Syllabus for

Applied Mathematics- III (IT/CE)

Scheme (Theory: 4 hrs, Tutorial: 1 hr)

UNIT - I: LAPLACE TRANSFORM(14 Hrs)

Definition, Properties, Laplace Transform of Derivatives and Integrals, Evaluation of Integrals by Laplace Transform, Inverse Laplace Transform and its Properties, Convolution Theorem(Statement Only), Laplace Transform of Periodic Functions(Statement Only) and Unit Step Function, Applications of Laplace Transform to solve Ordinary Differential Equations, Simultaneous Differential Equations, Integral Equations & Integro-Differential Equations.

UNIT – II: FOURIER TRANSFORM (06 Hrs)

Definition and Properties(excluding FFT), Fourier Integral Theorem, Relation with Laplace Transform, Applications of Fourier Transform to Solve Integral Equations.

UNIT – III: Z-TRANSFORM(08 Hrs)

Definition, Convergence of Z-transform and Properties, Inverse Z-transform by Partial Fraction Method, Power Series Expansion, Convolution of two sequences.Solution of Difference Equations with Constant Coefficients by Z-transform method.

UNIT –IV: MATRICES (12 Hrs)

Linear and Orthogonal Transformations, Linear dependence of vectors, Characteristics equation, Eigen values and Eigen vectors, Statement and Verification of Cayley-Hamilton Theorem [without proof], Reduction to Diagonal form, Reduction of Quadratic form to Canonical form by Orthogonal Transformation, Sylvester's Theorem[without proof], Solution of Second Order Linear Differential Equation with Constant Coefficients by Matrix method. Largest Eigen value and Eigen vector by Iteration method.

UNIT – V: THEORY OF PROBABILITY (10 Hrs)

Axioms of Probability, Conditional probability, Baye's Rule, Random variables: Discrete and Continuous random variables, Probability function and Distribution function, Joint distributions, Independent Random Variables, Conditional Distributions.

UNIT – VI: MATHEMATICAL EXPECTATION & STOCHASTIC PROCESS(10 Hrs)

Mathematical Expectation, Variance, Standard Deviation, Moments, Moment generating function, Covariance & Correlation Coefficient, Conditional expectation. Stochastic process: Bernoulli and Poisson process.

Text Books

1. Higher Engineering Mathematics by B.S. Grewal, 40th Edition, Khanna Publication.
2. Advanced Engineering Mathematics by Erwin Kreysizig, 8th Edition, Wiley India.
3. Applied Mathematics for Engineers & Physicist by L. A. Pipes and L. R. Harvill.
4. Theory & Problems of Probability and Statistics by M. Spiegel , Schaum's Series, McGraw Hill .
5. Probability and Statistics for Engineers by Miller, Freund and Johnson, 4th ed.PHI.

Reference Books

1. A Text Book of applied Mathematics, Volume II , by P.N. Wartikar & J.N. Wartikar, Poona Vidyarthi Griha Prakashan
2. Introductory methods of Numerical Analysis, by S.S. Sastry, PHI
3. Mathematics for Engineers by Chandrika Prasad
4. Probability, Statistics with Reliability, Queuing and Computer Science Applications by K. S. Trivedi.
5. Probability, Statistics and Randam Processes by T. Veerarajan, Mc Graw-Hill .
6. A text book of Engineering Mathematics by N. P. Bali & M. Goyal, Laxmi Publication.

BEIT302T PROGRAMMING LOGIC AND DESIGN USING 'C'

(Theory Credit: 05)

Teaching Scheme:	Examination Scheme:
Lecture: 4 Hours/week	Theory: T (U): 80 Marks T (I): 20 Marks
Tutorial: 1 Hour/week	Duration of University Exam. : 03 Hours

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UNIT I:

Introduction and Structure of 'C' Programming: Algorithms and Flowchart, Characteristics of algorithm, Basic Techniques, Decision Making, Looping Technique, Multiway Decision Making. Examples through 'C'.

UNIT II:

Function and Pointers: Introduction to functions, why use function, Scope rule of function, call by value, call by reference, recursion, Iterative versus recursive style, Storage Classes in C. Preprocessor Directives in 'C': Macro, File Inclusion. Array: one dimensional array, pointer and array, Searching (Linear and Binary) and Sorting (Selection, Bubble, Insertion). Array of pointers, multidimensional array (2-D array).

UNIT III:

String and Structure: Introduction to string, pointers and strings, standard library function and user defined function, two dimensional array of character, array of pointer to string, limitation. Structure: Declaration, Accessing and memory representation of structure, array of structure, additional features of structure, pointer to structure. Union: Introduction, difference between structure and union, union of structure.

UNIT IV:

Console and File I/O: Types of I/O, console I/O functions, File I/O: data organization, file operation, file opening modes, file copy programming, String I/O files, Text file and binary file, low level disk I/O, Command line argument, detecting errors in reading / writing. Bitwise operators, Enumerated data types, typedef, typecasting, bit-field operator, volatile qualifier.

UNIT V

Dynamic memory allocation and Graphics in 'C': Malloc(), Calloc(), free(), realloc(), Sizeof() operator. Setting Text mode: textmode(), textbackground(), textcolor(), gotoxy(), cputs().Setting Graphics Mode: Drawing a Point on Screen, Drawing – lines, rectangle, circles, arcs, polygon. Functions to fill colors. Display Text in Graphics mode, outtext(), outtextxy(), justifying text. Computer animation: getimage (), putimage (), imagesize().

UNIT VI:

Advanced Concept in 'C: Different types of pointers, ROM – BIOS function, Elementary TSR's.

Text Books:

1. Programming Techniques Through 'C' : M. G. Venkateshmurthy (Pearson)
2. LET US 'C : Yashwant P. Kanetkar. (BPB).
3. Graphics Under C: Yashwant Kanetkar (BPB).
4. Writing TSR'S through 'C': Yashwant Kanetkar (BPB).
5. Programming in 'C': Ashok N. Kamthane (2nd Edition[Pearson])

Reference Books:

1. The Complete Reference C (4th Edition): Herbert Schildt [TMH]
2. The C Programming Language: Dennis Ritchie & Brain Kernighan [Pearson]
3. Programming with C : K.R.Venugopal & S.R.Prasad [TMH]
4. Programming in C: B. L. Juneja and Anita Seth (cengage learning)
5. A First Course in Programming with 'C': T. Jeyapoovan (Vikas)

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BEIT302P PROGRAMMING LOGIC AND DESIGN USING 'C'

(Practical Credit: 01)

Teaching Scheme:	Examination Scheme:
Practical: 2 Hours/ week	Practical: P (U): 25 Marks P (I): 25 Marks
	Duration of University Exam. : 02 Hours

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Note:

1. Practicals are based on PROGRAMMING LOGIC AND DESIGN USING 'C' syllabus (subject code: BEIT302T)
2. Practicals have to be performed using 'C' language
3. There should be at the most two practicals per unit
4. Minimum ten practicals have to be performed
5. Do not include study experiments

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BEIT303T ETHICS IN INFORMATION TECHNOLOGY

(Theory Credit: 04)

Teaching Scheme:	Examination Scheme:
Lecture: 3 Hours/ week	Theory: T (U): 80 Marks T (I): 20 Marks
Tutorial: 1 Hour/ week	Duration of University Exam. : 03 Hours

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UNIT I:

An overview of Ethics: Ethics in business world, Ethics in IT, Ethics for IT professionals and IT users, IT professionals, Ethical behavior, IT professional malpractices, IT users.

UNIT II:

Computer and Internet Crime: IT security incidents: Increasing Complexity Increases Vulnerability, Higher Computer user Expectations, Expanding and changing systems. Introduces new risks, Increased Reliance on Commercial Software with known Vulnerabilities, Types of Exploits, Perpetrators, Reducing Vulnerabilities, Risk Assessment, Establishing a Security Policy, Educating Employees, contractors and part-time Workers, Prevention, Detection, Response.

UNIT III:

Privacy: The right of Privacy, Recent History of Privacy Protection, Key Privacy and Anonymity issues, Governmental Electronic Surveillance, Data Encryption, Identity Theft, Consumer Profiling, Treating Consumer Data Responsibility, Workplace Monitoring, Advanced surveillance Technology, Defamation, Freedom of Expression: Key issues, Controlling Access to Information on the Internet, Anonymity, National, Security Letters, Defamation and Hate Speech.

UNIT IV:

Intellectual Property: Copyrights, Patents, Trade Secret Laws, Key Intellectual Property Issues, Plagiarism, Reverse Engineering, Open Source Code, Competitive Intelligence, Cyber squatting, Software Development, Strategies to Engineer Quality Software, The Importance of Software Quality, Software Development Process, Capability Maturity Model Integration for Software, Key Issues in Software Development, Development of Safety-Critical Systems, Quality Management Standards.

UNIT V:

Ethics of IT Organization: Need for Nontraditional Workers, Contingent Workers H-IB Workers, Whistle-blowing, Protection for Whistle-Blowers, Dealing with Whistle-Blowing Situation.

UNIT VI:

The Impact of Information Technology on the Quality of Life: The impact of IT on the standard of Living and productivity, the Digital Divide, The impact of IT on Health care costs, Electronic Health Records, Use of Mobile and Wireless Technology, Telemedicine. Medical Information Wet Sites for lay people.

Text Books:

1. George Reynolds, “Ethics in information Technology” Cengage Learning

Reference Books:

1. Deborah G.Johnson,"Computer Ethics",3/e Pearson Education.
2. Sara Baase, "A Gift of Fire: Social, Legal and Ethical Issues, for Computing and the Internet," PHI Publications.
3. Richard A.Spinello, "Case study in Information Technology Ethics", second Edition PHI Publications.
4. Duncan Lanford "Internet Ethics".
5. D. Micah Hester and Paul J. Ford "Computer and Ethics in the Cyber age".

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BEIT304T DIGITAL ELECTRONICS AND FUNDAMENTALS OF MICROPROCESSOR
(Theory Credit: 05)

Teaching Scheme:	Examination Scheme:
Lecture: 4 Hours/ week	Theory: T (U): 80 Marks T (I): 20 Marks
Tutorial: 1 Hour / week	Duration of University Exam. : 03 Hours

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UNIT I:
Analog Vs. Digital Systems, Boolean Algebra, D' Morgan's Laws. Types of Number System: Decimal, Binary, Octal, Hex, Type of Codes: Reflected (Gray), Self Complementary (Excess-3), BCD and ASCII codes, Conversion of Codes, Gates and their truth tables.

UNIT II:
Forms of Expression: Sum of products and Product of Sums, Standard Sum of products and Product of Sums, Minterms and Maxterms, Canonical Sum of products and Product of Sums. Karnaugh map: simplification of functions using K-map (up to 5 variables) and their implementation using logic gates.

UNIT III:
Combinational Circuits: Decoders, Encoders. Priority Encoder, Multiplexers, Demultiplexers, Code converters. Implementation of Functions using Decoder. Arithmetic Circuits: Adder (Half and Full), Subtractor (Half and Full). BCD adder / Subtractor, Concept of ALU.

UNIT IV:
Types Flip Flops: SR, JK, Master Slave JK, D and T. Race around Condition (Racing) and Toggling. Characteristics Table and Excitation Table, Conversion of Flip-Flop. Sequential Circuits: Counters, Modulus of Counter, Types- Synchronous Counter and Asynchronous (Ripple) counter.

UNIT V:
8085 microprocessor architecture, addressing modes, instruction sets.

UNIT VI:
Interrupts, Basic memory organization, Timing diagram, Programming in 8085.

Text Books:

1. Modern digital Electronics- R. P. Jain, McGraw Hill.
2. Digital Integrated Electronics- Herbert Taub, McGraw Hill.
3. Digital Logic and Computer Design- Morris Mano (PHI).
4. Digital Integrated Electronics- Herbert Taub, McGraw Hill.
5. Digital Electronics Logic and System – James Bingnell and Robert Donovan, Cengage Learning
6. Digital Circuits & Systems by K.R.Venugopal & K. Shaila
7. 8 bit Microprocessor by Ramesh Gaonkar.
8. 8 bit microprocessor & controller by V. J. Vibhute, Techmak Publication.
9. 8085 Microprocessor & its Applications by A. Nagoor Kani, McGraw Hill.

