Oriented Methods and Programming	3	1	2	4.5
6	UTR-201	Industrial Training (Undertaken during Summer Vacations)	0	0	0	4.0
7	UPD-201	Personality Development Programme	2	0	0	2.0
8	XXX-XXX	Department Elective-3	-	-	-	-
Department Elective – 3						
1	IBM-200	Introduction to Virtualization Technology	3	0	2	4.0
2	UCS-202	Principles of Programming Language	3	1	0	3.5
3	UCS-208	System Software	3	1	0	3.5
4	UCS-210	Modeling and Simulation	3	1	2	4.5
5	UCS-215	Human Aspects of Information Technology	3	1	0	3.5
6	IBM-232	Linux on Mainframe	3	0	0	3.0
7	IBM-211	IT Applications and Open Standards	2	0	0	2.0
8	IBM-252	Advance Concepts in Telecom Business	2	0	0	2.0
9	IBM-223	Advanced Statistical Analysis	3	0	0	3.0

SEMESTER –IV

Sr.No	Code	Course Title	L	T	P	Credit
1	UMA-251	Discrete Mathematics and Logic Design	3	1	0	3.5
2	UCS-255	Analysis and Design of Algorithms	3	1	0	3.5
3	UCS-281	Operating System	3	1	2	4.5
4	UCS-252	Software Engineering	3	1	0	3.5
5	UCS-253	Computer Networks	3	1	2	4.5
6	UPD-251	Personality Development Programme	2	0	0	2
7	XXX-XXX	Department Elective-4	-	-	-	-
8	XXX-XXX	Department Elective-5	-	-	-	-
Department Elective – 4						
1	IBM-253	Dynamic Paradigm in Cloud Computing and Virtualization	0	0	0	2
2	UGP-251	General Proficiency	0	0	0	1
Department Elective – 5						
1	IBM-251	Cloud Computing Techniques	3	1	0	3.5
2	UCS-282	Mobile Application Development	3	1	2	4.5
3	UCS-284	Invention & Innovations in Computing	3	1	0	3.5
4	UCS-285	Ecommerce & ERP	3	1	0	3.5
5	UCS-280	Fundamentals of Structured Programming	3	1	0	3.5
6	IBM-233	Mainframe OS services	3	0	0	3
7	IBM-212	OSS Development Methodology	3	0	0	3
8	IBM-260	Advance Concepts in Telecom Business	2	0	0	2
9	IBM-261	Data warehouse and Multidimensional modelling	3	0	2	4

SUMMER BREAK

Sr.	Code	Subject	L	T	P	Credit
1.	UTR- 301	Industrial Training	0	0	0	4

SEMESTER –V

Sr.No	Code	Course Title	L	T	P	Credit
1	UEC-305	Microprocessor Theory and Its Applications	3	1	2	4.5
2	UCS-301	Theory of Automata and Computation	3	1	0	3.5
3	UCS-302	Internet Fundamentals & Web Designing	3	1	2	4.5
4	UCS-306	Advanced Programming	3	1	2	4.5
5	UTR-301	Industrial Training (Undertaken during Summer Vacations)	0	0	0	4
6	UPD-301	Personality Development Programme	2	0	0	2
7	XXX-XXX	Department Elective-6	-	-	-	-
8	XXX-XXX	Department Elective-7	-	-	-	-

Department Elective – 6						
1	IBM-302	Cloud Computing Architecture	3	1	0	3.5
2	UCS-347	Object Oriented Software Engineering	4	0	0	4
3	UCS-348	Distributed Systems	4	0	0	4
4	UCS-330	Artificial Intelligence & Expert System	3	1	2	4.5
6	UCS-349	Advanced Databases	4	0	0	4
7	IBM-332	Mainframe DBMS	2	0	0	2
8	IBM-311	Marketing & Services in OSS	2	0	0	2
9	IBM-351	Global Telecom Policies & Trends	3	0	0	3
10	IBM-345	Data mining and Predictive modelling	3	0	2	4
Department Elective – 7						
1	IBM-300	Web Application Server and Advanced PHP	3	1	2	4.5
2	UCS-380	Management Information System	4	0	0	4
3	UCS-335	Agile software development	4	0	0	4
4	UCS-389	Software Project Management	4	0	0	4
5	IBM-341	Business Strategy and Analytics	3	0	0	3

SEMESTER-VI

Sr.No	Code	Course Title	L	T	P	Credit
1	UCS-350	Compiler Design	3	1	0	3.5
2	UCS-353	Computer Peripherals & Interfaces	3	1	2	4.5
3	UCS-356	Data Warehousing & Data Mining	3	1	0	3.5
4	UMA-351	Statistical Methods	3	1	0	3.5
5	UPD-351	Personality Development Programme	2	0	0	2
6	XXX-XXX	Department Elective-8	-	-	-	-
7	XXX-XXX	Department Elective-9	-	-	-	-
8	XXX-XXX	Department Elective-10	-	-	-	-
Department Elective – 8						
1	IBM-354	Dynamic Paradigm in Cloud Computing & Virtualization	0	0	0	2
2	UGP-351	General Proficiency	0	0	0	1
Department Elective – 9						
1	IBM-323	Graphics and Animation Tools	3	1	2	4.5
2	UCS-351	Computer Graphics	3	1	2	4.5
3	UCS-398	Multimedia	3	1	2	4.5
4	UCS-377	Cyber Security	4	0	0	4
5	IBM-333	Virtualization on Mainframes	3	0	0	3
6	IBM-352	Mobile Communication Standards	3	0	2	4
7	IBM-342	Expert Systems	3	0	2	4
Department Elective – 10						
1	IBM-355	Cloud Deployment Models	3	0	2	4
2	UCS-397	Parallel Computing	4	0	0	4
3	UCS-396	Information Storage & Management	4	0	0	4

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4	IBM-334	Mainframe Clustering	3	0	0	3
5	IBM-314	Open Source Mobile Platform	3	0	2	4
6	IBM-353	Mobile Communication Network Design	3	0	0	3

SUMMER BREAK

Sr.	Code	Subject	L	T	P	Credit
1.	UTR- 401	Industrial Training	0	0	0	4

SEMESTER –VII

Sr.No	Code	Course Title	L	T	P	Credit
1	UCS-400	Python	3	1	2	4.5
2	UCS-413	Minor Project	0	0	6	3
3	UTR-401	Industrial Training (Undertaken during Summer Vacations)	0	0	0	4
4	UPD-401	Personality Development Programme	2	0	0	2
5	XXX-XXX	Department Elective-11	-	-	-	-
6	XXX-XXX	Department Elective-12	-	-	-	-
7	XXX-XXX	Department Elective-13	-	-	-	-
8	XXX-XXX	Open Elective-1	3	1	0	3.5
Department Elective – 11						
1	IBM-403	Security in Cloud	3	1	0	3.5
2	IBM-404	Business Process Management I	3	0	0	3
3	UCS-463	Distributed Operating System	4	0	0	4
4	UCS-401	Cryptography & Network Security	3	1	0	3.5
5	UCS-499	Cloud Computing	4	0	0	4
6	UCS-455	Mobile Databases	4	0	0	4
7	IBM-413	Licensing in OSS	2	0	0	2
8	IBM-427	Wireless and AD-Hoc Network	3	0	0	3
9	IBM-428	Operation Research & Optimization	3	0	2	4
Department Elective – 12						
1	UCS-402	Unix Linux Administration	3	1	2	4.5
2	IBM-408	Cloud Performance Tuning	3	0	0	3
3	IBM-401	Backup and DR	3	0	0	3
4	UCS-409	Information Retrieval	4	0	0	4
5	IBM-431	Resource allocation on Mainframes	3	0	0	3
6	IBM-432	Advanced Scripting (REXX)	3	0	0	3
9	IBM-414	Administering Open Source Systems	3	0	2	4
10	IBM-451	Operations Support System (OSS)	3	0	0	3
11	IBM-444	Social and Web Analytics	3	0	0	3
12	IBM-441	BAO & Cloud	3	0	0	3
13	IBM-442	Real time monitoring & Analytics	3	0	0	3
Department Elective – 13						

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1	UCS-403	Machine learning	3	1	2	4.5
2	IBM-409	XML Programming	3	0	2	4
3	UCS-462	Digital Image Processing	4	0	0	4
4	IBM-436	Networking for Mainframes	3	0	0	3
5	IBM-412	Healthcare applications & HL7 – I	2	0	0	2
6	IBM-456	Telecom Analytics	3	0	0	3
7	IBM-457	Business Support System (BSS)	3	0	0	3
8	IBM-445	Big Data analytics	3	0	2	4
9	IBM-443	Mobile Analytics	2	0	0	2
Open Elective – 1						
1	UMG-476	Human Ethics & values	3	1	0	3.5
2	UEC-462	Biomedical Instrumentation	3	1	0	3.5
3	UEC-463	Television Engineering	3	1	0	3.5
4	UEE-403	Energy Management	3	1	0	3.5
5	UEE-452	Non Conventional Electrical Power Generation	3	1	0	3.5
6	UCE-312	Advance Construction Techniques and Project Management	3	1	0	3.5
7	UCE-365	Advanced Environmental Engineering	3	1	0	3.5
8	UME – 410	Basic Manufacturing Technology	3	1	0	3.5
9	UME – 411	Measurement Techniques	3	1	0	3.5

SEMESTER –VIII

Sr.No	Code	Course Title	L	T	P	Credit
1	XXX-XXX	Department Elective-14	-	-	-	-
2	XXX-XXX	Department Elective-15	-	-	-	-
3	XXX-XXX	Department Elective-16	-	-	-	-
4	UCS-472	Major Project	0	0	16	8
5	UPD-451	Personality Development Programme	2	0	0	2
6	XXX-XXX	Open Elective-II	3	1	0	3.5
7	XXX-XXX	Open Elective-III	3	1	0	3.5
Department Elective – 14						
1	IBM-303	Service Oriented Architecture	3	0	0	3
2	UCS-408	Grid Computing	4	0	0	4
3	UCS-477	Ethical Hacking	4	0	0	4
4	UCS-459	Software Maintenance	4	0	0	4
5	UCS-457	Soft Computing	4	0	0	4
6	IBM-437	Mainframe Application Development	3	0	0	3
7	IBM-416	Retail applications & ARTS - I	2	0	0	2
8	IBM-454	Machine to Machine Communication	3	0	0	3
9	IBM-446	Business Process management	3	0	0	3
1	UCS-458	Software Verification, Validation and Testing	4	0	0	4
2	IBM-406	Business Intelligence	3	1	2	4.5
5	UCS-449	Software Testing	3	1	0	3.5
Department Elective – 16						
1	UGP-451	General Proficiency	0	0	0	1
2	IBM-470	Dynamic Paradigm in Cloud Computing and Virtualization IV	0	0	0	2
Open Elective – II						

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1	UMG-450	Entrepreneurship Development & Enterprise Management	3	1	0	3.5
2	UEC-464	Satellite Communication	3	1	0	3.5
3	UEC-465	Digital Signal Processing & Applications	3	1	0	3.5
4	UEE-457	Transformer Engineering	3	1	0	3.5
5	UEE-411	Direct Energy Conversion	3	1	0	3.5
6	UCE-311	Advance Concrete Technology	3	1	0	3.5
7	UCE-409	Geographic Information Systems For Resources Management	3	1	0	3.5
8	UME –464	Renewable Energy Sources	3	1	0	3.5
9	UME – 466	Automation & Robotics	3	1	0	3.5
Open Elective – III						
1	UMG-475	Total Quality Management	3	1	0	3.5
2	UEC-466	Optical Communication	3	1	0	3.5
3	UEC-467	Principles of Digital Communication	3	1	0	3.5
4	UCE-476	Disaster Management	3	1	0	3.5
5	UCE-412	Building Project and Estimates	3	1	0	3.5
6	UEE-456	Hydro Power Station Design	3	1	0	3.5
7	UEE-408	Illumination Engineering	3	1	0	3.5
8	UME – 459	Engineering In Industry & Entrepreneurship	3	1	0	3.5
9	UME – 458	Emerging Automotive Technologies	3	1	0	3.5

Typical Curriculum Structure of AICTE for UG ECE Degree Programmes

S. No.	Course Work - Subject Area	Range of Total Credits (%)		B.Tech. ECE (BUEST)
		Minimum	Maximum	
1.	Humanities and Social Sciences (HS), including Management;	05	10	10.5
2.	Basic Sciences(BS) including Mathematics, Physics, Chemistry, Biology;	15	20	16
3.	Engineering Sciences (ES), including Materials, Workshop, Drawing, Basics of Electrical/Electronics/Mechanical/Computer Engineering, Instrumentation;	15	20	26.5
4.	Professional Subjects-Core (PC), relevant to the chosen specialization/branch; (May be split into Hard (no choice) and Soft(with choice), if required;)	30	40	114.5
5.	Professional Subjects – Electives (PE), relevant to the chosen specialization/branch;	10	15	07
6.	Open Subjects- Electives (OE), from other technical and/or emerging subject areas;	05	10	07
7.	Project Work, Seminar and/or Internship in Industry or elsewhere.	10	15	18.5
8.	Personality Development and General Proficiency	Credits		20
Total Credits				220.5

SEMESTER I & II

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Engineering Mathematics-I**Course Code: - UMA-101**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
3 103.5

Unit-1: Calculus of one variable

Differential Calculus: Successive Differentiation, Leibnitz Theorem, Expansion of Function Maclaurin's and Taylor's expansion, Indeterminate forms, Approximation of errors.

Unit-2: Calculus of two variables

Partial Differentiation, Partial Derivatives, Euler's Theorem Total Differentiation, Jacobians and their properties. Maxima and Minima of two variables, Lagrange's Method of Undetermined multipliers. Multiple integrals, Change of order, Area, length, volume and surface area.

Unit – 3: Vector Calculus

Gradient, divergence and curl of a vector and their physical interpretations, Line, surface and Volume integrals, statement and Theorem of Green, Stoke and Gauss and their applications.

Unit-4: Complex Analysis

Brief Review of Complex Number, Functions of Complex Variable, Analytic Functions, Cauchy Reimann Equations, Milne Thompson Method, Singularities, Cauchy Integral Theorem, Cauchy Residue Theorem.

Text Book:

1. P.K. Mittal, "Engineering Mathematics" , Vrinda Prakashan
2. Complex Analysis, R.V. Churchill and Brown, Fifth Edition and Mc Graw Hill Series.

Reference Books:

1. Calculus, Anton, Bivens & Davis, John Wiley & Sons, New York.
2. Advanced Engg. Mathematics, Erwin Kreyszig, John Wiley & Sons, New York.
3. Advanced Engg. Mathematics, Michael D. Greenberg, Pearson Education.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Engineering Chemistry**Course Code: - UCH-101**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
3 124.5

Unit-1

Polymers and Polymerization- organic polymers, polymerization, various types of polymerization, effect of structure on properties of polymers, preparation properties and technical application of thermo-plastics (PVC, PVA, Polyamides), thermosets (PF,UF), and elastomers (SBR,GR-M), Silicones .

Inorganic Engineering Materials.

Introduction and applications of glass, cement gypsum, lime, plaster of paris,

Composites- Classification, advantages & application of composites.

Refractories- Introduction, classification, properties & important refractory materials & applications.

Unit – 2

Water Chemistry: Introduction, Sources of water, Impurities, Hardness, Units, Chemical analysis of water-free chlorine, alkalinity, Estimation of hardness by EDTA method, Analysis by EDTA method, Oxidations (BOD & COD), Boiler Corrosion, Carry Over- Priming and foaming, Scales and Sludges, Caustic embrittlement. Sewage & Treatment, Drinking water treatment, Desalination of water, Softening methods and related numerical problems.

Corrosion -A Threat: Introduction, Types of corrosions, Electrochemical Theory, Pitting, Water Line, Differential Aeration corrosions, Stress Corrosion, Factors affecting Corrosion, Preventive measures.

Unit-3

Lubricants: Introduction, Functions of Lubricants, Mechanism of Lubrication, Additives, Greases and Emulsions, Properties of Lubricants - Viscosity Index, Fire & Flash point, Pour & Cloud point, Aniline point, saponification number, acid number.

Fuels and Combustion: Introduction, class of fuels (Solid, Liquid and Gases) Coal and its origin, Analysis of Coals, Petroleum fuels, Crude Petroleum and its refining, Cracking, Synthetic petrol, knocking, octane number Reforming Hydro finishing and Diesel, cetane number Kerosene, Gasoline.: Coal gas, Oil Gas, Bio- Gas, Nuclear Fuel.

Unit - 4

Stereo Chemistry: Structures, types, applications and stereochemistry of natural products like alkaloids, steroids, quinoids terpenoids including, allenes and biphenyls.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Soil Chemistry: Soil pH, Inorganic & organic components in soils, Acid base & Ion exchange reactions in soils, Micronutrients and macronutrients, soil testing, Nitrogen pathways and NPK in soil.

Text Books:

1. Engineering Chemistry: By P.C.Jain & Monika Jain, Dhanpat Rai and Sons.
2. A Text Book of Engineering Chemistry: By Shashi Chawla, Dhanpat Rai & Sons.
3. Physical Chemistry: By R.P.Verma, Pardeep Publishers Jalandhar.
4. Chemistry in Engineering & Technology, Vol.I & Vol.II, Rajaram, Kuriacose (TMH).

Reference Books:

1. Physical Chemistry, P.W.Atkin (ELBS, Oxford Press)
2. Chemistry of Natural products by OP Aggarwal.
3. Engineering Chemistry- by A.K. Tripathi Satya Prakashan, New Delhi.
4. Stereo Chemistry of Organic Compounds by P.S. Kalsi.
5. Environmental Chemistry by A.K. De , New Age International Publishers

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Chemistry Lab**Course Code :- UCH-101**

Evaluation Components for Practical Courses (Students are required to perform at least 8 practical mandatorily from the given list of practical)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	30

1. To determine the solid carbon, volatile matter, ash content and percentage of moisture in given sample of coal by proximate analysis method and classify the coal.
2. To determine the total alkalinity in a given sample of water using a standard acid.
3. To determine the percentage of Chlorine in a given sample of CaOCl_2 which has been dissolved in one liter of solution.
4. To determine the surface tension of the two given unknown liquids by using Stalpmometer and identify the given liquid.
5. To determine the coefficient of viscosity of the given unknown liquids by using Ostwald's Viscometer and identify the given liquid.
6. To determine the coefficient of viscosity of the given lubricating oil using Red Wood Viscometer
7. To determine the surface tension of the given liquid by drop number method by using Stalpmometer and identify the given liquid.
8. To determine the flash point and fire point of given sample of oil using Pens key Marten's apparatus.
9. To determine the amount of Chlorine in given sample of water approximate N/20 sodium Thiosulphate solution. Ask for your requirement.
10. Estimation of calcium as CaO volumetrically in cement.
11. To determine the chemical oxygen demand of waste water.
12. To prepare phenolformaldehyde resin.
13. To prepare Hexamethylenediamine Adipic acid (Nylon 66) polymer.
14. Determine of total hardness of water by EDTA method.
15. To determine cloud and pour point of lubricating oil.
16. Preparation of Urea Formaldehyde resin.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Fundamentals of Computer & C Programming**Course Code: - UCS-103**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
3 124.5

Unit-1

An Overview of Computer System: Anatomy of a digital Computer, various kinds of registers in CPU and their roles, Classification of Computers, Generations of computers, hardware, software, firmware, von Newman and Harvard Architecture.

Memory: Classification of memory- Main, Auxiliary memory and Cache memory, Memory Hierarchy.

Secondary storage devices: Hard disk, Floppy disk.

Input Devices: Keyboard, Mouse, Joystick, etc.

Output Devices: Monitors (CRT, TFT, Plasma panels) Printers (Dot-Matrix, Inkjet, Laser), plotters, Optical mark readers.

Radix number system: Decimal, Binary, Octal, Hexadecimal numbers and their inter-conversions; Representation of information inside the computers.

Unit-2

Programming Languages: Machine, Assembly, and High Level Language, introduction to Assembler, Compiler, Interpreter, seven phases of compilers, symbol Table, Debuggers, Linker and Loader.

Programming fundamentals: Algorithms, pseudo codes and Flowcharts, Debugging, testing and documentation, structure-programming concepts, top down and bottom-up design approaches.

Operating System Basics: Introduction and Functions of Operating System, Types of OS and case studies on NT, XP, 2000 and Linux. 13. **Operating System:** Revision of functions of O.S., Windows installation, NT, 2000, XP and Linux Case Studies.

Unit-3

Networking: Introduction to network, LAN, WAN, MAN, Internet and WWW, Introduction to e-mail.

Introduction: Structure of a C Program, C Compilers, Editing, Compiling & Running of a C program, Data types, Constants and Variables, Operators and Expressions, Different types of expressions and their Evaluation, Conditional Expression, Assignment statement, Library functions, typecasting.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Unit-4

Decision Control Structure: Decision making using if, if-else, elseif and switch statements.

Iterative Statements: Looping using for, while and do-while statements, Transferring Program control using break, continue and goto statements.

Text Book:

1. Computer fundamentals: P. K. Sinha, BPB
2. Teach yourself all about computers: Barry Press and Marcia Press, IDG Books India
3. Spirit of C: Mullis Cooper, Jacob Publications

Reference Books:

1. Let us C: Yashwant kanetkar, BPB
2. The C Programming: Language, Kerningha, B.W. & Ritchie D. M--PHI
3. Programming in C: Gotterfied B, Tata McGraw Hill
4. C programming a Practical Approach: Ajay Mittal, Pearson Education

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Computer Lab**Course Code :- UCS-103**

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from thr given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	30

DOS:

1. Study of internal commands of DOS
2. Study of external commands of DOS.

C Programming:

Write a program to find the largest of three numbers (if-then-else).

1. Write a program to find the largest number out of ten numbers (for statement).
2. Write a program to find the average male height & average female heights in the class (input is in form of sex code, height).
3. Write a program to find roots of quadratic equation using functions and switch statement.
4. Write a program using arrays to find the largest and second largest no.
5. Write a program to produce ASCII equivalent of given number
6. Write a program to find divisor or factorial of a given number.
7. Write a recursive program for Factorial of a number.
8. Write a program to print Fibonacci sequence of numbers is 0, 1, 1, 2, 3, 5, 8.....
9. Write a program that takes two operands and one operator from the user perform the operation and then print the answer
10. Write a program to find sum of digits of a number.
11. Write a program to find reverse of a number.
12. Write a program to check if a number is Armstrong number
13. Write a program to check if an entered number is palindrome.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

14. Write a program to print the following outputs:

```
1
2 2
3 3 3
4 4 4 4
5 5 5 5 5
```

Note: - Record to be maintained both electronically and hard copy for evaluation.

Course Name: - Principles of Electrical Engineering
Course Code: - UEE-105

Assessment and Evaluation Components	
Quizzes /Assignments/Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
3 124.5

Unit-1

D.C.circuits: Ohm's law, Kirchoff's Laws, Thevenin's, Norton's, superposition theorem, Maximum power transfer theorem, Nodal and Mesh analysis.

A.C. circuits: Sinusoidal signal, instantaneous and peak values, RMS and average values, phase angle, polar and rectangular, exponential and trigonometric representations RL and C components, behavior of these components in A.C. circuits, concept of complex power, power factor.

Transient Response: transient response RL, RC and RLC circuits with step input.

Unit-2

Series and Parallel A.C. circuits: Series and Parallel A.C. circuit, Series and Parallel resonance. Q factor, cut off frequency and bandwidth.

Three phase circuits: Phase and line voltages and currents, balanced star and delta circuits, power equation, measurement of power by 2-wattmeter method, importance of earthing.

Unit-3

Electromagnetism: Basic concepts of magnetic circuits, Series magnetic circuits, parallel magnetic circuits, series parallel magnetic circuits, analogy between electrical and magnetic circuits, magnetic circuit with air gap, Laws of electromagnetic induction, self-inductance, mutual inductance, coefficient of coupling.

Basic concepts of transformers and rotating electrical machines (operating principle, construction and applications).

Unit-4

Measuring Instruments: Voltmeter, Ammeter, Wattmeter, Energy meter.

Batteries: Storage batteries:- Types, construction, charging and discharging, capacity and efficiency of Lead-acid batteries.

Text Books:

1. Kothari & Nagarith: Basic Electrical Engg. (2nd Edition), TMH.

Reference Books:

2. B.L. Theraja & A.K. Theraja, S.Chand: Electrical Technology (Vol-1).
3. Deltoro: Electrical Engg Fundamentals, PHI.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Principles of Electrical Engineering Lab
Course Code: - UEE-105

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	30

List of Experiments:

1. To verify KCL and KVL.
2. To study frequency response of series RLC circuit and determine resonance frequency.
3. To study frequency response of parallel RLC circuit and determine resonance frequency.
4. To perform direct load test of transformer and plot efficiency v/s load characteristics.
5. To study and verify Thevenins, Norton's, superposition and maximum power theorems.
6. To perform O.C and S.C test of transformer.
7. To study various types of meters.
8. Measurement of power by 3 voltmeter / 3 ammeter method.
9. Measurement of power in 3-phase system by 2-wattmeter method

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Engineering Drawing**Course Code: -UEG-101**

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	30

L T P Cr
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Unit-1**Introduction to Conventional Drawing**

Various types of lines, Principles of drawing, Size & Location as per IS code (SP-46) for general engg. Drawing, Dimensioning exercises Conventional exercise of Lettering Techniques, Drawing pertaining to symbols, Free hand lettering techniques (in letters & numerals in 3, 5, 8 & 12mm sizes), Vertical & Inclined Drawing at 75°. Instrumental lettering in single stroke, Linear, Diagonal & Vernier Scale, BIS Conventions.

Computer Aided drawing

Computer Screen, Layout of software, std. tool bar/menus & description of most commonly used tool bars, navigation tool bars & tools. Co-ordinate system and reference planes. Definitions of HP, VP, RPP, & LPP. Creation of 2D/3D environment. Selection of drawing size and scale. Commands & creation of lines, Commands and creation of lines, Co-ordinate points, axes, poly lines, square, rectangle polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet, curves, constraints viz. tangency, parallelism, inclination & perpendicularity, Dimensioning, Line convention, material conventions & lettering

Unit-2**Orthographic Projections**

Definition- Planes of Projection, reference lines & conventions employed, Projections of points in all four quadrants, Projections of straight lines (located in first quadrants/first angle only), true and apparent lengths, true & apparent indications to reference planes.

Orthographic Projections of Plane Surfaces & Engg. Objects (First Angle Projections only)

Definitions- Projections of plane surfaces-triangle, square rectangle, rhombus, pentagon, hexagon & circle, planes in different positions by change of position method only (No problem on punched & composite plates), Engg. Objects projections.

Unit-3**Projections of Solids (First Angle Projections only)**

Definitions- Projections of right regular-tetrahedron, hexahedron (cube), prisms, pyramids, cylinders and cones in different positions.

Isometric Projections (Using Isometric scales) Isometric scale & projection of simple plane figures, Isometric projections of tetrahedron, hexahedron (cube), right regular prisms, pyramids, cylinders, cones, spheres, cut spheres & combination of solids

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Unit-4

Sections & Development of lateral surfaces of solids

Section planes, Sections, Section views, Apparent shapes, & true shapes of sections of regular prisms, pyramids, cylinders and cones resting with base on HP, Sectioning of Engg. Objects, Developments of lateral surfaces of trays, tetrahedrons spheres and transition pieces

Text Books

1. P.S. Gill: Engg. Drawing & Engineering Graphics
2. N.D. Bhatt: Elementary Engg. Drawing

Reference Books:

1. A primer on Computer Aided Drawing-2006: Published by VTU, Belgaum
2. Computer Aided Engg. Drawing: S.Trymbaka Murthy, I.K. International Publishing

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Environmental Science**Course Code: - UEN-101**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

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Unit-1

The Multi-disciplinary nature of environmental studies & Definition Scope & importance, Need for public awareness, Inter- relationship of technology growth.

Natural Resources-Renewable & Non Renewable resources, Forest resources- use & over exploitation, deforestation, Timber extraction, Dams & their effects on forests & tribal people, Water Resources-Use & over utilization of surface & ground, water, floods, draughts-conflicts over water dams benefits & problems, Mineral Resources- Use & over Exploitation, environmental effects of extracting & mineral resources, Food Resources- world food problems changes caused by agriculture & over grazing effects of modern agriculture fertilizer & pesticide problems, water logging, saliency, Energy Resources growing energy needs, renewable & Non-Renewable energy sources, use of alternate energy, Land resources- land as resource, land degradable, man induced land sleds, Soil erosim & desertifical, individual role in conservation of natural resources, Equatable use of resources for sustainable life style.

Unit-2

Ecosystems- Natural Ecosystems- Concept, Structure & Function, Ecological Succession, Flow of energy in Ecosystem, Ecological Succession, Brief Features of Forest, Grass Land, Desert & Aquatic ecosystem.

Biodiversity- Different genetic & ecosystem diversity, Biogeography classification in it, Biodiversity at global, National & Local levels, Biosphere cycles, Carbon Dioxide Cycle, Eco-Imbalance system, Principles, effects.

Unit-3

Environmental Pollution- Definition, Causes effects & Control measures of Air, Water, Soil, Marine, Thermal pollution, Nuclear Hazards, Industrial Hazard & safety, Solid Waste & E-waste management causes, effects & control measures of urban & industrial, Role of individual to prevent pollution, Disaster Management, Floods, Earthquakes cyclone & landslides, Brief introduction to safely Engineering.

Unit-4

Human Population & Environment-Population growth, Variation among nations, Population Explosion, Environment & Human Health, Human Rights, Value Education, Women Child Welfare, HIV/AIDS-its causes, effects, & control, Role of information Technology in

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Environment & Human Health, Environment Acts & Social Issues from unsustainable to sustainable development, Urban problems related to energy, water conservation, Rain Water harvesting, watershed management, Resettlement & Rehabilitation of people, its problems & concerns, Environmental Ethics- Issues & possible solutions, Climate change, Global Warming, Acid rain, Ozone layer depletion, Nuclear accidents & holocaust consumerism & waste products, Environment Protection Act Air (Prevention & Control of Pollution) Act-1981 Water (Prevention & Control of Pollution) Act – 1974 Forest Servation Act – 1980 Wildlife protection Act- 1972 , Issue involved in enforcement of environmental legislation.

