Programme: MCA

Computer Applications

Scheme and Syllabi

w.e.f. Academic Session 2020-21

BUEST

SCHOOL OF ENGINEERING & EMERGING TECHNOLOGIES

Semester - I

Sr.No	Code	Course Title	L	T	P	Credit
1	PCA-101	Programming Methodologies with C	3	1	6	6.5
2	PCA-102	E-Governance and E-Commerce	3	1	0	3.5
3	PHU-102	Effective Communication Skills	3	1	2	4.5
4	PEC-144	Electronics and Microprocessors	3	1	2	4.5
5	PAM-105	Discrete Mathematics	3	1	0	3.5
6	PPD-101	Personality Development Programme	2	0	0	2
7	PCA-101	Programming Methodologies with C	3	1	6	6.5
		Total	17	5	10	24.5

Semester - II

Sr.No	Code	Course Title	L	T	P	Credit
1	PCA-151	Data Structure	3	1	4	5.5
2	PCA-152	OOP with C++	3	1	4	5.5
3	PCA-153	Software Engineering	3	1	0	3.5
4	PCA-154	Computer Organization and Architecture	3	1	0	3.5
5	PCA-155	Introduction to Operating Systems and Linux	3	1	4	5.5
6	PPD-151	Personality Development Programme	2	0	0	2
		Total	17	5	12	25.5

Semester –III

Sr.No	Code	Course Title	L	T	P	Credit
1	PCA-201	Programming in JAVA	3	1	4	5.5
2	PCA-202	Agile Methodologies	3	0	2	4
3	PCA-203	Information Storage and Management	3	1	0	3.5
4	PCA-204	Data Communication and Computer Networks	3	1	0	3.5
5	PCA-205	Artificial Intelligence	3	1	4	5.5
6	UXX-XXX	Open Elective -1	3	1	0	3.5
7	PPD-201	Personality Development Programme	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 –IV

Sr.No	Code	Course Title	L	T	P	Credit
1	PCA-251	Internet & Web Fundamentals	3	1	4	5.5
2	PCA-252	Relational Data Base Management System	3	1	4	5.5
3	PCA-253	Building Enterprise Applications	3	0	2	4
4	PCA-XXX	Departmental Elective-I	4	0	0	4
5	PMA-254	Computer Oriented Optimization Methods	4	0	0	4
6	UXX-XXX	Open Elective -2	3	1	0	3.5
7	PPD-251	Personality Development Programme	2	0	0	2
	Department Elective – 1					
1	PCA-481	Data Warehousing	4	0	0	4
2	PCA-482	Mobile Computing	4	0	0	4
3	PCA-483	Neural Networks and Fuzzy Logic	4	0	0	4
4	PCA-484	Management Information System	4	0	0	4
5	PCA-485	Theory of Automata	4	0	0	4
6	PCA-486	Mobile Application Development	4	0	0	4
	Open Elective -2					
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

Semester –V

Sr.No	Code	Course Title	L	T	P	Credit
1	PCA-301	Computer Graphics	3	1	4	5.5
2	UMA-351	Statistical Methods	3	1	0	3.5
3	PCA-302	Business Intelligence	3	0	2	4
4	PCA-303	Design and analysis of Algorithms using C++	3	1	4	5.5
5	PCA-XXX	Departmental Elective-II	4	0	0	4
6	UXX-XXX	Open Elective -3	3	1	0	3.5
7	PPD-301	Personality Development Programme	2	0	0	2
		Department Elective-2				
1	PCA-491	Digital Image Processing	4	0	0	4
2	PCA-492	Simulation & Modelling	4	0	0	4
3	PCA-493	Cloud Computing	4	0	0	4
4	PCA-494	Security in Computing	4	0	0	4
6	PCA-495	Big Data Analytics	4	0	0	4
		Open Elective -3				
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 Automative Technologies	3	1	0	3.5

Semester-VI

Sr.No	Code	Course Title	L	T	P	Credit
1	PCA-351	Software Development Project	0	0	0	**25**

Typical Curriculum Structure of AICTE for UG ECE Degree Programmes

S. No.	Course Work - Subject Area	Range of Total *Credits (%)* ***Minimum*** ***Maximum***		B.Tech. ECE (BUEST)
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

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 METHODOLOGIES IN C

Course Code: - PCA-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	1	6	6.5

Unit 1

Programming process: Problem definition, Algorithms, Flow Charts, C Character set, Identifiers and keywords, Data types, Declarations, Expressions, Statements and Symbolic Constants. Input-Output functions ,Preprocessor commands: #include, #define C Program structure Operators and their procedure: Arithmetic, Unary, Logical and relational operators .Debugging: Tracking defects, debugging by code inspection, debugging by logs, debugging using step-by-step execution, using break points.

Unit 2

Control statements: Branching, looping using for, while and do-while Statements, Nested control structures, switch, break, continue statements, Comma Operators. Functions: Definition, Call, prototypes, and passing arguments to functions. Program structure: Storage classes, automatic, external and static variables, Recursion vs Iteration.

Unit 3

Arrays: Definition, Access of Elements, initialization, passing array elements as arguments and passing arrays as arguments; Multidimensional arrays, strings. Pointers: address and dereferencing operators, declaration, assignment, initialization, arithmetic, precedence of address and dereferencing operators, pointer comparison, conversion. Passing pointers to functions. Arrays as functions arguments, pointer arrays and pointers to pointers. Dynamic memory management .

UNIT 4

Structure: Variable, initialization, accessing members, assignment, size of structure, scope of a structure, nesting, pointer to structures, scope of a structure type definition, structure as function arguments, function values: Arrays of structures, structures containing arrays, self referential structures. Bitwise logical operators: AND, OR, complement precedence and Associating bitwise shift operators, File processing: opening and closing, data files, creation, processing & unformatted data files, random file access.

Text Book:

1. let us C by Yashwant Kanetkar

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. The C programming Language, By Brian W. Kernighan and Dennis M. Ritchie, Published by 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.

Course Name: - E- GOVERNANCE & E-COMMERCE

Course Code: - **PCA-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	1	0	3.5

Unit 1

E-Governance Infrastructure and Strategies: E-readiness: Digital System Infrastructure, Legal Infrastructural Preparedness, Institutional Infrastructural Preparedness, Human Infrastructural Preparedness, Technological Infrastructural Preparedness; Evolutionary Stages in E-Governance.

UNIT 2

Models of E-Governance: Introduction; Model of Digital Governance: Broadcasting/ Wilder Dissemination Model, Critical Flow Model, Comparative Analysis Model, Mobilization and Lobbying Model, Interactive-service Model/Government-to-Citizen-to-Government Model (G2C2G); Evolution in E-Governance and Maturity Models: Five Maturity Levels, Characteristics of Maturity Levels, Key areas, Towards Good Governance through E-Governance Models.

UNIT 3

Overview of E-Commerce Technologies: Encryption overview, Elements of an encryption .System, Secret key encryption, Public-key encryption, Digital signatures, Digital Certificates, Cryptography export restrictions, Secure Sockets Layer(SSL), Secure Electronic Transactions (SET),Smart Cards and its applications. Enterprise Resource Planning-Evolution of ERP, Characteristics, Features, Components, Need, ERP Vendors, Business Process Reengineering, Advantages of ERP, Packages, Implementation of ERP Packages, Future of ERP Systems, Integrated SAP Model, Integrated Data-Master Data, Transactional data, Integrated Processes, Pros and Cons of integration, SAP Architecture and Integration.

UNIT 4

Electronic Data Interchange- Evolution, uses, Benefits, Working of EDI,EDI Standards(includes variable length EDI standards),Cost Benefit Analysis of EDI, Electronic Trading Networks, EDI Components, File Types ,EDI Services, EDI Software, Business Approach of EDI, EDIFACT(Overview, Structure, EDIFACT Software),Business Future of EDI,EDI Administration. EDI Security, Security Mechanisms, Technological aspects (Smart Cards, Worm Disks, Biometrics), Security Mechanism. Security Issues in E-Commerce Technologies- Introduction to Security, Passwords, Viruses, Firewalls, Encryption (PGP, SHTTP, SSL).

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. 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 Jallandhar.
4. Chemistry in Engineering & Technology, Vol.I & Vol.II, Rajaram, Kuriacose (TMH).

Reference Books:

1. Backus, Michiel, e-Governance in Developing Countries, IICD Research Brief, No. 1, March 2001.

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: - Effective Communication Skills

Course Code: - PHU-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	1	2	4.5

UNIT 1

Grammar: Use of punctuation marks, articles, prepositions, Idioms & phrases and their usage, Phonetics, Spoken English

Reading Skills: Model of reading to learn- SQ3R.; Reading, Tactics and strategies; Reading purposes: kinds of purposes and associated comprehension; Reading for meaning; reading outcomes structure of meaning technique, Paraphrase, Summary writing.

Writing Skills: Guide lines for effective writing; writing styles for application, personal resume, business letter, memo, Technical Report: Style, arrangements, illustration, main section and appendices, conclusion, list references, table of contents, synopsis, revision,

UNIT 2

Listening Skills: Barriers to listening, Effective listening skills, Feedback Skills. Attending telephone calls, Note taking,

Speaking and Discussion Skills: Components of an effective talk/presentation, Planning and organizing content for a talk/presentation, use of visual aids, effective speaking skills, discussion skills,

UNIT 3

Communication Process: Concept and Importance, Definitions & kinds of communication,

System of Communication: Formal and Informal, Barrier to effective communication, Grapevine system of Communication.

Principles of Business communication: Planning and conducting conversations, Interviews and discussion, preparation of oral statements, effective listening, Electronic communication.

UNIT 4

Written communication: Guides to effective writing, correspondence: including letters and job application, Memorandum, office orders, Reports: Types and preparation, Project Reports.

Non-Verbal Communication: Importance and Type, Cluster and congruency, Kinetics Vocal Cues. Modern Forms of Communication: Telegram, Telex, Fax, Tele-conferences, E-Mail.