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BEIT304P DIGITAL ELECTRONICS AND FUNDAMENTALS OF MICROPROCESSOR
(Practical Credit: 01)

Teaching Scheme:	Examination Scheme:
Practical: 2 Hours/ week	Practical: P (U): 25 Marks P (I): 25 Marks
	Duration of University Exam. : 02 Hours

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Note:

1. Practicals are based on DIGITAL ELECTRONICS AND FUNDAMENTALS OF MICROPROCESSOR syllabus (subject code: BEIT304T)
2. There should be at the most two practicals per unit
3. Minimum ten practicals have to be performed
4. Do not include study experiments

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BEIT305T DATA COMMUNICATION

(Theory Credit: 05)

Teaching Scheme:	Examination Scheme:
Lecture: 4 Hours/ week	Theory: T (U): 80 Marks T (I): 20 Marks
Tutorial: 1 Hour/ week	Duration of University Exam. : 03 Hours

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UNIT I:

Data Communication: Communication Model, Data Representation, Data Flow (Simplex, Half duplex, Full duplex), Communication networking.

UNIT II:

Protocol Models: Need for protocol architecture, OSI Model fundamentals, TCP/IP Model fundamentals, addressing (Physical, Logical, Port addressing).

UNIT III:

Physical Layer and Media: Data and Signals, Analog and Digital, Periodic Analog Signals, Digital Signals, Transmission impairment, Data Rate Limits, Performance, Digital Transmission, Digital-to-Digital Conversion(Line Coding & Block coding), Analog-to-Digital Conversion(PCM & DM), Transmission Modes(Parallel & Serial).

UNIT IV:

Analog Transmission and Multiplexing: Analog Transmission, Digital-to-analog Conversion (ASK, FSK, PSK & QAM), Analog-to-analog Conversion (AM, FM & PM), Multiplexing (Frequency Division Multiplexing and Time Division Multiplexing), Switching:-switching networks, circuit switching, and Packet switching.

UNIT V:

Communication Media: Transmission Media: Guided media (Twisted pair, Co-axial cable, Optical fiber), Connectors (Twisted pair, Co-axial cable, Optical fiber), Unguided Media (Radio, microwave, satellite, Infrared).

UNIT VI:

Local Area Networks: The Basics (Topologies, hub, Switch, Bridges, Gateway), Local Area Networks- Internetworking, Local Area Networks- Software and support System, Introduction to Metropolitan Area Networks and Wide Area Network, Internet.

Text Books:

1. Data Communications and Networking By A. Behrouz Forouzan, 4th edition, TMH publication
2. Data Communications and Networking, 1/e, Curt White, CENGAGE Learning, ISBN: 9788131505571.

Reference Books:

1. Data and Computer Communications, William Stallings, Seventh Edition, Pearson Prentice Hall.
2. Electronics Communication Systems by G. Kennedy, 5th edition, TMH
3. Analog and Digital Communication By T.L. Singal, TMH

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BEIT306T ENVIRONMENTAL ENGINEERING

(Total Credits: Nil)

Teaching Scheme: Examination Scheme:
Lecture: 2 Hours/ week Theory: (Audit Course)

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UNIT I: Introduction:
Definition, scope and importance; Need for public awareness institution in environment, people in environment

UNIT II: Natural Resources:
Renewable and non-renewable and associated problem; Role of an individual in conservation of natural resources; equitable use of resources for sustainable lifestyles

UNIT III: Ecosystems:
Concept of an ecosystem – understanding ecosystrem, ecosystem degradation, resource utilization Structure and function of an ecosystem- producers, consumers and decomposers, Energy flow in the ecosystem – water, carbon, oxygen, nitrogen, and energy cycle, integration of cycles in nature Ecological Succession; Food chains ,food webs and ecological pyramids ;Ecosystem types- Characteristic features structure and function of forest ,grassland ,desert and aquatic ecosystems.

UNIT IV: Bio-diversity:
Introduction – biodiversity at genetic, species and ecosystem levels Bio-geographic classification of India Value of biodiversity- consumptive use value, productive use value, social, ethical, moral, aesthetic and optional value of biodiversity. India as a mega – diversity nation; hotspots of biodiversity Threats to bio-diversity –habitat loss, poaching of wildlife, man-wild life conflicts. Common endangered and endemic plant and animal species of india. Insitu and Exsitu conservation of biodiversity.

UNIT V: Pollution:
Definition; causes effects and control measures of air, water, soil, marine, noise and thermal pollution and nuclear hazards Solid water management – causes, effects and control measures of urban and industrial waste Role of individual and institution in prevention of pollution Disaster management – floods, earthquake, cyclone, landslides

UNIT VI: Social Issues and the Environment:
Unsustainable to sustainable development; urban problems related to energy; Water conservation, rainwater harvesting, watershed management; problems and concerns of resettlement and rehabilitation of affected people. Environmental ethics - issues and possible solutions – Resource Consumption patterns and need for equitable utilization; Equity disparity in Western and Eastern countries; Urban and rural equity issues; need for Gender equity. Preserving resources for future generations The rights of animals; Ethical basis of environment education and awareness; Conservation ethics and traditional value systems of India Climate change, global warming, acid rain, Ozone layer depletion, Nuclear accidents and holocausts. Wasteland Reclamation; Consumerism and Waste products Environment legislations - The Environment (protection) Act ; The Water (prevention and control of pollution) Act ; The Wildlife Protection Act; Forest Conservation Act ; Issues involved in enforcement of environmental Legislations – environment impact assessment (EIA), Citizens actions and Action groups. Public awareness – using an environmental calendar of activities self Initiation

UNIT VII: Human Population and the Environment:

Global population growth, variation among nations Population Explosion; Family welfare programmes - methods of stetrilization; Urbanization Environment and human health – Climate and health, infectious Diseases, water –related diseases, risk due to chemical in food, cancer and environment. Human Rights – Equity, nutrition and health rights, intellectual property rights(IPRS), Community Biodiversity registration(CBRs).Value education – environment value, valuing nature, valuing culture, social justice, human heritage, equitable use of resources , common property resources , ecological degradation. HIV/AIDS; Women and child welfare; Information technology in environment and human health.

Text Books:

1. UGC publication “a text book of environment studies for undergraduate courses by Erach bharucha”, published by university Press (india) Pvt. Ltd., Hyderabad-500029.
2. Text Book of Environmental Studies, Second Edition by Deeksha Dave and S. S. Katewa, Cengage Learning

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BEIT307P COMPUTER LAB-I

(Practical Credit: 02)

Teaching Scheme:
Practical: 2 Hours/ week

Examination Scheme:
Practical: P (U): 25 Marks P (I): 25 Marks
Duration of University Exam. : 02 Hours

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G-01: Demonstration of computer hardware and Bios settings.
(North Bridge, South Bridge, PCI slots, ISA slots, AGP slot, memory bank slots, EIDE connector, Floppy connector, Chipset, Power connector, CPU slot, SMPS, Bios cell, Clock) (Ports-Serial, Parallel, PS/2, USB, Types of USB-A, B, Mini-A, Mini-B, Games, Ethernet/RJ42, Modem/RJ11, VGA, S-Video, HDMI, DVI- Mini & Micro DVI, IEEE 1394 Interface, SCSI, Minijack)

G-02: To demonstrate and study the various types I/O devices.
(Ex: Printers, Mouse, Scanner, monitor (CRT, LCD) etc.)

G-03: Execution of internal and external dos commands.
(Ex: Format, type, copy con, prompt, etc.)

G-04: Batch programming: Command Redirection and Pipelines, Variables and Control constructs.

G-05: Demonstration of system tools for windows operating systems.

G-06: Experiment based on system Registry of windows operating system.

G-07: Demonstration of complete booting process of windows operating system.

G-08: Demonstrate and study of networking accessories and Commands
(Hub, Switch, Bridge, Router, LAN Card, CAT cables, Coaxial cable, Fiber Optic cable, Repeater, Modem, Commands: ping, tracert etc.)

G-09: To demonstrate and study the troubleshooting of a computer system.
(Power supply problem, Boot failure Problem, Display problem, RAM problem, Motherboard Problem, CPU problem, CMOS battery problem etc.)

Note:

1. Practical sessions based on Any Six/Seven groups may be planned.

Reference Books:

1. PC Hardware: The complete Reference by Craig Zacker, 1st Edition, TMH publication.
2. Troubleshooting, Maintaining and Repairing PCs by Stephen Bigelow, 5th Edition, TMH publication.
3. PC Hardware: A Beginner's Guide by Ron Gilster, 1st edition, TMH publication.
4. Mastering Windows XP registry by Peter D Hipson. Sybex publication.
5. Windows ® Command-Line Administration: Instant Reference by John Paul Mueller, Sybex publication
6. Network + Training Guide by Drew Bird and Mike Harwood, Pearson Education

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SYLLABUS FOR

DISCRETE MATHEMATICS AND GRAPH THEORY

BE IV Semester (CS/CT/CE/IT)

Scheme (Theory: 4 hrs. & Tutorial:1 hr.)

UNIT-I: Mathematical Logic and Set Theory (08 Hrs)

Propositions and Logical Operations, Quantifiers, Conditional Statements and Tautologies, Methods of Proof, Principle of Mathematical Induction. Basic concepts of set theory, Operations on Sets, The power set.

UNIT-II: Relations and Functions(12 Hrs)

Relations: Ordered pairs and n-tuples, Product Sets and Partitions, Relations and Digraphs, Matrix of Relation, Paths in Relations and Digraphs, Properties of Relations, Equivalence Relations & Partitions, Compatible Relation, Manipulation of Relations, Composition of Relations, Transitive Closure of a relation, Partial order relation, Partially ordered set, Hasse Diagrams.
Functions: Definition, Composition of functions, Types of Functions, Invertible Function, Permutation Function, Characteristics function of a set with Theorems.

UNIT-III: Group Theory (12 Hrs)

Binary Operations, Properties, Semigroups,
Monoids,Subsemigroup,Submonoid, Isomorphism & Homomorphism, ,
Groups(only definitions and examples) Subgroups and Homomorphism, Cosets and Lagrange's Theorem, Normal subgroups.

Unit- IV:Rings, Lattices & Boolean Algebra(10 Hrs)

Rings, Fields, Integral Domain, Ring Homomorphism (definitions & examples), Lattices: Properties, Types of Lattices, Sub lattices, Isomorphic Lattices, Complemented & Modular Lattices (definitions & examples), Boolean Algebra: Definition, Properties, Simplification of Switching Circuits.

Unit-V: Graph Theory (12 Hrs)

Basic concepts of Graph Theory, Digraphs, Basic definitions, Paths and Circuits, Reachability and Connectedness, Matrix representation of graphs, Subgraphs & Quotient Graphs, Isomorphic digraphs & Transitive Closure digraph, Euler's Path & Circuit (only definitions and examples). Trees, Binary

Tree, Labeled Trees, Undirected Trees, Spanning Trees of Connected Relations, Prim's Algorithm to construct Spanning Trees, Weighted Graphs, Minimal Spanning Trees by Prim's Algorithm & Kruskal's Algorithm.

Unit-VI: Combinatorics(06Hrs)

Generating Functions, Recurrence Relations, Counting: Permutations & Combinations, Pigeonhole Principle with Simple Applications.

Text Books

1. Discrete Mathematical Structures(3rd Edition) by Kolman, Busby & Ross PHI.
2. Discrete Mathematical Structures with Applications to Computer Science byTremblay &Manohar, Tata McGraw- Hill.
3. Combinatorial Mathematics, C.L.Liu (McGraw Hill)

Reference Books

1. Discrete Maths for Computer Scientists & Mathematicians by Mott, Kandel, Baker.
2. Elements of Discrete Mathematics by C. L. Liu.
3. Discrete Mathematics by Lipschutz.
4. Discrete Mathematics by R.Johnsonbaugh.
5. Higher Engineering Mathematics by B.S. Grewal, 40th Edition, Khanna Publication

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BEIT402T **ALGORITHMS AND DATA STRUCTURES**
(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I:
An Introduction to data structure: Introduction, Definition, Classification of data structure, Concept of data, Data types, Abstract data Types (ADT), Features of structured program. Introduction to algorithms: Definition and Characteristics of an Algorithm, Apriori analysis, Time and space complexity, Average , Best and Worst case complexities, Big 'O' Notations, Asymptotic notations, Top-Down and bottom-up programming techniques, Recursion, Divide and conquer strategy. (e.g. Quick sort, Tower of Hanoi).