Text Books:

1. Environment Education: S.S. Randhawa, S.Vikas & Co. Publications
2. E-Waste-Implications, management & regulations in India and current global best practices: Rakesh Johri, TERI New Delhi

Reference Books:

1. Environment Science: Kaushik, New Age International
2. Environmental Science & Engineering: S.K. Dhameja, S.K. Kataria & Sons Publications

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Workshop Practice**Course Code :- UWP-110**

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	30

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Fitting shop: Study of tools and processes; One Simple exercise involving fitting work.

Carpentry Shop: Study of tools and their use, carpentry joints, and Preparation of a half-lap corner joint or mortise and tenon joints. Study of woodworking lathe.

Welding Shop: Study of tools and their use, Simple butt joint, Lap joint, different welding processes and preparation of any one welding joint.

Sheet metal shop: Study of tools and operations, Making one job out of the following: funnel complete with soldering / Fabrication of tool box / tray / electrical panel box etc.

Machine Shop: Study and demonstration of tools and operations on Lathe / Shaper / Milling machine / Grinding machine / Drilling machine.

Materials: Study of different materials of engineering use, Ferrous & Non ferrous materials and their constituents, Properties and their applications. Heat treatment of ferrous metals and its importance, Microstructures of carbon steels

Manufacturing Processes: Study and demonstration of processes such as Rolling, Press working, wire drawing, Shearing and punching, & Plastic molding etc.

Smithy shop & Forging shop: Study of smithy process and forging process describing different methods of forging. and demonstration of a simple smithy job.

Metal Casting:

- i. Study of Mold making process and with special emphasis on bench molding .
- ii. Demonstration of Casting process of any simple job.

Text Books & Reference Books:

1. Hajra, Bose, Roy: Workshop Technology, Vol 1 & 2, Media Promotors
2. Raghuvanshi B.S.: Workshop Technology, Vol 1 & 2, Dhanpatrai

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Engineering Mathematics-II
Course Code :- UMA-102 Assessment

and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
3 103.5

Unit - 1: Linear Algebra

Rank of a Matrix, consistency and inconsistency of a system of Linear equations, Elementary row and column transformations inverse of matrices, Eigen Values and eigen vectors. Cayley Hamilton Theorem, Diagonalization, Vector spaces R^n over R , linear transformations R^n to R^m

Unit – 2: Differential Equations:

Solution of first order and first degree differential equations: variables separable, homogeneous, exact, linear and equation reducible to above types. Linear Differential equations of nth order with constant coefficients. Complementary functions and particular integrals, Ordinary simultaneous equations.

Unit – 3: Laplace Transform

Laplace transform, existence theorem, Laplace transform of derivatives and integrals, Inverse laplace transform, Unit Step function, Dirac delta function, Laplace transform of periodic function, Convolution Theorem. Applications to solve simple linear and simultaneous diff equations.

Unit-4: Fourier Transform

Fourier series, Euler formulae, half range series, Fourier integral & Fourier Transform.

Text Books:

1. P.K. Mittal: Engineering Mathematics, Vrinda Prakashan

Reference Books:

1. Calculus: Anton, Bivens & Davis, John wiley & Sons, New York.
2. Advanced Engg. Mathematics: Erwin Kreyszig, John Wiley & Sons, NewYork.
3. Advanced Engg. Mathematics: Michael D. Greenberg, Pearson Education.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Engineering Physics**Course Code: - UPY-101**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
3 124.5

Unit-1**Optics:**

Interference: Division of wave front & Division of amplitude – Fresnel’s biprism , Thin film interference & Newton’s rings. Michelson interferometer and its applications.

Diffraction: Fresnel and Fraunhofer diffraction, Half period zone, zone plate, diffraction at straight edge, plane transmission grating. Dispersive power & resolving power of a grating.

Fiber Optics: Introduction, acceptance angle, numerical aperture, type of optical fiber- step index and graded index fibers, applications of optical fibers in communication.

Laser: Spontaneous and stimulated emission of radiation, Population inversion and optical pumping, Principle and production of laser ,three and four level laser, Construction and working of Ruby and He-Ne laser

Unit-2**Electrostatics and Electrodynamics**

Basic laws of electricity & magnetism, Gradient, Divergence and Curl and their physical meaning , Divergence and Stokes theorems, continuity equation, Maxwell’s equations in integral and differential forms, Electromagnetic wave propagation in free space, Poynting vector.

Relativistic Mechanics:

Inertial and non-inertial frames, Galilean transformations, Michelson–Morley experiment , Einstein’s postulates of special theory of relativity, Lorentz transformation equations.

Length contraction, time-dilation, Addition of velocities, Variation of mass with velocity and mass-energy relation, Relativistic energy-momentum transformation.

Unit-3**Quantum Mechanics:**

Quantum theory of light, photoelectric effect, Compton effect, pair production, matter waves and de-broglie hypothesis, particle diffraction, uncertainty principle and applications.

Postulates of quantum mechanics and Schrödinger theory, time dependent and time independent Schrodinger wave equation, wave function, Born interpretation and normalization, expectation values. Applications to particle in a box (infinite potential well) finite potential step and barrier problems, tunneling, linear harmonic oscillator (one dimensional).

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Unit-4

Statistical physics:

Classical and Quantum statistics: Maxwell –Boltzmann statistics, Bose- Einstein and Fermi-Dirac statistics, Fermi energy, free electron model and its applications.

Super conductivity:

Occurrence,destruction of super conductivity, Meissen effect, type I and type II Super-conductors; applications of superconductors.

Text Books:

1. Concepts of Modern physics: Beiser (Tata Mc Grow Hill)
2. Fundamentals of Physics: Resnick, Halliday, and Walker (Wiley)
3. Principles of Physics: R.A. Serway and J.W. Jewett (Thomas Asia Pvt. Ltd.)
4. Optics: Jenkins & White

Reference Books:

1. Introduction to special theory of Relativity: Robert Resnick (Wiley)
2. Quantum mechanics: Schiff.
3. Quantum mechanics: Pauling & Wilson.
4. Principle of Optics: B.K. Mathur.
5. Optics: A.G. Ghatak 3rd edition (Tata McGrow Hill – 2005)
6. Optics: Brij lal and Subramaniam (S. Chand)
7. Physics part I and II: Resnick, Halliday, and Krane , John Wiley – 2002).
8. Modern Physics: Kenneth Krane, (2nd Edition, John Wiley & Sons) – 1998
9. Physics of the atom: Wehr, Richards and Adair (4th Edition, Addison- Weseley)
10. Elements of Electromagnetics: Mathew N.D., Sadiku S.A.D. (Oxford University press)
11. Electrodynamics: D.J. Giriffith.
12. Lasers: O. Svelto.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Engineering Physics Lab**Course Code: - UPY-101**

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	30

1. To determine the wavelength of monochromatic light by Newton's ring.
2. To determine the wavelength of sodium light by using plane transmission grating.
3. To determine the wavelength of sodium light by using Michelson interferometer.
4. To find the refractive index of a prism by using spectrometer.
5. To determine the attenuation loss of a signal optical fiber.
6. To determine the numerical aperture of an optical fiber.
7. To determine the low resistance of the material of given wire using Carey Foster's bridge.
8. To draw hysteresis curve of a given sample of ferromagnetic material.
9. To find the capacitances of two capacitors (air and dielectric) by De'sauty Bridge
10. To find the frequency of AC mains by using electric vibrator.
11. To find the value of high resistance by Substitution method.
12. To convert a galvanometer into an ammeter of a given range
13. To determine the variation of magnetic field along the axis of a current carrying coil and then to estimate the radius of the coil.
14. To study the Hall Effect and determine Hall coefficient, carrier density and mobility of a given semiconductor material using Hall-effect set up.
15. To determine the wavelength of He-Ne laser by using single slit experiment.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Advanced C Programming**Course Code: - UCS-102**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
3 124.5

Unit-1

Functions: Introduction to user defined functions, passing values between function, Function Prototype and Recursion.

Arrays: Introduction to arrays, array initialization, array traversal, bound checking, passing array element to functions, passing entire array to a function, operations on arrays.

Two dimensional Arrays: creating a 2D array, array operations (addition, subtraction, multiplication, transpose).

Unit-2

Pointers: Introduction to pointers, pointer operator, call by value and call by reference, pointer to array and array of pointers.

Strings: Introduction to strings, string operations (strlen, strcpy, strdup, strlen, strcat, strcmp), gets v/s scanf, puts v/s printf.

Unit-3

Structure: Use of Structures, Declaring a Structure, Accessing Structure Elements, Storing structure elements, Array of Structures, pointer to structure.

Union: Difference between union and structures, Introduction to enumerations.

Unit: 4

File Handling: Classification of files, file opening modes, Operations on text and binary files (reading, writing, copying, and concatenation).

Text Books:

1. Computer fundamentals: P. K. Sinha, BPB
2. Teach yourself all about computers: Barry Press and Marcia Press, IDG Books India

Reference Books:

1. Spirit of C: Mullis Cooper, Jacob Publications
2. Let us C: Yashwant Kanetkar, BPB
3. The C Programming Language, Kernighan B.W. & Ritchie D. M, PHI
4. Programming in C: Gotterfied B, Tata McGraw Hill
5. C programming a Practical Approach: Ajay Mittal, Pearson Education

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Advanced C Programming Lab**Course Code: - UCS-102**

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from thr given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	30

1. Write a C program to enter N natural numbers in ascending order in 1-D array, and apply linear and binary search on it.
2. Reading N integers in 1-D array and sort them using Bubble sort and calculate their mean, median.
3. Write c program to evaluate polynomials like $p(x)=a*x*x+b*x+c$ etc. using Horner's Rule.
4. Write a program to read two matrices A and B and compute $A+B$, $A-B$, $A*B$, A and B transpose.
5. Write a program to demonstrate call by value and call by reference (use swapping of two numbers), write function to calculate square and cube of a number.
6. Write program to read single and strings separated by space (using gets ()), perform strlen, contact, strup, strcmp on them using appropriate functions.
7. Create a Program using structures and Union which reads Name, Age and Salary of employee print them using dot and -> operators.
8. Using enum for name in place of integer values.
9. WAP to open a file and print its content on screen.
10. Write a program to edit and print the content of a pre written file.
11. Reading and Write file in Text and binary modes.
12. Write a program which prints its source code.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Communication & Professional Skills in English**Course Code: - UHU-101**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
3 024.0

Unit 1**Grammar and Reading skills:**

- Vocabulary building: parts of speech with usage, phraseology, idioms, one word substitution for a group of words, antonyms, synonyms.
- Sentence formation, simple sentences of all six types.
- Clauses.
- Simple, Multiple and Compound sentences.
- Verb Forms and Tenses.
- Active Passive voice.
- Narration.
- Reading comprehension.
- A text book containing short stories, plays and poems.
- Newspaper reading.

Unit 2**Listening skills:**

- Familiarization with listening skills.
- Phonetics: word accent, intonation.

Unit 3**Speaking skills:**

- Non Verbal Communications.
- Phonetics: Consonants and vowel sounds, transcriptions, syllables.
- Speech presentation, paper reading, extempore, self-introduction.
- Dialogues, debates, role play and quizzes.
- Group discussion, Interview skills.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Public speaking skills.

Unit 4

Writing Skills:

- Letter writing: personal, official and business and covering letters.
- Resume' writing.
- Essay writing.
- Report writing.
- Story writing.

Text Books:

1. An Exordium: Zeenat Khan & Akanksha Vashisht.
2. English Grammar: Murphy

Recommended Books:

1. English Grammar and Composition: Prof. M. Krishna swami.
2. Patterns of English structures: A.S. Hornby. (Macmillian publications recommended)
3. A text book of English Poems: stories & essays (Macmillian publications recommended)
4. High school English Grammar: Wren & Martin.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Language Lab**Course Code: - UHU-101**

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	30

1. Self-introduction with one's name, family background, place of residence, one's educational qualifications and experiences and defining one's career objective and projecting ones strengths and skill-sets.
2. Interview Skills: Students will participate in mock interviews.
3. Presentation skills: Students will make presentations on given topics.
4. Group Discussion; Students will participate in group discussions.
5. Phonetics: Stress & intonation- Ear Training- Correct pronunciation- Sound recognition exercise- common Errors in English.
6. Conversation: Face to Face Conversation – Telephone conversation- Role play activities (Student will take on roles and engage in conversation).
7. Reading comprehension and vocabulary.
Filling in the blanks- vocabulary building –
Reading and answering question – Newspaper reading
8. Listening comprehension: Students will be excerpts of different conversational recordings and questions based on the respective excerpts will be given to them.
9. Pronunciation Training: Through language lab software.
10. Remedial grammar exercises: Through language lab software.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Principles of Electronics Engineering
Course Code: - UEC-105

Assessment and Evaluation Components	
Quizzes /Assignments/Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
3 124.5

Unit-1

Brief review of Band Theory, Types of Semiconductors, Charge densities in semiconductor. Semiconductor Diode, Reverse and Forward bias conditions, Diode Characteristics and parameter, Equivalent circuit and frequency response, Ideal vs. Practical diode, Temperature Dependence of P-N junction diode, Diode Capacitance, Half and Full wave Rectifiers, Clipping and Clamping circuits, Avalanche diode, Zener Diode and its role as a voltage regulator.

Unit-2

Bipolar junction transistor (BJT) and their I/P and O/P characteristics in CE, CB mode, Transistor as a switch, Temperature variation of saturation parameters, h parameters. JFET and MOSFET, Equivalent circuit, Enhancement mode and Depletion mode MOSFETS, Unijunction transistor (UJT), its characteristics, parameters and circuit operation, Photo transistor, its characteristics and applications.

Unit-3

Bias for transistor amplifier: fixed bias, emitter feed back bias. Feedback principles. Types of feedback, Stabilization of gain, reduction of non-linear distortion, change in resistance by negative feedback in amplifier. Amplifiers coupling, types of coupling, Amplifier pass band, RC-Coupled amplifiers at mid, low and high frequencies.

Unit-4

Semiconductor processing, active and passive elements, Integrated circuits, bias for integrated circuits. Basic operational amplifier, applications of operational amplifier – adder, subtractor, Integrator, differentiator and comparator.

Text Books:

1. Electronic Principles: A.P.Malvino, TMH
2. Electronic Fundamentals and Applications: J.D. Ryder, PHI.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Reference Books:

1. Electronic Circuits & Devices: J.Millman & C.C.Halkias, TMH
2. Integrated Circuits & Devices: J.Millman & C.C.Halkias, TMH
3. Basic Electronic & Linear Circuits: N.N.Bhargava & Kulshrestha, TMH

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Principles of Electronics Engineering Lab
Course Code: - UEC-105

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from thr given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	30

List of Experiments:

1. To study the use and scope of using an oscilloscope as a measuring device in an electronic laboratory.
2. To study the use and scope of using a multimeter (digital and analog) as a measuring device in an electronics laboratory.
3. To study the use and scope of function generator as a signal source in an electronics laboratory.

Set up an experiment to:

1. Draw forward bias and reverse bias characteristics of a p-n junction diode and use it as a half wave and full wave rectifier.
2. Draw the characteristics of a Zener diode and use it as a voltage regulator.
3. Draw characteristics of common base configuration of p-n-p transistor.
4. Draw characteristics of common emitter configuration of an npn transistor.
5. Draw characteristics of common drain configuration of a MOSFET.
6. Find the voltage and current gain of single stage common emitter amplifier.
7. Draw the characteristics curve of UJT.
8. Find the voltage gain of single stage voltage series feedback amplifier.
9. Use operational amplifier as:
 - Inverting amplifier
 - Non-inverting amplifier
 - Comparator
10. Use operational amplifier as:
 - Integrator
 - Differentiator
11. Use operational amplifier as:
 - Adder
 - Precision amplifier

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

12. Find the overall voltage gain and current gain of a two stage RC coupled amplifier. Emphasis is on system design and not on discrete components, some of the component around which exercises can be built are

- SCR as triacs and power control.
- Power supplies using zener.
- Opto couplers and isolations where photo diode, transistors, leds are used.
- Laser diode (laser pointer)
- Operation amplifiers.
- Operation amplifiers as instrumentation amplifiers.

Note: - Record to be maintained in the laboratory record book for evaluation. Usage of breadboard approach to be encouraged.

Text Books:

1. Basic Electronic & Linear Circuits: N.N.Bhargava & Kulshrestha, TMH
2. Electronic Devices & Circuit Theory: Robert L.Boylestad & Louis Nashelsky, Pearson Edu.

Reference Books :

1. Principles of Electronics: V.K. Mehta, S. Chand Publisher
2. Electronics Devices & Circuits: Millman Helkias, TMH.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Principles of Mechanical Engineering**Course Code :- UME-105**

Assessment and Evaluation Components	
Quizzes /Assignments/Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
3 124.5

Unit-1**First Law of Thermodynamics**

Basic concepts of thermodynamics, systems -open and closed, equilibrium, Heat and work
Essence and corollaries of the first law, analytical expressions applicable to a process and cycle, internal energy, enthalpy and specific heats, first law analysis of steady flow, applications of steady flow energy equation to engineering devices.

Applications of first law of Thermodynamics

Closed and open systems, analysis of non-flow and flow processes for an ideal gas under constant volume (Isochoric), constant pressure (Isobaric), constant temperature (Isothermal), adiabatic and polytropic conditions. Analysis of free expansion and throttling processes. Representation of these processes on P-V charts and analysis of property changes and energy exchange (work and heat) during these processes.

Unit-2**Second Law of Thermodynamics**

Limitations of first law, various statements of second law and their equivalence, application of statements of second law to heat engine, heat pump and refrigerator. Philosophy of Carnot cycle and its consequences. Carnot theorem for heat engines and heat pump. Third law of thermodynamics.

I. C. engine –basic engine components and nomenclature working principles of 4S and 2S engines, comparison of SI and CI engine, classification of IC engines, applications of IC engines. Lubricating, cooling and Fuel Circuits.

Refrigeration and Air Conditioning: Vapor compression Refrigeration Cycles, working of domestic refrigerator, window type Air conditioner.

Unit-3**Simple Stresses & Strains**

Concept & types of Stresses and strains, Poisson's ratio, stresses and strain in simple and compound bars under axial loading, stress strain diagrams, Hooks law, Elastic constants. Numerical problems. Automobile engineering- components of automobile- the basic structure-

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Frame, axles, Suspension, wheel {just an overview} transmission system (layout and brief description).

Shear Force and Bending Moments

Definitions, SF & BM diagrams for cantilevers, simply supported beams with or without overhang and calculation of maximum BM and SF and the point of contra flexure under (i) concentrated loads, (ii) uniformly distributed loads Numerical Problems.

Unit-4

Bending Stresses in Beams

Bending Stresses in Beams with derivation of Bending equation and its application to beams of circular, rectangular

Torsion of Circular Members

Torsion of Solid and hollow circular shafts, Numerical Problems.

Fluid Machines: Impulse and reaction turbines construction and working of Pelton turbine, Francis turbine and Kaplan turbine, construction and working of centrifugal and reciprocating pumps.

Text Books:

1. Nag, P.K., "Engineering Thermodynamics": Tata McGraw – Hill, New Delhi.
2. Yadav, R., Thermal Science and Engineering: Central Publishing House, Allahabad.
3. Strength of Materials: G.H.Ryder – Third Edition in S I units 1969 Macmillan India.
4. Mechanics of Materials: Dr. Kirpal Singh, Standard Publishers Distributors, New Delhi.
5. Internal Combustion Engines: V Ganeshan (Second addition) Tata McGraw- Hill, NewDelhi.

Reference Books:

1. Strength of Materials: Popoy, PHI, New Delhi.
2. Strength of Materials: Sadhu Singh, Khanna Publications.
3. Strength of Materials: A Rudimentary Approach – M.A.Jayaram, Revised Ed. 2001, Sapna Book House, Bangalore.
4. Strength of Materials: U.C.Jindal.
5. Moran, M.J. and Shapiro, H.N., Fundamentals of Engineering Thermodynamics, John Wiley, New York.
6. Van Wylen: G.J., Fundamental of Classic Thermodynamics, John Wiley, New York.
7. Spalding, D.B. and Cole, E.H., Engineering Thermodynamics, ELBS, New Delhi.
8. Hibbeler, R.C. Engineering Mechanics – Statics, Addison Wesley Longman, New Delhi.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Principles of Mechanical Engineering Lab
Course Code: - UME-105

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	30

List of Experiments:

1. To study low-pressure boilers.
2. To study High-pressure boilers.
3. Calibration of thermometers.
4. Calibration of pressure gauges.
5. Study of discharge measuring devices.
6. To determine co-efficient of discharge of orifice meter.
7. To verify the Bernoulli's Theorem.
8. To find Young's Modulus of Elasticity using Searl's apparatus.
9. To find Young's Modulus of Elasticity of a beam with deflection beam apparatus.
10. To find Modulus of rigidity with the help of torsion apparatus.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Programming in C
Course Code: - UCS-104

Assessment and Evaluation Components	
Quizzes /Assignments/Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
3 124.5

Unit-1

An Overview of Computer System: Anatomy of a digital Computer, various kinds of registers in CPU and their roles, Classification of Computers.

Memory: Classification of memory- Main, Auxiliary memory and Cache memory, Memory Hierarchy.

Secondary storage devices: Hard disk, Floppy disk.

Input Devices: Keyboard, Mouse, Joystick, etc.

Output Devices: Monitors (CRT, TFT, Plasma panels) Printers (Dot-Matrix, Inkjet, Laser), plotters, Optical mark readers

Unit-2

Operating System Basics: Introduction and Functions of Operating System, Types of OS and case studies on NT, XP, 2000 and Linux. 13. Operating System: Revision of functions of O.S., Windows installation, NT, 2000, XP and Linux Case Studies.

Programming fundamentals: Algorithms, pseudo codes and Flowcharts, Debugging, testing and documentation, structure-programming concepts, top down and bottom-up design approaches.

Unit-3

Introduction: Structure of a C Program, C Compilers, Editing, Compiling & Running of a C program, Data types, Constants and Variables, Operators and Expressions, Different types of expressions and their Evaluation, Conditional Expression, Assignment statement, Library functions, typecasting.

Decision Control Structure: Decision making using if, if-else, elseif and switch statements
 Iterative Statements: Looping using for, while and do-while statements, Transferring Program control using break, continue and goto statements.

Unit-4

Functions: Introduction to user defined functions, passing values between function, Function prototype and Recursion.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Arrays: Introduction to arrays, array initialization, array traversal, bound checking, passing array element to functions, passing entire array to a function, operations on arrays.

Two dimensional Arrays: creating a 2D array, array operations (addition, subtraction, multiplication, transpose).

Pointers: Introduction to pointers, pointer operator, call by value and call by reference, pointer to array and array of pointers.

Strings: Introduction to strings, string operations (strlen, strcpy, strncpy, strlwr, strcat, strcmp), gets v/s scanf, puts v/s printf.

Structure: Use of Structures, Declaring a Structure, Accessing Structure Elements, Storing structure elements, Array of Structures, pointer to structure.

Text Books:

1. Computer fundamentals	P. K. Sinha	BPB
2. Teach yourself all about computers	Barry Press and Marcia Press	IDG Books India
3. Spirit of C	Mullis Cooper	Jacob Publications
4. Let us C	Yashwant Kanetkar	BPB

Reference Books :

1. The C Programming Language	Kernighan B.W. & Ritchie D. M	PHI
2. Programming in C	Gotterfied B	Tata McGraw Hill
3. C programming a Practical Approach	Ajay Mittal	Pearson Education

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Programming in C
Course Code: - UCS-104

Evaluation Components for Practical Courses (Students are required to perform at least 8 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	30

List of Experiments:

1. Write a program to find the largest of three numbers (if-then-else).
2. Write a program to find the largest number out of ten numbers (for statement).
3. Write a program to find factorial of a given number.
4. WAP to print Fibonacci sequence of numbers is 0, 1, 1, 2, 3, 5, 8.....
5. WAP to find reverse of a number.
6. Write a C program to enter N natural numbers in ascending order in 1-D array, and apply linear and binary search on it.
7. Write a program to demonstrate call by value and call by reference (use swapping of two numbers), write function to calculate square and cube of a number.
8. Write program to read single and strings separated by space (using gets ()), perform strlen, contact,strup, strcmp on them using appropriate functions.
9. Create a Program using structures and Union which reads Name, Age and Salary of employee print them using dot and -> operators.
10. Write a program to read two matrices A and B and compute A+B, A-B, A*B, A and B transpose.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

SEMESTER III

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Relational Database Management System
Course Code: - UCS-251

Assessment and Evaluation Components	
Quizzes /Assignments/Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
3 124.5

Unit 1: Introduction

- Overview of DBMS
- Components of DBMS
 - Users
 - Language
 - Structure
 - data-dictionary
 - data manager
 - DBA
- File processing versus Data Management
- File Oriented approach versus Database Oriented approach
- SPARC 3-level architecture.
- A brief overview of three traditional models
 - hierarchical mode
 - network model and relational model

Unit 2: ER-Models

- Entity-Relationship model as a tool for conceptual design
 - Entities attributes and relationships
- ER-Diagram
- Converting ER-Model into relational schema.
- **Relational Model**
 - Properties of relational model { Codd's 12 rules (integrity rules (concept of keys))}
- Relational algebra
 - Select
 - Project
 - cross product
- joins
 - theta-join
 - equi-join
 - natural-join
 - outer join
- Tuple relational calculus

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Domain relational calculus

Unit 3: Query Languages

- Functional Dependencies
- Multi-valued Dependencies
- Normalization (up to 5th level)
- Structured Query language (with special reference of SQL of Oracle)
 - INSERT
 - DELETE
 - UPDATE
 - VIEW
- Definitions and use of Temporary tables
- Nested queries
 - Correlated nested queries
 - integrity constraints
 - not null
 - unique check
 - primary key
 - foreign key references
- **File Organization**
 - Sequential file
 - index sequential files
 - Direct files
 - Hashing
 - B-trees
 - index files

Unit 4: Concurrency Control

- Transaction
- Timestamping
- Lock-based
- Protocols
- serializability and Recovery Techniques
- **Introduction to Distributed Data Processing**
- Query processing
 - Introduction
 - steps in Query processing
 - General Processing Strategies
 - Query Optimisation
- Recovery and securit
- Introduction to Object-Oriented Database
 - C/S Database
 - Knowledge Based Database and Distributed Database Management System

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Text Books:

1. Course Notes by the Instructor.
2. C.J. Date “An introduction to data base System”
3. Naveen Prakash “Introduction to Database management systems”

Reference Books:

1. Bipin C Desai “An introduction to database management system”
2. Abraham Silberschataz, Henry F. Korth S. Sudershan “Database System Concepts”

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Relational Database Management System Lab
Course Code: - UCS-251

Evaluation Components for Practical Courses (Students are required to perform at least 8 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	30

List of Experiments:

1. Creation, altering and dropping of tables and inserting rows into a table (use constraints while creating tables) examples using SELECT command.
2. Queries (along with sub Queries) using ANY, ALL, IN, EXISTS, NOT EXISTS, UNION, INTERSET, Constraints. Example:- Select the roll number and name of the student who secured fourth rank in the class.
3. Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.
4. Queries using Conversion functions (to_char, to_number and to_date), string functions (Concatenation, lpad, rpad, ltrim, rtrim, lower, upper, initcap, length, substr and instr), date functions (Sysdate, next_day, add_months, last_day, months_between, least, greatest, trunc, round, to_char, to_date)
5. i) Creation of simple PL/SQL program which includes declaration Unit, executable Unit and exception Handling Unit (Ex. Student marks can be selected from the table and printed for those who secured first class and an exception can be raised if no records were found)
 ii) Insert data into student table and use COMMIT, ROLLBACK and SAVEPOINT in PL/SQL block.
6. Develop a program that includes the features NESTED IF, CASE and CASE expression. The program can be extended using the NULLIF and COALESCE functions.
7. Program development using WHILE LOOPS, numeric FOR LOOPS, nested loops using ERROR Handling, BUILT IN Exceptions, USE defined Exceptions, RAISE-APPLICATION ERROR.
8. Programs development using creation of procedures, passing parameters IN and OUT of PROCEDURES.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

9. Program development using creation of stored functions, invoke functions in SQL Statements and write complex functions.
10. Program development using creation of package specification, package bodies, private objects, package variables and cursors and calling stored packages.
11. Develop programs using features parameters in a CURSOR, FOR UPDATE CURSOR, WHERE CURRENT of clause and CURSOR variables.
12. Develop Programs using BEFORE and AFTER Triggers, Row and Statement Triggers and INSTEAD OF Triggers

Course Name: - Digital Electronics**Course Code: - UEC-201**

Assessment and Evaluation Components	
Quizzes /Assignments/Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
3 124.5

Unit 1:

- Binary, octal & Hexadecimal number systems and their inter conversion
- Binary arithmetic (Addition & Subtraction, Multiplication & Division)
- 1's & 2's complements, 9's & 10's complement, BCD code, BCD Addition
- Gray Code, Error Detection and Correction, Hamming code.

Unit 2:

- Logic functions (OR, AND, NOT, NAND, NOR, XOR)
- Elements of Boolean Algebra (Theorems truth tables and relations)
- Negative & Positive logic, Saturated & non saturated logic
- fan in, fan-out, Logic IC's, de Morgan's Theorem, minterms and maxterms.
- Karnaugh mapping, K-map representation of logical function for 2, 4,5 & 6 variable, simplification of Boolean equations with the help of K-map,
- Various minimization techniques, Quine's method and Quines Mc-Cluskey method
- Half adder, full adder, half subtractor, full subtractor, serial and parallel binary adder.

Unit 3:

- Introduction and performance criteria for logic families
- various logic families - DCTL, RTL, DTL, TTL & EC working and their characteristics in brief
- MOS Gates and CMOS Gates, comparison of various logic families

Unit 4:

- Various kinds of Flip-Flop: RS Flip-Flop, Clocked RS Flip-Flop
- Edge triggered D Flip-Flop, Flip-Flop Switching time
- J/K Flip-Flop, JK Master Slave Flip flop
- Shift registers: serial in serial out
- serial in parallel out ,parallel in serial out, parallel in parallel out,
- Ring counters, asynchronous counters, synchronous counters.
- D/A Converter, A/D Converter, Multiplexers and Demultiplexer
- Encoder and Decoder & their applications

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Text Books :

1. Digital Principles & Applications: Malvino and Leach, TMH.
2. Digital Integrated Electronics: Taub and Schilling, TMH.