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. English Grammar and Composition by Prof. M. Krishna swami.
2. High School English Grammar and Composition by Wren and Martin.
3. Patterns of English structures by A.S. Hornby. (Macmillian publications recommended)

Reference Books:

1. McGraw, SJ;Basic Managerial Skills for All, Prentice Hall of India, New Delhi 1991
2. Handbook of Practical Communication Skills by Chrissie Wright
3. Business Communication by K.K.Sinha

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: - ELECTRONICS & MICROPROCESSORS
Course Code:- PEC-144

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
Computer Number Systems and Codes, Adding and Subtracting Binary, Octal, Hex and BCD Numbers, Basic Logic Gates, Latches, Flip-Fops: RS, JK, D, T types of FF's, Master Slave FF, Race around problem; Registers, Shift registers: SISO, SIPO, PIPO & PISO, Counters, Synchronous & asynchronous counters, Modulo-N counters, UP / DOWN counters

Unit 2
Combinational Circuits: Half adders, full adders, multiplexers, demultiplexers. Boolean Algebra, Boolean expression simplification & minimization using Karnaugh's maps. Computer Block Diagram, Types of Computers, Common Microprocessor Types: Microprocessor Evolution, Dedicated Controllers, Bit-Slice Processors, General Purpose CPU's. Introduction to The 8086, 8088, 80188 & 80286 Microprocessors,

Unit 3
8086 Hardware, Addressing Memory and Ports in Microcomputer Systems, 8086 Timing Parameters, 8086 assembly Language Programming: Simple Sequence Programmes, Flags, Jumps, WHILE-DO & REPEAT-UNTIL implementations, Debugging, 8086 Instruction descriptions, 8086 Interrupts and interrupt Responses, Hardware Interrupt Applications, Programmable Parallel Ports and Handshake I/O, Interfacing Microprocessor to Keyboards, Alphanumeric Displays,

Unit 4
D/A Converter Operation & Interfacing, A/D Converter Types & Interfacing, 8086 Maximum Mode, DMA Transfer. Microcomputer Displays, Raster Scan Graphics Displays, CRT Terminals, Raster Scan Color Graphics, Vector Scan CRT Displays, Alphanumeric/Graphics LCD's Mass Data Storage Systems, FDD Storage, HDD Storage, Optical Storage, Printer Mechanisms.

Text Books:

1. Douglas V. Hall: Microprocessors and Interfacing: Programming & Hardware: Tata McGraw-Hill.
2. Malvino& Leach: Digital Electronics & Fundamentals: 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. Liu &Gibbson: Microcomputer Systems the 8086/8088 Family – Architecture, PHI.
2. Morris M. M.: Digital Logic and Computer Design: 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: - Discrete Mathematics

Course Code:- PAM-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 1 0 3.5

Unit 1
Mathematical Logic: Statement and notations, Connectives, Conjunction, Disconjunction, Statement Formulas, Truth Tables, Tautologies, Conditional and Bi conditional ,Well Formed Formulas ,normal forms, theory and Inference for statement calculus, predicate calculus, Inference theory for predicate calculus. Lattices and boolean algebra: Relations to partial ordering, Lattices, Hasse Diagram, Axiomatic definition of Boolean Algebra as algebraic structures with two operations, Boolean Functions, Representing Boolean Functions, Switching Circuits, Gate Circuits,

Unit 2
Relations and Functions: Binary relations, Composition of relations; Equivalence relations and partitions; Transitive Closure, Partially ordered sets, Functions, Injection, Surjection and bijection; Composition of functions. Recursion and Recurrence Relations: Recursive functions, iteration, sequences and discrete functions, Recurrence relations, Generating function and their applications,

Unit 3
Graph and Tree: Directed and Undirected Graphs, Weighted Graphs, Circuits, Paths, Cycles, Connectivity, Adjacency and Incidence Matrices, Eulerian Path , Hamiltonian path and circuits, Trees, Rooted trees, Binary Search trees and Minimal Spanning Tree, Kruskal's algorithm and Prim's Algorithm.

Unit 4
Algebraic structures: Introduction to algebraic structures, semi groups, Groups, Permutation Groups, Subgroups, Cosets, Normal Subgroups, Cyclic Groups, Lagrangestheorem,Burnside theorem, Homomorphisms, Isomorphism, Automorphism, Congruencies, Applications of Congruences, Rings, Finite fields: Definition, Representation, Structure, Integral Domain, Irreducible Polynomial, Polynomial Roots, Splitting Field.

Text Books:

1. TrembleyJ.P.andManohar R., Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw Hill (2003).

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. Alan Doerr And Kenneth Levaseur, Applied Discrete Structures For Computer Science, Galgotia Publications Pvt. Ltd., New Delhi.

Reference Books:

1. Seymour LipschutzAnd Marc Lars Lipson, Discrete Mathematics", Mcgrraw- Hill International Editions, Schaum's Series, 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.

SEMESTER 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: - Data Structures

Course Code:- PCA – 151

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	4	5.5

Unit 1

Basic Concepts and Notations, Data Structures and Data Structure Operations, Mathematical Notation and Functions, Algorithmic Complexity and Time Space Tradeoff. Basic Data Structures and Operations on them: Arrays, Stacks and Queues and Their Applications, Linked and Sequential Representation. Linked List, Representation of Linked List, Multi-Linked Structures.

UNIT 2

Trees-Definitions and Basic Concepts, Linked Tree Representation, Representations in Contiguous Storage, Binary Trees, Binary Tree Traversal, Searching, Insertion and Deletion in Binary Trees, Binary Search Tree, Heap and Heap Sort Algorithm, AVL Trees. Graphs and Their Application, Sequential and Linked Representation of Graph-Adjacency Matrix, Operations on Graph, Traversing a Graph, Dijkstra's Algorithm for Shortest Distance, DFS and BFS, Minimal Spanning Tree.

UNIT 3

Searching and Sorting, use of Various Data Structures for Searching and Sorting, Linear and Binary Search, Bubble Sort, Insertion Sort, Shell Sort, Selection Sort, Merge Sort, Radix Sort, Quick Sort. Hashing: Introduction to hash table, hash function, resolving collision by chaining and open addressing, deleting items from a hash table.

UNIT 4

File Organization: Sequential File Organisation : Processing Sequential files, Operations on sequential files.Direct File Organisation : Processing of Direct Files, Operations on sequential files. Indexed Sequential Organisation: Processing of Indexed Sequential files, Multi Level Indexing & B-Trees, Inverted Files. File Sorting Techniques: Sorting in External Memory, Merging Files

Text Books:

1. A. Tanenbaum, Y. Lanhgsam and A.J. Augenstein, "Data Structures Using C", Prentice Hall of India

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. Mary E. S. Loomis, "Data Management and File Structures", PHI, 1995.
3. Seymour Lipschultz, "Theory and Practice of Data Structures", McGraw-Hill, 1988.
4. E. Horowitz and S. Sahni, "Data Structures with Pascal", Galgotia, 3rd Edition, 1991.

Reference Books:

1. Sedgewick, "Algorithms in C", Pearson Education.
2. M. J. Folk, B. Zoellick, G Riccardi, "File Structures", 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: - OOPS with C++

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 1 4 5.5

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, passingarray 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, strupr, strlwr, 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. The C++ programming language by Bjarne Stroustrup Addison Wesley
2. Object Moudling and design by James Rumbaugh, Michel Blha William Premerlani, Fredetrick Eddy and William Lorence, PHI

Reference Books:

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

Course Name: - SOFTWARE ENGINEERING

Course Code: - PCA-153

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

Unit1
The software problem, software engineering problem, software engineering approach. Software development process, project management process, software configuration management process, software requirement analysis and specification- software requirements, problem analysis, requirement specification and validation.

Unit 2
Software Planning: Cost estimation, function point and COCOMO models project schedule estimation, staffing and personnel planning, software configuration management plan, quality assurance, monitoring plans and risk management.

Unit 3
Software Design: Design concepts, abstraction, modularity, structure, concurrency, information hiding, modularization, coupling and cohesion, design notations, data flow diagrams, structure charts, procedure templates, pseudo code, decision tables, detailed
Design considerations, verification, complexity, data binding and cohesive metrics.

Unit 4
Implementation Issues: Structured coding techniques, coding style, standards and guidelines.
Verification and Validation Techniques: Quality assurance, static analysis, symbolic execution, unit testing and debugging, system testing, CASE tools, Software Reliability basic concepts, computation of system reliability, models, and estimation.

Text Books:

1. K. K. Aggarwal & Yogesh Singh, "Software Engineering", 2nd Ed., New AgeInternational, 2005.
2. R. S. Pressman, "Software Engineering – A practitioner's approach", 5th Ed.,McGraw Hill Int. Ed., 2001.

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.

Recommended Books:

1 Pankaj Jalote, "An Integrated Approach To Software Engineering." Narosa Publishing House, 1991.

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 Organization & Architecture
Course Code:- PCA-154

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: A Brief history of Processors, The VON NEUMANN model, The system Bus model, A Typical computer system. Digital Logic Circuits: Logic gates , Boolean algebra, K-maps , combinational circuits, flip-flops, sequential circuits. Digital Components: Integrated circuits, multiplexers, encoders, demultiplexers, decoders, shift registers, binary counters, memory units.

UNIT 2

Data Representation: Binary numbers, binary codes, fixed point representation, floating point representation, error detection codes. Computer Arithmetic: Introduction, addition and subtraction, multiplication algorithms, division algorithms, floating point arithmetic operation, decimal arithmetic unit, decimal arithmetic operations. RISC/CISC, Register Transfer and Micro operation: Register transfer language, register transfer, bus and memory transfer, arithmetic micro operations, logic micro operations, shift micro operations.

UNIT 3

Basic Computer Organization and Design: Instruction codes, computer registers, computer instructions, timing & control, instruction cycle, memory reference instructions, input- output and interrupt design of basic computer, design of accumulator logic. Microprogrammed Control Unit : Control memory, address sequencing. Central Processing Unit: Introduction, general register organization, stack organization, instruction formats, addressing modes.