UNIT II:
Stacks and Queue: Definition and Terminology, Concept of stack, Stack implementation, Operation on stack, Algorithms for push and pop, Implementing stack using pointers, Application of stacks, Evaluation of polish notation, multiple stack. Queue: Queue as ADT Implementation of queue, Operation on queue, Limitations, Circular queue, Double ended queue (dequeue), Priority queue, Application of queues, multiple queues.

UNIT III:
Linked List : Introduction, Linked list, Representation of linear linked list, Operation on linked list, Types of linked list, Singly linked list, Circular linked list, Doubly linked list, Circular doubly linked list, Application: Addition of Two polynomials, Generalized linked list, Sparse matrix.

UNIT IV:
Tree: Introduction to Non Linear Data Structures, Binary tree Concept and terminology, Representation of binary trees, Algorithm for tree traversals (recursive and non recursive). Conversion of general tree to binary tree (Implementation not expected). Binary search trees, Extended binary tree, Threaded binary tree. Height balanced and weight balanced binary trees, B-Tree, B^+ Tree, AVL tree, Multiway tree, 2-3 Tree.

UNIT V:
Graphs: Concepts and terminology, Representation of graphs using adjacency matrix, adjacency list, Depth First search and Breadth First Search Algorithms, Spanning trees, Minimal cost spanning tree and Shortest path algorithm (Single Source-all pairs).

UNIT VI:
Searching and sorting Techniques: Importance of searching. Sequential, Binary, Sorting : Bubble sort, selection sort, quick sort, Merge sort, heap sort, Shell sort, Analysis of these algorithms in worst and average cases. Hashing techniques and collision handing mechanism.

Text Books:

1. Data Structures with C by SEYMOUR LIPSCHUTZ [TMH].
2. Data Structure using C by ISRD Group [TMH].
3. Data Structure through C by G. S. BALUJA [Dhanpat Rai & co.].
4. Introduction to Data Structure in C by Ashok N. Kamthane [Pearson].
5. Data structures using C and C++ by Tenenbaum [Pearson].
6. Data structures Pseudocode with C by Gilberg/Foruzen, Cengage Learning

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BEIT402P **ALGORITHMS AND DATA STRUCTURES**
(Practical Credit: 01)

Teaching Scheme:	**Examination Scheme:**
Practical: 2 Hours/week	**Practical: P (U): 25 Marks P (I): 25 Marks**
	Duration of University Exam. : 02 Hours

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Note:

1. Practicals are based on ALGORITHMS AND DATA STRCUTURES syllabus (subject code: BEIT402T)
2. Practicals have to be performed using 'C' language
3. There should be at the most two practicals per unit
4. Minimum ten practicals have to be performed
5. Do not include study experiments

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BEIT403T **THEORY OF COMPUTATION**

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I:

Strings, Alphabet, Language operations, Finite state machine definitions, Finite automation model, Acceptance of strings and language, Non deterministic finite automation, Deterministic finite automation, Equivalence between NFA and DFA, Conversion of NFA into DFA, Minimization of FSM, Equivalence between two FSM's Moore and Mealy machines

UNIT II:

Regular sets, Regular expressions, Identity rules, Manipulation rules, Manipulation of regular expressions, Equivalence between RE and FA, Inter conversion, Pumping lemma, Closure properties of regular sets(proofs not required), Chomsky hierarchy of languages, Regular grammars, Right linear and left linear grammars, Equivalence between regular linear programming and FA, Inter conversion between RE and RG.

UNIT III:

Context free grammar, Derivation trees, Chomsky normal form, Greibach normal form, Push down automata, Definition, Model acceptance of CFL, Equivalence of CFL and PDA, Inter conversion, Closure properties of CFL(Proofs omitted),Pumping Lemma of CFL, Introduction of DCFL and DPDA

UNIT IV:

Turing Machine: Definition, Model of TM, Design of TM, Universal Turing Machine, Computable function, Recursive enumerable language, Types of TM's (proofs not required), Linear bounded automata and Context sensitive language, Counter machine

UNIT V:

Decidability and Undecidability of problems, Properties of recursive & recursively enumerable languages, Halting problems, Post correspondence problem, Ackerman function, and Church's hypothesis.

UNIT VI:

Recursive Function: Basic functions and operations on them, Bounded Minimalization, Primitive recursive function, μ-recursive function, Primitive recursive predicates, Mod and Div functions, Unbounded Minimalization, Equivalence of Turing Computable function and μ-recursive function.

Text Books:

1. Introduction to Automata Theory, Languages and Computation by J. E. Hopcraft,R. Motwani, J. D Ullman, second Edition, Pearson Education, Aisa
2. An Introduction to Formal Languages and Automata by Peter Linz

3. Introduction to Langauges and the theory of Automata by John Martin, Third Edition(TMH)

Reference Books:

1. Theory of Computer Science, Automata, Languages and Computation by K. L. P. Mishra and N. Chandrasekaran, Third Edition, PHI Learning.
2. Elements of Theory of Computation by Lewis H.P and Papadimition C.H.

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BEIT404T COMPUTER ARCHITECTURE AND ORGANIZATION

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I:

Basic Structure of Computers:

Functional Units, Basic Operational Concepts, Bus Structures, Software, Multiprocessors and Multicomputers.

Machine Instructions:

Memory Locations and Addresses, Memory Operations, Machine program sequencing, addressing modes and encoding of information, Assembly Language ,Stacks, Queues and Subroutine.

UNIT II:

Instruction Sets:

Instruction Format, limitations of Short word- length machines, High level language Considerations, Motorola 68000 architecture.

Processing Unit:

Some fundamental concepts, Execution of a complete instruction, Single, two, three bus organization, Sequencing of control Signals.

UNIT III:

Micro-programmed Control:

Microinstructions, grouping of control signals, Micro program sequencing, Micro Instructions with next Address field, Perfecting microinstruction, Emulation, Bit Slices, Introduction to Microprogramming, Macro Processor.

UNIT IV:

Arithmetic: Number Representation, Addition of Positive numbers, Logic Design for fast adders, Addition and Subtraction, Arithmetic and Branching conditions, Multiplications of positive numbers, Signed Operand multiplication, fast Multiplication, Booth's Algorithm, Integer Division, Floating point numbers and operations.

UNIT V:

The Memory System:

Some Basic Concepts, Semiconductor RAM Memories, Memory system considerations, Semiconductor ROM Memories, Memory interleaving, Cache Memory, Mapping techniques, Virtual memory, Memory Management requirements.

UNIT VI:

Computer Peripherals:

I/O Devices, DMA, Interrupt handling, online storage, File services.

Processors:

Families of microprocessors Chips, Introduction to RISC & CISC Processors, Introduction to Pipelining.

Text Books:

1. Computer Organization 4 th Edition, 2001 V. Carl Hamacher Mc GrawHill.
2. Computer Organization and Design (The Hardware/Software Interfaces) 4th Edition David A. Patterson & John L. Hennessy Morgan Kaufmann.

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BEIT405T **OBJECT ORIENTED METHODOLOGY**
(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I:
Introduction object-oriented development,Object Oriented Methodology, three Models, object oriented terms, object modeling Technique, object and classes links and associations, generalization and inheritance, grouping constructs a sample object module. Advanced object modeling; aggregation abstract classes, multiple, inheritance, metadata, candidate keys.

UNIT II:
Dynamic modeling, events and states, nested state diagrams, concurrency, advanced dynamic modeling concepts, functional models, data flow diagram, constraints, a sample functional module

UNIT III:
Design methodology overview of analysis, problem statement, ATM network, object modeling, various phases, dynamic modeling, various phases

UNIT IV:
System design, overview, sub systems, allocating subsystems, management of data stores, choosing software control, implementation, handling boundary condition

UNIT V:
Object design, overview, designing algorithms, design optimization, optimization of control, adjustment of inheritance, design of associations, object representation, physical packaging,

UNIT VI:
Implementation, programming languages, database systems, object oriented style, reusability, extensibility, robustness.

Text Books:

1. Object Oriented Modeling and Design by James Rumbaugh, Michal Blaba, William Premerlani, Frederic Eddy, William Lorerson, PHI, 1997
2. Object –oriented Programing Using C++ and Java by Ramesh Vasappanavar, Anand Vasappanavar , Gautam Vasappanavar, PEARSON, 2011

Reference Books:

1. Mastering C++ by A.R.Venugopal, Rajkumar, T. Ravishanker ,TMH, 1997.
2. Computer Science A Structured Approach Using C++ by Behrouz A. Forouzan , Richard F. Gilberg, Second Edition, CENGAGE Learning.

3. Object Oriented Programming with C++ by E Balagurusamy, Fifth Edition, TMH.

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BEIT405P **OBJECT ORIENTED METHODOLOGY**
(Practical Credit: 01)

Teaching Scheme:
Practical: 2 Hours/week

Examination Scheme:
Practical: P (U): 25 Marks P (I): 25 Marks
Duration of University Exam. : 02 Hours

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Note:

1. Practicals are based on OBJECT ORIENTED METHODOLOGY syllabus (subject code: BEIT405T)
2. Practicals have to be performed using 'C++' language
3. There should be at the most two practicals per unit
4. Minimum ten practicals have to be performed
5. Do not include study experiments

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BEIT406P **COMPUTER LAB-II**
(Practical Credit: 02)

Teaching Scheme:
Practical: 2 Hours/week

Examination Scheme:
Practical: P (U): 25 Marks P (I): 25 Marks
Duration of University Exam. : 02 Hours

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G-01. Experiment based on MS Office macro programming.

G-02. Installation of OS and Configuring a Desktop for– the Windows Operating System (XP and 7) and the Linux Operating System (Ubuntu/Fedora/Mint).

G-03. Introduction to UNIX Operating System, The UNIX architecture and Command Usage, The File System, PIPES, Filters using Regular Expressions.

G-04. Introduction to Linux Operating System, flavors of Linux vi Editor, vim Editor

G-05. The Shell - Shell Variables; Scripts; Meta Characters and Environment; if and case Statements; for, while and until loops; Essential Shell Programming.

G-06. AWK (The Pattern-Action Language) - BEGIN and END Patterns; Variables, Records and Fields; Loops; Handling Text; String Manipulations.

G-07. Introduction to MATLAB Simulator and Programming based on MATLAB Simulator.

Note:

1. Practical sessions based on Any Four/Five groups from G-01 to G-06 may be planned.
2. Practical Group G-07 is compulsory.

Reference Books:

1. Sumitabha Das, "UNIX – Concepts and Applications", Fourth Edition, Tata McGraw Hill, 2006.
2. Behrouz A. Forouzan and Richard F. Goldberg, "UNIX and Shell Programming", Thomson Publishing, 2005.
3. Guide to Unix and Linux by Harley Hahn's 1st edition, TMH publication, 2011.
4. Microsoft Office Programming: A Guide for Experienced Developers by Rod Stephens, Apress,2003
5. Dale Dougherty and Arnold Robbins, "sed and awk", Second Edition, O'Reilly Media, 1997
6. "A concise Introduction to MATLAB", by William J. Palm III, First Edition, Tata McGraw Hill.
7. "MATLAB and Simulink for Engineers" by Agam Kumar Tyagi, Oxford University Press.