Reference Books :

1. Digital Circuits and Logic Design: Samuel C Lee, PHI
2. Pulse, Digital and Switching Waveforms: Millman and Taub, TMH
3. Modern Digital Electronics: R.P.Jain, TMH
4. Digital Fundamentals: Floyd, Pearson Edu.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Digital Electronics Lab
Course Code: - UEC-201

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	30

LIST OF EXPERIMENTS:

1. Verify truth tables of AND, OR, NOT, NAND, NOR and XOR gates.
 - Implement (i) half adder (ii) full adder using AND – OR gates.
 - Implement full adder using NAND gates as two level realization.
 - Implement full subtractor using 8 to 1 multiplexer.
 - Verify truth tables of RS & JK flip flops and convert JK flip flops into D type & T type flip flops.
 - Realization of Gates(AND, OR, NOT) with discrete components.
2. Use of 4-bit shift register for shift left and shift right operations.
3. Use 4-bit shift register as a ring counter.
 - Implement mod – 10 counter and draw its output wave forms.
 - Implement 4-bit DAC using binary weighted resistance technique/R-2R ladder network technique.
 - Implement 8 – bit ADC using IC (ADC 0800/0801).
4. Construct bounce less switch.
5. Construct a pulser of 1 Hz and 10 Hz, 1k Hz and manual.
6. Construct logic state detector.
7. Construct opto – sensor based.
8. Measurement rotational speed of motor.
9. Measurement time elapse between two events.
10. Measurement of linear velocity.
 - Measurement of acceleration.
11. Construct a memory using TTL Circuits. Read and write data onto a memory from bus.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Data Structure & Algorithms with C
Course Code: - UCS-200

Assessment and Evaluation Components	
Quizzes /Assignments/Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
3124.5

Unit 1: Introduction

- Definition, Classification, Operations on data structures
- mathematical notation and functions, Abstract Data Types (ADT)
- Algorithm, Efficiency of an Algorithm, Asymptotic notations
- Time-Space trade-off.

Arrays:

- Definition, Single and Multidimensional Arrays
- Representation of Arrays: Row and Column Major Order
- Operations on arrays: Insertion, Traversal, Searching, Deletion
- Application of arrays, Sparse Matrices.

Memory Allocation Schemes:

- Static & Dynamic Memory Allocation schemes
- Dynamic memory allocation functions.

Linked Lists:

- Need of dynamic data structures, Implementation of lists
- Operations on lists: Insertion, Deletion, Searching
- Doubly linked lists, Operations on Doubly Linked Lists:
- Insertion, Deletion, circular & header Linked Lists

Unit 2: Stacks

- Introduction, Sequential & Linked implementation of stacks
- Operations: Insertion, Deletion & Traversal, Applications:
- Evaluation of postfix expression, Converting Infix expression to Postfix expression, Recursion.

Queues:

- Definition, Sequential & Linked implementation of linear queues,
- Operations: Insertion, Deletion & Traversal. Circular queue, Deque, Priority queues

Unit 3: Trees

- Definition, Basic terminology, Binary tree,
- Implementation of a binary tree, Operations on binary trees
- Binary tree traversals, Representation of infix, postfix and prefix expressions using trees,

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Binary Search Trees:

- Insertion, deletion and searching, B trees, B+ trees, AVL Trees.

Tables:

- Definition, Hash Functions, Implementation & Applications

Unit 4: Graphs

- Definition of undirected & Directed Graphs & Networks,
- Basic terminology, Representation of graphs, Graph traversals,
- minimum-spanning trees,
- Shortest path Algorithm Warshall's & Dijkstra's Algorithm,
- Typological Sorting.

Search:

- Linear Search, Binary Search.

Sort:

- Selection sort, Insertion Sort, Bubble Sort,
- Merge Sort, Quick Sort, Radix and Heap sort

Text Books:

1. Data structures by Seymour Lipschutz
2. Data structures and algorithms by A.V. Aho, J.E. Hopcroft and T.D. Ullman

Reference Books:

1. Data Structures using C by A. M. Tenenbaum

Course Name: - Data Structure & Algorithms with C Lab**Course Code: - UCS-200**

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	30

LIST OF EXPERIMENTS

1. Write a program to insert and delete an element at a specified location in an array.
2. Write a program to print array elements in row and column major order.
3. Write a program to search an element in an array using Linear Search.
4. Write programs to search an element in the array using Binary Search.
5. Write a menu driven program to perform various operations on strings (string length, reverse, concatenate, comparison) using user defined programs.
6. Write a program to implement stack using arrays.
7. Write a program to implement queue using arrays.
8. Write a menu driven program for matrices to do the following operation depending on whether the operation requires one or two matrices
 - Addition of two matrices
 - Subtraction of two matrices
 - Finding upper and lower triangular matrices
 - Trace of a matrix
 - Transpose of a matrix
 - Check of matrix symmetry
9. Write a program to implement Binary search tree.
10. Write a program to perform insertion & deletion operation on Binary Search trees.
11. Write a program for implementation of a file and performing operations such as insert, delete and update a record in a file.
12. Write a program to create a linked list & display elements of a linked list.
13. Create a linked list and perform the following operation on it
 - Add a node
 - Delete a node
 - Count no. of nodes
14. Write a program to implement breadth first search on a graph.
15. Write a program to implement depth first search on a graph.
16. Sorting
 - Bubble sort
 - Merge sort
 - Insertion sort

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Selection sort
- Radix sort
- Quick sort

Course Name: - Computer Architecture & Organization
Course Code: - UCS-201

Assessment and Evaluation Components	
Quizzes /Assignments/Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
3103.5

Unit 1: Basic Computer Organization & Design:

- Instruction codes, common bus system, computer instruction
- Design of basic computer, Design of accumulator logic.
- **General System Architecture:**
- Store program control concept
- Flynn's classification of computers (SISD, MISD, MIMD);

Unit 2: Control Design:

- Basic concepts, Hardwired control, Micro programmed control,
- Design of control unit. **Instruction Set Architecture:**
- Instruction set based classification of processors (RISC, CISC, and their comparison);
- addressing modes: register, immediate, direct, indirect, indexed;

Unit 3: Input-Output Organization:

- I/O interface, Modes of transfer, Priority interrupts
- DMA, I/O processor.
- **Memory Organization:**
- Memory hierarchy, Main memory, Auxiliary memory
- Associative memory, Cache memory, virtual memory,
- Memory management H/W.

Unit 4: Memory Hierarchy & I/O Techniques:

- The need for a memory hierarchy (Locality of reference principle,
- Memory hierarchy in practice: Cache, main memory and secondary memory
- Memory parameters: access/cycle time, cost per bit); Main-memory (Semiconductor RAM & ROM organization, memory expansion,
- Static & dynamic memory types); Cache memory (Associative & direct mapped cache organizations. Allocation & replacement policies, segments, pages & file organization, virtual memory.
- **Introduction to Parallelism:**
- Goals of parallelism (Exploitation of concurrency
- throughput enhancement); Amdahl's law;

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Instruction level parallelism (pipelining, super scaling –basic features);
- Processor level parallelism (Multiprocessor systems overview).

Text Books:

1. Computer Architecture & Organization by J.P Hayes
2. Computer System Architecture by Morris Mano

Reference Books:

1. Advanced Computer Architecture by Kai Hwang

Course Name: - Object Oriented Methods & Programming
Course Code: - UCS-250

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
3124.5

Unit-1

Introduction to OOP: Programming Paradigms, Basic Concepts of OOP: Class, Objects, Data Abstraction, Encapsulation, Information Hiding, Inheritance, Polymorphism, Message Passing, Dynamic Binding, Benefits of OOPs.

Introduction to C++: C++ Program Structure, I/O Statements, Keywords, Various Data Types, Variable Declaration, Operators, Scope Resolution Operator, Manipulators, Expressions, Control Structures, Functions, Arrays, Pointers, Preprocessor Directives.

Unit-2

Classes and Objects: Class Declaration, Access Specifiers, Member Function Definitions, Private and Public Member Function, Nesting of Member Function, Arrays within Class, Array of Objects, Objects as Function Arguments, Friend Function.

Constructor and Destructors: Constructors, Parameterized Constructors, Copy Constructor, Dynamic constructors, Destructors

Unit-3

Overloading: Function Overloading, Operator Overloading, Operator Function as Class Member Vs. Friend Function, Overloading Unary operator, Overloading Binary Operator, Type Conversions, String Class.

Inheritance: Base and Derived Classes, Visibility Modes, Single Inheritance, Multiple Inheritance, Multilevel Inheritance, Hierarchical Inheritance, Hybrid Inheritance, Method Overriding, Virtual Base Classes, Abstract Class, Nesting of Classes

Unit-4

Polymorphism: This Pointer, Virtual Functions, Dynamic Binding

File and I/O Streams: I/O Stream Classes, Console I/O Operations (Formatted and Unformatted), File Stream Classes, Various Operations on Files, File Pointers.

Templates and Exception Handling: Class Templates, Function Templates, Member Function Templates, Exception Handling, Try, Throw and Catch Block

Text Books:

- The C++ programming language by Bjarne Stroustrup Addison Wesley
- Object Moulding and design by James Rumbaugh, Michel Blha William Premerlani, Fredetrick Eddy and William Lorence, PHI

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Reference books:

1. Object oriented programming in turbo C++ by Robbet Lofre, Galgotia Publication
2. Programming with C++ By D.Ravichandern , Tata Mcgraw Hill

Course Name: - Object Oriented Methods & Programming Lab
Course Code: - UCS-250

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	30

List of Practicals:

1. Raising a number n to a power of p is the same as multiplying n by itself p times. Write a function called `power()` that takes a double value for an int value for p and returns the result as double value. Use a default argument of 2 of p , so that if this argument is omitted, the number will be squared. Write a main (`main()`) function that gets values from the user to test this function.

2. A point on the two dimensional plane can be represented by two numbers: an X coordinate and a Y coordinate. For example (4,5) represents point 4 unit to the right of origin along the X axis and 5 units up the y-axis. The sum of the two points can be defined as new point whose X and Y coordinates. Write a program that uses a structure called `point` to model a point. Define three points and have the user input values to two of them. Then set the third point equal to the sum of the other two. And display the value of new points. Interaction with the program might look like this.
 - Enter Coordinate of P1: 3 4
 - Enter Coordinate of P2: 5 7
 - Coordinates of P1+P2 are : 8 11

3. Create the equivalent of four function calculator. The program should request the to user to enter a number, an operator and another number. It should carry out the specified arithmetical operation: adding, subtracting, multiplying or dividing the two numbers. (it should use a switch statement to select the operation) finally it should be display the result.

4. When it finishes the calculation, the program should ask if the user want to do another calculation. The response can be 'Y' or 'N'. Some sample interaction with the program might look like this.
 - Enter first number ,operators and second number 12+100
 - Answer =112
 - Do another (Y/N)?N

5. A phone no. such as (212)767-8900, can be thought of as having three parts area code(212), the exchange (767) and the number (8900). Write a program that uses a

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

structure to store these three parts of phone no. separately. Call the structure phone .
create two structure Enter your area code Exchange and number : 415 555 1212

- My number is (415)555-1212
6. Create two classes DM and DB which stores the value of distances DM stores distance in meters and centimeters and DB in feet and inches . Write a program that can read value for the classes objects and add one object of DM with another object DB.
 - Use a friend function to carry out the addition operation .The object that stores the result may be a Dm object or DB object depending on the units in which result are required .The display should be in the format of feet and inches or meters and centimeters depending on the object on display.
 7. To find the roots of quadratic equation using oop technique.
 8. Consider the following class definition class father {
 - Protected : int age;
 - Public:
 - Father (int x){age = x;}
 - Virtual void iam ()
 - {
 1. cout <<"I AM THE FATHER , my age is ";<<age<<endl;}
 - };
 - Derive the two classes son and daughter from the above classes and for each define iam() to write our similar but appropriate message .You should also define suitable constructors for these classes
 - Now write a main () that creates objects of three classes and then call iam() them .Declare pointer to father , successively assign addresses of object of the two derived classes to this pointer and in each case , call iam() through the pointer to demonstrate polymorphism in action.
 9. Imagine a tollbooth with a class called Toll booth .The two data item are a type unsigned into to hold the total number of cars and type double to hold the total amount of money collected . A constructor initializes both these to 0. A member function called nopaycar(). Increments the car total and adds 0.50 to the cash total. Another function, called nopaycar(), increment the car total but adds nothing to the cash total. Finally , a member function called display the two totals . Include a program to test this class . This program should allow the user to push one key to count paying a car ,and another to count a non paying car. Pushing the ESC key should cause the program to print out the total cars and total cash and then exit
 10. Write a function called reverse it () that reverses a string(an array of char) use a for loop that swap the first and last characters, then the second and next to last character and so on The string should be passed to reversesit (), and print out the result. Use an input method that allows embedded blanks. Test the program with Napoleon's famous phrase , "Able was ere I saw Elba".
 11. To overload a binary operator using friend function.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Departmental Elective - 3

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Principles of Programming Language**Course Code: - UCS-202**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
3103.5

Unit 1: Introduction:

- A brief history, Characteristics of a good programming language,
- Programming language translators compiler & interpreters ,
- Elementary data types – data objects, variable & constants, datatypes, Specification & implementation of elementary data types,
- Declarations ,type checking & type conversions ,
- Assignment & initialization, Numeric data types,
- enumerations, Booleans & characters,
- Syntax & Semantics.

Unit 2: Structured data objects:

- Structured data objects & data types , specification & implementation of structured data types,
- Vector & arrays, records Character strings, variable size data structures , Union, pointer.

Subprograms and Programmer Defined Data Types:

- Evolution of data type concept abstraction,
- encapsulation & information hiding, Subprograms,
- type definitions, abstract data types, over loaded subprograms, generic subprograms

Unit 3: Sequence Control:

- Implicit & explicit sequence control, sequence control within expressions,
- sequence control within statement, Subprogram sequence control: simple call return, recursive subprograms,
- Exception & exception handlers, co routines.

Data Control:

- Names & referencing environment, static & dynamic scope,
- Local data, Shared data: dynamic & static scope,
- Parameter & parameter transmission schemes.

Unit 4: Introduction to storage management:

- Major run time elements requiring storage, Static storage management, Stack based storage management, Heap storage management.

Programming Languages:

- Introduction to procedural, non-procedural, structured, logical, functional and object oriented programming language,

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.



Comparison of C & C++ programming languages

Text Books:

1. Programming languages Design & implementation by T.W. .Pratt
2. Programming Languages – Principles and Paradigms by Allen Tucker & Robert Noonan

Reference Books:

1. Fundamentals of Programming languages by Ellis Horowitz

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - System Software
Course Code: - UCS-208

Assessment and Evaluation Components	
Quizzes /Assignments/Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
3103.5

Unit 1: Introduction:

Introduction, Evolution of Components of Programming System, Architecture: System Software and machine architecture, The Simplified Instructional Computer, SIC: Machine Architecture, CISC: Traditional CISC machine, Cray T3E Architecture, Assembler Functions: Basic assembler functions: start, end, byte, word, A simple SIC assembler, General Design Procedure, Design of Assembler: Single Pass, Multi-pass assembler,

Unit 2: Loaders and Linkers:

Compile and GO loaders, General loader scheme, Absolute Loader: architecture Relocating Loader Direct- Linking Loader, Loader Design options: Linkage Editor Dynamic Linking Bootstrap Loader, Design of an absolute loader,

Unit 3: Macros:

Macro Language and Macro Processor: Macro Instructions, Features of Macro Facility: Macro Instruction Arguments Conditional Macro Expansion, Macro Calls within Macros,

Unit 4: System Software Tools:

Text Editor, Overview of Editing Process, User Interface, Editor Structure

Text Books:

1. "Systems Programming", John J. Donovan, McGraw-Hill, 1972.

Reference Books:

1. "System Software: An Introduction to System Programming", L. L. Beck, 3rd edition.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Modeling and Simulation
Course Code: - UCS-210

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
3 1 2 4.5

Unit 1: Definition and Reasons for simulation:

Continuous (time-oriented) and discrete (event) systems, Modeling/programming simple deterministic systems, Rates and system dynamics. Stochastic variables; discrete vs continuous probability; algorithms for generating random numbers, their comparison with respect to speed and validity; continuous uniformly distributed random numbers; methods for generating non-uniform distributions, Arrival patterns, service times, and queue formation.

Unit 2: Formulating systems as events and entities (such as resources, queues, gates, and linkages). Congestion in systems; arrival patterns; Poisson arrivals; the exponential distribution; the coefficient of variation; service times; normal distribution; queuing disciplines; Measures for Queues; Analytic Solutions of Queuing Problems; Utilization as a Design Factor; Other factors like grade of service

Unit 3: Discrete Events:

Representation of time; queues and servers ;generation of arrival patterns; resource seizing; departures simulation of a telephone system and computer networks; simulating components of an operating system; delayed calls; modeling policies; priority queues; tasks; gathering statistics; counters and summary statistics; measuring utilization and occupancy; recording distributions and transit times

Unit 4: Simulation in C++, GPSS, Simulations Packages, Trends in simulation. Software. SIMSCRIPT programs; SIMSCRIPT system concepts; organization of a SIMSCRIPT program; blocks, names, and labels; SIMSCRIPT statements; entities, events, and activities; defining the system; defining the system model; referencing variables; the procedural structures; arrival event; timing routine; disconnect event; closing event; execution, debugging and validation; interpreting outputs and system optimization via modification.

Text Books :

1. "Simulation Modeling and Analysis", Law and Kelton, 3rs edition, McGraw-Hill, 2000.
2. "Discrete-Event System Simulation", 2nd edition, Prentice-Hall, 1996

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Modeling and Simulation lab
Course Code: - UCS-210

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	30

LIST OF EXPERIMENTS:

1. Write an introduction in MATLAB.
2. Write a program related to Branching Statements.
3. Write a program for multiple loops
4. Write a program to create functions,
5. Write a program to implement additional data types in MATLAB.
6. Write a program to implement plots in MATLAB
7. Write a program to construct arrays, inputs/outputs etc.
8. Introduction regarding usage of any Network Simulator.
9. Practical Implementation of Queuing Models using C/C++.

Course Name: - Human Aspects Of Information Technology
Course Code: - UCS-215

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
3103.5

Unit 1:

Importance of user Interface: Definition, Importance of good design, Benefits of good design. A brief history of Screen design, The graphical user interface: Interaction Styles, popularity of graphics, The concept of direct manipulation, Graphical Systems: Advantages and Disadvantages, Characteristics.

Unit 2:

Web user: Interface popularity, Characteristics, Principles of user interface, Design process: Human interaction with computers. Importance of human characteristics, human consideration. Human interaction speeds, Business functions: Understanding business functions. Screen Designing: Design goals (introduction), Screen planning: Screen planning and purpose, organizing screen elements.

Unit 3:

Ordering of screen data and content: Screen navigation and flow. Visually pleasing composition: Amount of information. Information retrieval on web: Statistical graphics, Windows: New and Navigation schemes. Select proper kind of windows. Choose the proper screen based controls.

Unit 4:

Components: Text and messages. Icons and increases: Multimedia, Graphics, Colors, Uses problems, choosing colors, Software tools: Introduction, Specification methods, Interface – Building Tools, Interaction Devices: Keyboard and function keys, Pointing devices, Speech recognition digitization and generation. Image and video displays.

Text Books:

1. Nielsen, J. (1994), "Usability Engineering", Elsevier.
2. Rosson, M. B., & Carroll, J. M. (2001), " Usability Engineering: Scenario-Based development of human-computer interaction", Elsevier.

Reference Books:

1. Mayhew, D. (1999), "The Usability Engineering Lifecycle: A Practitioner's Handbook for user interface design", Morgan Kaufmann.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

SEMESTER IV

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Discrete Mathematics & Logic Design
Course Code: - UMA-251

Assessment and Evaluation Components	
Quizzes /Assignments/Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
3 103.5

Unit-1

Set theory: Introduction to set theory, set operation, Algebra of set, combination of sets, Duality, finite and infinite sets, Classes of sets, Partitions, Power Sets, Multi Sets, Cardinality and multiplicity, Venn Diagrams.

Relations: Cartesian product, Representation of relation, Types of relations, Inverse Relations, Composition of Relations, Equivalence relation and partition, partial ordering relations and lattices, Mathematical Induction.

Functions: Functions and its types, Composition of function.

Unit-2

Propositional Calculus: Basic operations: AND (^), OR(\vee), NOT(\sim), Truth value of a compound statement, propositions, tautologies, contradictions.

Counting Techniques: Basic Counting Principles, Permutations with and without repetition, Combination, Pigeonhole Principle.

Unit-3

Recursion And Recurrence Relation :Polynomials and their evaluation, Sequences, Introduction to AP, GP and AG series, partial fractions, linear recurrence relation with constant coefficients, Homogeneous solutions, Particular solutions, Total solution of a recurrence relation using generating functions.

Algebraic Structures Definition, elementary properties of algebraic structures, examples of a Monoid, Submonoid, Semigroup, Groups and rings, Homomorphism, Isomorphism and Automorphism, Subgroups and Normal subgroups, Cyclic groups, Integral domain and fields, Cosets, Lagrange's theorem, Rings, Division Ring.

Unit-4

Graphs and Trees: Introduction to graphs, Directed undirected graphs, Homomorphism and isomorphic graphs, Cut points and bridges, Multigraphs and Weighted graph, Paths and circuit, shortest path in weighted graph, Eulerian path and circuit. Hamilton path and circuit, Planar graphs, Euler's formula, Trees, Spanning trees, Binary trees and its traversals.

File System Implementation; File System Structure; Allocation Methods, Free Space Management Directory Implementation; Efficiency and Performance; Recovery.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Text Books

1. Elements of discrete mathematics by C.L. Liu, McGraw Hill
2. Concrete Mathematics: A foundation for Computer Science by Ronald Graham Donald Knuth and oren patashic, Addison - Wesley
3. Mathematical Structure for Computer Science by Judith L. Gersting, Computer Science Press
4. Applied Discrete Structures for computer Science by Doerr and Levasseur, Galgotia publications

Reference Books

1. Discrete Mathematics by A. Chtewynd and P. Diggle ,Edward Arnold
2. Schaums Outline series: Theory and problems of Probability by S. Lipshutz, McGraw-Hill
3. Discrete Mathematical Structures by B. Kolman and R.C. Busby, PHI.

Course Name: - Analysis & Design of Algorithms

Course Code: - UCS-255

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
3103.5

Unit 1: Introductory Concepts

- The notation of algorithm
- fundamentals of algorithmic problem solving
- analyzing algorithms
- Review of fundamental data structures
 - Arrays, Stacks
 - Queue
 - Linked list
- **Fundamentals of analysis of algorithms efficiency**
 - Asymptotic notation and standard efficiency classes
 - mathematical analysis of recursive and non-recursive algorithms
- **Divide and Conquer**
 - General Method
 - Merge sort
 - Quick sort
 - Selection sort
- **Sorting in Linear time**
 - Counting sort
 - Radix sort and Bucket sort.
- **Search**
 - Linear Search
 - Binary search

Unit 2: Graphs

- Review of Graphs
- Representation of Graphs
 - Breadth-first search
 - Depth-first Search
- Topological Sort
- Strongly connected Components
- **Trees**
 - Review of Trees

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Minimum spanning tree
- Kruskal and Prim's algorithm
- Single source shortest paths
- Bellman-Ford algorithm
- Single source shortest path in directed acyclic graphs
- Dijkstra's algorithm
- All pairs shortest paths
- Shortest paths and matrix multiplication
- Floyd-Warshall algorithm
- Johnson's algorithm

Unit 3: Dynamic Programming

- Introduction
 - Elements of Dynamic Programming
- Matrix Chain Multiplication
- Longest Common Subsequence
- Optimal binary search tree
- Knapsack problem
- Travelling sales person problem.
- **Greedy Method**
 - An activity selection problem
 - Elements of Greedy Programming
 - Huffmann codes
 - A task scheduling problem
- **Backtracking and Branch and Bound**
 - The 8 Queens problem
 - Graph coloring
 - Hamiltonian cycles
 - Least Cost Search(LC)
 - The 15 puzzl
- **Bounding**
 - FIFO branch and bound
 - LC branch and bound.

Unit 4: Maximum Flow:

- Flow Networks
- The Ford-Fulkerson method
- Maximum Bipartite matching
- **Sorting Networks**
 - Comparison networks
 - Zero-one principle
 - Bitonic sorting network
 - merging network
 - sorting network

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.



NP hard and NP complete problems

- P
- NP
- NP hard and NP complete problems
- Cook's theorem(proof not required)
- Basic introduction to clique problem
- vertex cover problem
- Hamiltonian cycle problem
- Approximation algorithms
- vertex cover problem
- Travelling salesman problem

Text Books:

1. Cormen, Leiserson, Rivest, Stein "Introduction to Algorithms"
2. Horowitz Ellis And Sartaj Sahni "Fundamentals of Computer Algorithms"
3. Anany V. Levitin "Introduction to Design and analysis of algorithms"

Reference Books:

1. Aho-Hopcroft and Ullman "The Design and Analysis of computer algorithms"
2. D.E. Kunth "The art of computer programming"

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Operating System**Course Code: - UCS-281**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
3124.5

Unit-1

Introduction: OS services and components, Multitasking, Multiprogramming, Time sharing, Buffering, Spooling.

Process & thread management: Concept of process and threads, Process states, Process management, Context switching, Interaction between processes and OS, Multithreading Models, CPU Scheduling.

Unit-2

Process Synchronization: Race conditions, mutual exclusion requirements, Critical Section problem, s/w and h/w solutions, Semaphores, monitors, classical IPC problem and solutions.

Deadlocks: characterization, detection, recovery, avoidance and prevention

File Management: File Concept, Access methods, Directory Structure, File Protection, File System Structure, Allocation methods, Free Space Management

Unit-3

Memory management: Memory partitioning, swapping, Contiguous Memory allocation, paging, Segmentation, Segmentation with paging.

Virtual memory: Concepts, Overlays, Demand paging, Performance of demand, paging, thrashing, Page replacement algorithm.

Unit-4

I/O Systems: I/O hardware, I/O channels, Structure of I/O System, Principles of I/O software, Goals, interrupt handlers, device drivers, device independent I/O software

Secondary Storage Structure: Disk structure, Disk scheduling, Disk Management, Swap-space management, RAID Structure

Protection: Protection, Goals of protection, Domain of protection, Access matrix, Implementation of access matrix, Revocation of access rights,

Security: The security problem, authentication, one-time passwords, program threats, System threats, Threat monitoring, Encryption, Computer-security classifications

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Text Books:

1. Operating Systems by Achiest S. God bole, Tmh
2. Operating Systems by D. M. Dhamdhare, Tmh
3. Understanding Operating System by Flynn & Métiens Thomsan
4. Operating Systems Design & Implementation by Andrew Dagenham, Albert S. Wood
Hull Pearson
5. Operating System Concepts by Silberschatz & Galvin, Wiley

Reference Books:

1. Operating System (5th) – Internals & Design Principles by William Stallings, Prentice Hall Of India
2. Operating System Concepts by James Peterson, Abraham Silberschatz, Addison-Wesley
3. Computer Organization & Architecture by William Stallings ,Prentice Hall Of India
4. Modern Operating Systems by Andrew Tanenbuam, PHI.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Operating System Lab

Course Code: - UCS-281

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	30

LIST OF EXPERIMENTS:

1. Simulation of the CPU scheduling algorithms a) Round Robin b) SJF c) FCFS d) Priority
2. Simulation of MUTEX and SEMAPHORES.
3. Simulation of Bankers Deadlock Avoidance and Prevention algorithms.
4. Implementation of Process Synchronization (Reader-Writer, Sleeping Barber and Dining Philosopher's Problem)
5. Simulation of page Replacement Algorithms a) FIFO b) LRU c) LFU
6. Simulation of paging techniques of memory management.
7. Simulation of file allocation Strategies a) Sequential b) Indexed c) Linked
8. Simulation of file organization techniques:
 - a) Single Level Directory
 - b) Two Level Hierarchical

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Software Engineering
Course Code: - UCS-252

Assessment and Evaluation Components	
Quizzes /Assignments/Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
3 1 0 3.5

Unit-1

Introduction- Need for software engineering, issue in the design of large software, software life cycle models waterfall Model, Iterative, Prototype, and Evolutionary, Spiral Models & their comparison, overview of software development process.

Software Requirement Analysis and Specification- Requirements Engineering, Crucial process step, State of the practice, problem analysis, Data dictionaries, Entity relationship diagram, code object diagram, approaches to problem analysis, Structured requirements definition, structured analysis & design techniques, Software prototyping, Software requirements specification, Nature of SRS, characteristics of good SRS, Organization of the SRS.

Unit-2

Software Metrics: What and why: Definition, areas of applications, problems during implementation, size metrics, The basic information Flow Model, the more sophisticated information Flow Model, Metrics analysis using statistics for Assessment, Flow problems with metric data.

Software Project Planning: Cost estimation: Models , Static ,single variable model, Static multivariable model, The constructive cost model: Basic model, Intermediate model, Detailed COCOMO Model, The Putnam resource allocation model: The trade off-of-time versus cost, development sub cycle, software risk management : what is Risk, typical software risks , Risk management Activities, Risk identification, Risk projection, Risk management activity, Team Structure.

Unit-3

Software testing techniques: Software testing fundamental testing objectives, testing principles, testability, test case design, White box testing, flow graph notation, cyclomatic complexity, driving test cases, graph matrices, black box testing, graph base testing methods, equalization partitioning, comparison testing, orthogonal Array testing, Testing for real time system.

Software Testing Strategies: Strategic approach to software testing, verification and validation, unit testing, unit test procedures, integration testing, top down integration, bottom up integration, regression testing, smoke testing, validation testing, alpha testing

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

and beta testing, system testing, recovery testing, security testing, stress testing, performance testing.

Unit-4

Software maintenance: What is software maintenance; categories of maintenance, problem during maintenance, potential solution to maintenance problems, the maintenance process: program understanding, generating particular maintenance proposal, ripple effect, modified program testing, maintenance models: Quick fix model, iterative enhancement model, reuse oriented model, Boehm's model estimation of maintenance cost, Beladay and Lehman model, Boehm model, Configuration management activities, software version, Change control process.