UNIT 4

Input – Output Organization: Peripheral devices, DMA, input – Output interface, asynchronous data ransfer, modes of data transfer, priority interrupt, direct memory access, input – output processor. Memory Organization: Memory hierarchy, main memory, auxiliary memory, associative memory, cache memory, virtual memory, memory management hardware.

Text Books:

1. Morris Mano, Computer System Architecture, 3rd Edition, Prentice-Hall of India Private Limited, 1999.
2. WIliam Stallings, Computer Organization and Architecture, 4th Edition, Prentice Hall of India Private Limited, 2001

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. Harry & Jordan, Computer Systems Design & Architecture, Addison Wesley, Delhi,2000.

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: - Introduction to Operating Systems and Linux
Course Code :-PCA-155

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	4	5.5

Unit 1

Introduction: Introduction: Definition Of The Operating System, Functions Of An Operating System, Different Types Of Systems - Simple Batch System, Multi-Programmed Batched System, Time Sharing System, Personal Computer Systems, Parallel Systems, Distributed Systems, Real Time Systems, Computer System Structure- operation, I/O structure, storage structure, Operating System Services .Basic concept of multiprogramming, multitasking and multiprocessing, goals and major functions of operating system Memory management schemes with advantages and disadvantages- Paging, Segmentation and Paged Segmentation .

Unit 2

Process Management: Process, process state transition, Process control Block, Independent and cooperating process, Scheduling Algorithms, with necessary examples and demo on Windows **Process Synchronization:** The Critical Section Problem,, Semaphores, Classical Problems of Synchronization, Critical Regions. **Deadlocks:** Deadlock Characterization, Methods For Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery From Deadlock. **Inter-Process Communication**: Threads, Concurrency, Critical section, Mutual Exclusion, Semaphore.

Unit 3

File Management: introduction to File system, file types and file operations, file operation commands, file access rights, file storage management. **File System Interface:** File Concept, Access Methods–sequential, direct, index, Directory Structure–single-level, two–level, tree-structured, acyclic-graph, general graph, Directory Implementation–linear list, hash table, Efficiency and Performance **Device Scheduling**: Illustrate the concept of I/O channels, interrupts and the structure of an I/O system with necessary examples and demo on Windows. Disk Structure, Disk Scheduling, FCFS, SSTF, SCAN, C-SCAN, Look Scheduling, Selection of A Scheduling Algorithm, Disk Management-disk formatting.

Unit 4

Linux: Linux Operating System Concepts and Architecture , User Space, Kernel Space, Processes and Daemons, Process Control, Linux File system, User, Group and Resource Management , Configuration Files, File system Permissions, Access Permissions and Security, , /proc file system , Common File system Commands, Partitioning and Disk 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.

Installing and Selecting Software Introduction to shell and Kernel programming : Why shell programming, Creating a script, Variables, Shell commands and control structures, Kernel Basics, General kernel responsibilities, Kernel organization, Kernel modules Using Kernel Services , System calls , Signals and interrupts , Managing memory , Address architecture, address space.

Text Books:

1. Silberschatz and Galvin, Operating System Concepts, John Wiley & Sons ,Sixth 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.

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:- Programming in Java

Course Code: -PCA-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 1 4 5.5

Unit 1:
Introduction To Object Oriented Programming: Data Abstraction, Encapsulation, Inheritance (Public, Protected And Private), Polymorphism, Information Hiding. JAVA Virtual Machine, JDK **Java Elements:** Data Types, Literal and Variables, Operators–Arithmetic, Bit-wise, Relational, Boolean Logical, Assignment, The '?' Operator, Operator Precedence, Control Statements–Selection (if, switch), Iteration Statements (while, do-while, for) Jump Statement, Arrays (One-dimensional, Multi-Dimensional).**Introducing Classes:** Class Fundamentals, Declaring Objects, Methods, Constructors, 'This' Keyword, Over loading Methods.

Unit 2: Inheritance: Inheritance Basics, Protected Members, Method Overriding, Multiple Inheritance, Functions. **Packages:** Importing Inbuilt Packages and sub Packages, Creation of User-Defined Packages and sub-packages, importing user defined packages, Hiding a class in the package.
Exception Handling: Fundamental, Exception Types, Uncaught Exceptions, Try And Catch, Dealing With Exceptions (try, throw, throws, finally). User-Defined Exceptions.

Unit 3:
Multithreading–Java Thread Model, The Main Thread, Creating a Thread, Creating Multiple Threads, Thread Priorities, Synchronization, Inter-thread Communication, Multithreading.
Java Applets: Applet Basics, The Applet Class, Applet Architecture, An Applet Skeleton, Applet Display Methods, Layouts (Flow, Grid) **Event Handling:** Delegation Event Model, Event Classes and Interfaces, Mouse Events, Keyboard Events; Coding on Events, Adaptor Classes, AWT Classes and controls.

Unit 4: JDBC Basics - Java Database Connectivity: JDBC Oracle Connection and Prepared Statement, SQL Queries through JAVA **Swings:** JApplet, JFrame, JComponent, JTables, Tabbed Panes, Scroll Panes. **Servlets:** Lifecycle; Servlet Parameters, Handling HTTP Request and Response, Using Cookies, Session tracking.**JAVA Beans:** Advantage of Beans, Bean Properties Methods.

Text Book:

1. Patrick Naughten& Herbert Schildt, " The Complete Reference Java ." 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. Gilbert, Stephan D. And William B. Hccarthy, " Object Oriented Programming In Java ", 1997, The Waite

Reference Books:

1. Mary Compoine And Kathy Walrath ," The Java Turtoria1 ", Addison-Wesley, 1996.
Horstmann, Cay S. And Gary Cornell, "Core Java 1.1 : Fundamentals ." 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: - Agile Methodologies

Course Code: - PCA-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
3	0	2	4.0

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), 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

Unit 4

Agile Software Design and Development: Agile design practices, Role of design Principles including Single Responsibility Principle, Open 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

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.

3. Prentice HallAgile Testing: A Practical Guide for Testers and Agile Teams By Lisa Crispin, Janet Gregory Publisher: Addison Wesley Published: 30 Dec 2008

Reference Books:

1. Prentice HallAgile Testing: A Practical Guide for Testers and Agile Teams By Lisa Crispin, Janet Gregory Publisher: Addison Wesley Published: 30 Dec 2008.

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: - Information Storage& Management

Course Code: -PCA-203

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 Information Storage and Management: Data; Types of Data; Information; Storage, Evolution of Storage Technology and Architecture; Data Center Infrastructure- Core Elemnts; 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

Unit 2

Direct- Attached Storage: Types of DAS; Benefits and Limitations ;**Introduction to SCSI:** Evolution,; Interfaces, Architecture and Addressing, SCSI Command Model .**Storage Area Networks**: Fibre 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

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; Local Replication Technologies, Creating Multiple Replicas, Management Interface, Remote Replication, 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.

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. Information Storage and Management by G. Somasundaram and Alok Shrivastava, Wiley 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: - Data Communication & Computer Networks

Course Code: - PCA-204

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: Definition, Uses, Application, Structure, Network Software, Design Issues For The Layer, The O.S.I. Reference Model, Services, Example Networks - Public Networks, ARPANENT, MAP AND TOP, USENET, CSNET, BITNET, SNANET. **Physical Layer:** Theoretical Bases For The Data Communication, The Maximum Data Rate Of A Channel, Transmission Media, Magnetic Media, Twisted Pair, Base-band Coaxial Cable, Fiber Optics, Line Of Sight Transmission Communication Satellite, Analog Transmission, Digital Transmission, Transmission And Switching, Terminal Handling, ISDN, Digital Network.

Unit 2

Medium Access Layer: Local And Metropolitan Area Network, Aloha Protocol, LAN Protocol, IEEE Standard 802.4 For LAN'S, Fiber Optic Networks, Satellite Networks, Packet Radio Networks. **Data Link Layer:** Design Issues–Framing, Error Control, Flow Control, Link Management, Error Detecting Code and Error Correcting Codes, Elementary Data Link Protocols – An Unrestricted Simplex Protocol, A Stop And Wait Protocol, A Simplex Protocol For A Noisy Channel, Sliding Window Protocol – A One Bit Sliding Window Protocol, A Protocol Using Go Back n , Protocol Specification And Verification – Finite State Machine Models, Petri Net Models.

Unit 3

Network Layer: Design Issues, Routing Algorithms–Shortest Path Routing, Isolated Routing, Flooding, Distributed Routing, Optimal Routing, Flow Based Routing, Broadcast Routing, Congestion Control Algorithms–Pre-allocation of Buffers, Packet Discarding, Flow Control, Choke Packets, Deadlocks, Internetworking–Bridges, Gateways. **Transport Layer:** Design Issues, Connection Management–Addressing, Establishing a Connection, Releasing a Connection, Time–Based Connection Management, Flow Control And Buffering, Multiplexing, Crash Recovery.

Unit 4

Session Layer: Design Issues–Data Exchange, Dialog Management, Synchronization, Activity Management, Exception Reporting, Remote Procedure Call–The Client Server Model, Implementation Of RPC, Semantics of RPC, Orphans. **Presentation Layer: Design Issues**–Data Representation, Data Compression, Network Security And Privacy, Abstract Syntax Notation 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.

Data Structure, Abstract Syntax, Transfer Syntax, Data Compression Techniques, Cryptography **Application Layer: Design Issues**–File Transfer, Access and Management, Electronic Mail, Virtual Machines and Other Application

Text Book:

1. A.S. Tanenbaum, Computer Networks, PHI.
2. Uyless D. Black, Data Communication and Distributed Networks, PH International.
3. Cannon and Luccke, Understanding Communication Systems, Texas Instruments.