8. “MATLAB for Engineers”, by Holly Moore, Prentice Hall, Third Edition
9. www.mathworks.in

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PROPOSED SYLLABUS OF INFORMATION TECHNOLOGY

FIFTH AND SIXTH SEMESTER

RTM NAGPUR UNIVERSITY, NAGPUR

ACADEMIC SESSION: 2014-2015

Annexure J

FOUR YEAR BACHELOR OF ENGINEERING (B. E.) DEGREE COURSE
SEMESTER: FIFTH
BRANCH: INFORMATION TECHNOLOGY

Sr. No.	Subject Code	Subjects	Workload				Credit				Marks				
			L	P	T	Total Hrs/ Week	L	P	T	Total	Theory		Practical		Total Marks
											Sess.	Univ.	Sess.	Univ.	
1	BEIT501T	System Programming	3	-	1	4	3	-	1	4	20	80	-	-	100
2	BEIT502T	Design and Analysis of Algorithms	4	-	1	5	4	-	1	5	20	80	-	-	100
3	BEIT503T	Software Engineering	3	-	1	4	3	-	1	4	20	80	-	-	100
4	BEIT503P	Software Engineering	-	2	-	2	-	1	-	1	-	-	25	25	50
5	BEIT504T	Computer Graphics	4	-	1	5	4	-	1	5	20	80	-	-	100
6	BEIT504P	Computer Graphics	-	2	-	2	-	1	-	1	-	-	25	25	50
7	BEIT505T	Java Programming	3	-	1	4	3	-	1	4	20	80	-	-	100
8	BEIT505P	Java Programming	-	2	-	2	-	1	-	1	-	-	25	25	50
9	BEIT506T	Industrial Economics and Entrepreneurship Development	4	-	-	4	4	-	-	4	20	80	-	-	100
		Total	21	6	5	32	21	3	5	29	120	480	75	75	750

Annexure J

FOUR YEAR BACHELOR OF ENGINEERING (B. E.) DEGREE COURSE
SEMESTER: SIXTH
BRANCH: INFORMATION TECHNOLOGY

Sr. No.	Subject Code	Subjects	Workload				Credit				Marks				
			L	P	T	Total Hrs/ Week	L	P	T	Total	Theory		Practical		Total Marks
											Sess.	Univ.	Sess.	Univ.	
1	BEIT601T	Computer Networks	4	-	1	5	4	-	1	5	20	80	-	-	100
2	BEIT602T	Operating Systems	4	-	1	5	4	-	1	5	20	80	-	-	100
3	BEIT603T	Database Management Systems	4	-	1	5	4	-	1	5	20	80	-	-	100
4	BEIT603P	Database Management Systems	-	2	-	2	-	1	-	1	-	-	25	25	50
5	BEIT604T	Internet Programming	4	-	1	5	4	-	1	5	20	80	-	-	100
6	BEIT604P	Internet Programming	-	2	-	2	-	1	-	1	-	-	25	25	50
7	BEIT605T	Functional English	2	-	1	3	2	-	1	3	10	40	-	-	50
8	BEIT606P	Mini Project and Industrial Visit	-	2	-	2	-	2	-	2	-	-	25	25	50
		Total	18	6	5	29	18	4	5	27	90	360	75	75	600

Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur

Scheme of Absorbtion of New course(C.B.S.) to Old course of Fifth Semester

B. E. (Information Technology)

As per Old course scheme of RTM, Nagpur University				As per New course(C.B.S.) scheme of RTM, Nagpur University		
Sr. No	Sem	Subjects	Th / Pr	Subject Code	Subjects	Th / Pr
1	V	System Software	Th	BEIT501T	System Programming	Th
2	V	Computer Graphics	Th	BEIT504T	Computer Graphics	Th
3	V	Computer Graphics	Pr	BEIT504P	Computer Graphics	Pr
4	V	Principles of Management	Th	BEIT506T	Industrial Economics and Entrepreneurship Development	Th
5	V	Information Theory and Data Communication	Th			
6	V	Information Theory and Data Communication	Pr			
7	V	Discrete and Integrated Circuits	Th			
8	V	Discrete and Integrated Circuits	Pr			
9	V	Object Oriented Methodologies	Th			
10	V	Object Oriented Methodologies	Pr			
				BEIT502T	Design and Analysis of Algorithms	Th
				BEIT503T	Software Engineering	Th
				BEIT503P	Software Engineering	Pr
				BEIT505T	Java Programming	Th
				BEIT505P	Java Programming	Pr

Note: If any student has cleared any subject as mentioned in absorption scheme of relevent semester in previous semester of old course will be exempted for appearing in the examination for that subject

Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur

Proposed Scheme of Absorbtion of New course(C. B. S.) to Old course of Sixth Semester

B. E. (Information Technology)

As per Old course scheme of RTM, Nagpur University				As per New course (C. B. S.)scheme of RTM, Nagpur University		
Sr. No	Sem	Subjects	Th / Pr	Subject Code	Subjects	Th / Pr
1	VI	Software Engineering	Th			
2	VI	Software Engineering	Pr			
3	VI	JAVA Programming	Th			
4	VI	JAVA Programming	Pr			
5	VI	Database Management Systems	Th	BEIT603T	Database Management Systems	Th
6	VI	Database Management Systems	Pr	BEIT603P	Database Management Systems	Pr
7	VI	Operating Systems	Th	BEIT602T	Operating Systems	Th
8	VI	Microprocessors	Th			
9	VI	Microprocessors	Pr			
10	VI	Visual Techniques	Th			
11	VI	Visual Techniques	Pr			
				BEIT601T	Computer Networks	Th
				BEIT604T	Internet Programming	Th
				BEIT604P	Internet Programming	Pr
				BEIT605T	Functional English	Th
				BEIT606P	Mini Project and Industrial Visit	Pr

Note: If any student has cleared any subject as mentioned in absorption scheme of relevent semester in previous semester of old course will be exempted for appearing in the examination for that subject

BEIT501T SYSTEM PROGRAMMING
(Theory Credit: 04)

Teaching Scheme:	Examination Scheme:
Lecture: 3 Hours/week	Theory: T (U): 80 Marks T (I): 20 Marks
Tutorial: 1 Hour/week	Duration of University Exam. : 03 Hours

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UNIT I:

Introduction to System Software and IBM 360 Machine:

Evolution of components of programming system, Operating System, Overview, Functions and Facilities o, Goals of System software, Views of System Software, Virtual machine. General machine structure IBM 360/370, Machine Language Assembly language.

UNIT II:

Assembler:

Design of Pass-I and Pass-II Assemblers, Table Processing, Searching and Sorting, Problems based on symbol table, Base table and Literal table generation, Machine code generation and Searching and sorting.

UNIT III:

Macro Language and Macro Processor:

Macro instruction, Features of Macro facility, Implementation of 1-Pass, 2-Pass Macro processor, Macro calls within macro, macro definition within macros.

UNIT IV:

Loaders and Linkers:

Different Loading Schemes, Binders, Overlays, Linking loaders, Design of absolute loaders, Design of Direct Linking loaders.

UNIT V:

Compiler:

Phases of Compiler, Cross Compiler, Bootstrapping, Erros in each phases, ,Compiler writing tools, Lex and YACC, Databases used in Compilation process.

UNIT VI:

UNIX Device Drivers:

Introduction to Device drivers, Types of Device Drivers, Design issues in Device Drivers, Driver installation with example, character driver-A/D Converter, Block Driver-RAM Disk driver, Terminal Driver-The COM1 port driver

Text Books:

1. J. J. Donovan; System Programming; TMH, 2012
2. D.M. Dhamdhere; System Programming; THM; 2011
3. George Pajari; Eritting Unix Device Drivers; Pearson Education; 2011
4. O.G. Kakade; Principles of Compiler Design; Laxmi Pub. 2008

Reference Books:

1. Leland Beck, D. Manjula; System Software; An Introduction to System Programming; Pearson Education; 2013
2. Alfred Aho, J. Ullman; Principles of Compiler Design; Narosa Pub. 2010

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BEIT502T DESIGN AND ANALYSIS OF ALGORITHMS

(Theory Credit: 05)

Teaching Scheme:	Examination Scheme:
Lecture: 4 Hours/week	Theory: T (U): 80 Marks T (I): 20 Marks
Tutorial: 1 Hour/week	Duration of University Exam. : 03 Hours

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UNIT I:

Mathematical foundation, summation of arithmetic and geometric series, Σn, Σn^2, bounding summation using integrations, recurrence relations, solutions of recurrence relations using technique of characteristic equation, recursion tree method and master theorem, generating functions, Complexity calculation of various standard functions, principles of designing algorithms

UNIT II:

Asymptotic notations of analysis of algorithms, analyzing control structures, worst case, average case and best case analysis of insertion sort, selection sort and bubble sort, ,lower bound proof, amortized analysis, application of amortized analysis, Sorting networks, comparison networks, biotonic sorting network.

UNIT III:

Divide and conquer strategies: Binary search, quick sort, merge sort, heap sort, Stressen's matrix multiplication algorithm, min-max algorithm. Greedy Approach: Basic strategy, activity selection problem, application to job sequencing with deadlines problem, knapsack problem, optimal merge pattern, Huffman code, minimum cost spanning tree using Prim's and Kruskal's algorithm,

UNIT IV:

Dynamic Programming: Basic Strategy, Multistage graph (forward and backward approach), Longest Common Subsequence, matrix chain multiplication, Optimal Binary Search Tree, 0/1 Knapsack problems, Travelling Salesman problem, single source shortest path using Bellman-Ford algorithm, all pair shortest path using Floyd- Warshall algorithm.

UNIT V:

Basic Traversal and Search Techniques, breadth first search and depth first search, connected components. Backtracking: basic strategy, 4-Queen's problem, 8-Queen's problem, graph coloring, Hamiltonian cycles etc, Approximation algorithm and concepts based on approximation algorithms

UNIT VI:

NP-hard and NP-complete problems, basic concepts, non-deterministic algorithms, NP-hard and NP-complete, Cook's theorem, decision and optimization problems, polynomial reductions, graph based problems on NP Principle, Computational Geometry, Approximation algorithm.

Text Books:

1. "Introduction to Algorithms", Thirs Edition, Prentice Hall of India by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein.
2. "The Design and Analysis of Computer Algorithms", Pearson education by Alfred V. Aho, John E. Hopcraft, Jeffrey D. Ullman.

3. "Fundamentals of Computer Algorithms", Second Edition, University Press By Horowitz, Sahani, Rajsekharam.
4. "Fundamentals of Algorithms", Prentice Hall by Brassard, Bratley
5. "Design and Analysis of Algorithms",Pearson Education, IInd Edition, Parag Dave, Himanshu Dave

Reference Books:

1. Computer Algorithms: Introduction to Design and analysis, 3rd Edition, By Sara Baase and A. V. Gelder Pearson Education.