Software quality Assurance: Quality concepts, Quality, Quality control, Quality assurance, cost of quality, SQA Activities, Cost impact of defects, defect application and removal, Review meeting, reporting and record keeping, statistical software quality assurance, software reliability, measure of reliability and availability. **Software Reuse:** Issue in Software Reuse

Text Books:

1. Software Engineering- A practitioner's Approach by RogerS. Pressmen, TMH
2. Software Engineering by K.K. Aggarwal & Yogesh , Nova Science,

Reference Books :

1. Software Engineering- A practitioner's Approach by RogerS. Pressmen, TMH

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Computer Networks
Course Code: - UCS-253

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
3124.5

Unit 1: Introduction

- Layered Network Architecture
- ISO-OSI Model
- Comparison of OSI and TCP/IP models.
- **Data Link Protocols**
 - Stop and Wait protocols
 - Noise free and Noisy Channels
 - Performance and Efficiency
 - Sliding Window protocols
 - Go Back and Selective Repeat ARQs
 - performance and Efficiency
 - Verification of Protocols using Finite State Machine
 - HDLC Data Link Protocol
 - Integrated Services Digital network
 - Interfaces, Devices; Channel Structure
 - Asynchronous Transfer Mode (ATM)
 - ATM Cells, Header and Cell Formats
 - Layers in ATM
 - Class 1,2,3,4 Traffic.
- **Local Area Networks (LANs)**
 - IEEE 802.3, 802.4 and 802.5 Protocols
 - performance of Ethernet and Token ring Protocols
 - FDDI protocol; Distributed Queue Dual Bus (DQDB) protocol.

Unit 2: Network Layer protocols

- Design Issues
- Virtual Circuits and Datagrams
- Routing Algorithms
- Optimality principle
- Shortest path routing
 - Dijkstra Algorithms
 - Bellman-Ford and Floyd-Warshall Algorithms

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Flooding and Broadcasting
- Distance Vector Routing
 - Link Stat Routing
 - Flow Based Routing
- Multicasting Routing
 - Flow and Congestion Control
- General Principles
- Window Flow Control
 - Packet Discarding
 - Isarithmic Control
- Traffic Shaping
- Choke packets
- RSVP
- Dead Locks and their Avoidance
- Network Layer in ATM
- Interworking
 - Bridges
 - Routers and Gateways
 - Internet Architecture and Addressing.

Unit 3: Transport Layer Protocols

- Design Issues
 - Quality of Services
 - Primitives
- Connection Management
 - Addressing
 - Connection Establishment and Releases
 - Use of Timers

Unit 4: Presentation and Application Layer protocols

- Presentation Concepts
- SNMP-abstract Syntax notation.1 (ASN. 1)
- Structure of Management, Management Information Base
- Cryptography
- substitution and Transposition Ciphers Flow Control and Buffering
- Multiplexing
- Crash Recovery
- Elements of TCP/IP Protocol
- User Datagram protocol
- UDP/TCP Layering
 - Segment Format
 - Checks Sum
 - Timeout
- Connection Management
- Finite State Machine.
- **Session Layer protocol:**
 - Dialog Management

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Synchronization
- OSI Session primitives
- Connection Establishment.
- Data Encryption Standards (DES)
- DES Chaining
- Breaking DAS
- Public Key Cryptography
- Authentication Protocols
- Electronic Mail
- World Wide Web.
- **Introduction to Novell NetWare**
 - History, the rise of NetWare
 - Netware 286 2.x
 - Netware 3.x
 - Netware 4.x
 - Strategic Mistakes
 - Netware 5.x
 - Netware 6.0
 - Netware 6.5
 - Current Netware Situation and Performance.

Text Books:

1. Andrew S. Athenaem: Computer Networks – Third Edition
2. S. Keshav: An Engineering Approach to Computer Networks

Reference Books:

1. FOROUZAN: Data Communication and Networking

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Computer Networks Lab

Course Code: - UCS-253

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	30

LIST OF EXPERIMENTS:

1. Construct a network of 2 or 3 system.
2. Simple communication between the systems in exchanging a binary word.
3. Encryption and decryption on the ASCII character set being transmitted.
4. Experimentation with standard set of protocols
5. Experimentation with protocol kit.
6. Experimentation with modulation.
7. To study different types of transmission media.
8. To study 16 Quadrature Amplitude Multiplexing.
9. To study Serial Interface Centronics and its applications.
10. To configure the modern of a computer.
11. To make inter-connections in cables for data communication in LAN.
12. To install LAN using Tree topology.
13. To install LAN using STAR topology.
14. To install LAN using Bus topology.
15. To configure a HUB/Switch

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Departmental Elective - 5

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Mobile Application Development**Course Code: - UCS-282**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr**3124.5****Unit 1: Introduction**

Introduction – PCS Architecture, Cellular Telephony, Mobile Computing Architecture Mobile devices: Device Overview, Input mechanism, Wireless communication, Mobile Device classification, Device Manufacturers Mobile Generations: Devices and Applications for: 1G, 2G, 2.5G, 3G Mobility Management :Handoff, Roaming Management, Roaming Management under SS7 Handoff Management :Handoff Detection, Strategies for Handoff Detection, Channel Assignment, Link Transfer Types, Hard Handoff, Soft Handoff.

GSM and Mobility Management GSM System Overview: GSM Architecture, Data Services, Unstructured Supplementary Service Data Mobility Management : GSM Location Update, Mobility Databases, Failure Restoration, VLR Identification Algorithm, VLR Overflow Control

Unit 2: GSM Services

GSM Service: SMS Architecture, SMS Protocol Hierarchy, Mobile-Originated Messaging, Mobile –Terminated Messaging International Roaming for GSM: International GSM, Call Setup, Reducing the International Call, Delivery Cost.

Mobile Number Portability: Fixed Network Number Portability, Number Portability for Mobile

Networks, Mobile Number Portability Mechanisms, Implementation Costs for Mobile Number Mobile prepaid service: Wireless intelligent network approach, service node approach, hot billing approach, handset based approach

GSM Data Layer General Packet Radio Service (GPRS): GPRS Functional Groups, GPRS Architecture GPRS Network Nodes, GPRS Interfaces, GPRS Procedures, GPRS Billing, Evolving from GSM to GPRS Wireless Application Protocol (WAP): WAP Model, WAP Gateway, WAP Protocols WAP UAProf and Caching, Wireless Bearers for WAP, WAP Developer Toolkits, Mobile Station Application Execution Environment Third-Generation Mobile Services: Paradigm Shifts in Third-Generation Systems W-CDMA and cdma2000, Improvements on Core Network, Quality of Service in 3G Wireless Operating System for 3G Handset

Unit 3: Mobile Application Architectures Choosing the right architecture: Application architecture, Device type, Enterprise connectivity, Enterprise data, Enterprise integration, User

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

notification, security, battery life Application Architectures: Wireless internet, Smart Client, messaging Smart Client Overview: architecture Smart Client Development process: Need analysis phase, design phase, implementation and testing phase, deployment phase

Unit 4: Recent And Future Trends : Android OS and its Architecture, Mobile Applications, User Interface design for mobile Applications, Managing Application Data, Performance, Scalability, Modifiability, Availability and Security of Mobile Applications, Testing Methodologies for Mobile Applications. Future Mobile Generations: 4G, 5G

Text Books:

1. Yi Bang Lin, “Wireless and Mobile Network Architectures”, Wiley Publications.
2. Martyn Mallick, “Mobile and Wireless design essentials”, Wiley Publications.

Reference Books:

1. Ke-Lin Du & M.N. S. Swamy, “Wireless Communication Systems, From RF Subsystems

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Mobile Application Development Lab

Course Code: - UCS-282

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from thr given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	30

LIST OF EXPERIMENTS:

1. Develop an application that uses GUI components, Font and Colours
2. Develop an application that uses Layout Managers and event listeners.
3. Develop a native calculator application.
4. Write an application that draws basic graphical primitives on the screen.
5. Develop an application that makes use of database.
6. Develop an application that makes use of RSS Feed.
7. Implement an application that implements Multi-threading
8. Develop a native application that uses GPS location information.
9. Implement an application that writes data to the SD card.
10. Implement an application that creates an alert upon receiving a message.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Inventions and Innovations In Computing**Course Code: - UCS-284**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

**L T P Cr
3103.5****Unit 1:**

The passion for invention - profile of great inventors in computing history, their creations and impacts, Technological creativity in idea generation, Creating ideas based on needs (Application Pull), Creating ideas based on observation of phenomena (Technology Push), Understanding the role and use of Space, Time, Matter, and Energy in invention, Recognition and effective use of Resources in invention, Using analogy and feature transfer for invention, Recognition of patterns of technological evolution and their use in invention, Turning ideas into meaningful inventions.

Unit 2:

Computing devices, The Language Before the Hardware, The Earliest Processors, Dawn of Modern

Computers, Transitioning Toward Transistors, Invention of semiconductor materials; Examples of simple and complex CPUs; Programming Paradigms and Languages, Compilers and Algorithms;

Unit 3:

Operating Systems; Internet and distributed computing; Social networks; Numerical methods for the approximate computer solution of otherwise intractable problems; Databases; Data Analytics; Computer graphics and animation; Graphics Processor Unit; Computer and data security; Program

Verification, Testing, Reliability and Correctness.

Unit 4: Top Computing machines, Top Green Computing machines, their ranking system. Internet of Things, Smart devices, Smart cities (requirement, design and implementations), Case study: Smart streetlightening and smart traffic management, use of technology and open data, Interpreting Technology type, five key phases of a technology's life cycle.

Text Books

1. Elizabeth Raum, The History of the Computer (Inventions That Changed the World), 2007.
2. Chris Woodford, Communication and Computers (History of Invention), 2004.
3. Ahmad, Ishfaq, Ranka, Sanjay, Handbook of energy - aware and green computing, 2012.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Reference Books:

1. Fortino, Giancarlo, Internet of things based on smart objects: technology, middleware and Applications Smart City, 2014.
2. Salvi, Dilip M., Inventions that made history, 1990.

Course Name: - Ecommerce and ERP
Course Code: - UCS-285

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
3 103.5

Unit 1: Introduction and Concepts:

Networks and commercial transactions – Internet and other novelties; networks and electronic transactions today, Model for commercial transactions;

Internet environment – internet advantage, worlds wide web and other internet sales venues
 Online commerce solutions.

Security Technologies:

Insecurity Internet; A brief introduction to Cryptography; Public key solution; Key distribution and certification; Prominent cryptographic applications.

Electronic Payment Methods:

Updating traditional transactions; secure online transaction models; Online commercial environments; digital currencies and payment systems; Offline secure processing; private data networks.

Protocols for Public Transport of Private Information:

Security protocols; secure protocols; Secure hypertext transfer protocols; Secure sockets layers; Integrating security protocols into the web; Non-technical provide Shopping techniques and online selling techniques. Internet tools. Electronic Commerce Online Resources and Guide to the CD-ROM.

Unit 2: Electronic Commerce Providers:

On-line Commerce options: Company profiles. Electronic Payment Systems: Digital payment systems; First virtual internet payment system; cyber cash model.

On-line Commerce Environments:

Servers and commercial environments; Netscape product line; Netscape commerce server; Microsoft internet explorer and servers;open market.

Digital Currencies:Optional process of Digicash, Ecash Trail; Using Ecash; Smart cards, Electronic Data Interchange; Its basics; EDI versus Internet and EDI over Internet. **Strategies,**

Techniques and Tools: Internet Strategies: Internet Techniques

Unit 3: ERP –

An Enterprise Perspective; Production Finance, Personnel disciplines and their relationship, Transiting environment, MIS Integration for disciplines, Case Study, Information / Workflow, Network Structure, Client Server Integrator System, Virtual Enterprise. ERP –Resource Management Perspective; Functional and Process of Resource. Management, Basic Modules of ERP System-HRD, Personnel Management, Training and Development, Skill Inventory,

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Material Planning and Control, Inventory, Forecasting, Manufacturing, Production Planning, Production Scheduling, Production Control, Sales and Distribution, Finance, Resource Management in global scenario, dynamic data management in complex global scenario

Unit 4: ERP – Information System Perspective:

Evolution of Application Software Technology Management, EDP, MIS, DBMS, DSS OLAP (Online Analysis and Processing), TP, OAS, KBS, MRP, BPR, SCM, REP, CRM, Information Communication Technology, E-Business, E-Commerce, EDI— ERP-Key Managerial Issues: Concept Selling, IT Infrastructure, Implication, ERP Systems on Business Organization, Critical success factors in ERP System, ERP Culture Implementation Issues, Resistance to change, Public Service and Organizations (PSO) Project, ERP Selection issues, Return on Investment, Pre and Post Implementation Issues

Text Books:

1. Frontiers of Electronics Commerce by Ravi lalakota, Andrew Whinston
2. Enterprise Resource Planning – Concepts and practice by K. Garg and N.K. Venkita Krishna

Reference Books:

1. The SAP/3 Handbook by John Antonio, Fernandz

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Fundamentals of Structured Programming
Course Code: - UCS-280

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
3 1 0 3.5

Unit 1: Introduction to the C Language

The C Language and its Advantages, The Structure of a C Program, Writing C Programs, Debugging a C Program, Examining and Running a C Application Program, Data Types and Variables, Data Types (integer, floating, character, type conversion, type definitions), sizeof() operator, Input/Output Management Input/Output Management: printf(), scanf(), Conversion specifiers, Escape sequences, Expressions and operators, Arithmetic operators: operator precedence and associativity, Assignment operators, Increment and decrement operators, Expression evaluation, Expression statements, Relational operator, logical operator, arithmetic assignment, Selection statements, Logical expressions, if statement, switch statement, Loops While Do..while, For Exiting from a loop (break, continue, goto)

Unit 2: Arrays

One-dimensional array, Multidimensional array

Modular Programming with Functions

Defining and calling functions, Function declarations, Arguments, Return statement, Program termination (exit function)

Pointers and Strings

Pointer variables, The address and indirection operators, Pointer assignment, Pointer as argument Pointer as return values, Pointer Arithmetic, Using pointers for array processing, String literals, variables, Reading and writing strings, Using the C string library: strcpy, strlen, strcat, strcmp, Arrays of strings

Unit 3: Structures and Dynamic Memory Allocation

Structures, Arrays of Structures, Passing Structures to Functions, Nested Structures, Unions Enumerations, Dynamic Memory Allocation (malloc, calloc, realloc), Deallocating storage, Linked list (-> operator, creating, displaying, searching)

The Preprocessor

How the preprocessor works, The C Preprocessor and the #include and #define Directives, Macro definitions (simple, parameterized macros), general properties of macros #if and #endif directives, the defined operator.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Unit 4: File Input/Output Streams:

file pointers, standard streams and redirection, text files versus binary files File operations: opening a file, modes, closing a file, attaching a file to an open stream, obtaining file names from the command line File Input and Output, reading/writing data, structure to files, random access.

Text Books:

1. David Griffiths, Dawn Griffiths, Head First C, O'Reilly Media; 1 edition (April 19, 2012)
2. Clovis L. Tondo (Author), Scott E. Gimpel (Author), "The C Answer Book: Solutions to the Exercises in 'The C Programming Language,' Second Edition", Prentice Hall; 2nd edition (November 11, 1988)

Reference Books:

1. Peter van der Linden, Expert C Programming: Deep C Secrets, Prentice Hall; 1st edition (June 24, 1999)

SEMESTER V

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: -Microprocessor Theory & Its Applications**Course Code:-UEC-305**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

**L T P Cr
3124.5****Unit 1: Introduction:**

- Evolution of microprocessor
- General Architecture of microprocessor
 - Registers
 - ALU
 - System buses
- Instruction cycle
 - Fetch cycle
 - Execute cycle
- Machine cycle
 - T states
- Architecture of 8085
- Block diagram
- Pin diagram
- Instruction formats
- Addressing Modes
- Timing diagrams.

Unit 2: Instruction Set & Programming:

- Instructions set of 8085
 - Data manipulation
 - Data transfer
 - Arithmetic & logical instructions
 - Status management instructions
- Development of Assembly language program.

Unit 3: Interrupts & data transfer:

- Interrupts:
 - Hardware & Software Interrupts
 - Polled and vectored interrupts
 - Level and edge triggered interrupts
 - Enabling, disabling and masking of interrupts.
- Data transfer schemes:

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

DMA

Memory mapped

I/O mapped

Schemes of I/O interfacing

- Interfacing memory Chips with a microprocessor
 - RAM
 - ROM
- Bus contention
- Concept of wait states.

Unit 4: Peripheral devices & applications of microprocessor:

- Description of peripheral IC's
 - 8155(Multi Function Device)
 - 8251(Universal Synchronous Asynchronous Receiver Transmitter)
 - 8255(Programmable I/O)
 - 8253(Programmable Interval Timer/Counter)
 - 8257(Programmable DMA controller)
 - 8259(Priority Interrupt Controller)
 - 8279(Key board and Display Controller)

Applications of microprocessor

- A temperature Monitoring system
- Water level control
- Traffic control
- Generation of square waves using I/O port and SOD lines

Text Books:

1. Ramakant Gaonkar, Microprocessor & Architecture, programming and applications, Penram International Publisher.
2. B.Ram, Fundamentals of microprocessor & microcomputers, Dhanpat Rai & Sons.

Reference Books:

1. A.P.Mathur, An introduction to microprocessor , Tata MC Graw Hills.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: -Microprocessor Theory & Its Applications

Course Code:-UEC-305

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	30

LIST OF PRACTICALS:

1. Study of 8085 Microprocessor Trainer kit.
2. Write a program using 8085 for
 - Two 8 bit numbers addition.
 - Two 16 bit numbers addition
3. Write a program using 8085 for
 - Two 8 bit numbers subtraction
 - Two 16 bit numbers subtraction
4. Write a program for multiplication of two 8 bit numbers using 8085.
5. Write a program for division of two 8 bit numbers division using 8085
6. Write a program for sorting a list of numbers in ascending & descending order.
7. Code conversion-Binary to Gray & Gray to binary.
8. Program for finding square of a number using look up table & its verification
9. Write a program for temp control using 8085 & 8255 PPI
10. Write a program for water level control using 8085 & 8255 PPI
11. Generate different waveforms using DAC interfacing it with a microprocessor kit using 8255 PPI port.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name:-Theory Of Automata & Computation**Course Code:-UCS-301**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
3103.5

Unit 1: Finite Automata and Regular Expression

- Finite State System
- Basic Definitions
- Non-Deterministic finite Automata (N DFA)
- Deterministic finite Automata(DFA)
- Equivalence of DFA and N DFA Finite Automata with
- E-moves
- Regular expression
- Equivalence of finite Automata and expression
- Regular expression conversion and vice –versa.

Unit 2: Introduction to Machines

- Concept of basic machines
- Properties and limitation of FSM
- Moore and Mealy Machines
- Equivalence of Moore and Mealy Machines
- Conversion of NFA to DFA by Arden's method

Properties of Regular Sets

- The Pumping Lemma for Regular sets
- Application of the pumping lemma
- Closure properties of regular sets
- Myhill-Nerode Theorem and minimization of Finite Automata
- Minimization Algorithm
- Kleene's Theorem.

Unit 3: Grammars

- Definition
- Context Free and context sensitive grammar
- Ambiguity
- Regular grammar
- Reduced forms
- Removal of useless Symbols and unit production
- Chomsky Normal Form(CNF)
- Griebach Normal Form(GNF).

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Pushdown Automata

- Introduction to push-down machines
- Application of pushdown machines.

Unit 4: Turing Machines

- Deterministic and Non-Deterministic Turing Machines
- Design of T.M
- Halting problem of T.M.
- PCP problem.

Chomsky Hierarchy

- Chomsky hierarchies of grammars
- Unrestricted grammar
- Context sensitive Language
- Relation between language of classes.

Computability

- Basic Concepts
- Primitive Recursive Functions

Text Books:

1. Hopcroft & O.D.Ullman, R.Motwani: Introduction to Automata Theory, languages & computations.
2. K.L.P.Mishra & N.Chandershekarani: Theory of Computer Sc. (Automata, Language & Computation)

Reference Books:

1. Peter Linz: Introduction to formal language & Automata
2. John C. Martin: Introduction to Languages and the Theory of Computation

Course Name: - Internet Fundamentals & Web Designing**Course Code: - UCS-302**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
3124.5

Unit-1:

Electronic Mail and Internet: Introduction, advantages and disadvantages, E-mail inner workings, E-mail management, Newsgroups, mailing lists, chat rooms. Introduction to networks and internet, Working of Internet, Modes of Connecting to Internet, Internet Service Providers(ISPs), Internet address, standard address, domain name, DNS.

World Wide Web: Introduction, Web Browser details, Search engines, Web crawler, Gopher, Telnet and FTP.

Unit-2:

Static Web Pages HTML- different tags, sections, image & pictures, listings, tables, frame, frameset, form.

Dynamic Web Pages and XML - The need of dynamic web pages; an overview of DHTML, cascading style sheet (css), XML.

Unit-3:

PHP: What is PHP? History of web programming; how PHP fits into the web environment; installation and configuration; "Hello World"; syntax, variables, operators, flow control structures

More language basics; using GET and POST input, working with HTML forms; built-in and user-defined functions; variable scope; using the PHP manual, getting help.

Input validation, string manipulation and regular expression functions; date and time functions, code re-use, require(), include(), and the include_path; filesystem functions and file input and output; file uploads; error handling and logging; sending mail

Unit-4

Java Script - Data types, variables, operators, conditional statements, array object, date object, string object.

Introduction to Web Servers: PWS, IIS, Apache; Microsoft Personal Web Server. Accessing & using these servers.

Text Books:

1. Fundamentals of the Internet and the World Wide Web by Raymond Greenlaw and

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Ellen Hepp, TMH

2. Internet & World Wide Programming by Deitel,Deitel & Nieto, Pearson Education

Reference Books :

1. Complete idiots guide to java script by Aron Weiss, QUE, 199

Course Name: -Internet Fundamentals & Web Designing Lab**Course Code: - UCS-302**

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	30

LIST OF EXPERIMENTS:

1. Write a program to illustrate the use of text-level tags and block-level tags.
2. Create a document that takes format of business letter by using <p> and
 tag.
3. Create a document (bill of sale) by using <pre> tag and complete with a aligned dollar (\$) values and total.
4. Create an ordered list using Roman Numerals after the 5th item increase the next list value by 3.
5. Use the align attribute of image tag to align another image or text.
6. Create a webpage to demonstrate various types of linking.
7. Create a resume using HTML tag.
8. Create a web page which displays the map of our country. Link each city or state on the image map such that the respective html page of the city or state is displayed when user selects an area.
9. Create a table of contents in which each menu item or content should load a web page.
10. To create a web page of your organization (college) using html tags and frames.
11. Write a simple PHP program that displays a welcome message.
12. Write a PHP program using the string comparison operators
13. Write a XHTML form for gathering user input in PHP
14. Write a PHP program obtaining user input through forms.
15. Write a PHP program using PHP's arithmetic operators

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Advanced Programming
Course Code: - UCS-306

Assessment and Evaluation Components	
Quizzes /Assignments/Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
3124.5

Unit 1: Introduction

- Object oriented programming
- Two paradigms
- Abstraction
- the OOP principles
- Difference between C/C++ and Java, Applets and Applications
- Java Development Kit
- Advantages of Java
- Variables, data types, operators, decision control statements, Iterative Statements, Switch case, Type casting.

Introduction to classes

- Class fundamentals
- Declaring object reference variable
- Introducing methods
- Constructors
- This key word
- Garbage collection
- The finalize() method

Methods and Classes

- Overloading methods
- Using objects as parameters
- Recursion
- Static data members & Member functions
- Arrays, vectors, String and string buffer.

Inheritance

- Inheritance basics
- Using super
- Method overriding
- Dynamic method dispatch
- Abstract Classes
- Using final with inheritance

Unit 2: Package

- Defining packages

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Package access protection
- Importing packages

Interfaces

- Defining and Implementing Interfaces
- Multiple Inheritances through Interfaces.

Exception handling

- Exception handling fundamentals
- Exception types
- Uncaught Exceptions Using try and catch
- Multiple catch clauses
- Nested try statements throw, finally
- User defined exceptions.
 - Multithreaded Programming
 - The Java thread model
 - The main thread
 - Creating thread, multiple thread,
 - Using is alive() and join ()
 - Thread priorities
 - Synchronization
 - Inter thread communications.

Unit 3: Abstract windowing Toolkit

- Introduction to Applets
- Applet architecture,
- HTML applet tag
- Display Methods
- Parameter passing
- Event Handling
 - Event handling mechanism
 - Event classes (Action Event, Mouse Event, Key Event)
 - Event Listener Interfaces (ActionListener, KeyListener, MouseListener)
 - Adapter classes
- Window Fundamentals
 - Component
 - Container
 - Panel
 - Window & Frame,
 - Working with Graphics, colors, Fonts
 - AWT Controls
 - Layout Manager & Menus.
- Difference between AWT and Swing
- Swing components
- classes

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- buttons
- boxes
- panes
- Tables, fields and trees.
- JDBC
 - Java as a database front end
 - Database Client/Server methodology
 - Two-and three-tier
- Database design
- Operations
 - Insertion
 - Deletion
 - selection
 - updating a database
- Servlets
 - Introduction
 - Life cycle
 - Simple Programs
 - Handling Http request and response
 - Handling cookies
 - Session tracking

Text Books:

1. The Complete Reference by Patrick Naughton, Herbert Schildt
2. Programming with Java by E. Balagurusamy, Tata McGraw Hill

Reference Books :

1. Programming with JAVA by John R. Hubbard, Schaum's Outline Series, McGraw Hill

Course Name: - Advanced Programming Lab
Course Code: - UCS-306

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	30

LIST OF EXPERIMENTS:

1. Write a program to find even and odd numbers from 1 to 50.
2. Write a program to convert the given temperature in Fahrenheit to Celsius using the following conversion formula

$$C=(F-32)/1.8$$
 And display the result in tabular form
3. Write a program to display all the factors of a number entered by user: e.g. If entered 8 it would response with 2 & 4.
4. Write a program to find LCM and HCF of two numbers entered by a user.
5. Write a menu driven program which will prompt the user to select one of the following options:
 - To calculate sum of digits of a number
 - To find factorial of a number
 - To check if a number is prime or not
 - To check if number is positive or negative
 - To check whether the given number is an Armstrong number
 - To check whether the given number is a palindrome
6. Write a program to determine the sum of the following Harmonic series for n=8:
 $1+1/2+1/3+\dots\dots\dots+1/n$
7. Write a program to print the following pattern:
 *
 **

8. Write a program to print the fibonacci series upto n terms
 0,1,1,2,3,5,8.....n
9. Write a program using nested if-else statement to print the following grade according to the percentage of the student

GRADE	PERCENTAGE
Hon ours	above 75%
First division	60% - 75%
Second division	50% - 60%
Third division	40% - 50%
Fail	less than 40%

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

10. Design a Class to represent a bank account. Include the following details
Data Members:
 - Name of the depositor
 - Account number
 - Type of Account
 - Balance amount in accountMethods:
 - To assign initial values
 - To deposit an amount
 - To withdraw an amount after checking the balance
 - To display the name and balance
11. Create a string buffer object to illustrate how to
 - Display capacity and length of string buffer
 - Insert character at the beginning.
 - Append & Reverse the string.
12. Write a programme to access data from database using JDBC and modify data in the Database.
13. Write a programme to implement frame, panels through different layout managers in Applets and swings.
14. Write a programme that shows a solid circle that moves from left to right. Across the applet display area. The flicker effect should be noticeable.
15. Write a programme to implement Applet that displays a different Images based on the polymorphism using
 - Overloading
 - Overriding
16. Write a program to implement run time polymorphism.
of week. The Applet should accept seven parameters that Identify the Image file.
17. Write an application that execute two threads one after another, Create threads by Implementing.
 - Thread Class
 - Runnable Interface.
18. Write an application that defines sphere class with three constructors first from accepts no arguments. It assumes that sphere is centered at origin & has radius of one unit. The record from accept one double value and represents radius and centered at origin, third from accepts four double arguments and specify radius and origin.

Departmental Elective-6

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Object Oriented Software Engineering
Course Code: -UCS-347

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
4004.0

Unit 1: Review of Object Oriented System

- Design object
- Class Hierarchy
- Inheritance
- Polymorphism
- Object relationships and associations
- Aggregations and object containment
- Object persistence
- Meta class
- Object oriented systems development life cycle
- Software development process object oriented system development
- A use case driven approach.

Unit 2 : Methodology for object oriented design

- Object modeling techniques as software engineering methodology
- Rumbaugh methodology
- Jacobson methodology
- Booch Methodology
- Patterns
- Frameworks,
- The unified approach
- Unified modeling language (UML).

Unit 3 :Object Oriented Analysis

- Analysis process
- Use case driven object oriented analysis
- Use-case model,
- Object classification
 - Theory
 - Different approaches for identifying classes

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Responsibilities and collaborators Identifying object relationship
- Attribute
- Methods
- Super sub class relationships
- A – part of relationships aggregation class responsibilities
- Object responsibilities

Unit 4 : Object Oriented design process

- Corollaries
- Design axioms
- Design patterns
- Object oriented design philosophy
- UML object constraint language

Designing classes

- The process
- Class visibility
- Refining attributes
- Designing methods
- Protocols
- Packages
- Managing classes
- Designing interface objects
- View layer interface design
- Macro and Micro level Interface design
- Macro and Micro level interface design process.