Reference Books:

1. James Martin, Computer Networks and Distributed Processing, PHI.

Course Name: -Artificial Intelligence

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 Code:-PCA-205

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	4	5.5

Unit 1

Scope of AI-Games, theorem proving, natural language processing, vision and speech processing, robotics, expert systems, AI techniques- search knowledge, abstraction. Problem solving-State space search; Production systems, search space control: depth-first, breadth-first search, heuristic search - Hill climbing, best-first search, branch bound. Problem Reduction, Constraint Satisfaction End, Means-End Analysis

Unit 2

Knowledge Representation Predicate Logic: Unification, modus pones, resolution, dependency directed backtracking .Rule based System: Forward reasoning: conflict resolution, backward reasoning: use of no backtrack. Structured Knowledge Representation: Semantic Nets: slots, exceptions and default frames, conceptual dependency, scripts.

Unit 3

Handling uncertainty-Non-Monotonic Reasoning, Probabilistic reasoning, use of certainty factors, fuzzy logic.

Unit 4

Learning-Concept of learning, learning automation, genetic algorithm, learning by inductions, neural nets. Expert Systems-Need justification for expert systems, knowledge acquisition, Case studies: MYCIN, RI.

Text Books

1. 1E. Rich and K. Knight, "Artificial intelligence", TMH, 2nd ed., 1992.
2. N.J. Nilsson, "Principles of AI", Narosa Publ. House, 1990
3. D.W. Patterson, "Introduction to AI and Expert Systems", PHI, 1992.

Reference Books:

1. Peter Jackson, "Introduction to Expert Systems", AWP, M.A., 1992.
2. R.J. Schalkoff, "Artificial Intelligence - an Engineering Approach", McGraw Hill Int Ed., Singapore,

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 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	1	0	3.5

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

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: - 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
3 1 0 3.5

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

3 1 0 3.5

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

Course Name: - Energy 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 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
3 1 0 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,
- Maintenance and Energy Audits.

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. Handbook of Energy Audits by Albert Thuman – Fairman Press Inc.
2. Energy basis for man and nature by Howard T.Odum & Elisbeth 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
3 1 0 3.5

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
3 1 0 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

Course Name: - Advanced Environmental Engineering

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 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
3 1 0 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
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

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. An Introduction to power plant technology by G.D.Rai.

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: - 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

3 1 0 3.5

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 gaiting 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:

Extursion and other processes : Extrusion principle, hot extrusion, cold extrusion, wire drawing, swaging, tube making, Sheet metal operation, shearing action, drawing dies, spinning, bending, strech 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 wedling (MIG), submerged arc welding (SAW)

Unit 4:

Resistance Welding: Principles, resistance sopt 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. Foundary 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**

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31 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
  - Verniermethod,
  - 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 andelectrical 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
  - **S**traight 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 IV

Course Name: INTERNET & WEB TECHNOLOGIES

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 Code: - PCA-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 1 0 3.5

Unit 1
Objected oriented concepts - object oriented programming (review only) -- advanced concept in OOP - relationship - inheritance - abstract classes polymorphism - Object Oriented design methodology - approach - best practices. UML class diagrams - interface - common base class

Unit 2
Internetworking - Working with TCP/IP - IP address - sub netting - DNS - VPN - proxy servers - firewalls - Client/Server concepts - World Wide Web - components of web application - MIME types, browsers and web servers - types of web content - URL - HTML - HTTP protocol - Web applications - performance - Application servers - Web security. User Experience Design - Basic UX terminology - UXD in SDLC - Rapid prototyping in Requirements

Unit 3
HTML5 - Basic HTML tags - Look and feel using CSS - Client side scripting using Java Script(JS) and Validations - Document Object Model (DOM) – Jquery

Unit 4
Business tier using POJO (Plain Old Java Objects) - Introduction to Frameworks - Introduction to POJO - Multithreaded Programming - Java I/O - Java Database Connectivity (JDBC) Presentation tier using JSP - Role of Java EE in Enterprise applications - Basics of Servlets - To introduce server side programming with JSP.

Text Books

1. Douglas E Comer, Internet Book, The: Everything You Need to Know About Computer Networking and How the Internet Works, 4/E, Prentice Hall, 2007
2. Jeffrey C. Jackson, Web Technologies: A Computer Science Perspective, Prentice Hall, 2007

Reference Books

1. Herbert Schildt, Java: The Complete Reference, McGraw-Hill Professional, 2006. Discrete Mathematical Structures by B. Kolman and R.C. Busby, PHI.

Course Name: - RELATIONAL 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.

Course Code: - PCA-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 4 5.5

Unit 1

Query Processing and Optimization Basic Algorithms for executing Query Operations, Using Heuristics in Optimization ,Transaction Processing Concepts,Introduction to Transaction Processing, Transaction and System concepts ,Desirable Properties of transaction ,Schedules and recoverability, Serializability of schedules, Concurrency Control Techniques Locking Techniques for concurrency control ,Techniques Based on Time Stamp Ordering, Multiversion concurrency control Techniques, Validation Concurrency Control Techniques

Unit 2

Recovery techniques Recovery Concepts: Recovery Techniques Based on Deferred Update ,Recovery Techniques Based on Immediate Update, Shadow Paging, Recovery in Multi database Transaction ,Database Security and Authorization, Introduction to Database Security Issues, Discretionary Access Control Based on Privileges Mandatory Access Control for Multilevel Security Statistical Database Security. Advanced Data Modeling Concepts Enhanced – ER (ERR)-to-Relational Mapping Data Abstraction Knowledge Representation Concepts Integrity Constraints in data modeling, EER Update Operation Transaction

Unit 3

Object-Oriented Databases Overview of Object-Oriented concepts Object Identity Object Structure Type Constructor Encapsulations of Operations, Methods Persistence, Type, Class Hierarchies, Inheritance, Complex Objects, Other O –O concepts, Distributed Databases and Client-Server Architecture, Introduction to Distributed DBMS Concepts, Overview of Client-Server Architecture ,Data Fragmentation, Replication and Allocation Techniques for Distributed Database Design Types of Distributed Database Systems, Query Processing in Distributed Databases, Overview of Concurrency Control and Recovery in Distributed databases

Unit 4

Deductive Databases Introduction to Deductive Databases, Prolog/Data log Notation, Interpretation of Rules, Basic interference Mechanism for Logic Programs and their evaluation, The LDL System, Other Deductive Database Systems Emerging Database Technologies and applications, Progression of Database Technology, Emerging Database Applications ,Next Generation of Databases Database Management Systems

Text 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.

1. FUNDAMENTALS OF DATABASE SYSTEMS by Ramez Elmasri, Shamkant B. Navathe ,
2. DISTRIBUTED DATABASE : PRINCIPLES AND SYSTEM by Ceri S. and Palagatti,G , TMH

Reference Books:

1. DATABASE SYSTEM CONCEPTS by Korth, H. and Silberschatz,A , 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: - BUILDING ENTERPRISE APPLICATIONS

Course Code: - PCA-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
3 0 2 4.0

Unit 1

Introduction to Enterprise application: Introduction to enterprise applications and their types, software engineering methodologies, life cycle of raising an enterprise application, introduction to skills required to build an enterprise application, key determinants of successful enterprise applications, and measuring the success of enterprise applications

Unit 2

Incepting enterprise application and business process modeling: Inception of enterprise applications, enterprise analysis, business modeling, requirements elicitation, use case modeling, prototyping, non functional requirements, requirements validation, planning and estimation

Unit 3

Enterprise Architecture and designing enterprise application: Concept of architecture, views and viewpoints, enterprise architecture, logical architecture, technical architecture - design, different technical layers, best practices, data architecture and design - relational, XML, and other structured data representations, Infrastructure architecture and design elements - Networking, Internetworking, and Communication Protocols, IT Hardware and Software, Middleware, Policies for Infrastructure Management, Deployment Strategy, Documentation of application architecture and design

Unit 4

Constructing enterprise application: Construction readiness of enterprise applications - defining a construction plan, defining a package structure, setting up a configuration management plan, setting up a development environment, introduction to the concept of Software Construction Maps, construction of technical solutions layers, methodologies of code review, static code analysis, build and testing, dynamic code analysis - code profiling and code coverage Testing and rolling out enterprise application Types and methods of testing an enterprise application, testing levels and approaches, testing environments, integration testing, performance testing, penetration testing, usability testing, globalization testing and interface testing, user acceptance testing, rolling out an enterprise application.

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. Software Requirements: Styles & Techniques - published by Addison-Wesley Professional
2. Software Systems Requirements Engineering: In Practice - published by McGraw-Hill/Osborne Media

Reference Books:

1. Managing Software Requirements: A Use Case Approach, 2/e - published by Pearson

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 Oriented Optimization Methods
Course Code: - PMA-254

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

Linear Programming Problem (LPP): Formulation and examples, Feasible, Basic feasible and optimal solutions, Graphical Method to solve L.P.P., Simplex Method, Big M Method, Duality theory, Dual LPP, Dual simplex algorithm,

Unit 2

Transportation Problem (TP): Mathematical formulation, Basic feasible solutions of T.Ps by North West corner method, Least cost-Method, Vogel s approximation method. Unbalanced TP, optimality test of Basic Feasible Solution (BFS) by U-V method, Stepping Stone method, degeneracy in TP.

Unit 3

Queue Theory: Queuing system, its elements, characteristics, Classification of Queuing Models, Single Server Model, Multiple server and Machine service Models (M/M/R: GD/K/K, R<K), M/G/1: GD/∞ .Game theory: Two-person, zero-sum games, The maxmin and minmax principle, pure strategies, mixed strategies, Graphical solution of 2xn and mx2 games, Dominance property, General solution of m x n rectangular games, Linear programming problem of GP.

Unit 4

Network Models Scope and definition of Network Models, Minimal spanning Tree Algorithm, Shortest route problem, Maximal flow model, PERT and CPM.

Text Books:

1. G. Hadley, Linear Programming, Narosa Publishing House (2002).
2. H.A. Taha, Operations Research: An Introduction, Prentice Hall of India Pvt. Ltd., 7th Edition
3. J.K. Sharma, Operations Research, Macmillan India Pvt. Ltd. 2003.