BEIT503T SOFTWARE ENGINEERING

(Theory Credit: 04)

Teaching Scheme:	Examination Scheme:
Lecture: 3 Hours/week	Theory: T (U): 80 Marks T (I): 20 Marks
Tutorial: 1 Hour/week	Duration of University Exam. : 03 Hours

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UNIT I:

Basics: Introduction to Software Engineering, Software Myths, Software Engineering- A Layered Technology, Software Process Framework, Software Process Models: The Waterfall Model, Incremental Process Models, Evolutionary Process Models, Specialized Process Models, Agile Process Models

UNIT II:

Measures Metrics and Indicator, Metrics for process & projects: Software measurement, metrics for software quality, metrics for small organization, Estimation: Software scope and Feasibility, Resources, Software project estimation, Decomposition Techniques, Empirical Estimation Models, Make-buy Decision, Project scheduling

UNIT III:

System Engineering: Hierarchy, Business Process Engineering, Product Engineering, System Modeling, Requirements Engineering: Requirements Analysis, Analysis Modeling Approaches, Data Modeling, Object-Oriented Analysis, Scenario-Based Modeling, Flow-Oriented Modeling, Class-based Modeling, Behavioral Model, Metrics for Analysis Models

UNIT IV:

Design Engineering Concepts, Design Model, Pattern-Based Software Design, Architectural Design, Mapping data flow into software architecture, Cohesion, Coupling, User interface analysis and Design,
Metrics for Design Models

UNIT V:

Unit Testing, Integration Testing, Validation Testing, System Testing, Art of Debugging, Software Testing Fundamentals, Black-Box Testing, White-Box Testing, Metrics for Source Code, Metrics for Testing & Maintenance

UNIT VI:

Risk Management: Risk strategies, Software risks, Risk identification, Risk refinement, RMMM Quality Management: Quality Concepts, Software Quality Assurance, Software Reviews, Formal Technical Review, Software Reliability, Change Management: Software Configuration Management, SCM Repository, SCM Process, Reengineering: Software reengineering, Reverse Engineering, Restructuring, Forward Engineering

Text Books:

1. Software Engineering-A Practitioner's Approach (Sixth Edition) by Roger Pressman (TMH)
2. Software Engineering (Ninth Edition)-Ian Summerville (Pearson)
3. Software Engineering for students (4^{th} Edition)- Douglas Bell(Pearson)

Reference Books:

1. Schaum's Outline of Theory and Problems of Software Engineering by David Gustafson (TMH)
2. Software Engineering (Third Edition) by K. K. Aggarwal and Yogesh Singh (New age International Publishers)
3. Software Engineering, Theory and Practice(4^{th} Edition)- Pfleeger, Atlee(Pearson)

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BEIT503P SOFTWARE ENGINEERING

(Practical Credit: 01)

Teaching Scheme:	Examination Scheme:
Practical: 2 Hours/ week	Practical: P (U): 25 Marks P (I): 25 Marks
	Duration of University Exam. : 02 Hours

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Note:

1. Practicals are based on SOFTWARE ENGINEERING syllabus (subject code: BEIT503T)
2. Practicals are based on:
    a) DFD
    b) UML diagrams for software
    c) Testing Tools
    d) CASE Tools
3. Minimum ten practicals have to be performed
4. Do not include study experiments

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BEIT504T COMPUTER GRAPHICS

(Theory Credit: 05)

Teaching Scheme:	Examination Scheme:
Lecture: 4 Hours/week	Theory: T (U): 80 Marks T (I): 20 Marks
Tutorial: 1 Hour/week	Duration of University Exam. : 03 Hours

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UNIT I:

Geometry and line generation: points, lines, planes, pixels and frames buffers, types of display devices and its architecture DDA and Bresenham's algorithms for line generation, Bresenham's algorithm for circle generation, aliasing , anti-aliasing and its techniques.

UNIT II:

Graphics primitives: Display files, algorithms for polygon generation, polygon filling algorithms, NDC (normalized device co-ordinates), 2D transformations: scaling, rotation, translation, rotation about arbitrary point, reflections, shearing.

UNIT III:

Segment tables: operations on segments, data structures for segments and display files, Windowing and clipping: window, viewport, viewing transformations, clipping, line and Polygon clipping.

UNIT IV:

3D Graphics: 3D Transformation, parallel, perspective and isometric projections, 3D Transformations. Hidden surfaces and line removal: Painter's, Z-buffer, Warnock's, Back-face Removal algorithm

UNIT V:

Curves and surfaces: Methods of interpolation, Bezier and B-splines, surface rendering methods: Gouraurd Shading, Phong Shading, Constant Intensity Shading, Fast Shading.

UNIT VI:

Color Models and Color Application: Properties of light, standard primaries, chromaticity Diagram, Intuitive colour concept RGB, YIQ CMY, HSK, colour models and their conversion, colour selection and applications. Animation: Design of Animation sequences, animation Function, Raster animation, animation Language, Key-Frame System, motion Specification.

Text Books:

1. Procedural elements for computer graphics by David F. Rogers, Mc-Graw Hill.
2. Computer Graphics 'C' Version, Second Edition By Donald Hearn and M.Pauline Baker, Pearson publication
3. Mathematical elements for computer graphics by David Rogers and J. Alan Adams, Tata Mcgraw Hill Education Private Limited
4. Computer graphics principles and practice in C by Foley, Vandam, Feiner and Huges (Pearson)
5. Computer Graphics, Vikas publications, Neeta Jain
6. Principles of interactive computer graphics by Newman and Sproul.

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BEIT504P COMPUTER GRAPHICS

(Practical Credit: 01)

Teaching Scheme:	Examination Scheme:
Practical: 2 Hours/ week	Practical: P (U): 25 Marks P (I): 25 Marks
	Duration of University Exam. : 02 Hours

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Note:

1. Practicals are based on COMPUTER GRAPHICS syllabus (subject code: BEIT504T)
2. There should be at the most two practicals per unit
3. Minimum ten practicals have to be performed
4. Do not include study experiments

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BEIT505T JAVA PROGRAMMING

(Theory Credit: 04)

Teaching Scheme:	Examination Scheme:
Lecture: 3 Hours/week	Theory: T (U): 80 Marks T (I): 20 Marks
Tutorial: 1 Hour/week	Duration of University Exam. : 03 Hours

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UNIT I:

Introduction to Java, Data types, Literals: Types of Literals, Operators, Control Statements: If, switch, do-while, while, for, enhanced for loop, Nested Loop, break, continue, return statements, Classes: Fundamentals of classes, Declaring objects, Assigning objects, Reference variables, Overloading methods, Constructors, this keyword, Wrapper classes, Using object as parameter, Argument passing, Command line arguments, returning object, static modifier, final modifier, Nested classes: inner classes, Garbage collection.

UNIT II:

Arrays, Vectors and Generics, String Handling: String and StringBuffer class, String constructors, Data conversion using valueOf(), toString() methods, Methods for String Comparison, Searching string and modifying string.

UNIT III:

Object class, Inheritance, Abstract classes and methods, Interfaces, Method Overriding, Packages: Package Fundamental, Access protection, Importing packages, Exception Handling: Fundamental Exception type: Checked, Unchecked and Uncaught Exceptions, throw and throws keywords, Creating user defined exceptions, Built-in Exceptions.

UNIT IV:

Multithreading:Fundamentals, Thread Life Cycle, Ways of creating threads, Creating multiple threads, isAlive (), join (), Thread Synchronization, Thread priorities, Interthread communication, Methods for suspending, resuming and stopping threads.

UNIT V:

I/O stream, Byte stream, Character stream, Pre-defined streams, Reading console input, Writing console output, PrintWriter class, Reading and Writing files, transient and volatile modifiers, instanceof, strictfp and native methods.

UNIT VI:

Introduction to Swings, AWT as a origin of Swing, Key swing features, Components and container, Swing packages, Event handling, Creating swing applets, Controls: label and image icons, JTextField, Swing Buttons, Tabbed Panes, JScrollPanes, JList, JComboBox, JTable.

Text Books:

1. The Complete Reference (Seventh Edition) by Herbelt Schildt, TATA McGRAW-HILL Publications

Reference Books:

1. Sun Certified Java Programmer for Java 6 by Kathy Sierra.
2. The Java™ Programming Langauge(3rd Edition) by Arnold, Holmes, Gosling, Goteti
3. Core Java for Beginners by Rashmi Kanta Das(III Edition) Vikas Publication
4. Programming in Java(Second Edition) by Sachin Malhotra and Saurabh Choudhary, Oxford University Press

BEIT505P JAVA PROGRAMMING

(Practical Credit: 01)

Teaching Scheme:
Practical: 2 Hours/ week

Examination Scheme:
Practical: P (U): 25 Marks P (I): 25 Marks
Duration of University Exam. : 02 Hours

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Note:

1. Practicals are based on JAVA PROGRAMMING syllabus (subject code: BEIT505T)
2. There should be at the most two practicals per unit
3. Minimum ten practicals have to be performed
4. Do not include study experiments

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BEIT506T INDUSTRIAL ECONOMICS AND ENTREPRENEURSHIP DEVELOPMENT

(Theory Credit: 03)

Teaching Scheme:	Examination Scheme:
Lecture: 4 Hours/week	Theory: T (U): 80 Marks T (I): 20 Marks
Tutorial: Nil	Duration of University Exam. : 03 Hours

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Objective:

Study of this subject provides an understanding of the scope of an industrial economics and entrepreneurship development, key areas of business development, sources of finance, project preparation, methods of taxation and tax benefits, significance of entrepreneurship and economic growth, application of engineering skills in entrepreneurial activities etc.

UNIT I:

Industrial economics, Types of Business structures, top and bottom line of the organization, economic analysis of business, economics of operations, economic prudence in business.

UNIT II:

Market structures- Monopoly, Oligopoly, and Monopolistic competition. Pricing strategies, business integration- forward backward integration, economies of scale, diseconomies of scale, liberalization, privatization and globalization. Business cycles, optimum size of firm.

UNIT III:

The functions of central bank and commercial banks, Foreign Direct Investment, Free trade vs. Protectionism, Capital formation, Inflation, Recession and stagnation, Inclusive growth, Public-Private partnership for development, Multiplier effect, Accelerator effect.

UNIT IV:

Entrepreneurship meaning, Major Motives Influencing an Entrepreneur, Factors Affecting Entrepreneurial Growth. Project Formulation, Product development, Market Survey and Research, Demand forecasting techniques,Techno Economic Feasibility Assessment – Preparation of Preliminary Project Reports – Project Appraisal – Sources of Information – Classification of Needs and Agencies.

UNIT V:

Need – Sources of Finance, Term Loans, Capital Structure, venture capital. Angel funding, Financial Institution, management of working Capital, Costing, Break Even Analysis, Network Analysis Techniques of PERT/CPM – Taxation – Direct, Indirect Taxes.

UNIT VI:

Sickness in small Business, Major problems faced by SSIs, Foreign Direct Investments and threat to SSI, Technical consultancy organizations, safeguard measures against variation in currency value, Government Policy for Small Scale Enterprises, tax holidays, and incentives to SSIs.

TEXT BOOKS

Industrial Economics. By, Ranjana Seth, Ane Book Pvt Ltd.
Modern Economic Theory By, K.K. Dewett. S.Chand.
Industrial Economics. By, Jagdish Sheth, Pearson Publication.
"Entrepreneurial Development" By, S.S.Khanka S.Chand & Co. Ltd. Ram Nagar New Delhi, 1999.
Hisrich R D and Peters M P, "Entrepreneurship" 5th Edition Tata McGraw-Hill, 2002.
Management of Entrepreneurship. By, N.V.R. Naidu, I.K. International Pvt Ltd.
Entrepreneurial Development. By, S.Anil Kumar. New Age International.
Small- Scale Industries and Entrepreneurship, By, Dr. Vasant Desai, Himalaya Publication.

REFERENCE BOOKS:

Business Economics. By, K.Rajgopalchar. Atalantic Publishers.
Microeconomics. By, Robert Pindyk
Business Economics. By, H.L. Ahuja,H. L. Ahuja,Louis Prof. De Broglie. S.Chand.

Rabindra N. Kanungo “Entrepreneurship and innovation”, Sage Publications, New Delhi, 1998.

Financing Small Scale Industries in India, By, K.C.Reddy.Himalaya Publication.