Text Books:

1. Object Oriented systems development by Ali Baharmi , TMH

Reference Books:

1. Object Oriented Modeling and Design by Rumbaugh , PHI
2. Object Oriented analysis and design by Grady Booch , Addison Wesley
3. Object Oriented software Engineering by Subash Mehta, Suresh K. Basandra, Galgotia Publication.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Distributed Systems**Course Code :-UCS-348**

Assessment and Evaluation Components	
Quizzes /Assignments/Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

**L T P Cr
4004.0****Unit 1: Introduction to Distributed System**

- Distributed System
- Goals
- Hardware concepts
- Software concepts
- Client-Server model
- Examples of distributed systems

Communication

- Layered protocols
- Remote procedures call
- Remote object invocation
- Message oriented communication
- Stream-oriented communication

Processes

- Threads
- Clients, Servers
- Code Migration
- Software agent

Unit 2: Naming

- Naming entities
- Locating mobile entities
- Removing un-referenced entities

Synchronization

- Clock synchronization
- Logical clocks
- Global state
- Election algorithms
- Mutual exclusion
- Distributed transactions

- Introduction
 - Data centric consistency models
 - Client centric consistency models

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Distribution protocols
- Consistency protocols

Security

- Introduction
- Secure channels
- Access control
- Security management

Unit 4: Distributed File System

- Sun network file system
- CODA files system

Case Study

- CORBA
- Distributed COM
- Globe
- Comparison of CORBA, DCOM, and Globe

Text Books:

1. G. Coulouris, J. Dollimore, and T. Kindberg: Distributed Systems: Concepts and Design
2. Taunenbaum: Distributed Systems: Principles and Paradigms

Reference Books:

1. M. Singhal & N. Shivaratri: Advanced Concepts in Operating Systems

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Artificial Intelligence & Expert**Course Code: - UCS-330**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
3124.5

Unit 1: Introduction to AI

- Definition of Artificial Intelligence (AI)
- Problems
- Techniques
- Architecture of AI machines
- logic family
- Classification of logic
- Introduction to LISP
 - List manipulations
 - Functions
 - Predicates
 - Conditionals
 - Input, output local variables
 - Iteration
 - Recursion
 - Lists
 - Arrays.
- Problems Spaces & Search
- Defining a problem as a space Search
- Production systems and its Architecture
- Problem characteristics
- Production system characteristics
- Logic program
 - Horn clause
 - Program for scene interpretation
 - Unification of goals
 - SLD resolution
 - SLD treeFlow of satisfaction
 - Controlling back tracking using CUT

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Command use of CUT
- Implementation of backtracking using stack
- Risk of using cuts
- Fail predicate
- Application of cut-fail combination
- Replacing cut-fail by not.

Knowledge Representation Issues:

- Representations and Mappings
- Approaches to knowledge representation
- Issues of knowledge representation
- The frame problem

Unit 3: Propositional Logic

- Proposition
- Tautologies
- Theorem proving
- Semantic method of theorem proving
- Forward chaining
- Backward chaining standard theorems
- Method of substitution
- Theorem proving using Wang's algorithm.

Predicate Logic

- Alphabet of first order logic (FOL)
- Predicate
- Well-formed formula
- Clause form
- Algorithm for writing sentence into clause form
- Unification of predicates
- Unification algorithm
- Resolution Robinson's interface rule
- Scene interpretation using predicate logic.

Unit 4: Heuristic Search Techniques

- Generate and test
- Hill Climbing
- Best – first search (A*)
- Problem Reduction (AO*)
- Constraint satisfaction
- Means End Analysis.

Game Playing And Search

- Introduction Min-Max Algorithm
- Alpha-beta cut off
- Examples of games.

Expert System

- Component of an expert system
- Categories of an Expert System
- Stages in development of Expert System
- Expert System Development Tools
- Expert System Architecture

Text Books:

1. Introduction to Artificial Intelligence & Expert System by D.W. Patterson, Prentice hall of India, New Delhi

Reference Books

1. Artificial Intelligence by Rich, E & Knight K , Tata McGraw Hill Pub Co, New Delhi
2. Principles of Artificial Intelligence by Nilson, N.J. , Narosa Pub, House
3. Artificial Intelligence and Soft Computing- Behavioral and cognitive Modeling of Human Brains by A. Konar, CRC Press, USA

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Artificial Intelligence & Expert System Lab

Course Code: - UCS-330

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	30

○

LIST OF EXPERIMENTS:

1. Study of PROLOG/LISP.
2. Write a program to find a factorial of a number.
3. Write a program to the maximum of two numbers.
4. Write a program to illustrate the use of predicate not/fail.
5. To find the various relationships of a family.
6. Write a program to illustrate the procedural meaning of Prolog.
7. Medical diagnosis of Patient.
8. Write a program to solve 8 queens problem.
9. Solve any problem using breadth first search.
10. Solve any problem using depth first search.
11. Solve any problem using best first search.
12. Solve 8-puzzle problem using best first search.
13. Solve travelling salesman problem.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Advanced Database**Course Code: - UCS-349**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr**4004.0****Unit 1: Distributed databases features**

- Distributed database management systems
 - Review of Databases and computer networks
 - Levels of distribution transparency
 - Reference Architecture
 - Types of data fragmentation
 - Distributed transparency for read only
 - Applications and update applications
 - Distributed database access primitives
 - Integrity constraints

Unit 2: Distributed database design

- A frame work for distributed database design
- The design of database fragmentation
- The allocation of fragments. Translational global queries to Fragment queries
- Equivalence transformation for queries
- Transforming global queries Into fragment queries
- Distributed grouping and aggregate function evaluation
- Parametric queries.

Unit 3: Query optimization

- Problems in query optimization
- Objectives in query process Optimization
- Similar representation of queries
- Model for query optimization
- Join Query
- General queries.
- **Distributed transactions and concurrency control**
- Frame work for transaction management
- Properties and goals of transaction
- Atomicity of distributed transactions
- Recovery procedures
- Concurrency control for distributed transactions.
- Foundations of distributed concurrency control

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Distributed deadlocks
- Concurrency control based on time stamps

Unit 4: Reliability and protection

- Basic concepts
- Non-blocking commitment protocols
- Reliability and concurrency control
- Determining a consistent view of network
- Detection and resolution of inconsistency
- Check point and cold restart
- Authorization and protection
- Site to site protection
- User identification
- Authorization rules.

Text Book

1. Ceri and Pelagatti: Distributed databases principles and systems

Reference Books

1. Raghuramakrishnan: Database management system

Departmental Elective - 7

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: -Management Information System

Course Code: - UCS-380

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

**L T P Cr
4004.0**

Unit 1: Introduction

- Overview of MIS
- Structure of MIS
- Survey of information system technology**
 - H/W and S/W communication technology
 - Storage and data retrieval
 - Transaction processing
 - Office automation and information processing control functions

Unit 2: Conceptual foundations

- Decision making process
- Concepts of information
- Human information processors
- System concepts
- Concepts of planning and control
- Organizational structure and management concepts

Unit 3: Information based support systems

- Support systems for Planning & Control
- Decision making and management of knowledge work.
- Information system requirements**
 - Developing long range information plan
 - Strategies for determination of information requirements
 - Database requirements, user interface requirements.

Unit 4: Development, implementation and management of information system resources

- Developing and implementing application systems
- Quality assurance and evaluation of information systems
- Organization and management of information resources function
- Future developments and their organizational and social implications.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Text Book

1. G.B.Davis and M.H. Olson “Management Information System”
2. R.J.Murdick, Ross and Clagget “Information System for modern management”

Reference Books

1. Uma G . Gupta “Management Information System”
2. Kenneth C. Laudon “Management Information System Organisation “

Course Name: -Agile Software Development System
Course Code :-UCS-335

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
4004.0

Unit 1: Fundamentals Of Agile

- The Genesis of Agile, Introduction and background
- Agile Manifesto and Principles
- Overview of Scrum, Extreme Programming
- Feature Driven development
- Lean Software Development
- Agile project management
- Design and development practices in Agile projects
- Test Driven Development, Continuous Integration
- Refactoring, Pair Programming, Simple Design
- User Stories, Agile Testing, Agile Tools.

Unit 2 : Agile Scrum Framework

- Introduction to Scrum, Project phases
- Agile Estimation, Planning game
- Product backlog, Sprint backlog
- Iteration planning, User story definition
- Characteristics and content of user stories
- Acceptance tests and Verifying stories
- Project velocity, Burn down chart, Sprint planning and retrospective
- Daily scrum, Scrum roles – Product Owner
- Scrum Master, Scrum Team
- Scrum case study, Tools for Agile project management.

Unit 3: Agile Testing

- The Agile lifecycle and its impact on testing
- Test-Driven Development (TDD)
- X-Unit framework and tools for TDD
- Testing user stories - acceptance tests and scenarios
- Planning and managing testing cycle
- Exploratory testing, Risk based testing
- Regression tests, Test Automation
- Tools to support the Agile tester.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Unit 4: Agile Software Design And Development

- Agile design practices
- Role of design Principles including Single Responsibility Principle
- Open Closed Principle
- Liskov Substitution Principle, Interface Segregation Principles
- Dependency Inversion Principle in Agile Design
- Need and significance of Refactoring
- Refactoring Techniques
- Continuous Integration, Automated build tools
- Version control. Industry Trends Market scenario and adoption of Agile
- Agile ALM, Roles in an Agile project, Agile applicability
- Agile in Distributed teams, Business benefits
- Challenges in Agile, Risks and Mitigation
- Agile projects on Cloud, Balancing Agility with Discipline
- Agile rapid development technologies.

Text Books

1. Agile Software Development with Scrum By Ken Schawber, Mike Beedle
Publisher: Pearson.
2. Agile Software Development, Principles, Patterns and Practices By Robert C. Martin
Publisher: Prentice Hall.

Reference Books

1. Agile Testing: A Practical Guide for Testers and Agile Teams By Lisa Crispin, Janet Gregory
Publisher: Addison Wesley.
2. Agile Software Development: The Cooperative Game By Alistair Cockburn
Publisher Addison Wesley.
3. User Stories Applied: For Agile Software By Mike Cohn.

Course Name: -Software Project Management**Course Code :-UCS-389**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

**L T P Cr
4004.0****Unit 1: Conventional Software Management**

- The waterfall model
- Conventional software Management performance.

Evolution of Software Economics

- Software Economics
- Pragmatic software cost estimation

Improving Software Economics

- Reducing Software product size
- Improving software processes
- Improving team effectiveness
- Improving automation
- Achieving required quality
- Peer inspections

Unit 2: The old way and the new

- The principles of conventional software Engineering
- Principles of modern software management
- Transitioning to an iterative process

Life cycle phases

- Engineering and production stages
- Inception
- Elaboration
- Construction
- Transition phases

Artifacts of the process

- The artifact sets
 - Management artifacts
 - Engineering artifacts
 - programmatic artifacts

Unit 3: Model based software architectures

- A Management perspective and technical perspective

Work Flows of the process

- Software process workflows

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Iteration workflows
- Checkpoints of the process**

- Major mile stones
- Minor Milestones
- Periodic status assessments

Iterative Process Planning

- Work breakdown structures
- Planning guidelines
- Cost and schedule estimating
- Iteration planning process
- Pragmatic planning

➤ **Line-of-Business Organizations**

- Project Organizations
- Evolution of Organizations

Process Automation

- Automation Building blocks
- The Project Environment

Unit 4: Project Control and Process instrumentation

- The seven core Metrics
- Management indicators
- Quality indicators
- Life cycle expectations
- Pragmatic Software Metrics
- Metrics automation.

Tailoring the Process

- Process discriminants

Future Software Project Management

- Modern Project Profiles
- Next generation Software economics
- Modern process transitions

Case Study

- The command Center Processing and Display system- Replacement (CCPDS-R)

Text Books

1. Walker Royce: Software Project Management
2. Bob Hughes and Mike Cotterell: Software Project Management

Reference Books:

1. Joel Henry: Software Project Management
2. Pankaj Jalote: Software Project Management in practice

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Semester - VI

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Compiler Design**Course Code: -UCS-350**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

**L T P Cr
3103.5****Unit 1: Introduction**

- Assembler
- Linker
- Loader
- Preprocessors
- Compiler and Translators
- Structure of Compiler
- Different Phases of Compiler
- Bookkeeping, Error Handling
- Compiler Writing Tools
- Bootstrapping

Lexical Analysis

- Role of Lexical Analyser
- Design of Lexical Analyser
- Language for Specifying Lexical analyzer
- Implementation of lexical Analyser

Unit 2: Syntax Analysis

- Context-free Grammars
- Derivation and Parse trees

Basic Parsing Techniques

- Parsers
- Shift Reduce Parsing
- Operator Precedence Parsing
- Top-down Parsing
- Predictive Parsers

LR Parsers

- Canonical collection of LR (0) items
- Constructing SLR parsing tables
- Constructing canonical LR Parsing tables
- Constructing LALR Parsing tables Automatic Parser generators
- Implementation of LR parsing tables

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Unit 3: Syntax Directed Translation

- Syntax- directed translation schemes
- Implementation of syntax directed translators
- Intermediate code
- Postfix notation
- Parse trees and syntax trees
- Three address code
- Quadruples and triples
- Translation of assignment statements
- Boolean expressions
- Control statements

Symbol Tables

- The contents of a symbol table
- Data structures for symbol tables
- Representing scope information

Run Time Storage Administration

- Implementation of a simple stack allocation scheme
- Implementation of block structured languages
- Storage allocation in block- structured languages.

Unit 4: Error Detection And Recovery

- Error
- Lexical-phase errors
- Syntactic-phase errors
- Semantic errors.

Code Optimization

- The principle sources of optimization
- Loop optimization
- The DAG representation of basic blocks
- Global dataflow analysis

Code Generation

- Object programs
- Problems in code generation
- A machine model
- A Simple code generator
- Register allocation and assignment
- Code generation from DAGs
- Peephole optimization

Text Books:

1. Alfred V Aho, Monica S. Lam, Ravi Sethi, Jeffrey D Ullman- Compilers-Principles, Techniques and Tools, 2nd edition, Addison-Wesley.
2. D.M.Dhamdhare- System Programming and Operating Systems, 2nd revised edition, Tata McGraw – Hill.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Reference Books:

1. Charles N. Fischer, Richard J. leBlanc, Jr.- Crafting a Compiler with C, Pearson Education.
2. Andrew W Apple- Modern Compiler Implementation in C, Cambridge University Press.

Course Name :- Computer Peripherals and Interfaces
Course Code :-UCS-353

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
3124.5

Unit 1: SYSTEM RESOURCES

- Interrupt
- DMA Channel
- I/O Port Addresses and resolving and resolving the conflict of resources
- I/O buses
 3. ISA
 4. EISA
 5. Local bus
 6. VESA Local bus
 7. PCI bus
 8. PCI Express
 9. Accelerated graphics port bus

IDE & SCSI Interfaces

- IDE origin
- IDE Interface ATA standards ATA1 to ATA7
- ATA feature
- ATA RAID and SCSI RAID
- SCSI Cable and pin Connector pin outs
- SCSI V/s IDE Advantages and limitation.

Unit 2: Video Hardware

- Video display technologies
- DVI Digital signals for CRT Monitor
- LCD Panels
- Video adapter types
- Integrated Video/ Motherboard chipset
- Video RAM
- Video driver and multiple Monitor
- Graphic accelerators
- Advanced 3D Technologies
- TV Tuner and Video Capture upgrades troubleshooting Video Cards and Drivers.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Unit 3: I/O Interfaces

- I/O Interfaces from USB and IEEE1394I/O Interface from serial and Parallel to IEEE1394 and USB 961
- Parallel to SCSI converter
- Testing of serial and parallel port
- USB Mouse/ Keyboard Interfaces.

Unit 4: Input/ Output Driver software aspects

- Role of device driver DOS and UNIX/ LINUX device drivers.
- Design & Integration of Peripheral devices to a computer system as a Case Study
- Future Trends
- • Detailed Analysis of recent Progress in the Peripheral and Bus systems
- Some aspects of cost Performance analysis while designing the system

Text Books:

1. P. Pal Chandhari “Computer Organization and design”
2. Del Corso, H.Kirman, JD Nicond “Microcomputer buses & links”

Reference Books:

1. Mark Mines “Complete PC upgrade & maintenance guide”
2. Craig Zacker & John Rouske “PC Hardware: The complete reference”
3. Scott Mueller “Upgrading and Repairing PCs”ation.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name :- Computer Peripherals and Interfaces Lab
Course Code :-UCS-353

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from thr given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	30

LIST OF EXPERIMENTS:

1. To check and measure various supply voltages of PC.
2. To make comparative study of motherboards.
3. To observe and study various cables, connections and parts used in computer communication.
4. To study various cards used in a system viz. display card, LAN card etc.
5. To remove, study and replace floppy disk drive.
6. To remove, study and replace hard disk.
7. To remove, study and replace CDROM drive.
8. To study monitor, its circuitry and some elementary fault detection.
9. To study printer assembly and elementary fault detection of DMP and laser printers.
10. To observe various cables and connectors used in networking.
11. To study parts of keyboard and mouse.
12. To assemble a PC.
13. Troubleshooting exercises related to various components of computer like monitor, drives, memory and printers etc.
14. Partitioning of Hard Disk.
15. Hard Disk Formatting and its maintenance.
16. To study SMPS.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Data Warehousing & Data Mining
Course Code: -UCS-356

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
3103.5

Unit 1: Introduction to Data Warehousing

- Data Warehousing
 - Definition and characteristics
 - Need for data warehousing
 - DBMS vs. data warehouse
 - OLAP
 - Overall Architecture
- Data Warehouse Database
- Sourcing
- Acquisition
- Cleanup and Transformation Tools
- Metadata Access Tools, Data Marts

Introduction to Data Mining

- Data mining
 - Data mining functionalities
 - Kinds of patterns can be mined
 - Classification
 - Major issues
 - Functionalities
 - Classification data mining systems
- Multidimensional data model
 - Data cubes
 - Schemas for multidimensional databases
- OLAP operations
- Metadata

Unit 2: Data Pre-Processing

- Data cleaning
- Data Integration and Transformation Data Reduction, Discretization and concept hierarchy generation
- Data mining primitives
- Data mining Task
- A data mining query language
- Architecture of Data mining systems
- Characterization and comparison

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Concept Description

- Data mining techniques
- Concept description attribute oriented induction
- Analytical characterization
- Mining class comparisons
- Mining descriptive statistical measures

Unit 3: Association Rule Mining

- Mining single dimensional
- Boolean association rules from transactional databases
- Apriori algorithm, efficiency
- Mining rules without candidate generation
- Mining multilevel association rules from transaction databases mining multidimensional association rules from Relational databases and Data warehouses
- From association mining to correlation analysis
- Constraint based association mining

Unit 4: Applications and Trends in Data Mining

- Data mining system products and Research prototypes
- Additional themes on Data mining
- Social Impacts of Data Mining
- Trends in Data mining
- Realization to data mining using SQL Server
- Case studies in building business environment
- Application of data ware housing
- Data mining in Government
- National Data ware houses and case studies
- Commercial Importance of DW
- Applications of data mining
- data mining in business process
- embedded data mining

Text Books

1. Jiawei Han & Micheline Kamber: Data Mining –Concepts & Techniques
2. Alex Berson : Data Warehousing, Data Mining and OLTP

Reference Books:

1. Sam Anahory & Dennis Murray: Data Warehouseing in the Real World
2. Pieter Adrians, Dolf Zantinge: Data Mining

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: -Statistical Methods
Course Code: - UMA-351

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
3103.5

Unit 1:

Introduction: Theory of probability, probability concepts, random experiment and events, Mathematical Notion, probability function, law of addition of probability, extension of general law of addition of probabilities, multiplication law of probability and conditional probability, extension of multiplication law of probability, probability of occurrence of n independent events, independent events, conditions for mutual independence of n events, Bayes theorem.

Unit 2:

Random Variables and Distribution Functions: Random variable, distribution function, discrete random variable, probability mass function, discrete distribution function, continuous random variable, probability density function, various measures of central tendency, dispersion, skewness and kurtosis for continuous distribution, continuous distribution function

Unit 3:

Discrete Distribution, Bernoulli Distribution, binomial distribution, fitting of binomial distribution, Poisson distribution, the Poisson process, probability generating function of Poisson distribution, fitting of Poisson distribution, Normal distribution as a limit of binomial

Inferential statistics: Sampling, Sampling distribution, theory of estimation, hypothesis testing, z-test, student t - test, f- test, chi square test.

Unit 4:

Measures of Central Tendency: Central tendency, arithmetic mean, median & mode.

Measures of Dispersion: Meaning of dispersion, range, mean deviation, standard deviation, quartile derivation, measures of relative dispersion

Text Books:

1. Introduction to mathematical statistics Hogg and Craig Prentice Hall
2. Probability & Statistics with Reliability, Queuing, and Computer Science Application
Kishore S. Trivedi Prentice Hall

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Reference Books:

1. Fundamentals of Statistics A.M. Goon, M.K. Gupta & B. Dasgupta The World Press Pvt. Ltd
2. Inequalities theory application and measurements J.N. Kapoor Mathematical Sciences Trust Society.
3. Operational Research Kanti Swarup, P.K. Gupta, Manmohan Sultan Chand and Sons
4. Fundamentals of Mathematics Statistics S.C. Gupta and V.K. Kapoor Sultan Chand & Sons

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Departmental Elective- 9

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Computer Graphics**Course Code: - UCS-351**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

**L T P Cr
3124.5****Unit 1: Introduction to computer graphics & graphics systems**

- Introduction to Computer Graphics
- Computer Graphics Applications
- Computer Graphics Hardware and software
- Video Display Devices
 - Refresh cathode- ray tube
 - raster scan displays
 - random scan displays
 - color CRT-monitors
 - direct view storage tube
 - flat-panel display
 - 3D viewing devices
- Raster scan systems
- Random scan systems
- Graphics monitors and workstations.

Two dimensional Graphics Primitives

- Points and Lines
- Line drawing algorithms
- DDA, Bresenham's
- Circle drawing algorithms
- Using polar coordinates
- Bresenham's circle drawing
- Midpoint circle drawing algorithm

Filled area algorithms

- Scanline
- Polygon filling algorithm
- Boundary filled algorithm

Unit 2: Two/Three Dimensional Viewing

- The 2-D viewing pipeline
- Windows

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Viewports
- Window to view port mapping
- Clipping point
- Clipping line (algorithms)
- 4 bit code algorithm
- Sutherland-cohen algorithm

Polygon clipping algorithm

- Sutherland-Hodgeman polygon clipping algorithm

Two dimensional transformations

- Transformations
- Translation
- Scaling
- Rotation
- Reflection
- Composite transformation

Three dimensional graphics concept

- Matrix representation of 3-D Transformations
- Composition of 3-D transformation

Viewing in 3D

- Projections
- Types of projections
- The mathematics of planner geometric projections

Unit 3: Curves

Curve representation

- Surfaces
- Designs
- Bezier curves
- B-spline curves
- End conditions for periodic B-spline curves
- Rational B-spline curves

Hidden surfaces

- Depth comparison
- Z-buffer algorithm
- Back face detection
- BSP tree method
- The Painter's algorithm
- Scan-line algorithm
- Hidden line elimination
- Wire frame methods

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Fractal - geometry

Color & shading models

- Illumination
- Shading
- Image manipulation
- Illumination models
- Shading models for polygons
- Shadows
- Transparency

Unit 4: Multimedia

- Introduction to Multimedia
- Uses of multimedia
- Hypertext and hypermedia
- Image
- Video and audio standards

Audio

- Digital audio
- MIDI
- Processing sound
- Sampling
- Compression.

Video

- MPEG compression standards
- Compression through spatial and temporal redundancy
- Inter-frame and intra-frame compression
- Overview of other image file formats GIF, TIFF, BMP, PNG etc.

Animation

- Types
- Techniques
- Key frame animation
- Utility
- Morphing
- Virtual Reality concepts

Text Books:

1. David F Rogers “Procedural Elements for Computer Graphics”
2. Foley, Vandam, Feiner & Huges “Computer Graphics Principles and Practice”
3. Z. Xiang, R. Plastock “Schaum’s outlines Computer Graphics”

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Reference Books:

1. Donald Hearn and M Pauline Baker “Computer Graphics C Version”
2. Buford J. K “Multimedia Systems”

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Computer Graphics Lab**Course Code: - UCS-351**

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	30

LIST OF EXPERIMENTS:

1. Introduction to Computer Graphics and devices used in graphics
2. WAP to draw line using various line functions.
3. Draw a line using DDA/ Brehensam Algorithm.
4. Write a program to draw a rectangular pattern.
5. Construct a circle using Midpoint/Brehensam's algorithm.
6. WAP to draw an ellipse using midpoint algorithm.
7. WAP for polygon filing.
8. Study of Photoshop and tools used in it.
9. How to edit the picture in Photoshop using marquee, move, larso, clone stamp tool.
10. Editing image using dodge, blur and sponge tool text and notes tools.
11. Introduction to flash and how to move any object from one end to other.
12. Moving any character around the screen

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Multimedia**Course Code: - UCS-398**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
3124.5

Unit 1: Introduction:

- Multimedia and its types
- Introduction to Hypermedia
- Hyper Text, Multimedia
- Systems and their Characteristics,
- Challenges, Desirable Features, Components and Applications,
- Trends in Multimedia. Multimedia Systems Technology ,Multimedia Hardware devices
- Multimedia software development tools, Multimedia Authoring Tools
- Multimedia Standards for Document
- Architecture,SGML, ODA
- Multimedia Standards for Document interchange,
- MHEG, Multimedia Software for different media.

Unit 2 : Storage Media:

- Magnetic and Optical Media
- RAID and its levels, Compact Disc and its standards
- DVD and its standards, Multimedia Servers.

Audio: Basics of Digital Audio

- Application of Digital Audio
- Digitization of Sound, Sample Rates and Bit Size,
- Nyquist's Sampling Theorem Typical Audio Formats Delivering Audio over a Network
- Introduction to MIDI (Musical Instrument Digital Interface) Components of a MIDI S system
- Hardware Aspects of MIDI
- MIDI Messages. Audio Compression
- Simple Audio Compression Methods
- Psychoacoustics, MPEG Audio Compression.

Unit 3: Basics Of Compression:

- Classifying Compression Algorithms, Lossless Compression
- Algorithms, Entropy Encoding,
- Run-length Encoding, Pattern Substitution, Basics of Information theory

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Huffman Coding, Adaptive Huffman Coding, Arithmetic Coding, Lempel Ziv-Welch (LZW) Algorithm, Source Coding.

Unit 4: Techniques:

- Transform Coding,
- Frequency Domain Methods, Differential Encoding.
- Image and Graphics Compression: Colour in Images,
- Types of Colour Models, Graphic/Image File Formats: TIFF, RIFF
- BMP, PNG, PDF, Graphic/Image Data, and JPEG Compression, GIF Compression.

Video Compression:

- Basics of Video, Video Signals, Analog Video,
- Digital Video, TV standards, H. 261 Compression,
- Intra Frame Coding, Inter-frame (P-frame) Coding,
- MPEG Compression,
- MPEG Video, The MPEG Video Bitstream,
- Decoding MPEG Video in Software.
- Building Communication network, Application Subsystem,
- Transport Subsystem, QOS,
- Resource Management, Distributed Multimedia Systems.

Text Books:

1. Ralf Steinmetz and Klara, Nahrstedt, "Multimedia Computing Communications and Applications" Pearson Educations.

Reference Books:

1. Parag Havaldar, Gerard Medioni, "Multimedia Systems Design", PHI, Latest Edition

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Multimedia Lab
Course Code: - UCS-398

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	30

LIST OF EXPERIMENTS:

1. Procedure to create an animation to represent the growing moon.
2. Procedure to create an animation to indicate a ball bouncing on steps.
3. Procedure to simulate movement of a cloud
4. Procedure to draw the fan blades and to give proper animation.
5. Procedure to display the background given (filename: tulip.jpg) through your name.
6. Procedure to simulate a ball hitting another ball.
7. Procedure to create an animated cursor using `startdrag("ss", true); mouse.hide();`
8. Procedure to design a visiting card containing atleast one graphic and text information.
9. Procedure to take a photographic image. Give a title for the image. Put the border. Write your names. Write the name of institution and place.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Cyber Security**Course Code: - UCS-377**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
4004.0

Unit-1

Introduction to information systems, Types of information Systems, Development of Information Systems, Introduction to information security, Need for Information security, Threats to Information Systems, Information Assurance, Cyber Security, and Security Risk Analysis.

Unit-2

Application security (Database, E-mail and Internet), Data Security Considerations-Backups, Archival Storage and Disposal of Data, Security Technology-Firewall and VPNs, Intrusion Detection, Access Control.

Security Threats -Viruses, Worms, Trojan Horse, Bombs, Trapdoors, Spoofs, E-mail viruses, Macro viruses, Malicious Software, Network and Denial of Services Attack, Security Threats to E-Commerce- Electronic Payment System, e• Cash, Credit/Debit Cards. Digital Signature, public Key Cryptography.

Unit-3

Developing Secure Information Systems, Application Development Security, Information Security Governance & Risk Management, Security Architecture & Design.

Security Issues in Hardware, Data Storage & Downloadable Devices, Physical Security of IT Assets, Access Control, CCTV and intrusion Detection Systems, Backup Security Measures.

Unit-4

Security Policies, Why Policies should be developed, WWW policies, Email Security policies, Policy Review Process-Corporate policies-Sample Security Policies, Publishing and Notification Requirement of the Policies.

Information Security Standards-ISO, IT Act, Copyright Act, Patent Law, IPR. Cyber Laws in India ; IT Act 2000 Provisions, Intellectual Property Law: Copy Right Law, Software License, Semiconductor Law and Patent Law.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Text Books:

1. P. Pfleeger, Shari Lawrance Pfleeger, “Analysing Computer Security ”, Pearson Education India.
- 2.V.K. Pachghare, “Cryptography and information Security”, PHI Learning Private Limited, Delhi India.

Reference Books:

1. Dr. Surya Prakash Tripathi, Ritendra Goyal, Praveen Kumar Shukla ,”Introduction to Information Security and Cyber Law” Willey Dreamtech Press.
2. Schou, Shoemaker, “ Information Assurance for the Enterprise”, Tata McGraw Hill.
3. Chander, Harish,” Cyber Laws And It Protection ” , PHI Learning Private Limited ,Delhi ,India

Departmental Elective - 10

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Parallel Computing**Course Code: - UCS-397**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

**L T P Cr
4004.0****Unit 1: Scalability And Clustering**

- Evolution of Computer Architecture
- Dimensions of Scalability
- Parallel Computer Models
- Basic Concepts Of Clustering
- Scalable Design Principles
- Parallel Programming Overview
 - Processes
 - Tasks and Threads
 - Parallelism Issues
 - Interaction / Communication Issues
 - Semantic Issues in Parallel Programs.