Reference Books :

1. S.D. Sharma, Operations Research, Kedar Nath Ram Nath & Co. 14th Edition 2004
2. Kathti Swarup, P.K. Gupta and Manmohan, Operations Research, Sultan Chand & Sons n12.

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 - 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: - Data Warehousing

Course Code: - PCA-481

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

The Compelling Need for data warehousing: Escalating Need for strategic information, failures of Past decision-support systems, operational versus decision-support systems, data warehousing – the only viable solution, data warehouse defined .**Data warehouse – The building Blocks:** Defining Features, data warehouses and data marts, overview of the components, metadata in the data warehouse.

Defining the business requirements: Dimensional analysis, information packages – a new concept, requirements gathering methods, requirements definition: scope and content.

Unit 2

Principles of dimensional modeling: Objectives, From Requirements to data design, the STAR schema, STAR Schema Keys, Advantages of the STAR Schema. **Dimensional Modeling:** Updates to the Dimension tables, miscellaneous dimensions, the snowflake schema, aggregate fact tables, families of STARS.

Unit 3

OLAP in the Data Warehouse: Demand for Online analytical processing, need for multidimensional analysis, fast access and powerful calculations, limitations of other analysis methods, OLAP is the answer, OLAP definitions and rules, OLAP characteristics, major features and functions, general features, dimensional analysis.What are hypercube? Drill-down and roll-up, slice-and-dice or rotation, OLAP models, overview of variations, the MOLAP model, the ROLAP model, ROLAP versus MOLAP, OLAP implementation considerations

Unit 4

Data Mining Basics: What is Data Mining, Data Mining Defined, The knowledge discovery process, OLAP versus data mining, data mining and the data warehouse. Major Data Mining Techniques, Cluster detection, decision trees, memory-based reasoning, link analysis, neural networks, genetic algorithms, moving into data mining. Data Mining Applications, Benefits of data mining, applications in retail industry, applications in telecommunications industry, applications in banking and finance.

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. Paul Raj Poonia, "Fundamentals of Data Warehousing", John Wiley & Sons, 2003.

Reference Books:

1. Sam Anahony, "Data Warehousing in the real world: A practical guide for building decision support systems", John Wiley, 2004

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 Computing

Course Code: - PCA-482

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, Multigranularity 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, Mobile database recovery scheme.

Text Books

1. Mobile Database Systems By Kumar Vijay, John Willy &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: - Neural Networks and Fuzzy logic
Course Code: - PCA-483

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 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, 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, basic fuzzy inference algorithm, Applications of fuzzy system, useful tools supporting design.

Text Books:

1. Principles of Soft Computing by Sivanandam, Deepa, Wiley.
2. Neuro-Fuzzy and Soft computing by Jang J.S.R, Sun C.T. and Mizutani E , Prentice Hall.
3. Fuzzy Logic with Engineering Applications by Timothy J. Ross, McGraw Hill
4. Fundamentals of Neural Networks by Laurene Fausett, 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. Optimization and Machine Learning by E. Goldberg, Genetic Algorithms: Search, McGraw Hill.
2. Fuzzy Logic by Wang, Springer, Addison Wesley, Genetic Algorithms by Goldberg, 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: - Management Information Systems
Course Code: - PCA-484

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
The meaning and role of MIS: What is MIS? Decision support systems, systems approach, the systems view of business, MIS Organization within the company. Management Organizational theory and the systems approach: Development of organization theory, management and organizational behavior, management, information, and the systems approach.

Unit 2
Information Systems for decision making: Evolution of an information system, Basic Information Systems, decision making and MIS, MIS as a technique for making programmed decisions, decision assisting information systems .Strategic and project planning for MIS: General business planning, appropriate MIS response, MIS planning – general, MIS planning – details.

Unit 3
Conceptual system design: Define the problems, set system objectives, establish system constraints, determine information needs, determine information sources, develop alternative conceptual designs and select one, document the system concept, prepare the conceptual design report.

Unit 4
Implementation, evaluation and maintenance of the MIS: Plan the implementation, acquire floor space and plan space layouts, organize for implementation, develop procedures for implementation, train and operating personnel, computer related acquisitions, develop forms for data collection and information, dissemination, develop the files, test the system, cut over, document the system, evaluate the MIS, control and maintain the system.

Text Books:

1 R. G. Murdick, J. E. Ross and J. R. Clagget, "Information Systems for Modern Management", 3rd Edition by, PHI – 1994.

Reference Books:

1 Parker, Charles Case, Thomas, "Management Information System: Strategy & Action", 2nd Edition, TMH, 1993

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
Course Code:- PCA-485

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

Finite Automata and Regular Expression Finite State System Basic Definitions Non-Deterministic finite Automata (NDFA) Deterministic finite Automata(DFA) Equivalence of DFA and NDFA 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).

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. CP 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 Hopcroaft & O.D.Ullman, R.Motwani: Introduction to Automata Theory, languages & computations
2 K.L.P.Mishra & N.Chandershekaran: Theory of Computer Sc.)
3 Peter Linz: Introduction to formal language & Automata

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 John C. Martin: Introduction to Languages and the Theory of Computation

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:- PCA-486

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
Characteristics of mobile applications. Architecture and working of Android, iOS and Windows phone 8 operating system. User-interface design for mobile applications and managing application data.Integrating cloud services, networking, OS and hardware into mobile-applications. Addressing enterprise requirements in mobile applications: performance, scalability, modifiability, availability and security.

Unit 2
Introduction to Android Development Environment, What Is Android? Advantages and Future of Android, Frameworks, Tools and Android SDK. Installing Java, Android Studio, SDK Manager Components and updating its platforms

Unit 3
AVD Manager, Genymotion Plugin: Fastest Virtual devices,Understanding Java SE and the Dalvik Virtual Machine.The Directory Structure of an Android Project, Common Default Resources Folders, The Values Folder, Leveraging Android XML.

Unit 4
Introduction to iOS application development: Overview of iOS, iOS Development Environment,iOS Layers, basic of Swift, Building an application for IOS.Windows phone Environment: Overview of windows phone and its platform, Building windows phone applications.

Text Books:

1. Professional Mobile Application Development, JEFF MCWHERTER, SCOTT GOWELL, Wiley.
2. Android Studio Application Development, Belen Cruz, Zapata, Packt Publishing

Reference Books:

1. Professional Android 4 Application Development, Reto Meier, Wrox Publication
2. Beginning iPhone Development with Swift, David Mark, Apress 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.

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**

L T P Cr
3 1 0 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 opportModuleies,
- 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).

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: - 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
3 1 0 3.5

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 & econospheric 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. Trimothy Pratt, Charles W. Bostian,-Satellite Communications‖, John Wiley & Sons, 1986.
2. Dr. D.C. Aggarwal, ―Satellite Communications‖, Khanna Publishers, 2001.

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 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**

L T P CR
3 1 0 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:

- System function
- 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.
- TMS320CXXSERIES 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

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: - 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**

L T P CR.
3 1 0 3.5

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 Facto
  - 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 IncNew york.
4. Electrical Machines byJ. Nagrath&D.P.Kothari, Tata McGraw Hill
5. Electrical Machines by Husain Ashfaq ,DhanpatRai& Sons
6. Electric Machine and Tranformers by Irving L.Kosow, Prentice Hall of India.
7. Fundamentals of Electrical Machines by B.R. Gupta &VandanaSinghal, New Age International

Reference Books:

1. Electric Machinery by A.E. Fitggerald, C.KingsleyJr 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**

L T P CR.
3 1 0 3.5

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.

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 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**

L T P CR
3 1 0 3.5

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 whether 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. Nevile, 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**

L T P CR.
3 1 0 3.5

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 analize 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

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:-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**

L T P CR.
3 1 0 3.5

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:

- **Bio Energy**
  - 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

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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**

L T P CR.
3 1 0 3.5

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

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Unit 2:

Transfer Device, Feeders & Material Handling:

- Detriot- 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.
1. Write a XHTML form for gathering user input in PHP
2. Write a PHP program obtaining user input through forms.
3. 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.

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: - Computer Graphics

Course Code: - PCA-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
3	1	4	5.5

Unit 1

Overview Display devices – video, refresh CRT, raster scan, random scan, color CRT, monitors raster scan systems, video controller, raster scan display processor, input devices– trackball and space ball, joysticks, digitizers, scanners, touch panels, light pen. Scan Conversion: Primitive drawing – DDA and Bresenham's algorithm for line, circle, ellipse, general curves, filling – scan line, polygon fill algorithm, inside-outside tests, flood-fill, boundary-fill, attributes – area fill attributes, line and text attributes.

Unit 2

wo-Dimensional and Three-Dimensional Transformations: Basic transformations, matrix representation and homogeneous co-ordinates, composite transformation, reflection and shear transformation. Three-Dimensional Object Representations: Polygon surfaces, polygon tables, plane equations, polygon meshes, curved lines and surfaces, quadric surfaces, spheres, curves, spline representations and spline specifications, Bezier and B-spline curves.

Unit 3

Clipping and Viewing: Line clipping – Cohen Sutherland, Liang-Barsky, polygonclipping – Sutherland –Hodgeman, Weiter-Atherton, projection and its transformations –parallel and perspective and, vanishing points

Unit 4

Visibility: Classification and detection algorithms, back face detection, depth – buffer,scan line, depth sorting and BSP tree, ray casting method and curved surfaces. Rendering: Shading – Gouraud ,Phong , ray tracing and antialised ray tracing

Text Books:

1. Donald Hearn & M. Pauline Baker, "Computer Graphics." Prentice Hall India.
2. F. S .Hill Jr., "Computer Graphics." Macmillan Publishing Company.

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. David F. Rogers, "Procedural Elements For Computer Graphics."TataMacGraw 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.

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
3 1 2 4.5

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.