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BEIT601T COMPUTER NETWORKS

(Theory Credit: 05)

Teaching Scheme:	Examination Scheme:
Lecture: 4 Hours/ week	Theory: T (U): 80 Marks T (I): 20 Marks
Tutorial: 1 Hour/ week	Duration of University Exam. : 03 Hours

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UNIT I: Introduction

Introduction to computer networks & Internet, Network architecture, layered approach, OSI reference model, TCP/IP protocol suite, performance issues in networks, throughput, delay, latency, jitter, packet delivery ratio, packet loss rate, reliability, Introduction to Wireless Networks, IEEE 802.11, Bluetooth and WiMAX, wireless transmission, infrared transmission

UNIT II: Data Link Layer

Design issues, framing, error control, flow control, error-correcting and detecting codes, Data link protocols, unrestricted simplex protocol, simplex stop-and-wait protocol, one-bit sliding window protocol, Go Back N ARQ protocol, selective repeat ARQ protocol, static and dynamic channel allocation, ALOHA, CSMA/CD, CSMA/CA

UNIT III: Network Layer

Design issues, classful and classless addressing, IPv4 addressing mechanism, Subnetting and Supernetting, Next generation IP, IPv6 addressing, transition from IPv4 to IPv6, ICMPv6, routing algorithms, shortest path routing, flooding, flow-based routing, distance vector routing, link state routing, hierarchical routing, congestion control algorithms, OSPF, BGP, Multicasting, firewalls

UNIT IV: Transport layer and Application Layer

Quality of service, transport service primitives, elements of transport protocol, addressing, establishing a connection, releasing a connection, flow control and buffering, multiplexing, crash recovery, client server model, concurrency, processes, sockets, socket system calls

UNIT V:

BOOTP and DHCP, packet formats, operation, error control, transition states, DNS (Domain Name System), DNS in the Internet, Resolution, FTP and TFTP, connection, communication, command processing, file transfer, messages

UNIT VI:

Mobile IP, addressing, agents, three phases, agent discovery, registration, data transfer, Internet Security, privacy, digital signature, application layer security, transport layer security, security at the IP layer IPSec, Real Time traffic over the Internet

Text Books:

1. Computer Networks, Fifth Edition, Andrew Tanenbaum(Pearson Education)
2. TCP/IP Protocol Suite, Behrouz A Forouzan, McGraw Hill Fourth Edition

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BEIT602T OPERATING SYSTEMS

(Theory Credit: 05)

Teaching Scheme:	Examination Scheme:
Lecture: 4 Hours/week	Theory: T (U): 80 Marks T (I): 20 Marks
Tutorial: 1 Hour/week	Duration of University Exam. : 03 Hours

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UNIT I:

Introduction: What is Operating System(OS), structure of OS, history of OS, Types of OS: Time sharing, real-time, multiprocess (Asynchronous & Synchronous), multiprogramming (loosely coupled, tightly coupled), Distributed, web-based, client-server, peer-to-peer, services of OS, user view & machine view of OS, System calls, Spooling and buffering. Case Studies: Android, Linux, Windows 8.

UNIT II:

File Management: File Concept, file attributes, file operations, file system structure, file system implementation, file access methods, Disk Scheduling Algorithms, File protection, free space management on disk.

UNIT III:

Process Management: Process concept, process scheduling, operations on process, interprocess communication, communication between client-server, multithreaded model, process scheduling criteria, scheduling algorithm.

UNIT IV:

Memory Management: Preliminaries, Bare machine, resident monitor, swapping, multiple partitions, paging, segmentations, combined systems. Virtual Memory: Overlays, demand-paging performance, of demand paging, page replacement, virtual memory concepts, page replacement algorithms. Allocation algorithm, thrashing.

UNIT V

Process Synchronization: Critical Section problem, semaphores, classic problems: Dining Philosopher problem, producer-consumer, reader-writers problem, bounded buffer problem, monitors, Atomic transaction, synchronization examples.

UNIT VI:

Deadlock and Protection: System model, deadlock characterization, methods for handling deadlocks, prevention, detection, recovery, avoidance, Banker's Algorithm. Goal of protection, mechanism & policies, domain protection, access matrix, implementation of access matrix, dynamic protection structures, revocation, existing systems & language based protection, protection problem security.

Text Books:

1. Modern Operating Systems – A. S. Tanenbaum, Pearson Education
2. Operating System- A. S. Godbole, Tata McGraw Hill, third edition
3. Operating System Concepts- Silberchatz and Galvin, Addison Wesley
4. Android application Development for Java Programmers by James c. Sheusi, CENGAGE Learning.

Reference Books:

1. Operating Systems concepts and Design – Milan Milenkovic, Tata McGraw Hill

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BEIT603T DATABASE MANAGEMENT SYSTEMS

(Theory Credit: 05)

Teaching Scheme:	Examination Scheme:
Lecture: 4 Hours/week	Theory: T (U): 80 Marks T (I): 20 Marks
Tutorial: 1 Hour/week	Duration of University Exam. : 03 Hours

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UNIT I: Introduction to Database Systems

Database Systems: Significance and advantages, Types of Databases, Limitations of File processing system, the DBMS Environment, Data Abstraction, Data Independence, DBMS Architecture, Functions of DBMS, Formal relational query languages: Relational Algebra, Tuple Relational calculus, Domain Relational Calculus.

UNIT II: File Organization, Indexing and Hashing

File organization, Organization of records in files, Data dictionary storage, Basic concepts of indexing, Ordered indices, B+ Tree index files, B+ Tree indexing, B+ Tree Extensions, Multiple Key Access, Static Hashing, Dynamic Hashing, Comparison of Ordered Indexing and Hashing, Bitmap Indices, Index Definition in SQL.

UNIT III: Data Models and Relational Database Design

Evolution of Data Models, Entity Relationship Model, Development of ER Diagrams, Extended Entity Relationship Model. Relational model: Logical View of Data, Keys, Integrity Rules, Relational set operators, Data Dictionary and System Catalog, Indexes, Codd's Relational Database Rules. Normalization of Database Tables: Need and Significance, the normal forms - 1NF, 2NF, 3NF, BCNF, 4NF, 5NF, normalization & database design, denormalization.

UNIT IV: Query Processing and Query Optimization

Overview of Query Processing, Measures of Query cost, Selection Operation, Sorting, Join Operation, Other Operations, and Evaluation of Expressions. Overview of Query Optimization, Transformation of Relational Expressions, Estimating Statistics of Expression results, Choice of Evaluation Plans, Materialized Views

Unit V: Transaction Management

Transactions: Concept, Transaction Model, Transaction atomicity and Durability, Transaction Isolation, Serializability, Transaction Isolation Levels and Implementations. Concurrency Controls: Lock Based Protocol, Deadlock Handling, Time-stamp Based Protocols, and Validation Based Protocols. Recovery System: Failure Classification, Log Based Recovery, Advanced Recovery Techniques.

UNIT VI: SQL and Advanced SQL

Introduction to SQL: SQL Data Definition, Basic Structure of SQL Queries, Set Operations, Null values, Aggregate functions, Nested Sub-queries, Modifications of the Databases Intermediate SQL: Join Expressions, Views, Integrity Constraints, SQL Data types and Schemas, Authorization. Advanced SQL: Dynamic SQL and Embedded SQL, Functions and Procedures, Triggers.

Text Books:

1. Abraham Silberschatz, Henry F. Korth and S. Sudarshan, Database System Concepts, 6th Edition, McGraw Hill (SIE), 2013.
2. Carlos Coronel, Steven Morris and Peter Rob, Database Principles – Fundamentals of Design, Implementation and Management, 9th Edition, Cengage Learning, 2013.
3. Hector-Garcia Molina, Jeffrey Ullman and Jeniffer Widom, Database Systems – the Complete Book, 2nd Edition, Pearson Education, 2014.
4. Database Systems Concepts, Designs and Application(2e Pearson) by Shio Kumar Singh
5. The database book, Principles and Practice using MySQL by Narain Gehani, University Press.
6. An Introduction to Database Systems(8e Pearson) by Date, Kannan, Swamynathan

Reference Books:

1. Alexis Leon and Mathews Leon, Database Management Systems, Vikas Publishing, 2008.
2. Ramez Elmasri and Shamkant Navathe, Database Systems - Models, Languages, Design and Application Programming, 6th Edition, Pearson Education, 2009.

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BEIT603P DATABASE MANAGEMENT SYSTEMS

(Practical Credit: 01)

Teaching Scheme:
Practical: 2 Hours/ week

Examination Scheme:
Practical: P (U): 25 Marks P (I): 25 Marks
Duration of University Exam. : 02 Hours

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Note:

1. Practicals are based on DATABASE MANAGEMENT SYSTEMS syllabus (subject code: BEIT603T)
2. Practicals are to be performed using SQL
3. Minimum ten practicals have to be performed
4. Do not include study experiments

BEIT604T INTERNET PROGRAMMING

(Theory Credit: 05)

Teaching Scheme:	Examination Scheme:
Lecture: 4 Hours/ week	Theory: T (U): 80 Marks T (I): 20 Marks
Tutorial: 1 Hour/ week	Duration of University Exam. : 03 Hours

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UNIT I:

HTML and common tags: Introduction, www, Internet, URL, Common tags: Text formatting tags Line and Paragraph tags, Lists: ordered list Unordered List, definition List, anchor tag , Absolute and relative path, Tables and its attributes, Image tag- alt attribute, image mapping frames, forms , cascading style sheet, External style sheet, internal Style sheet.

UNIT II:

Java Scripts: Introduction Benefits of java script, Editing java scripts Displaying information, Alerls(), Promots(), confirm box, Operators, conditional statements, conditional loops, functions, arrays, *Objects*-math, string, date, Boolean, number, document, windows. DHTML with java script, Object model collection, events in java script, filters and transitions-Flip filter, Image mask, shadow filter, alpha filter, Blur filter. Difference between HTML and DHTML

UNIT III:

XML: Introduction, Advantages, Difference between HTML and XML, XML Namespace, Well formed and valid XML, XML Document type definition, XML schemas, Data types Attribute Types, XML Transformation- xsl, Document object model (DOM) using XML processors: DOM and SAX.

UNIT IV:

The Server Side: Client side Vs. Server side, Transformation from static to dynamic sites, Java Servlets, reading environment parameters, accessing parameter data, state management, event driven tracking.

UNIT V:

Java Server Pages: Need of JSP, JSP Life Cycle, Elements in JSP Page, Implicit JSP Objects, JSP Objects scope, JSP tags, JSP exceptions ,Expression Language, JSP standard tag Library custom tag Library, JSP and Equivalent Technologies.

UNIT VI:

Android applications Project: android applications components, application design, the screen layout and main.xml file, component Ids, few simple controls, getting and configuring android emulator, Key Classes like Button, TextView, EditText, View. OnClickListner

Text Books:

1. Web Technology Theory and Practices by M. Shrinivasan, PEARSON publication.
2. Android application Development for Java Programmers by James c. Sheusi, CENGAGE Learning.

3. The Modern approach to Web Technologies by Dr. Vaka Murali Mohan and Mr. S. Pratap Singh SCITECH Publications.
4. Web Technologies TCP/IP architecture, and Java Programming by Achyut S. Godbole & Atul Kahate , Tata McGraw-Hill publication Second edition.

Reference Books:

1. HTML: The Complete Reference, by Thomas A. Powell, McGraw Hill
2. XML: The Complete Reference, by Williamson, McGraw Hill

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BEIT404P INTERNET PROGRAMMING

(Practical Credit: 01)

Teaching Scheme:	Examination Scheme:
Practical: 2 Hours/ week	Practical: P (U): 25 Marks P (I): 25 Marks
	Duration of University Exam. : 02 Hours

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Note:

1. Practicals are based on INTERNET PROGRAMMING syllabus (subject code: BEIT404T)
2. Practicals are to be performed using Apache Tomcat and Eclipse IDE
3. There should be at the most two practicals per unit
4. Minimum ten practicals have to be performed
5. Do not include study experiments

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BEIT605T FUNCTIONAL ENGLISH

(Theory Credit: 03)

Teaching Scheme:	Examination Scheme:
Lecture: 2 Hours/week	Theory: T (U): 40 Marks T (I): 10 Marks
Tutorial: 1 Hour/week	Duration of University Exam. : 02 Hours

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Objective: At the end of the semester, students will have enough confidence to face competitive examinations(IELTES/ TOEFL/CAT/ MAT/ XAT/SNAP/GMAT/GATE etc.)to pursue masters degree. They will also acquire language skills required to write their Reviews/Projects/Reports. They will be able to organize their thoughts in English and hence face job interviews more confidently .