Unit 2: Enabling Technologies

- System Development Trends
- Principles of Processor Design
- Microprocessor Architecture Families
- Hierarchical Memory Technology
- Cache Coherence Protocols
- Shared Memory Consistency
- Distributed Cache Memory Architecture
- Latency Tolerance Techniques
- Multithreaded Latency Hiding.

Unit 3: System Interconnects

- Basics of Interconnection Networks
- Network Topologies and Properties
 - Buses, Crossbar and Multistage Switches
 - Software Multithreading
 - Synchronization Mechanisms.

Unit 4: Parallel Programming

- Paradigms And Programmability

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Parallel Programming Models
- Shared Memory Programming

Message Passing Programming:

- Message Passing Paradigm
- Message Passing Interface
- Parallel Virtual Machine.

Text Books:

1. Kai Hwang and Zhi. Wei Xu: Scalable Parallel Computing
2. Michael J. Quinn: Parallel Computing Theory and Practice

Reference Books:

1. Ananth Grama, Anshul Gupta, George Karypis, Vipin Kumar: Introduction to Parallel computing

Course Name: - Information Storage and Management**Course Code: - UCS-396**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

**L T P Cr
4004.0****Unit 1: Introduction to Information Storage and Management**

- Data
 - Types of Data
- Information Storage
 - Evolution of Storage Technology and Architecture
- Data Center Infrastructure- Core Elements
- Key Requirements for Data Center Elements
- Managing Storage Infrastructure
- Key Challenges in Managing Information
- Information Life Cycle

Storage System Environment:

- Components of SSE
- Host
- Connectivity
- Storage
- Disk Drive Components
- Performance
- Fundamental Laws Governing Disk Performance
- Logical Components of Host
- OS
- Device Driver
- Volume Manager
- File System
- Application

Data Protection

- RAID
- RAID Array Components
- RAID Levels
- RAID Comparison
- RAID Impact on Disk Performance
- Hot Spares

Intelligent Storage System

- Components

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Unit 2: Direct- Attached Storage

- Types of DAS
- Benefits and Limitation

Introduction to SCSI

- Evolution
- Interfaces
- Architecture and Addressing
- SCSI Command Model

Storage Area Networks

- Fiber Channel
- SAN and its evolution
- Components of SAN
- FC Connectivity
- FC Ports
- FC Architecture
- Zoning
- FC Login Types
- FC Topologies.

Network-Attached Storage

- General Purpose Servers Vs. NAS Devices
- Benefits NAS File I/O
- Components of NAS NAS File Sharing Protocols
- Performance and availability
- ISCSI and FCIP (overview)

Content-Addressed Storage

- Features & Benefits of CAS
- CAS Architecture
- Storage & Retrieval.

Storage Virtualizations

- Forms
- SNIA SV Taxonomy
- SV Configurations and Challenges

Unit 3: Introduction to Business Continuity

- Information Availability BC Planning Lifecycle
- Failure and Impact Analysis

Backup and Recovery

- Backup Purpose
- considerations Granularity Methods Process
- Topologies
- Backup and Restore Operations
- Recovery Considerations
- Backup Technologies

Local Replication

- Source and Target
- Local Replicas
- Data Consistencies

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Local Replication Technologies
- Creating Multiple Replicas
- Management Interface
- Remote Replication (Modes & Technologies)
- DWDM
- SONET

Unit 4: Securing the Storage Infrastructure

- Storage Security Framework
- Risk Triad
- Storage Security Domains
- SAN
- NAS and IP SAN

Managing The Storage Infrastructure

- Monitoring the Storage Infrastructure
- Storage Management Activities
- Challenges in Storage Infrastructure Management

Text & Reference Books:

1. G. Somasundaram and Alok Shrivastava “Information Storage and Management”

SEMESTER VII

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Python
Course Code: - UCS-400

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
3124.5

Unit 1:

- Introduction to Objects & Python's Math Library
- Understanding variables and basic operations on number and string data,
- Dealing with basics of math library (pow, sqrt, round, exp, pi, ceil, floor), displaying strings and numbers
- While statement.
- String Object Methods:
 - understanding string methods like
 - upper(),
 - lower(),
 - isdigit(),
 - isalnum(),
 - startswith(),
 - join(),
 - count(),
 - strip()
 - exploring string iterations,
- Basic if statement
- Number Object Operations:
- Working with number literals,
- Dealing with hexadecimal,
- Octal and binary numbers,
- Basic arithmetic operations,
- Mix type conversion,
- Integer to float and float to integer conversion,
- Formatting Numbers

Unit 2: List Object:

- Creating empty list,
- Initializing list,
- List indexing and slicing operations,
- Input method,
- Single and multidimensional arrays,
 - isalpha(),

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- `isnumeric()`,
- `split()`,
- `endswith()`,
- Generating range based lists,
- Nested lists.
- Introduction to Dictionaries:
 - Creating empty dictionaries
 - Initializing dictionaries,
 - Accessing dictionary items,
 - Merging and deletion.
 - Understanding dictionary specific methods
 - Dictionary comprehension.
- Exploring Statements and Syntax:
 - Iterations
 - Branching,
 - Assignment statement
 - Expression statement
 - Exploring print method

Unit 3: Introduction to Python Modular Programming:

- Declaring and calling user defined methods
- Recursive calls
- Returning multiple values via return statement
- Understanding local and global scopes
- Argument passing techniques (normal arguments: matched by position, keyword arguments: matched by name, default arguments, Using * and ** during calling time and receiving time.
- Object-Oriented Programming In Python:
 - Creating classes,
 - Objects,
 - Attributes,
 - Classes v/s dictionaries,
 - Constructors and idea of inheritance.

Unit 4: GUI Programming:

- Understanding and Installing PyQt4 and QT Designer Interface,
- Using GUI controls like push-buttons
- Text-boxes
- Radio buttons
- Checkboxes
- Labels
- Managing resource files
- Combo boxes
- List boxes
- Menu's and sub menu's
- Calendar control and other controls

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Understanding signal and slots
- Dealing with PyQt4 event handling mechanism.
- Push button events,
- checkbox and radio button events,
- menu events,
- Combo box and list box events etc.

Text Books:

1. Lutz, Mark. Learning Python. "O'Reilly Media, Inc.", 2013.
2. Barry, Paul. Head first Python. "O'Reilly Media, Inc.", 2010.

Reference Books:

1. Swaroop, C. H. "A Byte of Python." Enllaç web (2003).

Course Name: - Python Lab
Course Code: - UCS-400

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	30

LIST OF EXPERIMENTS:

1. Using for loop, print a table of Celsius/Fahrenheit equivalences. Let c be the Celsius temperatures ranging from 0 to 100, for each value of c, print the corresponding Fahrenheit temperature.
2. Using while loop, produce a table of sines, cosines and tangents. Make a variable x in range from 0 to 10 in steps of 0.2. For each value of x, print the value of sin(x), cos(x) and tan(x).
3. Write a program that reads an integer value and prints “leap year” or “not a leap year”.
4. Write a program that takes a positive integer n and then produces n lines of output shown as follows. For example enter a size: 5

```
*
**
***
****
*****
```
5. Write a function that takes an integer input and calculates the factorial of that number.
6. Write a function that takes a string input and checks if it's a palindrome or not.
7. Write a list function to convert a string into a list, as in list ('abc') gives [a, b, c].
8. Write a program to generate Fibonacci series.
9. Write a program to check whether the input number is even or odd.
10. Write a program to compare three numbers and print the largest one.
11. Write a program to print factors of a given number.
12. Write a method to calculate GCD of two numbers.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Departmental Elective - 11

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Distributed Operating System
Course Code: -UCS-463

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
4004.0

Unit 1: Introduction:

- Introduction to Distributed System
- Goals of Distributed system
- Hardware and Software concepts
- Design issues
- Communication in distributed system
- Layered protocols, ATM networks
- Client Server model
- Remote Procedure Calls and Group Communication
- Middleware and Distributed Operating Systems

Unit 2: Synchronization in Distributed System

- Clock synchronization
- Mutual Exclusion
- Election algorithm
- The Bully algorithm,
- Ring algorithm, Atomic Transactions
- Deadlock in Distributed Systems
- Distributed Deadlock Prevention
- Distributed Deadlock Detection.

Processes and Processors in distributed systems

- Threads
- System models,
- Processors Allocation
- Scheduling in Distributed System
- Real Time Distributed Systems

Unit 3: Distributed file systems

- Distributed file system Design
- Distributed file system Implementation
- Trends in Distributed file systems.
- Distributed Shared Memory
- What is shared memory
- Consistency models
- Page based distributed shared memory

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.



Shared variables distributed shared memory.

Unit 4: Case study



MACH



Introduction to MACH



Process management in MACH



Communication in MACH



UNIX emulation in MACH

Text Books:

1. Andrew S.Tanenbaum: Distributed Operating System

Reference Books:

1. P.K. Sinha : Distributed operating system

Course Name: - Cryptography and Network Security
Course Code: - UCS-401

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
3103.5

Unit 1: Introduction

- OSI Security Architecture
- Classical Encryption techniques
- Cipher Principles
- Data Encryption Standard
- Block Cipher Design Principles
- Modes of Operation
- Evaluation criteria for AES
- AES Cipher
- Triple DES
- Placement of Encryption Function
- Traffic Confidentiality.

Unit 2: Key Management

- Diffie-Hellman key Exchange
- Elliptic Curve Architecture and Cryptography
- Introduction to Number Theory
- Confidentiality using Symmetric Encryption
- Public Key Cryptography
- RSA

Unit 3 : Authentication And Hash Function

- Authentication requirement
- Authentication functions
- Message Authentication Codes
- Hash Functions
- Security of Hash Functions and MACs
- MD5 message Digest algorithm
- Secure Hash Algorithm
- RIPEMD ,
- HMAC Digital Signatures
- Authentication Protocols
- Digital Signature Standard.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Unit 4: Network Security

- Authentication Applications
- Kerberos
- X.509 Authentication Service
- Electronic Mail Security
- PGP
- S/MIME
- IP Security
- Web Security
- System Level Security
- Intrusion detection
- Password management
- Viruses and related Threats
- Virus Counter measures
- Firewall Design Principles
- Trusted Systems

Text Books:

1. Principles of Information Security by Michael EWhitman & Herbert J. Mattord, Vikash Publishing House.
2. Cryptography and Network Security by William Stalling, Pearson Education

Reference Books:

1. Security in Computing by Charles P. Pfleeger , PRENTICE HALL OF INDIA
2. Inside Internet Security by Jeff Crume, Addison Wesley

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Cloud Computing
Course Code: - UCS-499

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
4 0 0 4

Unit-1**Cloud Computing Basics**

Cloud Computing Overview; Characteristics; Applications; Internet and Cloud; Benefits; Limitations; Challenges; Cloud Computing Reference Architecture; Architectural Components; Cloud Computing Services and Deployment Models.

Unit-2**Abstraction and Virtualization**

Virtualization, Types of virtualization; Hardware Virtualization - full, partial, paravirtualization; Software Virtualization ; Memory Virtualization; Storage Virtualization; Data Virtualization; Network Virtualization; Nested Virtualization; Hypervisor- Type-1, Type-2; Hyperjacking.

Cloud Storage

Cloud Storage – managed, unmanaged; Storage as a Service; Cloud Storage issues and challenges; Creating cloud storage system; Virtual storage containers; SAN, NAS, SAN vs. NAS

Unit-3**SMAC**

SMAC-Social Media, Mobility, Analytics and Cloud; Big Data, Introduction to Hadoop, Map Reduce; Map Reduce steps

Cloud Security

Cloud security issues and challenges; cloud security controls, dimensions of cloud security, Security and privacy, identity management, physical security, confidentiality, access controllability, integrity, Migration to cloud-issues, approaches

Unit-4**Mobile Cloud Computing**

Overview of Mobile Cloud Computing, Advantages, Challenges, Using Smartphones with the Cloud, Offloading techniques - their pros and cons, Mobile Cloud Security

Cloud Computing Platforms

Introduction to cloud platforms: Google Cloud Platform – Google Compute Engine, Google App Engine, BigTable, BigQuery, Amazon Web Services, Microsoft Azure, IBM Bluemix, features of important cloud platforms.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Text Books:

1. Cloud Computing: A Practical Approach by Velte, McGraw Hill

Reference Books:

1. Notes and PPTs shared by the instructor.

Course Name: - Mobile Databases**Course Code: - UCS-455**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr**4 0 0 4.0****Unit 1: Mobile Database**

- Introduction
- Fully Connected Information Space
- Types of Mobility
- Fundamentals of Database Technology
- Conventional Database
 - Architecture, Database Processing
 - Serialization of Transaction
 - Advanced Transaction Model

Unit 2: Concurrency Control Mechanism

- Introduction,
- Ways of locking data items.
- The Phantom Problem,
- Multi granularity locking,
- Heuristics approach in locking scheme,
- Non locking based schemes.
- Data Processing and Mobility
 - Introduction
 - Effect of mobility on the management of data
 - Data Categorization
 - Location dependent data distribution

Unit 3: Transaction management in Mobile Database systems

- Mobile Database systems
- Transaction execution in MDS
- Mobile Transaction Model
- Execution model on ACID transaction framework
- Pre-write transaction execution model
- Data consistency in intermittent connectivity

Unit 4: Mobile database Recovery

- Introduction
- Log Management in Mobile Database systems

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

➤ Mobile database recovery scheme

Text Books:

- 1 Kumar Vijay: Mobile Database Systems

Reference Books:

1. Course Notes by the Instructor

Departmental Elective - 12

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Unix Linux Administration**Course Code: - UCS-402**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr**3 1 2 4.5****Unit 1: Introduction**

- Introduction to Multi-user System
- Emergency and history of Unix
- Feature and benefits
- Versions of UNIX.
- System Structure:
 - Hardware requirements
 - Kernel and its function
 - Introduction to system calls and Shell.
 - File System
 - Feature of Unix File System
 - Concept of i-node table
- Links
- Commonly used commands like who, pwd, cd, mkdir, rm, ls, mv, lp, chmod, cp, grep, sed, awk, pr, lex, yacc, make, etc.
- Getting started (login / logout)
- File system management
- File operation
- System calls
- Buffer cache.
- Vi Editor
 - Intro to text processing
 - Command and edit mode
 - Invoking vi
 - Command structure
 - Deleting and inserting line
 - Deleting and replacing character
 - Searching strings
 - Yanking
 - Running shell command
 - Command macros
 - Set windows
 - Set auto indent

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Set number
- Intro to excr file

Unit 2: Shell Programming

- Introduction to shell feature
- Wild card characters
- I/Out redirections
- Standard error redirection
- System and user created shell variables
- Profile files and pipes/tee
- Background processing
- Command line arguments
- Command substitution
- Read statement
- Conditional execution of commands
- Special shell variables \$ #, #?, \$* etc.
- Shift commands
- Loops and decision making- for, while and until
- Choice making using case...esac
- Decision making iffi
- Using test
- String comparison
- Numerical comparison
- Logical operation.
- Introduction to Shell :
 - Features
 - Changing the login shell
 - Cshrc
 - Login
 - Logout files
 - Setting environment
 - Variables
 - History and alias mechanism
 - Command line arguments
 - Redirection/appendng safely
 - Noclobber
 - Noglob
 - Ignore eof
 - Directory stacks (pushd, popd)
 - Feature of other shell (rsh, vsh).

Unit 3: Process Control

- Process management
- Process states and transition
- Regions and control of process

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Sleep and waking
- Process creation,
- Process killing
- Signals
- System boot and init process
- Traps
- Setting process priorities.
- Inter-process Communication
 - I/O Sub system
 - Terminal drives
 - Disk drive
 - Messages
 - Shared memory
 - Semaphores
 - Memory management
 - Swapping
 - Demand paging
- SystemCalls and Unix -C Interface
- File handling calls like - access (), open(), create(), read(), write(), close(), fseek()
- Process control systemcalls like kill(), exec(), fork(), wait(), signal(), exit()
- Comparing stdio library and calls

Unit 4: System Administration

- Process and Scheduling
- Security
- Basic System Administration
 - Adding a User
 - User Passwords
 - Delete of a User
 - Adding a Group
 - Deleting a Group
 - Super User
 - Startup and Shutdown
- Advanced System Administration
 - Managing Disk Space
 - Backup and Restore
 - Managing System Services.
- Xwindows: Introduction to Xwindows concept
- Introduction to Linux
 - Evolution of Linux
 - Red Hat Linux
 - Linux Installation and LILO
 - System Configuration
 - Gnome Desktop
 - K Desktop

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- X-configurator
- The X window system and window managers
- Shell Operations
- Linux File Structure

Text Books:

1. Design of Unix Operating System by Maurice Bach
2. Advanced Unix by Stephan Prata
3. The Unix Programming Environment by Kennighan and Pike

Reference Books:

1. Unix Programmers Guide by P. P. Selvester
2. Introduction to Unix System by Rachell Morgan

Course Name: - Unix Linux Administration
Course Code: - UCS-402

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	30

LIST OF EXPERIMENTS:

1. Session -1

- Log into the system
- Use vi editor to create a file called myfile.txt which contains some text.
- Correct typing errors during creation.
- Save the file
- Logout of the system

2. Session-2

- Log into the system
- Open the file created in session 1
- Add some text
- Change some text
- Delete some text
- Save the Changes
- Logout of the system

3. Use the cat command to create a file containing the following data. Call it mytable use tabs to separate the fields.

```
1425 Ravi 15.65
4320 Ramu 26.27
6830 Sita 36.15
1450 Raju 21.86
```

- Use the cat command to display the file, mytable.
- Use the vi command to correct any errors in the file, mytable.
- Use the sort command to sort the file mytable according to the first field. Call the sorted file my table (same name)
- Print the file mytable
- Use the cut and paste commands to swap fields 2 and 3 of mytable. Call it my table
- Print the new file, mytable
- Logout of the system.

4 Login to the system

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Use the appropriate command to determine your login shell
- Use the /etc/passwd file to verify the result of step b.
- Use the who command and redirect the result to a file called myfile1. Use the more command to see the contents of myfile1.

- Use the date and who commands in sequence (in one line) such that the output of date will display on the screen and the output of who will be redirected to a file called myfile2. Use the more command to check the contents of myfile2.

5 Write a sed command that deletes the first character in each line in a file.

- Write a sed command that deletes the character before the last character in each line in a file.
- Write a sed command that swaps the first and second words in each line in a file.

6 Pipe your /etc/passwd file to awk, and print out the home directory of each user.

- Develop an interactive grep script that asks for a word and a file name and then tells how many lines contain that word Repeat Part using awk

7 Write a shell script that takes a command line argument and reports on whether it is directory, a file, or something else.

- Write a shell script that accepts one or more file name as arguments and converts all of them to uppercase, provided they exist in the current directory.
- Write a shell script that determines the period for which a specified user is working on the system.

8 Write a shell script that accepts a file name starting and ending line numbers as arguments and displays all the lines between the given line numbers.

- Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.

9 Write a shell script that computes the gross salary of an employee according to the following rules:

- If basic salary is < 1500 then HRA =10% of the basic and DA =90% of the basic.
- If basic salary is >=1500 then HRA =Rs500 and DA=98% of the basic

The basic salary is entered interactively through the key board.

- Write a shell script that accepts two integers as its arguments and computers the value of first number raised to the power of the second number.

10 Write an interactive file-handling shell program. Let it offer the user the choice of copying, Removing, renaming, or linking files. Once the user has made a choice, have the program ask the user for the necessary information, such as the file name, new name and so on.

- Write shell script that takes a login name as command line argument and reports when that person logs in.
- Write a shell script which receives two file names as arguments. It should check whether the two file contents are same or not. If they are same then second file should be deleted.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- 11 Write a shell script that displays a list of all the files in the current directory to which the User has read, write and execute permissions.
- Develop an interactive script that ask for a word and a file name and then tells how many times that word occurred in the file.
 - Write a shell script to perform the following string operations:
 - i) To extract a sub-string from a given string.
 - ii) To find the length of a given string.
- 12 Write a C program that takes one or more file or directory names as command line input and reports the following information on the file:
- File type
 - Number of links
 - Read, write and execute permissions
 - Time of last access
- 13 Write C programs that simulate the following unix commands:
- mv
 - cp
14. Write a C program that simulates ls Command

Course Name: - Information Retrieval**Course Code: - UCS-409**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
4 0 0 4.0

Unit 1: Introduction

- Introduction to Information Retrieval
- Inverted indices
- Boolean queries
- Query optimization
- Nature of unstructured and semi-structured text.
- The term vocabulary and postings lists
- Text encoding
- Tokenization
- Stemming
- Emmatization
- Stop words
- Phrases
- Optimizing indices with skip lists
- Proximity and phrase queries\
- Positional indices.

Unit 2: Dictionaries and tolerant retrieval

- Dictionary data structures
- Wild-card queries
- Permuterm indices
- N-gram indices
- Spelling correction and synonyms
- Edit distance
- Soundex
- Language detection.
- Index construction
- Postings size estimation
- Sort-based indexing
- Dynamic indexing

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Positional indexes
- N-gram indexes
- Distributed indexing
- Real-world issues

Unit 3: Scoring

- Term weighting and the vector space model
- Parametric or fielded search
- Document zones
- The vector space retrieval model.
 - tf.idf weighting
- The cosine measure
- Scoring documents.
- Computing scores in a complete search system
 - Components of an IR system
 - Efficient vector space scoring
 - Nearest neighbor techniques
 - Reduced dimensionality approximations
 - Random projection.

Unit 4 : Classification:

- Naive Bayes model
- Spam filtering
- K Nearest Neighbors
- Decision Trees
- Support vector machine classifiers.
- Web Crawling
 - What makes the web different?
 - Web search overview
 - Web structure,
 - The user,
 - Paid placement
 - Search engine optimization
 - Web size measurement
 - Crawling and web indexes
 - Near-duplicate detection,
 - Link analysis
 - Learning to rank
 - Focused web crawler and its different architectures

Text Book:

1. Introduction to Information Retrieval by C. Manning, P. Raghavan, and H. Schütze , Cambridge University Press,2008

Reference Books:

1. Modern Information Retrieval by R. Baeza-Yates, B. Ribeiro-Neto , Addison-Wesley

Departmental Elective - 13

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Machine Learning**Course Code: -UCS-403**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
3 124.5

Unit-1**Introduction To Machine Learning**

Examples of Machine Learning Problems, Structure of Learning, Learning versus Designing, Training versus Testing, Characteristics of Machine learning tasks, Predictive and descriptive tasks, Machine learning Models: Geometric Models, Logical Models, Probabilistic Models. Features: Feature types, Feature Construction and Transformation, Feature Selection.

Unit-2**Classification And Regression**

Classification: Binary Classification- Assessing Classification performance, Class probability Estimation- Assessing class probability Estimates, Multiclass Classification.

Regression: Assessing performance of Regression- Error measures, Overfitting- Catalysts for Overfitting, Case study of Polynomial Regression. Theory of Generalization: Effective number of hypothesis, Bounding the Growth function, VC Dimensions, Regularization theory

Linear Models

Least Squares method, Multivariate Linear Regression, Regularized Regression, Using Least Square regression for Classification. Perceptron, Support Vector Machines, Soft Margin SVM, Obtaining probabilities from Linear classifiers, Kernel methods for non-Linearity.

Unit-3**Logic Based And Algebraic Models**

Distance Based Models: Neighbours and Examples, Nearest Neighbours Classification, Distance based clustering-K means Algorithm, Hierarchical clustering, Rule Based Models: Rule learning for subgroup discovery, Association rule mining. Tree Based Models: Decision Trees, Ranking and Probability estimation Trees, Regression trees, Clustering Trees.

Unit-4**Probabilistic Models**

Normal Distribution and Its Geometric Interpretations, Naïve Bayes Classifier, Discriminative learning with Maximum likelihood, Probabilistic Models with Hidden variables: Estimation-Maximization Methods, Gaussian Mixtures, and Compression based Models.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Trends In Machine Learning

Model and Symbols- Bagging and Boosting, Multitask learning, Online learning and Sequence Prediction, Data Streams and Active Learning, Deep Learning, Reinforcement Learning

Text Book:

1. Mitchell T.M., Machine Learning, McGraw Hill (1997).
2. Alpaydin E., Introduction to Machine Learning, MIT Press (2010).

Reference Books:

1. Bishop C., Pattern Recognition and Machine Learning, Springer-Verlag (2006).
2. Michie D., Spiegelhalter D. J., Taylor C. C., Machine Learning, Neural and Statistical Classification. Overseas Press (2009).

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Machine learning
Course Code: - UCS-403

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	30

LIST OF EXPERIMENTS:

1. Study and implementation of Genetic Algorithms.
2. Implement Naïve Bayes Classifier Algorithm.
3. Implement K-means Clustering Algorithm.
4. Implement Support Vector Machine.
5. Write a program for Back Propagation Algorithm.
6. Implement Linear Regression Algorithm.
7. Implement Logistics Regression Algorithm.
8. Implement Decision Tree Algorithm.
9. Implement Nearest Neighbor Algorithm.
10. Implement Random Forest Algorithm.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Digital Image Processing**Course Code: - UCS-462**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
4 004.0

Unit 1: Fundamentals:

- Introduction, origin, areas of image processing,
- Steps in digital image processing,
- Components of image processing system,
- Image sensing,
- Sampling and quantization,
- Neighboring Of pixels.

Image Enhancement and Restoration Enhancement:

- Spatial Filtering, Introduction to Fourier Transformation
- Restoration: A model of the Image Degradation/Restoration Process.

Unit 2: Color Image Processing:

- Color fundamentals,
- Models,
- Transformation and segmentation.
- Noise in Color images.

Wavelets:

- Wavelet functions,
- Wavelet transformations in one and two dimensions,
- Fast wavelet transforms.

Unit 3:Image Compression:

- Image compression models.
- Error free compression.
- Lossy compression.

Image segmentation:

- Line detection
- Edge detection
- Edge linking and boundary detection
- Region based Segmentations.

Unit 4: Representation and Description:

- Representation,

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Boundry and Regional Descriptors,
- Relational descriptors.

Object Recognition:

- Pattern and pattern classes,
- recognition based on Decision Theoretic Methods,
- Structural Methods

Text Book:

1. Rafael C. Gonzalez, Digital Image Processing.

Reference Books:

1. Richard E. Woods, Digital Image Processing.

Open Elective – 1

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Human Values and Professional Ethics**Course Code: - UMG-476**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
3 103.5

Unit 1: Introduction –Need, Basic Guidelines and Content:

- Understanding the need ,
- Basic guidelines,
- Content and process for value Education Self Exploration – What is it? – its content and process:
- Natural Acceptance and Experiential Validation – as the mechanism for self-explanation
- Continuous Happiness and Prosperity – A look at basic Human Aspirations

Unit 2 : Process for Value Education:

- Right Understanding,
- Relationship and Physical Facilities
- Basic requirements for fulfilment of aspirations of every human being with their correct priority
- Understanding Happiness and prosperity correctly
- A critical appraisal of the current scenario Method to fulfill the above human aspirations
- Understanding and living in harmony at various levels

Unit 3: Understanding Harmony in the Human Being:

- Understanding human being as a co-existence of the sentient 'I' and the material 'Body'
- Understanding the needs of Self('I') and 'Body' – Sukh and Suvidh
- Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer)

Unit 4: Harmony in Myself:

- Understanding the characteristics and activities of 'I' and harmony in 'I'
- Understanding the harmony of I with the Body :
- Sanyam and Swasthya:
- Correct appraisal of Physical needs,
- Meaning of Prosperity in detail.
- Programs to ensure Sanyam and Swasthya

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Practice exercises and Case Studies will be taken up in Practice Sessions relationship.

Text Book:

- 1 R R Gaur, R,Sangal, G.P Bagaria, 2009, A Foundation Course in value Education(English)
- 2 Pradeep Kumar Ramancharla, 2013, A foundation course in value education (Telugu)

Reference Books:

- 1 R R Gaur, R Sangal G P Bagaria, 2009, Teacher's Manual (English)
- 2 Pradeep Kumar Ramancharla, 2013, Teacher's Manual (Telugu)

Course Name: - Biomedical Instrumentation**Course Code: - UEC-462**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

LT P Cr
3103.5

Unit 1:

- Introduction to Biomedical Signals Tasks in Biomedical Signal Processing,
- Computer Aided Diagnosis,
- Examples of Biomedical signals:
 - ECG
 - EEG
 - EMG
- Review of linear systems
- Fourier Transform and Time Frequency Analysis (Wavelet) of biomedical signals
- Processing of Random & Stochastic signals,
- spectral estimation,
- Properties and effects of noise in biomedical instruments,
- Filtering in biomedical instruments

Unit 2:

- Cardio-logical Signal Processing Pre-processing,
- QRS Detection Methods,
- Rhythm analysis,
- Arrhythmia Detection Algorithms,
- Automated ECG Analysis,
- ECG Pattern Recognition,
- Heart rate variability analysis.

Unit 3:

- Adaptive Noise
- Cancelling Principles of Adaptive Noise Cancelling,
- Adaptive Noise Cancelling with the LMS adaptation,
- Algorithm,
- Noise Cancelling Method to Enhance ECG Monitoring,
- Fetal ECG Monitoring.

Unit 4:

- Neurological Signal Processing Modelling of EEG Signals
- Detection of spikes and spindles

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Detection of Alpha
- Beta and Gamma Waves
- Auto Regressive (A.R.) modelling of seizure EEG
- Sleep Stage analysis
- Inverse Filtering
- Least squares and polynomial modelling.

Text Books:

- 1 D.C.Reddy,—Biomedical Signal Processing: Principles and techniques, Tata McGraw Hill, New Delhi, 2005.
- 2 Willis J Tompkins, Biomedical Signal Processing, Prentice Hall, 1993.
- 3 R. Rangayan, —Biomedical Signal Analysis, Wiley 2002.

Reference Books:

- 1 Bruce, —Biomedical Signal Processing & Signal Modeling, Wiley, 2001.
- 2 K. Najarian and R. Splinter, —Biomedical Signal and Image Processing, Second Edition, The CRC Press.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Television Engineering**Course Code: - UEC-463**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
3103.5

Unit 1**Principles Of Tv:**

Picture elements, Theory of line, frame and field frequencies Blanking, Synchronization, interfacing, resolution, vertical resolution, horizontal resolution and video bandwidth, Use of AM in video and FM in audio, Block Diagram of TV Transmitter and Receiver, Construction of composite video signal.