Unit2

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 derivation, quartile derivation, measures of relative dispersion

Text Books:

1. J.N. Kapoor, "Inequalities theory application and measurements, Mathematical Sciences Trust Society, New Delhi, 1997.

Reference Books:

1. Kanti Swarup, P.K. Gupta, Manmohan " Operational Research, Sultan Chand and Sons, Educational Publishers, New Delhi, Ninth Edition (2000)

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:- Business Intelligence

Course Code: - PCA-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
3	0	2	4.0

Unit 1

Introduction to Business Intelligence, Introduction to OLTP and OLAP, BI Definitions & Concepts, Business Applications of BI, BI Framework, Role of Data Warehousing in BI, BI Infrastructure Components – BI Process, BI Technology, BI Roles & Responsibilities, Data Warehousing and Marts, Corporate Dashboards Corporate Performance Management,

Unit 2

Basics of Data Integration (**E**xtraction **T**ransformation **L**oading)**,** Concepts of data integration need and advantages of using data integration, introduction to common data integration approaches, introduction to ETL using SSIS, Introduction to data quality, data profiling concepts and applications

Unit 3

Introduction to Multi-Dimensional Data Modeling**,** Introduction to data and dimension modeling, multidimensional data model, ER Modeling vs. multi dimensiona lmodeling, concepts of dimensions, facts, cubes, attribute, hierarchies, star and snowflake schema, introduction to business metrics and KPIs, creating cubes using SSAS

Unit 4

Basics of Enterprise Reporting**,** Introduction to enterprise reporting, concepts of dashboards, balanced scorecards, introduction to SSRS Architecture, enterprise reporting using SSRS.

Text Books:

1. Business Intelligence by David Loshin.
2. Business intelligence for the enterprise by Mike Biere.

Reference Books:

1. Business intelligence roadmap by Larissa Terpeluk Moss, ShakuAtre.

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:- Design And Analysis of Algorithms using C++

Course Code: - PCA-304

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	4	5.5

Unit 1

Notion of Algorithm, Growth of functions, Summations, Recurrences: The substitution method, The iteration method, The master method (including proof), Asymptotic Notations and Basic Efficiency Classes. Use of Big O, Ω , Θ in analysis .Mathematical Analysis of few Non-recursive and Recursive Algorithms , Proof of Correctness.

Unit2

Sorting and Searching Techniques, Selection Sort, Bubble Sort, Insertion Sort, Sequential Search Binary Search. Depth first Search and Breadth First Search. Balanced Search trees, AVL Trees, Red-Black trees, Heaps and Heap sort, Hash Tables, disjoint set and their implementation. Divide and conquer Paradigm of Problem solving, complexity analysis and understanding of Merge sort, Quick Sort, Binary Search Trees, Sorting in linear time, Medians and Order statistics.

Unit3

Greedy Techniques, Prim's Algorithm, Kruskal's Algorithm, Dijkstra's and Bellman Ford Algorithm, Huffman trees. Knapsack Problem, Dynamic Programming paradigm, Warshall's and Floyd's Algorithm. Optimal Binary Search trees, Matrix multiplication Problem, 0/1 Knapsack Problem, maximum network flow problem, naive string matching algorithm, string matching with finite automata Knuth Morris Pratt algorithm , The Rabin-Karp Algorithm.

Unit4

Backtracking, n-Queen's Problem, Hamiltonian Circuit problem, Subset-Sum problem, Branch and bound, Assignment problem, Traveling salesman problem. Introduction to Computability, Polynomial-time verification, NP-Completeness and Reducibility, NP-Completeness Proof, NP-Complete problems, Proof of cook's theorem.

Text Books:

1. Jon Kleinberg and Eva Tardos , Algorithm Design, Pearson Edition, 2006.
2. "Algorithms" SanjoyDasgupta , Christos Papadimitriou UmeshVazirani TMH

Reference Books:

1. "Introduction to Algorithms", T.H. Cormen, C.E. Leiserson, R.L. Rivest and C. Stein, 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:- Digital Image Processing

Course Code: - PCA-491

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 And Digital Image Fundamentals Digital Image Representation, Fundamental Steps in Image Processing, Elements of Digital image processing systems, Sampling and quantization, some basic relationships like neighbors, connectivity, Distance measure between pixels, Imaging Geometry. **Image Transforms** Discrete Fourier Transform, Some properties of the two-dimensional fourier transform, Fast fourier transform, Inverse FFT.

UNIT 2

Image Enhancement-Spatial domain methods, Frequency domain methods, Enhancement by point processing, Spatial filtering, Lowpass filtering, Highpass filtering, Homomorphic filtering, Colour Image Processing. **Image Restoration-**Degradation model, Diagnolization of Circulant and Block-Circulant Matrices, Algebraic Approach to Restoration, Inverse filtering, Wiener filter, Constrained Least Square Restoration, Interactive Restoration, Restoration in Spatial Domain.

UNIT 3

Image Compression-Coding, Interpixel and Psychovisual Redundancy, Image Compression models, Error free comparison, Lossy compression, Image compression standards .**Image Segmentation-**Detection of Discontinuities, Edge linking and boundary detection, Thresholding, Region Oriented Segmentation, Motion based segmentation.

UNIT 4

Representation and Description-Representation schemes like chain coding, Polygonal Approximation, Signatures, Boundary Segments, Skeleton of region, Boundary description, Regional descriptors, Morphology. **Recognition and Interpretation-**Elements of Image Analysis, Pattern and Pattern Classes, Decision-Theoretic Methods, Structural Methods, Interpretation.

Text & Reference Books:

1. Digital Image Processing, Rafael C. Gonzalez & Ricahrd E, Woods-2002, Pearson Education Pte. Ltd.
2. Digital Immage Processing, A.K.Jain,1995, 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: - Simulation & Modeling
Course Code:- PCA-492

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

Definition of systems: Types of system, continuous and discrete modeling process and definition of a model. Common type of mathematical models used for engineering and non-engineering system (such as differential and partial differential equation models

UNIT 2

Simulation Process: Discrete and continuous simulation procedures. Random number generation and its testing discrete and continuous random variables, density and distributive functions, study of few distributions such as Poisson, Norma.

UNIT 3

Simulation of Queuing System: Elementary idea about networks of queuing with particular emphasis to computer system, environment (refer to section 9.1,9.2 & 9.3 of Trivedi's book.)
Verification & Validation: Design of simulation experiments and validation of simulation experiments comparing model data units and real system data.

UNIT 4

Simulation Language: A brief introduction to important discrete and continuous languages such as GPSS (Study & use of the language). Use of data base & AI techniques in the area of modeling and simulation.

Text Books:

1. Deo, Narsing: System Simulation with Digital Computers.
2. Gorden G: System Simulation, Prentice Hall (Two books above can be used as text books).
3. Shridhar Bhai Trivedi, Kishore: Probability & Statistics with reliability Queuing, Computer science Application.

Reference Books:

1. Payer, T.A., Introduction to System Simulation, McGraw Hill.
2. Reitman, J., Modeling and performance measurement of Computer System.
3. Spriet, WI A., Computer Aided Modeling and Simulation (Academic 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: - Satellite and Mobile Communication Networks
Course Code: - PCA-496

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

Wireless and Mobile Network Architecture: Principle of Cellular Communication. Overview 1G, 2G, 2.5G and 3G and 4G technologies. GSM Architecture and Mobility management, hand off management, Network signalling. Mobile Computing fundamental challenges. Mobile Devices – PDA and mobile OS, PalmOs, Win CE and Symbian.

Unit2

Mobile IP Protocol Architecture: Mobile IP and IP v 6 and its application in mobile computing. Cellular Digital Packet Data CDPD. VOIP. GPRS Services. Wireless Local Loop-WLL system. **Wireless Application Protocol (WAP):** The Wireless Application Protocol application environment, wireless application protocol client software, hardware and websites. Wireless application protocol gateways, implementing enterprise wireless application protocol strategy.

Unit3

Wireless Markup Language: An Introduction to Wireless Technologies, Markup Languages , An Introduction to XML, Fundamentals of WML., Writing and Formatting Text. Navigating Between Cards and Decks, Displaying Images, Tables, Using Variables, Acquiring User Input. **Wireless Markup Language Script:** An Introduction to WMLScript, WMLScript Control Structures, Events, Phone.com Extensions, Usability.

Unit4

Application of Mobile computing: ASP and Dynamic WAP Sites, XML and XSLT, Dynamic WML Generation with ASP and XSLT, Developing WAP Applications using Emulators. **Distributed Mobile Computing:** Distributed OS and file systems, Mobile Computing Software (Pervasive Computing) Development Strategies and tools, Data Management for Mobile Computing.

Text Books:

1. Yi Bing Lin, "Wireless and Mobile Networks Architecture", John Wiley.
2. Satellite Communication Systems - Systems, Techniques, and Technologies. ISBN: 0-471-49654-5- G. Maral and M. Bousquet, John Wiley & Sons, Fourth 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:- Security in Computing
Course Code:- PCA-494

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

Computer Security Concepts, Threats, Attacks and Assets, Security Functional Requirements, Security Architecture and Scope of Computer Security, Computer Security Trends, Computer Security Strategies. Program Security: Secure Program, Non-malicious Program Error, Viruses and other Malicious Code, Targeted Malicious Code, Control against Program Threats.

UNIT – II

Database Security: Database Management System, Relational Databases, Database Access Control, Inference, Security Requirements, Reliability and Integrity, Sensitive Data, Database Encryption. Network Security: Threats in Network, Network Security Controls, Firewall- Need for firewall, Characteristics, Types of firewall, Firewall Basing, Intrusion Detection System- Types, Goals of IDS, IDS strengths and Limitations.

UNIT – III

Internet Security Protocols and Standards: Secure Socket Layer (SSL) and Transport Layer Security (TLS), IPv4 and IPv6 Security, Kerberos 672, X.509 678, Public Key Infrastructure. Linux Security Model, File System Security, Linux Vulnerability, Linux System Hardening, Application Security. Window Security Architecture, Windows Vulnerability, Windows Security Defense, Browser Defenses.