Scope: The Curriculum designed is student –centered and it is guidance for their career

Course Structure

Unit 1. Functional Grammar: (4 periods) (3+3+2+2=10)

Common errors , Transformation of Sentences, Phrases, Idioms & Proverbs.
[50 sentences of common errors, 50 examples of Transformation of Sentences, (5 each type), 50 noun/prepositional phrases, 50 idioms/proverbs)

Unit II. English for Competitive Exams & Interview Techniques: (6 periods)
3+3+2+2=10 or (10X1=10)

IPA (vowel & consonant phonemes), Word building [English words /phrases derived from other languages), Technical Jargons, Synonyms/Antonyms, Analogies, Give one word for, Types & Techniques of Interview

Assignment :[25 Words for teaching IPA, 25 words/phrases of foreign origin, 25 technical jargons, 25 words for Synonyms/ Antonyms, 25 words for Analogies, 50 examples of give one word for]

Unit III (A) Formal Correspondence (8 periods) (10X1=10)

Business Letters, Technical Report Writing, Writing Resumes, e-mail etiquettes
[Orders, Complaints , Enquiries, Job applications & Resume Writing ,Writing Memoranda]

(B) Analytical comprehension: [Four fictional & four non-fictional unseen texts]

Unit 1V. Technical & Scientific Writing: (4 periods) (10X1=10)

Writing Reviews, Features of Technical Writing, Writing Scientific Projects, Writing Research papers.
Assignment: (Any one project/review as assignment)

Total number of periods required = 22 for each Branch of Engineering

Reference Books:

1. Oxford Learners' Dictionary of Current English
2. Business Communication - KK Sinha, Galgotia Publishers
3. Developing Communication skills- Krishna Mohan & Meera Banerjee
4. Effective technical Communication –Barun K Mitra
5. Effective Business Communication – Herta A Murphy, Habert Hidebrandt, Jane P Thomas

Evaluation Pattern:

Internal Examination: Weightage = 10 mrks

Written Examination: 05 marks

Project Seminar : 05 marks

External Examination: Weightage = 40 marks

Question Pattern for End Semester Examination.

Q No.	Unit No	Que.type	No. of Questions	Weightage
1 or 2	I	objective	2 bunches of 4 questions each	(3+3+2+2)=10)
3 or 4	II	Objective	2 bunch of 4 questions each	(3+3+2+2)=10 or (10X1=10)
5 or 6	III	subjective	1 out of 2	(10X1=10)
7 or 8	IV	Subjective	1 out of 2	(10X1=10)

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BEIT606P MINI PROJECT AND INDUSTRIAL VISIT

(Practical Credit: 02)

Teaching Scheme:	Examination Scheme:
Practical: 2 Hours/ week	Practical: P (U): 25 Marks P (I): 25 Marks
	Duration of University Exam. : 02 Hours

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Course Objective:

1. To develop an understanding of applications in real life
2. To develop research skills of students
3. To help the students in exploring career opportunities in their areas of interest.
4. To give an insight into the overall functioning of the organisations where students visited.
5. To develop Institute-Industry Interaction
6. To provide means to immerse students in actual supervised professional experiences

Constraints:

1. The students shall work in groups of 4-5 each and work on small application or research based/Industry oriented real time problems.
2. Local Mentor and Industry Mentor shall work in coordination if students are doing project in industry.
3. Industry visit should be planned to explore students about real time problems.
4. Students shall work on providing solutions to identified problems
5. Detailed reports are expected to be submitted at the end
6. Evaluation should be done based on feedback of Local and Industry Mentor

Expected Outcome:

1. Problem Identification and Definition
2. Defining data requirements and Identifying data sources
3. Literature Survey
4. Primary data collection
5. Software and Hardware requirements
6. Overall Project development as per the phases of SDLC
7. Outcome of the project
8. Utility of the project to the organisation

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SYLLABUS OF INFORMATION TECHNOLOGY

RTM NAGPUR UNIVERSITY, NAGPUR

ACADEMIC SESSION: 2015-2016

SEVENTH AND EIGHTH SEMESTERS

Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur

Absorption Scheme for New course(C.B.S.) to Old course of Seventh Semester

B. E. (Information Technology)

As per Old course scheme of RTM, Nagpur University					**As per New course(C.B.S.) scheme of RTM, Nagpur University**		
Sr. No	**Sub Code**	**Subjects**	**Th/ Pr**		**Subject Code**	**Subjects**	**Th/ Pr**
1	8IT47	Distributed Databases and Object Oriented Databases	Th		BEIT701T	Data Warehousing and Mining	Th
2	8IT47	Distributed Databases and Object Oriented Databases	Pr		BEIT701P	Data Warehousing and Mining	Pr
3	7IT43	Computer System Security	Th		BEIT702T	Computer System Security	Th
4	7IT41	Computer Network and Internet	Pr		BEIT702P	Computer System Security	Pr
5	7IT44	Elective-I Artificial Intelligence	Th		BEIT703T	Artificial Intelligence	Th
6	8IT51	Elective-II Mobile Communication	Th		BEIT704T1	Elective-I Mobile Computing	Th
7	7IT45	Elective-II Multimedia Systems	Th		BEIT704T2	Elective-I Multimedia Systems	Th
8	-----	------	-----		BEIT704T3	Elective-I Bio-informatics	Th
9	-----	------	-----		BEIT704T4	Elective-I Compiler Design	Th
10	-----	------	-----		BEIT705T1	Elective-II Software Testing and Quality Assurance	Th
11	8IT51	Elective-II Parallel Processing	Th		BEIT705T2	Elective-II Cluster and Grid Computing	Th
12	7IT42	Digital Signal Processing	Th		BEIT705T3	Elective-II Digital Signal Processing	Th
13	-----	------	-----		BEIT705T4	Elective-II Digital Forensic for Information Technology	Th
14	7IT46	Mini Project	Pr		BEIT706P	Seminar on Project	Pr
15	7IT42	Digital Signal Processing	Pr		-----	------	-----
16	7IT44	Elective-I Operation Research	Th		-----	------	-----
17	7IT44	Elective-I VLSI Design	Th		-----	------	-----
18	7IT45	Elective-II Fuzzy System and Neural Networks	Th		-----	------	-----
19	7IT45	Elective-II Digital Image Processing	Th		-----	------	-----
20	7IT45	Elective-II CAD/CAM	Th		-----	------	-----
21	7IT45	Elective-II Management Information Systems	Th		-----	------	-----
22	7IT41	Computer Network and Internet	Th		-----	------	-----

Members,
BOS (CE/IT)

Chairman,
BOS (CE/IT)

Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur

Absorbtion Scheme for New course(C. B. S.) to Old course of Eighth Semester

B. E. (Information Technology)

As per Old course scheme of RTM, Nagpur University					**As per New course (C. B. S.)scheme of RTM, Nagpur University**		
Sr. No	**Sub Code**	**Subjects**	**Th/ Pr**		**Subject Code**	**Subjects**	**Th/ Pr**
1	-----	------	-----		BEIT801T	Distributed Systems	Th
2	-----	------	-----		BEIT801P	Distributed Systems	Pr
3	-----	------	-----		BEIT802T	Gaming Architecture and Programming	Th
4	-----	------	-----		BEIT802P	Gaming Architecture and Programming	Pr
5	8IT50	Elective-I Real Time Systems	Th		BEIT803T1	Elective-III Embedded Systems	Th
6	7IT45	Elective-II Digital Image Processing	Th		BEIT803T2	Elective-III Digital Image Processing	Th
7	8IT51	Elective-II Pattern Recognition	Th		BEIT803T3	Elective-III Pattern Recognition	Th
8	7IT45	Elective-II Fuzzy System and Neural Networks	Th		BEIT803T4	Elective-III Machine Learning	Th
9	-----	------	-----		BEIT804T1	Elective-IV Cyber Security	Th
10	-----	------	-----		BEIT804T2	Elective-IV Cloud Computing	Th
11	8IT49	E-Commerce	Th		BEIT804T3	Elective-IV E-Commerce and Enterprise Resource Planning	Th
12	8IT50	Elective-I Enterprise Resource Planning	Th				
13	8II50	Elective-I Fibre Optical Communication	Th		BEIT804T4	Elective-IV Wireless Sensor Networks	Th
14	8IT52	Project	Pr		BEIT805P	Project	Pr
15	8IT50	Elective-I Modelling and Simulation	Th		-----	------	-----
16	8IT51	Elective-II Advanced Microprocessor	Th		-----	------	-----
17	8IT51	Elective-II Parallel Processing	Th		-----	------	-----
18	8IT47	Distributed Databases and Object Oriented Databases	Th		-----	------	-----
19	8IT47	Distributed Databases and Object Oriented Databases	Pr		-----	------	-----
20	8IT48	Web Technologies	Th		-----	------	-----
21	8IT48	Web Technologies	Pr		-----	------	-----
22	8IT51	Elective-II Mobile Communication	Th		-----	------	-----

Members,
BOS (CE/IT)

Chairman,
BOS (CE/IT)

FOUR YEAR BACHELOR OF ENGINEERING (B. E.) DEGREE COURSE
SEMESTER: SEVENTH
BRANCH: INFORMATION TECHNOLOGY

Sr. No.	Subject Code	Subjects	Workload				Credit				Marks				
			L	P	T	Total Hrs/ Week	L	P	T	Total	Theory		Practical		Total Marks
											Sess.	Univ.	Sess.	Univ.	
1	BEIT701T	Data Warehousing and Mining	4	-	1	5	4	-	1	5	20	80	-	-	100
2	BEIT701P	Data Warehousing and Mining	-	2	-	2	-	1	-	1	-	-	25	25	50
3	BEIT702T	Computer System Security	4	-	1	5	4	-	1	5	20	80	-	-	100
4	BEIT702P	Computer System Security	-	2	-	2	-	1	-	1	-	-	25	25	50
5	BEIT703T	Artificial Intelligence	4	-	1	5	4	-	1	5	20	80	-	-	100
6	BEIT704T	Elective -I	4	-	1	5	4	-	1	5	20	80	-	-	100
7	BEIT705T	Elective -II	4	-	1	5	4	-	1	5	20	80	-	-	100
8	BEIT706P	Seminar on Project	-	2	-	2	-	2	-	2	-	-	50	-	50
		Total	**20**	**6**	**5**	**31**	**20**	**4**	**5**	**29**	**100**	**400**	**100**	**50**	**650**

Elective I:

BEIT704T1: Mobile Computing
BEIT704T2: Multimedia Systems
BEIT704T3: Bio-informatics
BEIT704T4: Compiler Design

Elective II:

BEIT705T1: Software Testing and Quality Assurance
BEIT705T2: Cluster and Grid Computing
BEIT705T3: Digital Signal Processing
BEIT705T4: Digital Forensic for Info. Tech.

FOUR YEAR BACHELOR OF ENGINEERING (B. E.) DEGREE COURSE
SEMESTER: EIGHTH
BRANCH: INFORMATION TECHNOLOGY

Sr. No.	Subject Code	Subjects	Workload				Credit				Marks				
			L	P	T	Total Hrs/ Week	L	P	T	Total	Theory		Practical		Total Marks
											Sess.	Univ.	Sess.	Univ.	
1	BEIT801T	Distributed Systems	4	-	1	5	4	-	1	5	20	80	-	-	100
2	BEIT801P	Distributed Systems	-	2	-	2	-	1	-	1	-	-	25	25	50
3	BEIT802T	Gaming Architecture and Programming	4	-	1	5	4	-	1	5	20	80	-	-	100
4	BEIT802P	Gaming Architecture and Programming	-	2	-	2	-	1	-	1	-	-	25	25	50
5	BEIT803T	Elective-III	4	-	1	5	4	-	1	5	20	80	-	-	100
6	BEIT804T	Elective-IV	4	-	1	5	4	-	1	5	20	80	-	-	100
7	BEIT805P	Project	-	4	-	4	-	4	-	4	-	-	75	75	150
		Total	**16**	**8**	**4**	**28**	**16**	**6**	**4**	**26**	**80**	**320**	**125**	**125**	**650**

Elective III:

BEIT803T1: Embedded Systems
BEIT803T2: Digital Image Processing
BEIT803T3: Pattern Recognition
BEIT803T4: Machine Learning

Elective IV:

BEIT804T1: Cyber Security
BEIT804T2: Cloud Computing
BEIT804T3: E-Commerce and Enterprise Resource Planning
BEIT804T4: Wireless Sensor Networks

BEIT701T DATA WAREHOUSING AND MINING

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I:

Introduction to Data Warehousing:

Evolution of decision support systems, Failure of past decision support system, Operational v/s decision support systems, Data warehousing lifecycle, Architecture, Building blocks, Components of DW, Data Marts and Metadata

UNIT II:

Data Preprocessing:

Why preprocess the data?, Descriptive data summarization, Data cleaning, Data integration and transformation, Data reduction, Data Discretization and Concept Hierarchy Generation.