Unit 2**Television Cameras And Picture Tubes:**

Spectrum of light and eye response, Image orthicon, plumbicon, vidicon (Principles of operation, Construction and working), TV picture tube details, Modulation system used for sound and picture, VSB working, TV transmitter.

Unit 3**Tv Receiver:**

Block Diagram of TV Receiver, Tuner Circuits, Choice of IF amplifier, A.M. & F.M. detectors, Receiver sweep circuits, Video Frequency amplifier, synch. Pulse representation, deflection circuits.

Unit 4**Colour Tv:**

Hue, Saturation and luminance, Luminance and colour signal generation, Types of colour picture tubes (Basic principles and construction), colour subcarrier and colour triangle, NTPC, PAL, SECAM systems, Colour TV transmission & reception, Block Diagram of digital TV with merits.

Text Books

1. Monochrome & Colour TV: R.R Gulati: New Age Pub.

Reference Books:

1. Basic Television: G.M Grob : McGraw Hills
2. T.V. Engg : Dhake : Tata McGraw Hills

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Energy Management**Course Code: - UEE-403**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
310 3.5

Unit 1: Introduction

- Review of different Energy Sources
- Concept of Energy Management,
- Supply side management,
- Demand side management,
- Energy crisis,
- Energy Efficiency,
- Energy Scenario in India audits Conservation program,
- Computer Aided Energy Management System
- Energy Conservation
 - Energy Conservation needs and Objectives,
 - Energy Conservation in Domestic sector,
 - Energy Conservation in Industrial sector.

Unit 2: Energy Audit

- Need For Energy Audit,
- Types of Energy Audits,
- National Energy Plan and its impact on Energy Conservation,
- Energy audit team,
- Energy Audit Reporting format,
- Energy Audit Instruments.

Unit 3: Energy Efficient Technology

- Life cycle assessment,
- Energy efficient Motors,
- BIS Specifications for Energy Efficient Motors,
- Energy Efficient lighting sources,
- Power Quality

Unit 4: Energy Audits Practice

- Energy Audits of building systems,
- Electrical systems,

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

➤ Maintenance and Energy Audits.

Text Books

1. Handbook of Energy Audits by Albert Thuman – Fairman Press Inc.
2. Energy basis for man and nature by Howard T.Odum & Elisabeth C.Odum.

Reference Books:

1. Energy Management by Umesh Rathore, Kataria Publications

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Non Conventional Electrical Power Generation**Course Code: - UEE-452**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
3103.5

Unit 1: Introduction

- Energy situation and renewable energy sources:
- Global Energy scenario,
- World Energy consumption,
- Energy in developing countries,
- Fire wood crisis,
- Indian energy scene,
- Non-conventional renewable energy sources,
- Potential of renewable energy sources

Unit 2 : Wind Energy:

- Origin of wind
- Basic principle of wind energy
- Conversion
- Component of wind energy conversion system,
- Type of windmills,
- Wind electrical Generations in India.

Solar Energy:

- Introduction,
- Solar radiation,
- Solar energy collector,
- Solar thermal power generation,
- Low temperature application of solar energy.

Unit 3: Geo-thermal Power Plants

- Introduction
- Geothermal sources
- Comparison of Geo thermal energy with other energy forms,
- Development of Geothermal power in India.

Physical and thermochemical methods of bioconversion:

- Introduction,
- Biomass definition and potential,
- Physical method of bio conversion,

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Thermo chemical methods.

Unit 4: Wave, Tidal and OTEC:

- Introduction
- Basic principle of tidal power
- Wave energy,
- Component of Tidal power plant,
- Ocean Thermal Energy Conversions
- Advantages and disadvantages of tidal power generation.

Small and Mini Hydropower System:

- Introduction,
- Site development,
- Generation and electrical equipment,
- System of regulation of Hydroelectric Power in India.

Text Books:

1. Renewable Energy Sources by Maheshwar Dyal.
2. Small and mini Hydropower system by Tata Mc Graw Hill.
3. An Introduction to power plant technology by G.D.Rai.

Reference Books:

1. Solar Energy by Suhas.P.Sukhatma, Tata Mc Graw Hill.
2. Modern Power Plant Engg. by Joel

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Advance Construction Techniques and Project Management

Course Code: - UCE-312

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
310 3.5

Unit 1: Introduction

- Materials - Modular co-ordination,
- Standardization and tolerances-system for prefabrication.
- Pre-cast concrete manufacturing techniques
- Moulds –construction design, maintenance and repair

Unit 2 : Construction Techniques:

- Pre-casting techniques
 - Planning, analysis and design considerations
- Handling techniques
 - Transportation Storage and erection of structures.

Unit 3: CPM

- Introduction
 - Network techniques
 - Work break down
 - Classification of activities
 - Rules for developing networks
 - Network development-logic of network
 - Allocation of time to various activities
- Fulkerson’s rule for numbering events,
- Network analysis
- Determination of project schedules
- Critical path
- Ladder construction,
- Float in activities
- Shared float,
- Updating
- Resources allocation,
- Sources smoothing and resources levelling.

PERT:

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Probability concept in network,
- Optimistic time,
- Pessimistic time,
- Most likely time,
- Lapsed time,
- Deviation,
- Variance,
- Standard deviation,
- Slack critical path,
- Probability of achieving completion time,
- Central limit theorem.

Unit 4: Cost-Time Analysis:

- Cost versus time,
- Direct cost,
- Indirect cost,
- Total project cost and optimum duration
- Contracting the network for cost optimization,
- Steps in time cost optimization,
- Illustrative examples.

Inspection & Quality Control:

- Introduction
- Principles of inspection
- Enforcement of specifications
- Stages in inspection
- Quality control and testing of structures
- Statistical analysis.

Text Books:

- 1 Krishnaraju, N., Advanced Concrete Technology, CBS Publishers, 1985.
- 2 Nevile, A.M., Concrete Technology, Prentice Hall, Newyork, 1985.

Reference Books:

- 1 Construction Planning & Management by P.S. Gehlot & B.M.Dhir.
- 2 PERT & CPM -Principles & Applications by L.S.Srinath

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Advanced Environmental Engineering**Course Code: - UCE-365**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr
310 3.5

Unit 1: Advanced Wastewater Treatment:

Need for advanced wastewater treatment, process selection, granular- medium filtration, micro screening, control of nutrients, combined removal of nitrogen and phosphorus by biological methods, removal of toxic compounds and refractory organics, removal of dissolved inorganic substances, natural treatment systems- floating aquatic plant treatment systems.

Unit 2: Air and Water Quality Monitoring:

Design of air monitoring survey network, siting criteria, models for monitoring site selection, principles and techniques for ambient and stack sampling, acquisition and analysis of monitored data, BIS methods. Monitoring of water quality, planning sampling networks and schedules, sample collection and analysis, presentation and interpretation of results, methods and instruments for monitoring water pollutants, standards.

Unit 3: Environmental Modeling And Simulation: Principles of modeling and simulation, classification, introduction to air quality models, air pollution meteorology, impact on local and global climate, atmospheric stability, Gaussian models and modifications. Introduction to river, estuaries and lake hydro dynamics, dissolved oxygen models, eutrophication and nutrient-phytoplankton models, toxic substance models, temperature models, models for management applications.

Unit 4: Resources and Energy Recovery From Solid Waste: Processing techniques, material recovery systems, recovery of biological conversion products, recovery of thermal conversion products, recovery of energy from conversion products, materials and energy recovery systems

Text Books:-

1. Waste water Engineering- treatment and Reuse (Fourth Edition) : Metcalf & Eddy Inc: Tata McGraw Hill

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

2. Air Monitoring Survey Design K.E. Noll & T.L. Miller : Ann Arbor Science
3. Air Pollution Control Engineering (Second Edition): N.D. Nevers: McGraw Hill

Reference Books:

1. An Introduction to power plant technology by G.D.Rai.

Course Name: - Basic Manufacturing Technology**Course Code: - UME-410**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

LT P Cr**3103.5****Unit 1:**

Metal Casting Processes: Advantage and limitations, sand mold making procedure, Patterns and Cores. Pattern materials, pattern allowances, types of pattern, colour coding, Molding material, Molding sand composition, and preparation, sand properties and testing type of sand molds.

Cores: Types of cores, core prints, chaplets, chills, Gating systems, Gates and gating systems risers, Melting practice, Cupola, charge calculations. Casting cleaning and casting defects Fettling, defects in castings and their remedies, methods of testing of castings for their soundness.

Unit 2:

Special Casting Processes: Shell molding, precision investment casting, permanent mold casting, die casting, centrifugal casting, continuous casting.

Metal forming Processes: Nature of plastic deformation, hot working and cold working. Principles of rolling, rolling mills Forging: Forging operations, smith forging, drop forging, press forging, forging defects.

Unit 3:

Extrusion and other processes : Extrusion principle, hot extrusion, cold extrusion, wire drawing, swaging, tube making, Sheet metal operation, shearing action, drawing dies, spinning, bending, stretch forming, embossing and coining.

Gas and Arc Welding: Classification: Oxy-acetylene welding equipment and techniques. Electric arc welding: Electrodes, manual metal arc welding, inert gas shielding arc welding, tungsten inert gas welding (TIG), metal inert gas welding (MIG), submerged arc welding (SAW)

Unit 4:

Resistance Welding: Principles, resistance spot welding, resistance seam welding, upset welding, flash welding.

Other Welding Processes : Introduction thermit welding, electro slag welding, electron beam

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

welding, laser beam welding, forge welding, friction welding, diffusion welding, brazing and soldering.

Text Books:

1. Principles of Manufacturing Materials & Processes –Campbell J.S.Publisher–Mc Graw Hill.
2. Manufacturing Science – Ghosh A.Malik, A.K.Affiliated East-West Press Pvt. Ltd., New Delhi.
3. Foundry Technology – K.P.Sinha, D.B.Goel, Roorkee Publishing House.
4. Welding and Welding Technology, Richard L.Little Tata McGraw Hill Ltd.

Reference Books:

1. Principle of Metal casting- Rosenthal, Tata Mc Graw hill, New Delhi.
2. Production Technology – R.K.Jain, Khanna Publication Ltd., N D.
3. Manufacturing Processes and Systems : Ostwald Phillip F., Munoz Jairo, John Wiley & Sons (Asia) Pvt. Ltd.
4. Welding Technology – O.P.Khanna, Dhanpat Rai & Sons, Delhi.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name : - Measurement Techniques**Course Code :- UME-411**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr**3 1 0 3.5****Unit 1: Standards of Measurements**

- Standards of Measurements
 - Line standards
 - Imperial standard yard
 - Standard meter
 - Sub-standards and standards
 - End bars
 - Slip gauges
 - Angular slip gauges
 - Wavelength standard
- Measuring Principles
 - Principle for mechanical measuring instruments
 - Lever method
 - Vernier method,
 - Screw & screw nut method.
 - Compound gearing method,
 - Helical strip method.
- Principles of optical measuring instruments.
 - Reflection,
 - Refraction interference
 - Optical prism
 - Lenses
 - Optical systems.
 - Principle of electrical measuring instruments.
- Transformation of energy
- Variation of electric parameters
- Principles of pneumatic measuring instruments.
- Construction details of measuring instruments.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Abbe principle
- Graduation lines and scale division
- Pivot & bearings
- Measuring accuracy
- Dimensional & geometrical accuracy.
- Types of error
 - Systematic error,
 - Compound error,
 - Random error.

Unit 2:

- **Interchangeability**
 - Concept and need of interchange ability.
 - Systems of tolerances,
 - System of fits.
 - Limit Gauges
- **Standardisation**
 - Design Standardisation
 - Manufacturing Standardisation.
- **Linear and Angular Measurement**
 - Use of slip gauges,
 - Dial indicators.
 - Mechanical, optical and electrical comparators,
 - Pneumatic gauges,
 - Measuring machines,
 - Sine bars & angle,
 - Gauges,
 - Levels
 - Clinometer
 - Auto- Collimator
 - Tapper Gauges

Auto- collimator

Unit 3:

- **Straightness, Flatness and Squareness testing**
 - Straight edges
 - Surface plates straightness testing
 - Straight edge methods
 - Level or auto-collimator method
 - Flatness testing – level or auto – collimator method,
 - Optical flatness testing,
 - Squareness testing,
 - Indicator method,

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Auto – collimator methods
- Engineer’s Squares.



Screw Thread Measurement

- Errors in threads
- Screw thread gauges
- Measurement of element of the external and internal threads
- Thread caliper Gauges.

UNIT 4:



Spur Gear Measurement

- Geometry of spur gear,
- Measurement of spur gear parameters,
- Ram out,
- Pitch
- Profile
- Lead
- Backlash
- Tooth thickness
- Composite elements



Surface Finish Measurement

- Definition measurement of surface,
- Finishtaly surf,
- Profilo meter,
- Tomilson recorder
- Compariscope
- Interference methods



Miscellaneous

- Acceptance tests for a lathe
- Alignment of bearings

Text Books:

1. Gupta, I.C., “Engineering Metrology”, Dhanpat Rai & Sons, New Delhi, 1994.
2. Hume, K.J., “Engineering Metrology”, Mac Donald & Co. 1963.
3. R. K. Jain “Engineering Metrology”, Khanna publisher, Delhi

Reference Books:

1. Kumar, D.S., “Mechanical Measurements and Control”, Metropolitan, New Delhi.
2. Doeblein, E.O., “Measurement Systems, Application Design”, Mc Graw Hill, 1990.
3. Beckwith Thomas G., “Mechanical Measurements”, Narosa Publishing House, NewDelhi.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Semester - VIII

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Departmental Elective – 14

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Grid Computing**Course Code: - UCS-408**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr.
4004.0

Unit 1 : Introduction

- Grid Computing
- Benefits of Grid Computing
- Virtual Organizations
- Grid Architecture and its relationship to other distributed technologies
- Grid Application Areas,
 - OGSA
 - OGSI
 - Introduction to Semantic Grids.
- Building Blocks for Grid Systems
 - XML
 - SOAP
 - UDDI
 - Service Oriented Architecture
 - Web Services
 - Web Services Architecture
 - WSRF
 - Relationship between Grid and Web Services
 - Grid and Web Services Invocation.

Unit 2 : Data Management

- Overview of Data Management in GT4
- Data Movement:
 - Grid FTP
 - RFT
 - Data Replication
 - RLS

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Higher level data services.
- Resource Management and Scheduling
- Resource Management Concepts
- Generalized Resource Management Framework
- Grid Resource Management Systems
- Scheduling in Grids
- QoS
- Introduction to GRAM

Unit 3 : Security

- Security Issues in Grids
- Authentication Issues
- Trust and Privacy related Issues
- Authorization Issues
- Grid Security Frameworks
- Standards
- Web Services Security Specifications.
- Monitoring and Discovery Services:
 - Index Services
 - Resource Discovery
 - UDDI
 - Introduction to MDS in GT4

Unit 4 : Grid Middleware and Programming Model

- Study of Globus Toolkit 4 Components
- Programming Model
- Singleton and Multiple Resources
- Logging
- Lifecycle Management
- Notifications
- Study of important distributed systems like Legion,
- CRISI

Text Books

1. Grid Computing, First Edition by Joshy Joseph, Craig Fellenstein , Pearson Education
2. The Grid 2: Blueprint for a New Computing Infrastructure, Second Edition, by Ian Foster, Carl Kesselman , Morgan Kaufman
3. Introduction to Grid Computing, First Edition by Bart Jacob, Michael Brown, Kentaro Fukul, Nihar Trivedi , IBM Red Books

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Reference Books

1. Grid Resource Management - State of the Art and Future Trends by Zarek Nabrzyski, Jennifer M. Schopf, Jan Weglarz , Kluwer Academic Publishers
2. Grid Computing Security by Anirban Chakrabarti , Springer

Course Name :- ETHICAL HACKING**Course Code :- UCS-477**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

**L T P Cr.
400 4.0****Unit-1 Introduction:**

- Understanding the importance of security, Concept of ethical hacking and essential Terminologies
- Threat, Attack, Vulnerabilities, Target of Evaluation, Exploit.
- Phases involved in hacking

Footprinting:

- Introduction to footprinting , Understanding the information gathering methodology of the hackers, Tools used for the reconnaissance phase.

Unit-2 Scanning:

- Detecting live systems -on the target network,
- Discovering services running listening on target systems, Understanding port scanning techniques, Identifying TCP and LIDP services running on the target network, Understanding active and passive fingerprinting.

System Hacking

- Aspect of remote password
- Guessing Role of eavesdropping, Various methods of password cracking, Keystroke Loggers, Understanding Sniffers, Comprehending Active and Passive Sniffing, ARP Spoofing and Redirection,
- DNS and IP Sniffing, HTTPS Sniffing.

Unit – 3 Session Hijacking:

- Understanding Session Hijacking, Phases involved in Session Hijacking,
- Types of Session Hijacking, Session Hijacking Tools.

Hacking Wireless Networks:

- Introduction to 802.11, Role of WE?, Cracking WEP Keys, Sniffing Traffic, Wireless DOS attacks, WLAN Sniffers,
- WLAN Sniffers, Hacking Tools, Securing Wireless Networks.

Unit- 4 Cryptography:

- Understand the use of Cryptography over the Internet through PKI, RSA, MD5,
- Secure Hash Algorithm and Secure Socket Layer.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Text Books

1. Network Security and Ethical Hacking Rajat Aare, Luniver Press. 30 Nov-2006.
2. Network intrusion alert cm ethical hacking guide to intrusion detection, Ankit Podia, Menu Zacharia, Thomson Course Technology PTR, 12-Jun-2007.

Reference Books

1. Ethical Hacking, Thomas Mathew, 0571 Publisher, 28-Nov-2003.
2. Hacking Exposed: Network Security Secrets & Solutions, Stuart McClure, Joel SeatnbraV and George Kurtz, McGraw-Hill, 2005.

Course Name: - Software Maintenance**Course Code: - UCS-459**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

L T P Cr.
400 4.0

Unit 1: Fundamentals

- Meaning of software maintenance
- Software change
- Ongoing support
- Economic implications of modifying software
- The nomenclature and image problem
- Software maintenance framework
- Potential solutions to maintenance problem

Maintenance Process models

- Definitions
- Critical appraisal of traditional process models
- Maintenance process models
- Definitions
- Critical appraisal of traditional process models
- Maintenance process models

Program understanding

- Aims of program comprehension
- Maintainers and their information needs
- Comprehension process models
- Mental models
- Program comprehension strategies
- Factors that affect understanding
- Implication of comprehension theories and studies

Unit 2: Reverse Engineering

- Definitions
- Purposes and objectives
- Level of reverse engineering
- Supporting techniques
- Benefits
- **Reuse and reusability**
- Definitions

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Objectives and benefit of reuse
- Approach to reuse
- Domain ANALYSIS
- COMPONENTS engineering
- Reuse process model
- Factors that impact upon reuse

Maintenance measures

- Definitions
- Objectives of software maintenance
- Example measures
- Guidelines for selecting maintenance measures

Unit 3: Configuration management

- Definitions
- Configuration management
- Change control
- Documentation
- Management and organizational issues
- Management responsibilities
- Enhancing maintenance productivity
- Maintenance teams
- Personnel education and training
- Organizational modes

Unit 4: Building and sustaining maintainability

- Quality assurance
- Fourth generation languages
- Object-oriented paradigms
- **Maintenance tools**
- Criteria for selecting tools
- Taxonomy of tools
- Program understanding and reverse engineering
- Testing, configuration management, other tasks
- Past present and future of software maintenance

Text Books

1. G. Coulouris, J. Dollimore, and T. Kindberg: Distributed Systems: Concepts and Design

Reference Books

1. Taunenbaum: Distributed Systems: Principles and Paradigms
2. M. Singhal & N. Shivaratri: Advanced Concepts in Operating Systems

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Soft Computing**Course Code: - UCS-457**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

LTPCR.
4 00 4.0

Unit 1: Introduction to Artificial Neural Networks

- Introduction to Artificial Neural Network
- Artificial Neuron
- Classification of Artificial Neural Network
- Architecture of a Artificial Neural Network
- Activation Function
- Training an Artificial Neural Network
- Application of Artificial Neural Network.

Unit 2: Algorithms perceptions

- Training rules, Delta
- Back Propagation Algorithm
- Multilayer Perceptron Model
- Competitive learning networks
- Kohonen self-organizing networks
- Hebbian learning
- Hopfield Networks
- Neural Networks as Associative Memories
- Hopfield and Bidirectional Associative Memory

Unit 3: Genetic Algorithms

- Survival of the Fittest
- Fitness Computations
- Cross over
- Mutation
- Reproduction
- Rank method
- Rank space method.

Unit 4: Introduction to Fuzzy Logic System

- Fuzzy Sets Operation of Fuzzy Sets
- Properties Of Fuzzy Sets
- Fuzzy Relations

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Fuzzy Arithmetic
- Membership Functions
- Fuzzy To Crisp Conversion

Fuzzy Logic

- Fuzzy Rule Based Systems
- Fuzzy Decision Making
- Fuzzy Database
- Fuzzy Intelligent System
- Fuzzy Vs Crisp set
- Linguistic variables
- membership functions
- operations of fuzzy sets
- fuzzy IF-THEN rules
- variable inference techniques
- de-fuzzification techniques
- basic fuzzy inference algorithm
- Applications of fuzzy system
- Useful tools supporting design.

Text Books

1. Course Notes by the Instructor
2. G.J.Klir & T.A. Folyger: Fuzzy Sets, Uncertainty & Information
3. G.J.Klir & B.Yuan: Fuzzy sets & Fuzzy logic
4. Jang, Sun, Mizutani: Neuro-Fuzzy and Soft computing
5. Haykin: Neural networks: a comprehensive foundation

Reference Books

1. Goldberg: Genetic Algorithms
2. Sivanandam, Deepa: Principles of Soft Computing
3. Timothy J. Ross: Fuzzy Logic with Engineering Applications

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Departmental Elective-15

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Software Verification, Validation & Testing**Course Code: - UCS-458**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

**LTPCR.
4004.0****Unit 1: Introduction:**

- What is software testing and why it is so hard?
- Error, Fault, Failure,
- Incident, Test Cases,
- Testing Process,
- Limitations of Testing, No absolute proof of correctness,
- Overview of Graph Theory & Discrete Mathematics.

Unit 2: Functional Testing

- Boundary Value Analysis
- Equivalence Class Testing,
- Decision Table Based Testing
- Cause Effect Graphing Technique.
- Structural Testing
- Path testing,
- DD-Paths,
- Cyclomatic Complexity,
- Graph Metrics,
- Data Flow Testing,
- Mutation testing.

Unit 3: Reducing the number of test cases

- Prioritization guidelines,
- Priority category,
- Scheme
- Risk Analysis
- Regression Testing
- Slice based testing
- Testing Activities
- Unit Testing,
- Levels of Testing,
- Integration Testing,

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- System Testing,
- Debugging,
- Domain Testing.

Unit 4: Object Oriented Testing

- Issues in Object Oriented Testing
- Class Testing
- GUI Testing
- Object Oriented Integration and System Testing.
- Testing Tools
- Static Testing Tools
- Dynamic Testing Tools
- Characteristics of Modern Tools.

Text Books

1. William Perry, “Effective Methods for Software Testing”, John Wiley & Sons, New York, 1995.
2. Cem Kaner, Jack Falk, Nguyen Quoc, “Testing Computer Software”, Second Edition, Van Nostrand Reinhold, New York, 1993.
3. Boris Beizer, “Software Testing Techniques”, Second Volume, Second Edition, Van Nostrand Reinhold, New York, 1990.
4. Louise Tamres, “Software Testing”, Pearson Education Asia, 2002
5. Roger S. Pressman, “Software Engineering – A Practitioner’s Approach”, Fifth Edition, McGraw-Hill International Edition, New Delhi, 2001.
6. Boris Beizer, “Black-Box Testing – Techniques for Functional Testing of Software and Systems”, John Wiley & Sons Inc., New York, 1995.
7. K.K. Aggarwal & Yogesh Singh, “Software Engineering”, New Age International Publishers, New Delhi, 2003.

Reference Books

1. Marc Roper, “Software Testing”, McGraw-Hill Book Co., London, 1994.
2. Gordon Schulmeyer, “Zero Defect Software”, McGraw-Hill, New York, 1990.
3. Watts Humphrey, “Managing the Software Process”, Addison Wesley Pub. Co. Inc., Massachusetts, 1989.
4. Boris Beizer, “Software System Testing and Quality Assurance”, Van Nostrand Reinhold, New York, 1984.
5. Glenford Myers, “The Art of Software Testing”, John Wiley & Sons Inc., New York, 1979.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Software Testing**Course Code:- UCS-449**

Assessment and Evaluation Components	
Quizzes /Assignments/Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

**LTPCR.
31 0 3.5****Unit 1: Introduction**

- Basic concepts,
- Discrete mathematics for testers
- Graph theory for testers,
- Black box testing:
- Boundary value testing,
- Equivalence class testing
- White box testing:
- Statement coverage
- Branch coverage
- Condition coverage
- Path coverage
- M c Cabe's
- Cyclomatic complexity
- Decision Table based testing
- Data flow based testing

Unit 2 : Testing methods

- Integration testing
- System testing
- Interaction testing
- Performance testing
- Mutation testing
- Regression testing
- Error seeding
- Object oriented testing
- Issues in object oriented testing
- Test case design by object oriented software
- Fault based testing,
- Test cases and class hierarchy,

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Unit 3: Test Case Design

- Scenario based Test design
- Testing surface structure
- Testing deep structure
- Class testing:
- Random testing
- Object oriented classes.
- Partition testing at the class level
- Inter class test case design:
- multiple class testing.

Unit 4: Test Case Generation

- tests derived from behavior models
- Test case generation using UML diagrams,
- GUI testing,
- Object oriented system testing.
- Special topics in software Testing

Text Books

- 1 C. J. Paul, Software testing: A craftsmen's approach, CRC Press.
- 2 R. Gopalswamy, Software testing, Pearson.
- 3 G. J. Myers, The art of software testing, Wiley Interscience New York.

Reference Books

- 1 R. S. Pressman, Software Engineering A Practitioner's approach, McGraw Hill.
- 2 R. Mall, Fundamentals of Software Engineering, Prentice Hall of India

Open Elective – 2

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Entrepreneurship Development & Enterprise Management**Course Code: - UMG-450**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

**LTPCR.
310 3.5****Unit 1:**

- Developing Entrepreneurship
 - Element for a program,
- Developing Entrepreneurship competencies:
 - Need & process of development,
 - Social determinants of Entrepreneurship growth.
- Entrepreneurship development programs,
- Entrepreneurship orientation & awareness programme,
- New enterprise creation programme.

Unit 2:

- Existing Entrepreneurship programmes for existing enterprising for survival & growth.
- Evolution of various EDP programme in India,
- Managing growth & transition,
- The organization life cycle,
- Chasing Entrepreneurship roles.

Auto- collimator

Unit 3:

- Entrepreneurship & new venture opporModuleies,
- Planning for new ventures.
- Concept of planning paradigm
- Pre-start-up
- Early growth & later growth stage.

Unit 4:

- Incentive & subsidies available for Entrepreneurship growth.
- Guidance for project report preparation, Location,
- Environmental and managerial problems of new enterprise management,
- Managing family business. Some case studies of family run business in India.

Text Books:

1. Small Business and Entrepreneurship, by S. Anil Kumar (Author)

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

2. Entrepreneurship, by Alpana Trehan (Author)

Reference Books:

1. Entrepreneurial Development, by Nuzhath Khatoon (Author).

Course Name: - Satellite Communication**Course Code: - UEC-464**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

**L T P Cr
3103.5****Unit 1:**

Introduction to Satellite Communication Origin, Brief History, Current state and advantages of Satellite Communication, Active & Passive satellite, Orbital aspects of Satellite Communication, Angle of Evaluation, Propagation Delay, Orbital Spacing, System Performance

Unit 2:

Satellite Link Design Link design equation, system noise temperature, C/N & G/T ratio, atmospheric & ionospheric effects on link design, complete link design, interference effects on complete link design, earth station parameters, Earth space propagation effects, Frequency window, Free space loss, Atmospheric absorption, Rainfall Attenuation, Ionospheric scintillation, Telemetry, Tracking and command of satellites.

Unit 3:

Satellite Multiple Access System FDMA techniques, SCPC & CSSB systems, TDMA frame structure, burst structure, frame efficiency, super-frame, frame acquisition & synchronization, TDMA vs FDMA, burst time plan, beam hopping, satellite switched, Erlang call congestion formula, DA-FDMA, DA-TDMA.

Unit 4:

Satellite Services INTELSAT, INSAT Series, VSAT, Weather forecasting, Remote sensing, LANDSAT, Satellite Navigation, Mobile satellite Service.

Unit 5:

Laser & Satellite Communication Link analysis, optical satellite link Tx & Rx, Satellite, beam acquisition, tracking & pointing, cable channel frequency, head end equation, distribution of signal, n/w specifications and architecture, optical fibre CATV system.

Text Books

1. Dennis Roddy, —Satellite Communications, McGraw Hill, 1996.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Reference Books:

1. Timothy Pratt, Charles W. Bostian, -Satellite Communications, John Wiley & Sons, 1986.
2. Dr. D.C. Aggarwal, —Satellite Communications, Khanna Publishers, 2001.

Course Name: - Digital Signal Processing & Applications**Course Code: - UEC-465**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

LTPCR
3 10 3.5

Unit 1:

- Classification of signals,
- Singularity functions,
- Classification of system,
- Manipulation of Discrete time signals:
 - Signal analysis,
 - Signal characteristics
 - Typical discrete time signals,
 - Operation on signals,
 - Properties of linear time-invariant digital systems,
 - Sampling of analog signals and sampling rate conversion.
- Z-transform
 - Properties of Z-transform.
 - Inverse Z-transform – analysis of discrete time systems,
 - Convolution.