UNIT – IV

Physical Security Threats, Physical Security Prevention and Mitigation Measures, Recovery form Physical Security Breaches, Security Auditing Architecture, Security Audit Trail, Security Risk assessment, Security Controls or Safe

Text Books:

1. Charles. P. Pfleeger & Shari Lawrence Pfleeger, Security in Computing, fourth edition, Pearson Education, 2006.ISBN: 978-81-317-2725-6.

Reference Books:

1. William Stalling, Lawrie Brown, "Computer Security Principles and Practice", First edition, Pearson Education, 2010. ISBN: 978-81-317-3351-6.

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:- Big Data Analytics
Course Code:- PCA-495

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

INTRODUCTION TO BIG DATA Introduction– distributed file system–Big Data and its importance, Four Vs, Drivers for Big data, Big data analytics, Big data applications. Algorithms using map reduce

UNIT 2

INTRODUCTION TO HADOOP AND HADOOP ARCHITECTURE Big Data – Apache Hadoop & Hadoop EcoSystem, Moving Data in and out of Hadoop – Understanding inputs and outputs of MapReduce -, Data Serialization.

UNIT 3

HDFS-Overview, Installation and Shell, Java API; Hive Architecture and Installation, Comparison with Traditional Database, HiveQL Querying Data, Sorting And Aggregating, Map Reduce Scripts, Joins & Sub queries

UNIT 4

NoSQL What is it?, Where It is Used Types of NoSQL databases, Why NoSQL?, Advantages of NoSQL, Use of NoSQL in Industry, SQL vs NoSQL, NewSQL

Text Books:

1. Boris lublinsky, Kevin t. Smith, AlexeyYakubovich, "Professional Hadoop Solutions", Wiley, ISBN: 9788126551071, 2015
2. Chris Eaton,Dirk derooset al. , "Understanding Big data ", McGraw Hill, 2012.
3. BIG Data and Analytics , Sima Acharya, Subhashini Chhellappan, Willey
4. . MongoDB in Action, Kyle Banker,Piter Bakkum , Shaun Verch, Dream tech Press

Reference Books:

1. Tom White, "HADOOP: The definitive Guide", O Reilly 2012.
2. VigneshPrajapati, "Big Data Analyticswith R and Haoop", Packet Publishing 2013.

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 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**

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3 1 0 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 opportModuleies,
- 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:

3. 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.

4. Entrepreneurship, by Alpana Trehan (Author)

Reference Books:

2. Entrepreneurial Development, by Nuzhath Khatoon (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.

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
3 1 0 3.5

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 & econospheric 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

2. 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:

3. Trimothy Pratt, Charles W. Bostian,-Satellite Communications‖, John Wiley & Sons, 1986.
4. Dr. D.C. Aggarwal, ―Satellite Communications‖, Khanna Publishers, 2001.

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 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**

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3 1 0 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:

- System function
- 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.
- TMS320CXXSERIES PROCESSORS*:*
    - Architecture,
    - Memory,
    - Interrupts,
    - Addressing modes,
    - Assembly language programming.

Text Books:

3. David.K.Defatta, Joseph G,Lucas & William S.Hodgkiss, Digital signal processing
4. Sanjit K and Mitra, digital signal processing

Reference Books:

2. Farooq Hussain, Digital signal processing

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: - 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**

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3 1 0 3.5

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 Facto
  - 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:

8. Transformers by BHEL, Bhopal, Tata McGraw Hill.
9. Transformer Engineering by SV Kulkarni and SA Khaparde Marcel & Dekks Inc.
10. Transformer Engineering design and practices, SV Kulkarni, SA Khaparde, Marcel Dekker IncNew york.
11. Electrical Machines byJ. Nagrath&D.P.Kothari, Tata McGraw Hill
12. Electrical Machines by Husain Ashfaq ,DhanpatRai& Sons
13. Electric Machine and Tranformers by Irving L.Kosow, Prentice Hall of India.
14. Fundamentals of Electrical Machines by B.R. Gupta &VandanaSinghal, New Age International

Reference Books:

4. Electric Machinery by A.E. Fitggerald, C.KingsleyJr and Alexander Kusko, McGraw Hill, International Student Edition.
5. The Performance and Design of DC machines by A.E. Clayton, Pitman &Sons
6. 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**

L T P CR.
3 1 0 3.5

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:

2. Direct Energy Conversion by R.A.Coombe.

Reference Books:

2. Non-Conventional Energy Sources By –S.Rao.

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 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**

L T P CR
3 1 0 3.5

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

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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 whether 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

3. Krishnaraju, N., Advanced Concrete Technology, CBS Publishers, 1985.
4. Nevile, A.M., Concrete Technology, Prentice Hall, Newyork, 1985.

Reference Books

2. 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**

L T P CR.
3 1 0 3.5

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).

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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 analize 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:

3. Heywood L, Comelius. S and S. Carver (2006) An Introduction to Geographic Information System, Dorling Kinderseley (India) Pvt. Ltd.
4. Burrough P A 2000 P A McDonnell (2000) Principles of Geographic Information Systems, London: Oxford University Press

Reference Books:

2. Lo.C.P., Yeung. K.W Albert(2002) Concepts and Techniques of Geographic Information Systems, Prentice-Hall of India Pvt. Ltd. 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:-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**

L T P CR.
3 1 0 3.5

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:

- **Bio Energy**
  - 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,

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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

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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:

4. Solar Energy: Principles of Thermal Collection and Storage, S. P. Sukhatme and J. K. Nayak, McGraw-Hill Education
5. Solar Engineering of Thermal Processes, John A. Duffie, William A. Beckman, John Wiley, New York
6. Non-conventional energy resources, Shobh Nath Singh, Pearson India

Reference Books:

4. Non-conventional energy resources, Shobh Nath Singh, Pearson India
5. Solar Energy Engineering, Soteris Kalogirou, Elsevier/Academic Press.
6. 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**

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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:

- Detriot- 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:

3. Automation Production System & Computer Integrated Manufacturing. Mikell P. Grover
4. Robotics & Flexible Automation S.R. Deb

Reference Books:

3. Pneumatic Control and Hydraulic Control S.R. Majundar
4. 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**

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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 Soin

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:- 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**

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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 Loses
- 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

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 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**

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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.

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:-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**

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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**

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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 masonary calculation

Unit 2:

- Estimate of RCC works Estimate of RC Slab RCC Beam
- RCC T-beam slab and RCC coloumn 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 leed 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

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:-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**

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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**

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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

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 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**

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3 1 0 3.5

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
  - Productdesign 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: Spregiel. 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**

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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 fuelinjection 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 theAutomotive 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 ofAutomotive micro controllers
- Types of censors.
- Use of actuators in an automobile environment.

➢ **Vehicle Systems:**

- Constantly Variable Transmission
- Benefits
- Brake by wire
- Advantages overpower 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.

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**

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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 exrc 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 if ….fi
- 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/appending 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
- Sitting process priorities.
- Inter-process Communication
  - I/O Sub system
  - Terminal drives
  - Disk drive
  - Messages
  - Shared memory
  - Semaphores
  - Memory management
  - Swapping
  - Demand paging
- System Calls and Unix -C Interface
- File handling calls like - access (), open(), create(), read(), write(), close(), fseek()
- Process control system calls 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

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

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 thesystem.

8Write 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 a 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 Ã¢â‚¬â€œ 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

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:- 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.

Unit4 :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

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. 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

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 - 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	1	2	4.5

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:

2. Study and implementation of Genetic Algorithms.
3. Implement Naïve Bayes Classifier Algorithm.
4. Implement K-means Clustering Algorithm.
5. Implement Support Vector Machine.
6. Write a program for Back Propagation Algorithm.
7. Implement Linear Regression Algorithm.
8. Implement Logistics Regression Algorithm.
9. Implement Decision Tree Algorithm.
10. Implement Nearest Neighbor Algorithm.
11. 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	0	0	4.0

Unit 1: Fundamentals:

- Introduction, origin, areas of image processing,
- Steps in digital imageprocessing,
- 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.
- Noisein Color images.

Wavelets:

- Wavelet functions,
- Wavelet transformations in one and two dimensions,
- Fast wavelettransforms.

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 TheoreticMethods,
- Structural Methods

Text Book:

1. Rafael C. Gonzalez, Digital Image Processing.

Reference Books:

1. Richard E. Woods, Digital Image Processing.

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 – 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	1	0	3.5

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

Unit2 :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:

3 R R Gaur, R,Sangal, G.P Bagaria, 2009, A Foundation Course in value Education(English)
4 Pradeep Kumar Ramancharla, 2013, A foundation course in value education (Telugu)

Reference Books:

3 R R Gaur, R Sangal G P Bagaria, 2009, Teacher's Manual (English)
4 Pradeep Kumar Ramancharla, 2013, Teacher's Manual (Telugu

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: - 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
3 1 0 3.5

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:

4 D.C.Reddy,―Biomedical Signal Processing: Principles and techniques‖, Tata McGraw Hill, New Delhi, 2005.
5 Willis J Tompkins, Biomedical Signal Processing, Prentice Hall, 1993.
6 R. Rangayan, ―Biomedical Signal Analysis‖, Wiley 2002.

Reference Books:

3 Bruce, ―Biomedical Signal Processing & Signal Modeling,‖ Wiley, 2001.
4 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

3 1 0 3.5

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

2. Monochrome &Colour TV: R.R Gulati: New Age Pub.

Reference Books:

3. Basic Television: G.M Grob : McGraw Hills
4. 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
3 1 0 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

3. Handbook of Energy Audits by Albert Thuman – Fairman Press Inc.
4. Energy basis for man and nature by Howard T.Odum & Elisbeth C.Odum.

Reference Books:

2. 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

3 1 0 3.5

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:

4. Renewable Energy Sources by Maheshwar Dyal.
5. Small and mini Hydropower system by Tata Mc Graw Hill.
6. An Introduction to power plant technology by G.D.Rai.