Unit 2:

- Systemfunction
- Difference equation,
- IIR filter design:
 - Analog filter approximation,
 - Butter worth,
 - Chebyshev and Elliptic filters,
 - Bilinear transformations,
 - Impulse invariance technique,
 - Digital frequency band transformations.
- FIR filter design:
 - Window technique,
 - Equiripple approximation technique,
 - Frequency sampling technique.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Unit 3:

- Discrete Fourier Transform(DFT)
- Inverse Discrete time Fourier Transform
- Properties of DFT (circular convolution).
- Fast Fourier Transform (FFT)
- Decimation-in-time (DIT) algorithm-decimation-in-frequency algorithm-FFT,
- Radix-2 DIT and DIF implementation.

Unit 4:

- Applications of DSP in Voice,
- RADAR and Image Processing.
- TMS320CXX SERIES PROCESSORS:
 - Architecture,
 - Memory,
 - Interrupts,
 - Addressing modes,
 - Assembly language programming.

Text Books:

1. David .K. Defatta, Joseph G,Lucas & William S. Hodgkiss, Digital signal processing
2. Sanjit K and Mitra, digital signal processing

Reference Books:

1. Farooq Hussain, Digital signal processing

Course Name: - Transformer Engineering**Course Code: - UEE-457**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

**LTPCR.
3103.5****Unit 1:**

- **Introduction to Transformers**
 - Transformer Types
 - Transformer Losses
 - Operating Principles
 - Instrument Transformers
 - Transformer Construction
 - Auto –Transformer
 - Transformer connections.

- **Transformer Maintenance**
 - Insulation Testing
 - High Potential Testing
 - Turns Ratio Testing
 - Polarity Testing
 - Power Factor
 - Excitation Current
 - DC Winding Resistance
 - Polarization Recovery
 - Insulating Fluid
 - Dielectric
 - Dissolved Gas Analysis.

Unit 2:

- **Materials for Transformers**
 - Insulating oil
 - Insulating paper
 - Pressboard and wood
 - Insulated copper conductor for windings
 - Crepe paper
 - Sealing materials
 - Cold – rolled grain oriented electrical steel sheet.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

➤ **Winding and Insulation**

- Types of windings
- Surge voltage
- Heat transfer
- Insulation design
- Auto- collimator

Unit 3:

➤ **Cooling**

- Air Cooled Oil-Immersed
- Water-Cooled
- Forced-Oil Cooling,
- Self-Cooling with Air Blast Temperature Limits,
- Transformer loading.

➤ **Magnetic Circuit**

- Materials
- Design of magnetic circuit
- Optimum design of core

Unit 4:

➤ **Tap Changers**

- Off - circuit tap changer
- On load tap changer
- Automatic control of tap changer.

➤ **Transformer Auxiliaries**

- Buchholz relay
- Temperature indicators
- Oil level indicators oil preservation systems.

Text Books:

1. Transformers by BHEL, Bhopal, Tata McGraw Hill.
2. Transformer Engineering by SV Kulkarni and SA Khaparde Marcel & Dekks Inc.
3. Transformer Engineering design and practices, SV Kulkarni, SA Khaparde, Marcel Dekker Inc New york.
4. Electrical Machines by J. Nagrath & D.P. Kothari, Tata McGraw Hill
5. Electrical Machines by Husain Ashfaq, Dhanpat Rai & Sons
6. Electric Machine and Transformers by Irving L. Kosow, Prentice Hall of India.
7. Fundamentals of Electrical Machines by B.R. Gupta & Vandana Singhal, New Age International

Reference Books:

1. Electric Machinery by A.E. Fitzgerald, C. Kingsley Jr and Alexander Kusko, McGraw Hill, International Student Edition.
2. The Performance and Design of DC machines by A.E. Clayton, Pitman & Sons
3. The Performance and Design of AC machines by M.G. Say, Pitman & Sons

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Direct Energy Conversions**Course Code: - UEE-411**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

LTPCR.
3 1 03.5

Unit 1:**Introduction**

- Conventional generation (Thermal, Hydro etc)
- Alternative generation processes

**Thermionic Generation**

- The basic thermionic diode generator and its analysis
- Cross held devices
- Anode and cathode materials
- Experimental thermionic generator.

Unit 2:**Mhd Generation:**

- Principles of MHD generation
- Electrical conditions
- Faraday generator
- Hall generator
- Comparison of generators
- Choice of generator parameters
- Other generator configurations.

**Experimental Mhd Generation**

- Open cycle working
- Closed cycle operation
- Liquid metal systems

Auto- collimator

Unit 3:**Thermoelectric Generation**

- Seeback effect
- Peltier effect
- Thomson effect
- EMF relationship
- Generator analysis

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Material selection
- Experimental thermoelectric generation.

Unit 4:

- Fuel cells
- Principles of fuel cells
- Thermodynamics of the fuel cell
- Choice of fuels and operating condition
- Polarization and its effect
- Redox cell
- Overall efficiency
- Practical Fuel cells – various types.

Text Books:

1. Direct Energy Conversion by R.A.Coombe.

Reference Books:

1. Non-Conventional Energy Sources By –S.Rao.

Course Name: - Advance Concrete Technology**Course Code: - UCE-311**

Assessment and Evaluation Components	
Quizzes /Assignments/Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

**LTPCR
3 1 03.5****Unit 1:****Introduction:**

- Structure of hydrated Cement
- Special Cements
- Chemical admixtures
- Concept of Green Concrete using Mineral Admixtures
- Corrosion protection
- Fire resistance
- Sulphate attack on concrete
- Diffusion of chlorides in concrete
- Evaluation of concrete strength
- NDT Techniques

Unit 2:**Concrete mix design:**

- Principles of Concrete mix design
- Methods of Concrete mix design
- Design of high strength concrete and
- High performance concrete

Auto- collimator

Unit 3:**Properties of concrete:**

- Rheological behavior of fresh Concrete
- Properties of fresh concrete
- Properties of hardened concrete
- Strength
- Elastic properties
- Creep and Shrinkage
- Variability of concrete strength

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Unit 4:

- **Modern Trends in concrete:**
 - Modern trends in concrete manufacture
 - Placement techniques
 - Methods of transportation
 - Placing of concrete
 - Curing Techniques
 - Extreme weather concreting
 - Special concreting methods
 - Vacuum dewatering of concrete
 - Under water concreting
- **Special concrete:**
 - GModuleing
 - Shortcrete
 - Light weight Concrete
 - Mass concrete
 - Fly-ash Concrete
 - Fibre reinforced Concrete
 - Polymer Concrete
 - Ferro Reinforcement in concrete
 - Utilization of waste Material
 - Epoxy resins and screeds for rehabilitation- properties and application

Text Books

1. Krishnaraju, N., Advanced Concrete Technology, CBS Publishers, 1985.
2. Neville, A.M., Concrete Technology, Prentice Hall, Newyork, 1985.

Reference Books

1. A.R. Santhakumar, "Concrete Technology" Oxford University Press, 2006

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Geographic Information Systems for Resources Management**Course Code: - UCE-409**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

LTPCR.
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Unit 1:**Principles of GIS**

- Introduction to the basic Components and structure of GIS,
- Geographic concepts
- Geographical Entities and Spatial data formats will be introduced.

Unit 2:**Introduction to ArcGIS**

- Introduction to ArcGIS Software
- Components (ArcMap, ArcCatalog and ArcToolbox).

Auto- collimator

Unit 3:**Spatial data formats**

- Data Types
- The differences between raster and vector formats
- Non-native data formats and metadata.
- Data analyses and function are highly dependent on these spatial data.

Unit 4:**Map Projection**

- Overview of geographic coordinate systems and Map projections.
- Essential to geo-reference spatial data and superimpose spatial datasets

**Spatial data Analysis**

- An overview of multiple vector-based and raster-based (local, Focal, Zonal, and Global)
- Spatial operations will be provided. Queries,
- The Field calculator
- Raster calculator and model maker provide operational tools to conduct spatial analyze within the Arc GIS Environment.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Text Books:

1. Heywood L, Comelius. S and S. Carver (2006) An Introduction to Geographic Information System, Dorling Kinderseley (India) Pvt. Ltd.
2. Burrough P A 2000 P A McDonnell (2000) Principles of Geographic Information Systems, London: Oxford University Press

Reference Books:

1. Lo.C.P., Yeung. K.W Albert(2002) Concepts and Techniques of Geographic Information Systems, Prentice-Hall of India Pvt. Ltd. New Delhi

Course Name: - Renewable Energy Sources**Course Code: - UME-464**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

LTPCR.
3 1 03.5

Unit 1:

- **Scenario of Renewable Energy (RE) Sources**
 - Needs of renewable energy
 - Advantages and limitations of RE
 - Present energy scenario of conventional and RE sources
- **Wind Energy**
 - Energy available from wind
 - Basics of lift and drag
 - Basics of wind energy conversion system
 - Effect of density
 - Angle of attack and wind speed
 - Windmill rotors
 - Horizontal and vertical axes rotors
 - Drag
 - Lift
 - Torque and power coefficients
 - Tip speed ratio
 - Solidity of turbine
 - Wind turbine performance curves
 - Wind energy potential and site selection
 - Basics of wind farm

Unit 2:

- **BioEnergy**
 - Types of biogas plants
 - Biogas generation
 - Factors affecting biogas generation
 - Advantages and disadvantages
 - Biomass energy
 - Energy plantation
 - Gasification
 - Types and applications of gasifiers

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.



Ocean Energy:

- OTEC principle
- Open, closed and hybrid cycle OTEC system
- Energy from tides
- Estimation of tidal power
- Tidal power plants
- Single and double basin plant
- Site requirements
- Advantages and limitations,

Auto- collimator

Unit 3:



Solar Energy

- Energy available from the sun
- Spectral distribution
- Solar radiation outside the earth's atmosphere and at the earth's surface
- Solar radiation geometry
- Instruments for solar radiation measurements
- Empirical equations for prediction of availability of solar radiation, radiation on tilted surface
- Solar energy conversion into heat
- Types of solar collectors
- Evacuated and non-evacuated solar air heater
- Concentrated collectors
- Thermal analysis of liquid flat plate collector
- Air heater and cylindrical parabolic collector
- Solar energy thermal storage
- Heating and cooling of buildings
- Solar pumping
- Solar cooker
- Solar still
- Solar drier
- Solar refrigeration and air conditioning
- Solar pond
- Heliostat
- Solar furnace
- Photovoltaic system for power generation
- Solar cell modules and arrays
- Solar cell types
- Material
- Applications
- Advantages and disadvantages

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Unit 4:



Economic Analysis:

- Initial and annual cost
- Basic definitions
- Present worth calculations
- Repayment of loan in equal annual installments
- Annual savings
- Cumulative saving and life cycle cost
- Economic analysis of add on solar system
- Payback period
- Clean development mechanism



Demonstration of following equipment should be given to the students.

- Solar water heater
- Solar air heater
- Pyranometer
- Pyrhelioemeter
- Solar PV system
- Wind mill
- Biogas plant
- Gasifier
- Solar cooker

Text Books:

1. Solar Energy: Principles of Thermal Collection and Storage, S. P. Sukhatme and J. K. Nayak, McGraw-Hill Education
2. Solar Engineering of Thermal Processes, John A. Duffie, William A. Beckman, John Wiley, New York
3. Non-conventional energy resources, Shobh Nath Singh, Pearson India

Reference Books:

1. Non-conventional energy resources, Shobh Nath Singh, Pearson India
2. Solar Energy Engineering, Soteris Kalogirou, Elsevier/Academic Press.
3. Principles of Solar Energy, Frank Krieth & John F Kreider, John Wiley, New York

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Automation & Robotics**Course Code: - UME-466**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

**LTPCR.
3103.5****Unit 1:****Introduction to Automation:**

- Concept of Automation
- Reasons for Automating,
- Arguments for and against Automation
- Automation Strategies
- Economic Considerations
- Low cost
- Automation
- Advantages of Automation.

Fluid Control Components:

- Fluid
- power control elements
- Hydraulic & Pneumatic valves
- Flow and direction control valves
- Metering valve
- Hydraulic Servo System
- Fluid power symbols

Control Systems:

- Adaptive control
- Sequence control
- Programmable controllers
- Computer process control

Unit 2:**Transfer Device, Feeders & Material Handling:**

- Detroit- Type Automation
- Analysis of Automated flow lines
- Automated assembly System
- Automated Material Handling

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Automated Inspection & Testing

- Automated Inspection
- Principles and Methods
- Sensor technologies for automated inspection
- Co-ordinate measuring machines
- Other contact inspection methods
- Machine vision
- Optical
- Inspection methods
- Non-Contact Inspection Methods

Unit 3:

Robotics: Basic Concepts

- Definition and origin of robotics
- Different types of robotics
- Various generation of robots
- Degrees of freedom
- Asimov's laws of robotics
- Dynamic stabilization of robots.

Power Sources and Sensors

- Hydraulic
- Pneumatic and electric drives
- Determination of HP of motor and gearing ratio
- Path determination
- Micro machines in robotics
- Machine vision
- Ranging
- Laser
- Acoustic
- Magnetic
- Fiber optic and tactile sensors

Unit 4:

Manipulators, Actuators and Grippers

- Construction of manipulators
- Manipulator dynamics and force control
- Electronic and pneumatic manipulator control circuits
- End effectors
- Various types of grippers
- Design Consideration

Industrial Applications

- Applications of Robots
- Welding
- parts handling / transfer
- Assembly operations

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Parts sorting
- Parts inspection
- Future applications

Text Books:

1. Automation Production System & Computer Integrated Manufacturing. Mikell P. Grover
2. Robotics & Flexible Automation S.R. Deb

Reference Books:

1. Pneumatic Control and Hydraulic Control S.R. Majundar
2. Ghosh, Control in Robotics and Automation: Sensor Based Integration, Allied Publishers, Chennai, 1998.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Open Elective – 3

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Total Quality Management**Course Code: - UMG-475**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

**LTP CR.
3103.5****Unit 1:**

- Introduction to TQM & ISO 9000
- Total Quality Control
- Customer Focus & Total waste Elimination (TWE)
- Quality Assurance.
- Quality of Design & Development
- Inspection & Measurement workforce Teams
- Benchmarking
- TQM for Sales Marketing Management.

Unit 2:

- Business Process Re-engineering & Information Technology
- Quality control SQC/ SPC
- Technology & Product Quality
- Quality for After Sales Services Technology & Product Quality.

Unit 3:

- Organization for Quality
- Reliability as quality characteristics
- Quality leadership
- Quality linked productivity
- Total Quality
- Culture
- Quality and environment
- Cost of Quality

Unit 4:

- Cost of Quality
- Quality Control for Export Modules
- Quality Maturity and Discipline
- Total commitment for Quality
- TQM Implementation
- ISOm 9000 series of standards

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- ISO 9000-1
- ISO 9000-2
- ISO 9000-3.

Text Books:

1. TQM & ISO 14000: K.C.Arora.
2. Total Quality Control: Armand V. Feigenbaum.
3. Total Quality Management: Joseph.A.Patrick, Diana.S.Furr.

Reference Books:

1. Total Quality Management – Text: Joel E. Ross Cases & Readin
2. Total Quality Control Essentials: Sarv Singh Soim

Course Name: - Optical Communication**Course Code: - UEC-466**

Assessment and Evaluation Components	
Quizzes / Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

**LTP CR.
3103.5****Unit 1:**

- Need for Fiber Optic Communications System
- Role of Fiber Optic communication technology
- Basic Block Diagram
- Advantages & Disadvantages of Optical Fiber Communication
- Structure of optical wave guide
- Light propagation in optical fiber using ray theory
- Electromagnetic Mode Theory
- Step Index Fiber
- Graded Index Fiber
- Attenuation- Bending Losses
- Scattering
- Absorption
- Dispersion – Intermodal, Chromatic, limitations & remedies.

Unit 2:

- Light sources & Transmitters
 - Light Emitting Diodes
 - Hetero junction & DH structure
 - Laser diodes
 - Principle of action
 - Characteristics
 - Efficiency
 - Block Diagram and typical circuits of Transmitter.

Unit 3:

- Receivers
- Photodiodes –Working
- Power relationship
- PIN photodiodes
- Avalanche photodiode
- Block Diagram & typical circuits of receiver.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Unit 4:

- Fiber Cable Connection
 - Splicing
 - Connectors
 - Components of Fiber Optic Networks
 - Transceivers
 - Semiconductor
- Optical amplifiers
 - Principle of operation
 - Gain
 - Bandwidth
 - Cross talk
 - Noise, Applications
 - Advantages & Disadvantages.
 - Erbium Doped Fiber Amplifiers (EDFAs)
 - Operation
 - Gain
 - Noise
 - Components of EDFA module.

TEXT BOOKS

1. Fiber Optic Comm. Systems, D.K.Mynbaev
2. Optical Fiber Comm, John M.Senior

REFERENCE BOOKS

1. Optical Fiber Comm, G.Keiser

Course Name: - Principles of Digital Communication**Course Code: - UEC-467**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

**LTP CR.
3103.5****Unit 1: Pulse Modulation**

- Sampling process,
- Pulse – amplitude modulation ,
- Other forms of pulse modulation,
- Bandwidth – noise trade off,
- Quantization process,
- Pulse code modulation,
- Noise considerations in PCM system,
- ISI & Eye pattern in PCM,
- Time- division multiplexing,
- Digital multiplexers,
- Differential pulse code modulation ,
- Delta modulation,
- Adaptive Delta Modulation.

Unit 2: Digital Modulation Techniques

- Binary phase
- Shift keying,
- Differential phase shift keying,
- Differentially – encoding PSK (DEPSK),
- Quadrature phase shift keying (QPSK),
- M-ary PSK,
- Amplitude shift keying(ASK),
- Quadrature amplitude shift keying (QASK).
- Binary frequency shift keying,
- Similarity of BFSK and BPSK,
- M-array FSK,
- Minimum shift keying (MSK)

Unit 3: Data Transmission

- A base band signal receiver,
- Probability of error,
- The optimum filter,

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- White noise: the matched filter,
- Probability of error of the matched filter,
- Coherent reception:
- Correlation,
- Phase shift keying (PSK),
- Frequency shift keying (FSK),
- Non coherent detection of FSK,
- Differential PSK,).

Unit 4: Spread Spectrum Modulation

- Pseudo-noise sequences,
- Direct sequence spread spectrum,
- Processing gain,
- Frequency HOP spread spectrum,
- Linear Block Codes, Convolution codes.

Text Books:

1. Communication System : Simon Haykins, John wiley.
2. Principles of communication system: Taub and schilling: TMH.

Reference Books:

1. Electronics Communication System: Wayne Tomasi: Pearson Edu.
2. Communication system analog and digital: sanjay sharma.

Course Name: - Disaster Management**Course Code: - UCE-476**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

**LTP CR.
3103.5**

Unit 1: Understanding Disasters

- Understanding the Concepts and definitions of Disaster,
- Hazard,
- Vulnerability,
- Risk,
- Capacity–Disaster and Development,
- Awareness During Disaster,
- Search and Rescue,
- Needs Assessment and Disaster management.

Unit 2: Types Of Disaster And Its Control**Geological Disasters**

- Earthquakes
- Landslides
- Tsunami
- Mining

**Hydro-Meteorological Disasters**

- Floods
- Cyclones
- Lightning
- Thunder-storms
- Hail storms
- Avalanches
- Droughts
- Cold and eat waves

**Biological Disasters**

- Epidemics
- Pest attacks
- forest fire

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.



Technological Disasters

- Chemical
- Industrial
- Radiological
- Nuclear



Manmade Disasters

- Building collapse
- Rural and urban fire
- Road and rail accidents
- Nuclear, radiological
- Chemicals and biological disasters
- Global Disaster Trends–Emerging
- Risks of Disasters–Climate Change and Urban Disasters.

Unit 3: Disaster Management In India



Disaster Profile of India –Mega



Disasters of India and Lessons Learnt Disaster Management Act 2005



Institutional and Financial Mechanism National Policy on Disaster Management,



National Guidelines and Plans on Disaster Management



Role of Government (local, state and national),



Non-Government and Inter-Governmental Agencies

Unit 4:



Geo-informatics in Disaster Management

- GIS
- GPS
- RS



Disaster Communication System

- Early Warning and Its Dissemination



Land Use Planning



Development Regulations Disaster Safe Designs



Constructions in India

Text Books:

1. S.K.Duggal, “Earthquake resistant design of structures”, Oxford University Press
2. Ulrich ranke, “Natural Disaster Risk Management: Geosciences and Social Responsibility”
3. Michael Beach , “Disaster Preparedness and Management”

Reference Books:

1. Rajesh Anand,N.C.Jana,Sudhir Singh, “Disaster Management and Sustainable Development Emerging issues and concerns”
2. B C Bose, “Introduction to Disaster Management”

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Building Project and Estimates**Course Code: - UCE-412**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

**LTPCR.
3 10 3.5****Unit 1:**

- Procedure of Estimating Methods of Estimating
- Main item of work
- Deduction for openings;
- Degree of accuracy. Methods of Building Estimates
- Individual Wall Method
- Center Line method
- Arch masonry calculation

Unit 2:

- Estimate of RCC works Estimate of RC Slab RCC Beam
- RCC T-beam slab and RCC column with foundation
- Road Estimating
- Estimate of Earthwork
- Estimate of Pitching of Slopes
- Estimate of Earthwork of road from longitudinal sections
- Estimate of Earthwork in hill roads Canal estimate
- Earthwork in canals
- Different cases
- Breached sections/ Breach closures.

Unit 3:

- Specifications Purpose and Method of writing specifications
- Detailed Specifications for Brickwork
- RCC
- Plastering
- Mosaic Flooring
- R.R Stone Masonary
- Analysis of Rates
- Preparing analysis of rates for the following items works:
- Concrete
- RCC Works

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Brickwork in foundation and superstructure
- Plastering preparing lead statements.

Unit 4:

- PWD accounts and procedure of works
- Organization of Engineering department
- Work charged establishment; Contract
- Tender
- Tender Notice
- Tender Schedule
- Plinth Area
- FLOOR Area
- Carpet Area
- Approximate Estimate
- Plinth Area estimate
- Revised Estimate Supplementary estimate.
- Annual budgets of work
- Cash flow allocations yearly
- TF Accounts of materials USR Valuation
- Cost
- Price & Value
- Methods of Valuation
- Out Goings
- Depreciation
- Methods for estimating cost depreciation
- Valuation of Building.

Unit 5:

- Contracts
- Types of Contracts
- Contract Law
- EMD
- Tenders
- Acceptance of contract
- Branch of contract
- Cancellation of contract
- Re-tendering- work order
- Running pavement
- Final Bill
- Deviation orders
- Completion Certificate

Text Books:

1. Estimating & Costing in Civil Engineering by B.N. Dutta
2. Valuation of real properties by S.C. Rangwal, Charotar Publishing House

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Reference Books:

1. Estimating and Costing by M. Chakraborty , S. Chand publishing house

Course Name: - Hydro Power Station Design**Course Code: - UEE-456**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

**LTP CR.
3103.5****Unit 1:**

- Introduction Hydrology
- Stream flow
- Hydrographs
- Flow duration curves
- Mass curve
- Storage
- Investigation of site.

Unit 2:

- Types of dams
- Arrangement and location of hydro-electric station
- Types of hydroelectric plants and their fields of use
- Principle of working of a hydroelectric plant.

Unit 3:

- Power to be developed
- Size of plant and choice of Modules
- Types of turbines and their characteristics
- Design of main dimensions of turbines.

Unit 4:

- Draft tubes
- Turbine setting
- Penstock dimensions
- Scroll case
- Preliminary design of penstock
- Characteristics of generators.
- Various design aspects of mini and micro hydel plants.

Text Books:

1. Power Station Design by M.V.Deshpande.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Illumination Engineering
Course Code: - UEE-408

Assessment and Evaluation Components	
Quizzes /Assignments/Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

LTP CR.
3103.5

Unit 1:

- Introduction: Laws of illumination
- Inverse Square law and Lambert's Cosine law
- Their application in lighting calculations.
- Brief idea of methods of lighting calculations
- General Principles Of Illumination
 - Definitions
 - Modules of light
 - Definitions of flux
 - Solid angles
 - Luminous intensity and brightness
 - Glare, polar curves.

Unit 2:

- Colour:
 - Nomenclature of colour
 - Production of colour light and mixing colours,
 - Colours contrast
 - Colour matching.
- Electric Light Sources:
 - Brief description of characteristics of starting and application of the following lamps
 - Incandescent lamp.
 - Sodium Vapour lamp.
 - Mercury Vapour lamp
 - Fluorescent lamp
 - Neon lamp

Unit 3:

- General Illumination Design (LUMEN METHOD)
 - Room index and Utilization factor
 - Maintenance factor
 - Types of lighting schemes

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Design of lighting schemes with practical examples.
- Minimum level of illumination required for:
 - Domestic.
 - Commercial
 - Educational.
 - Health
 - Industrial buildings.
 - Flood lighting of building
 - Road lighting factory lighting.

Unit 4:

- Maintenance and Economics
 - Maintenance of luminaire
 - Luminaire depreciation caused by dust and dirt
 - Efficient light production
 - Lighting economics
 - Instruments used in photometric measurements.

Text Books:

1. NPTEL Notes

Reference Books:

1. Utilization Of Electric Power and Electric Traction by: J.B.GUPTA

Course Name: - Engineering In Industry & Entrepreneurship**Course Code: - UME-459**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

**LTPCR.
3103.5****Unit 1:**

- Introduction and its Development:
 - Industrial Engineering
 - Concept
 - Functions
 - Fields of application
 - Origin and development of factory system
 - Effects of Industrial Revolution
 - Principles of scientific management.
 - Pioneers of Scientific Management
 - F.W.Taylor
 - Henry L.Gantt
 - Frank B. Gilberth
 - Henri Fayol etc.Administration and Organistion
 - Organisation Structure
 - Authority and Responsibility
 - Types of organization
 - Line
 - Functional
 - Line and Staff and Committee.
 - Wage Incentive Plans:
 - Concept
 - Characteristics of good wage incentive plan
 - Methods of Wage Payment
 - Classification of Wage Incentive Plans
 - Factors influencing wage rates.

Unit 2:

- Plant Location & Plant Layout:
 - Factors effecting plant location
 - Selection of plant site
 - Quantitative techniques of plant location decision

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Plant layout
- Principles of layout design
- Product Development and Design:
 - Product and its classification
 - Product design considerations
 - Product development
 - Product characteristics
 - Standardization
 - Product Simplification and Diversification
 - Value engineering and its role in product design and cost rationalization.
- Ergonomics:
 - Role of ergonomics in industry
 - Effect of physical environment on performance.
- Production, Planning and Control:
 - Concept
 - Objectives
 - Need and functions of P.P.C
 - Functions of planning routing,
- Scheduling
- Dispatching and follow up and progress report.
 - Production control charts.
 - Route and process charts.
 - Operation charts
 - Machine load charts
 - Gantt charts
 - Progress charts
 - Bar chart.

Unit 3:

- Inspection and Quality Control:
 - Definition and functions of Inspection
 - Inspection methods
 - Definition,
 - Objectives and principles of Quality control
 - Statistical Quality Control (SQC) Economics of Quality Control.
 - Introduction to statistical methods of quality control
- Time and Method Study (Work Study):
 - Their importance in scientific management.
 - Definition and objectives
 - Various time estimates
 - Level of performance Allowances
 - Time recording techniques
 - Procedure of method study
 - Various charts and diagrams
 - Classification of motion

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Principles of motion Economy
- Introduction to MRP, JIT and TQM
 - Definitions
 - Objectives and benefits

Unit 4:

- Entrepreneurship Development
 - Entrepreneurship,
 - Role of entrepreneurship in Indian economy,
 - Characteristics of entrepreneur,
 - Types of entrepreneurs,
 - Some myths and realities about entrepreneurship.
 - Role and scope of small scale industries,
 - Concept of small scale and ancillary industries undertaking
 - How to start a small scale industry, Steps in launching own venture. Infrastructure facilities available for entrepreneurship development in India.

Text Books:

1. Industrial Management: Spriegel. John Wiley & Sons. N.York, 1961.

Reference Books:

1. Industrial Organisation: Kimball and Kimball. Vakils Feffer & Simsons Pvt. Ltd. Bombay, 1971

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Emerging Automotive Technologies**Course Code: - UME-458**

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	100

**LTPCR.
3 10 3.5****Unit 1:****Fuel Cell Technology for Vehicles**

- What is fuel cell
- Type of fuel cell
- Advantage of fuel cell.
- Current state of the technology.
- Potential and challenges.
- Advantages and disadvantages of hydrogen fuel

Unit 2:**Latest Engine Technology Features:**

- Advances in diesel engine technology
- Direct fuel injection Gasoline engine.
- Diesel particular emission control.
- Throttling by wire.
- Variable Valve Timing,
- Method used to effect variable Valve Timing.
- Electromagnetic Valves.
- Camless engine actuation.

**42 Volt System:**

- Need
- Benefits
- Potentials and challenges.
- Technology Implications for the Automotive Industry.
- Technological evolution that will occur as a result of the adoption of 42 volt systems.

Unit 3:**Electrical and Hybrid Vehicles:**

- Types of hybrid systems
- Objective and Advantages of hybrid Systems

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Current Status
- Future developments and prospects of hybrid vehicles



Integrated Starter Alternator:

- Starts stop operation
- Power Assist. Regenerative braking.
- Advanced lead acid batteries
- Alkaline batteries
- Lithium batteries
- Development of new energy
- Storage systems
- Deep discharge and rapid charging ultra-capacitors.

Unit 4:



X-By Wire Technology:

- What is X-By Wire
- Advantage over hydraulic systems
- Use of Automotive micro controllers
- Types of sensors.
- Use of actuators in an automobile environment.



Vehicle Systems:

- Constantly Variable Transmission
- Benefits
- Brake by wire
- Advantages over power braking systems.
- Electrical assist. Steering
- Steering by wire
- Advantages of steering by wire.
- Semi-active and fully active suspension system.
- Advantages of fully active suspension system.

Text Books:

1. Advanced Vehicle technologies by Heinz Heisler – SAE International Publication.
2. Electric and Hybrid Electric Vehicles by Ronald K.Jurgen – SAE International Publication.

Reference Books:

1. Batteries for Electric Vehicles by DAJ Rand, R.Woods and R.M.Dell – SAE International Publication.
2. Electronics Braking, Traction and Stability Control – SAE Hardboud papers.
3. Electronics steering and suspension systems – SAE Hardboud papers.
4. 42 Volt systems by Daniel J. Holt – SAE International Publication.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.