Reference Books:

3. Solar Energy by Suhas.P.Sukhatma, Tata Mc Graw Hill.
4. 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
3 1 03.5

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:

2 Krishnaraju, N., Advanced Concrete Technology, CBS Publishers, 1985.
2 Nevile, A.M., Concrete Technology, Prentice Hall, Newyork, 1985.

Reference Books:

3 Construction Planning &Management by P.S. Gehlot&B.M.Dhir.
4 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
3	1	0	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:-

4. 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.

5. Air Monitoring Survey Design K.E. Noll & T.L. Miller : Ann Arbor Science
6. Air Pollution Control Engineering (Second Edition): N.D. Nevers: McGraw Hill

Reference Books:

1. An Introduction to power plant technology by G.D.Rai.

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: - 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

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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 gaiting 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:

Extursion and other processes : Extrusion principle, hot extrusion, cold extrusion, wire drawing, swaging, tube making, Sheet metal operation, shearing action, drawing dies, spinning, bending, strech 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 wedling (MIG), submerged arc welding (SAW)

Unit 4:

Resistance Welding: Principles, resistance sopt 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:

5. Principles of Manufacturing Materials & Processes –Campbell J.S.Publisher–Mc Graw Hill.
6. Manufacturing Science – Ghosh A.Malik, A.K.Affiliated East-West Press Pvt. Ltd., New Delhi.
7. Foundary Technology – K.P.Sinha, D.B.Goel, Roorkee Publishing House.
8. 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**

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31 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
  - Verniermethod,
  - 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 andelectrical 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
  - **S**traight 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:

4. Gupta, I.C., "Engineering Metrology", Dhanpat Rai & Sons, New Delhi, 1994.
5. Hume, K.J., "Engineering Metrology", Mac Donald & Co. 1963.
6. R. K. Jain "Engineering Metrology", Khanna publisher, Delhi

Reference Books:

4. Kumar, D.S., "Mechanical Measurements and Control", Metropolitan, New Delhi.
5. Doeblein, E.O., "Measurement Systems, Application Design", Mc Graw Hill, 1990.
6. 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.
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Unit1 : Introduction

- Grid Computing
- Benefits of Grid Computing
- VirtualOrganizations
- 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**.**

Unit2 : 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

Unit4 : 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

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 :- 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.
4 0 0 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 802.1I,Role of WE?, Cracking WEP Keys, Sniffing Traffic, Wireless DOS attacks, WLAN Scanners,
- 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

2. Ethical Hacking, Thomas Mathew, 0571 Publisher, 28-Nov-2003.
3. Hacking Exposed: Network Security Secrets & Solutions, Stuart McClure, Joel SeatnbraV and George Kurtz, McGraw-Hill, 2005.

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 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.

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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**

L T P CR.
4 0 0 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**

L T P CR.
4 0 0 4.0

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 TableBased Testing
- Cause Effect Graphing Technique.
- StructuralTesting
- Path testing,
- DD-Paths,
- Cyclomatic Complexity,
- Graph Metrics,
- Data FlowTesting,
- Mutation testing.

Unit 3:Reducing the number of test cases

- Prioritization guidelines,
- Priority category,
- Scheme
- RiskAnalysis
- 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
- ObjectOriented 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**

L T P CR.
3 1 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
- Mc Cabe's
- Cyclomatic complexity
- Decision Table based testing
- Data flow based testing

Unit2 :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

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 – 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**

L T P CR.
3 1 0 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 opportModuleies,
- 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:

5. 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.

6. Entrepreneurship, by Alpana Trehan (Author)

Reference Books:

3. Entrepreneurial Development, by Nuzhath Khatoon (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.

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
3 1 0 3.5

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 & econospheric 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

3. 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:

5. Trimothy Pratt, Charles W. Bostian,-Satellite Communications‖, John Wiley & Sons, 1986.
6. Dr. D.C. Aggarwal, ―Satellite Communications‖, Khanna Publishers, 2001.

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 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**

L T P CR
3 1 0 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:

- System function
- 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.
- TMS320CXXSERIES PROCESSORS*:*
    - Architecture,
    - Memory,
    - Interrupts,
    - Addressing modes,
    - Assembly language programming.

Text Books:

5. David.K.Defatta, Joseph G,Lucas & William S.Hodgkiss, Digital signal processing
6. Sanjit K and Mitra, digital signal processing

Reference Books:

1. Farooq Hussain, Digital signal processing

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: - 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**

L T P CR.
3 1 0 3.5

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 Facto
  - 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:

15. Transformers by BHEL, Bhopal, Tata McGraw Hill.
16. Transformer Engineering by SV Kulkarni and SA Khaparde Marcel & Dekks Inc.
17. Transformer Engineering design and practices, SV Kulkarni, SA Khaparde, Marcel Dekker IncNew york.
18. Electrical Machines byJ. Nagrath&D.P.Kothari, Tata McGraw Hill
19. Electrical Machines by Husain Ashfaq ,DhanpatRai& Sons
20. Electric Machine and Tranformers by Irving L.Kosow, Prentice Hall of India.
21. Fundamentals of Electrical Machines by B.R. Gupta &VandanaSinghal, New Age International

Reference Books:

7. Electric Machinery by A.E. Fitggerald, C.KingsleyJr and Alexander Kusko, McGraw Hill, International Student Edition.
8. The Performance and Design of DC machines by A.E. Clayton, Pitman &Sons
9. 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**

L T P CR.
3 1 0 3.5

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:

3. Direct Energy Conversion by R.A.Coombe.

Reference Books:

3. Non-Conventional Energy Sources By –S.Rao.

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 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**

L T P CR
3 1 0 3.5

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 whether 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

5. Krishnaraju, N., Advanced Concrete Technology, CBS Publishers, 1985.
6. Nevile, A.M., Concrete Technology, Prentice Hall, Newyork, 1985.

Reference Books

3. 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**

L T P CR.
3 1 0 3.5

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 analize 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:

5. Heywood L, Comelius. S and S. Carver (2006) An Introduction to Geographic Information System, Dorling Kinderseley (India) Pvt. Ltd.
6. Burrough P A 2000 P A McDonnell (2000) Principles of Geographic Information Systems, London: Oxford University Press

Reference Books:

3. Lo.C.P., Yeung. K.W Albert(2002) Concepts and Techniques of Geographic Information Systems, Prentice-Hall of India Pvt. Ltd. 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:-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**

L T P CR.
3 1 0 3.5

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:

- **Bio Energy**
  - 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

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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:

7. Solar Energy: Principles of Thermal Collection and Storage, S. P. Sukhatme and J. K. Nayak, McGraw-Hill Education
8. Solar Engineering of Thermal Processes, John A. Duffie, William A. Beckman, John Wiley, New York
9. Non-conventional energy resources, Shobh Nath Singh, Pearson India

Reference Books:

7. Non-conventional energy resources, Shobh Nath Singh, Pearson India
8. Solar Energy Engineering, Soteris Kalogirou, Elsevier/Academic Press.
9. 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**

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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

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Unit 2:

Transfer Device, Feeders & Material Handling:

- Detriot- 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:

5. Automation Production System & Computer Integrated Manufacturing. Mikell P. Grover
6. Robotics & Flexible Automation S.R. Deb

Reference Books:

5. Pneumatic Control and Hydraulic Control S.R. Majundar
6. 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**

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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:

4. TQM & ISO 14000: K.C.Arora.
5. Total Quality Control: Armand V. Feigenbaum.
6. Total Quality Management: Joseph.A.Patrick, Diana.S.Furr.

Reference Books:

3. Total Quality Management – Text: Joel E. Ross Cases & Readin
4. Total Quality Control Essentials: Sarv Singh Soin

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:- 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**

L T P CR.
3 1 0 3.5

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 Loses
- 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

3. Fiber Optic Comm. Systems, D.K.Mynbaev
4. Optical Fiber Comm, John M.Senior

REFERENCE BOOKS

2. Optical Fiber Comm, G.Keiser

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 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**

L T P CR.
3 1 0 3.5

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:

3. Communication System : Simon Haykins, John wiley.
4. Principles of communication system: Taub and schilling: TMH.

Reference Books:

3. Electronics Communication System: Wayne Tomasi: Pearson Edu.
4. Communication system analog and digital: sanjay sharma.

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:-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**

L T P CR.
3 10 3.5

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:

4. S.K.Duggal, "Earthquake resistant design of structures", Oxford University Press
5. Ulrich ranke, "Natural Disaster Risk Management: Geosciences and Social Responsibility"
6. Michael Beach , "Disaster Preparedness and Management"

Reference Books:

3. Rajesh Anand,N.C.Jana,Sudhir Singh, "Disaster Management and Sustainable Development Emerging issues and concerns"
4. 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**

L T P CR.
3 1 0 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 masonary calculation

Unit 2:

- Estimate of RCC works Estimate of RC Slab RCC Beam
- RCC T-beam slab and RCC coloumn 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 leed 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:

3. Estimating & Costing in Civil Engineering by B.N. Dutta
4. 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

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:-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**

L T P CR.
3 1 0 3.5

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**

L T P CR.
3 1 0 3.5

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:

2. NPTEL Notes

Reference Books:

1. Utilization Of Electric Power and Electric Traction by: J.B.GUPTA

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 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**

L T P CR.
3 1 0 3.5

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
  - Productdesign 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:

2. Industrial Management: Spregiel. 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**

L T P CR.
3 1 0 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 fuelinjection 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 theAutomotive 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 ofAutomotive micro controllers
- Types of censors.
- Use of actuators in an automobile environment.

➢ **Vehicle Systems:**

- Constantly Variable Transmission
- Benefits
- Brake by wire
- Advantages overpower 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:

3. Advanced Vehicle technologies by Heinz Heisler – SAE International Publication.
4. Electric and Hybrid Electric Vehicles by Ronald K.Jurgen – SAE International Publication.

Reference Books:

5. Batteries for Electric Vehicles by DAJ Rand, R.Woods and R.M.Dell – SAE International Publication.
6. Electronics Braking, Traction and Stability Control – SAE Hardboud papers.
7. Electronics steering and suspension systems – SAE Hardboud papers.
8. 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.