UNIT III:

OLAP Analytical Processing:

OLAP in Data warehouse, Demand for online analytical processing, need for multidimensional analysis, limitations of other analysis methods, OLAP definitions and rules, OLAP characteristics, major features and functions. OLAP models- ROLAP, MOLAP, HOLAP, Differentiation, Data cubes and operations on cubes

UNIT IV:

Introduction of Data Mining:

Motivation, Importance, Data Mining functionalities, KDD and Data Mining, Data Mining v/s Query tools, Interesting patterns, Architecture, Classification of Data Mining systems, Major issues from Data warehousing and Data Mining, Applications of Data Mining.

UNIT V:

Mining Frequent Patterns and Association:

Basic Concepts: Market Basket analysis, motivating example, Frequent Item sets, Closed Item sets and Association rules, Frequent Pattern Mining Efficient and Scalable Frequent Item set. Mining Methods: Apriori Algorithm, Generating Association rules from Frequent Item sets, mining various kinds of association rules.

UNIT VI:

Business Intelligence and Big Data:

BI-Defining Business Intelligence, Important factors in BI, BI Architecture, BI framework, Development of BI system, BI applications in Marketing, Logistics and Production, Retail Industry. Big Data: - Understanding the challenges of Big data, Big data meets hadoop. Hadoop: Meeting Big data challenges, Hadoop Ecosystem, Core components, developing applications with Hadoop.

Text Books:

1. Data Mining (Concepts and Techniques) - Han and Kamber
2. Data Mining and Business Intelligence - Shinde and Chandrashekhar, Dreamtech Press
3. Professional Hadoop Solutions - Lublinsky, Smith, Yakubovich, Wiley

Reference Books:

1. Introduction to Data Mining – Tan, Steinbach, Vipin Kumar, Pearson Education.
2. Fundamentals of Data Warehouses, Jarke, Vassiliou, 2nd Edition, Springer.
3. Data Warehousing in Real World - Anahory, Murray, Pearson Education
4. Data Warehousing - Paulraj Ponniah

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BEIT701P DATA WAREHOUSING AND MINING

(Practical Credit: 01)

Teaching Scheme:	**Examination Scheme:**
Practical: 2 Hours/week	**Practical: P (U): 25 Marks P (I): 25 Marks**
	Duration of University Exam. : 02 Hours

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Note:

1. Practicals are based on DATA WAREHOUSING AND MINING syllabus (subject code: BEIT701T)
2. Practicals have to be performed on any open source tool.
3. There should be at the most two practicals per unit

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BEIT702T COMPUTER SYSTEM SECURITY

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I:

Introduction:

Need of information security, OSI security Architecture, Attacks, services, mechanism, Model of network security, Classical Encryption Techniques: Symmetric, Asymmetric, cipher model; substitution – Ceasor cipher, monoalphabetic, play fair; Transposition-Railfence, columnar; Steganography, S-DES, DES, TDES, AES; Block cipher principle, Mode, strength of DES.

UNIT II:

Differential and linear Cryptanalysis, Blowfish, RC2, RC5, IDEA, CAST-128, Characteristic of advance symmetric block cipher, Euler function, Chinese remainder theorem, Discrete logarithm, confidentiality using conventional encryption, placement of encryption function traffic, confidentiality, key distribution, random number generator.

UNIT III:

Public key cryptography- principles, RSA algorithm, key management, Diffie-Hellman key exchange, elliptic curve cryptography, Message Authentication, hash function Authentication requirements, functions, codes, hash functions, Security of hash function and MACs, Hash and MAC algorithm, MD5, Message Digest algorithm.

UNIT IV:

Secure hash algorithm (SHA-1), RIPEMD-160, HMAC, digital signatures and Authentication protocol-digital signature, authentication protocol, digital signature standard. Network Security practices, authentication applications-Kerberos, x.509 directory authentication service, Kerberos encryption technique

UNIT V:

E-mail security-Pretty Good Privacy, S/MIME, data compression using ZIP, radix-64 conversion, PGP random number generation, IP Security-Overview, Architecture, authentication header, Encapsulating security payload, combining security association, key management.

UNIT VI:

Web Security requirements, secure socket layer and transport layer security, secure electronic transaction, network management security-basic concepts of SNMP, SNMP V1, community facility, SNMP V3; System security-intruders, viruses and worms and related threads firewall-design principles, trusted system, DOS.

Text Books:

1. Forouzan, ''Cryptography and Network Security", Tata-McGraw hill.
2. William Stallings, "Cryptography and Network Security: Principle and Practice", Fifth Edition, Pearson.
3. Atul Kahate, "Cryptography and Network Security", Tata-McGraw hill.

Reference Books:

1. Josef Pieprzyk, Thomas Hardjono, Jennifer Seberry, "Fundamentals of computer Security", Springer.

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BEIT702P COMPUTER SYSTEM SECURITY

(Practical Credit: 01)

Teaching Scheme:	**Examination Scheme:**
Practical: 2 Hours/week	**Practical: P (U): 25 Marks P (I): 25 Marks**
	Duration of University Exam. : 02 Hours

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Note:

1. Practicals are based on COMPUTER SYSTEM SECURITY syllabus (subject code: BEIT702T)
2. There should be at the most two practicals per unit

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BEIT703T ARTIFICIAL INTELLIGENCE

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I:

History and Application of AI, the Turing Test approach, AI Problems and AI Techniques, Defining problem as state space representation, Production system, Problem characteristics, monotonic and non-monotonic production systems, Solving problems by searching-Toy problems, Real-World problems.

UNIT II:

Uniformed Search Strategies:

Breadth-first search, Depth-first search, Comparing uniformed search techniques.

Informed search strategies:

Generate-and-test, Hill climbing, best-first search, problem reduction, constraint satisfaction, Mean-ends analysis

UNIT III:

Knowledge Representation:

Issues in knowledge representation, Approaches to knowledge representation, introduction to ontology

Logic and Inferences:

Formal logic, history of logic and knowledge, propositional logic, resolution method in propositional logic

UNIT IV:

Structural Knowledge Representation:

Frames, scripts, predicate logic, semantic network, example of knowledge representation schemes, Truth maintenance system. Transition networks: RTN, ATN. Basic techniques of NLP, application of NLP

UNIT V:

Expert system:

Knowledge acquisition methods, knowledge engineering process, goals in knowledge system development, basic architecture of expert system, problem domain versus knowledge domain, Development of ES and life cycle of ES. Advantages of expert system, structure of Rule based expert system, characteristics of conventional system and expert system.

UNIT VI:

Statistical Reasoning:

Probability and Bayes theorem, Certainty factor, Dempster-Shafer theory, Fuzzy logic: crisp sets, application of fuzzy logic.

Text Books:

1. Artificial Intelligence (Third Edition) McGraw-Hill Elaine Rich, Kevin Knight.
2. A First course in Artificial Intelligence (McGraw-Hill) Deepak Khemani.
3. Artificial Intelligence A modern approach (Second Edition) Pearson, Stuart Russell, and Peter Norvig.

Reference Books:

1. Fuzzy Logic with Engineering application (Third edition) Timothy J.Rose

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ELECTIVE: I

BEIT704T1 MOBILE COMPUTING

(Theory Credit: 05)

Teaching Scheme:
Lecture: 4 Hours/week
Tutorial: 1 Hour/week

Examination Scheme:
Theory: T (U): 80 Marks T (I): 20 Marks
Duration of University Exam. : 03 Hours

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UNIT I:

Introduction to Mobile Computing:

Wireless Communication and examples, Applications cellular communication (1G to 4G Networks), GSM (Mobile services, system architecture protocol, Localization and Calling, Handover, Security)

UNIT II:

Mobile Computing Architecture:

Internet the ubiquitous network, Architecture for Mobile Computing three tier architecture, Design consideration for Mobile Computing, Mobile Computing, Mobile Computing through Internet.

UNIT III:

Wireless LAN:

Wireless LAN advantages, Applications, IEEE 802.11 standards, System Architecture, Protocol Architecture, Physical layer, Medium access control layer, MAC management roaming.

UNIT IV:

Mobility Management and Control:

Mobile agents, characteristics, requirement for Mobile Agent system, Platform (Aglet object Model, Agent Tcl architecture)

UNIT V:

Wireless Application Protocol:

WAP model, architecture, wireless datagram protocol, wireless transaction protocol, wireless session protocols.

UNIT VI:

Introduction to Android:

Layer android components, Mapping applications to process, Android development basics, Hardware tools, Android SDK features.

Text Books:

1. Mobile Communications: 2nd Edition, Jochen Schiller, Pearson Education.
2. Wireless Communication-Principles and Practice-2nd Edition, Theodore S. Rappaport, PHI Publications

Reference Books:

1. Mobile Computing- Technology, Applications and services creation-Ashok K. Talukder, Roopa R. Yavagal, TMH.
2. Mobile Computing-Theory and Practice-Kumkum Garg-Pearson Publications

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ELECTIVE: I

BEIT704T2 MULTIMEDIA SYSTEMS

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I:

Introduction : Definition of multimedia, Multimedia Basics, Where to use Multimedia, Multimedia Elements, Multimedia Applications

Multimedia Systems Architecture: Multimedia Workstation Architecture, High resolution Graphic displays, Multimedia Architecture Based on interface bus, Network architecture for Multimedia systems.

Evolving Technologies For Multimedia Systems: Hyper Speech, HDTV and UDTV, 3D Technologies and Holography, Virtual Reality, Video conferencing.

UNIT II:

Hardware: Macintosh Versus Windows Platform, Connections, Memory and Storage Devices, Input Devices, Output Hardware, Communication Devices

Basic Software Tools : Text Editing, Word Processing, OCR Software, Painting and Drawing Tools, 3D Modeling and Animation Tools, Image Editing, Sound Editing, Animation, Video, Digital Movie tools, Movie Editors, Compressing Movie Files

Making instant Multimedia : Linking Multimedia Object, office suites, word processors , spread sheets, databases, presentation tools, power point

Multimedia authoring tools: Types of authoring tools, card and page based authoring tools, Icon based authoring tools, and Time based authoring tools.

UNIT III:

Text: About Fonts and Faces, Using Text in Multimedia, Designing with Text, Hypermedia and Hypertext, The Power of Hypertext, Using Hypertext, Hypermedia Structures, Hypertext tools.

Images: Making Still Images, Bitmaps, 1 bit images, 8-bit gray level images, 8-bit color images, Dithering, 24 bit color images, Vector Drawing, Vector-Drawn Objects vs. Bitmaps, 3-D Drawing and Rendering, Color, Understanding Natural Light and Color, Computerized Color, Color Palettes, Color Look-up table.

Sound : The Power of Sound, Digital Audio, Making Digital Audio Files, MIDI Audio, MIDI vs. Digital Audio, Multimedia System Sounds, Adding Sound to Your Multimedia Project, Audio Recording, Keeping Track of Your Sounds, Audio CDs, Sound for Your Mobile, Sound for the Internet.

Animation: the Power of Motion, Principles of Animation, Animation by Computer, Animation Techniques.

Video: Using Video, How Video Works and Is Displayed, Analog Video, Digital Video, Displays, Digital Video Containers, Codec, Video Format Converters, Obtaining Video Clips, Shooting and Editing Video.

UNIT IV:

Data Compression: Need for Data compression, General Data compression Scheme, Compression standards, Non-lossy compression for images, Lossy compression for Photographs and video, Hardware Vs Software Compression.

Compression Schemes and standards:(Only Concepts of) Binary image compression, Color, Gray Scale image compression, JPEG, video image compression, Multimedia Standards for Video, Requirements for Full-motion Video Compression, MPEG, Audio compression, Fractal compression, advantages / disadvantages.

UNIT V:

Data and File Format Standards: Popular File Formats: RTF, RIFF, GIF, PNG, TIFF, MIDI, JPEG, JFIF, AVI, WAV, BMP, WMF, MIX, MPEG standards - TWAIN. **Multimedia Databases**, Storage and Retrieval, Database Management systems, Database Organization and Transaction management for multimedia systems.

Multimedia Skills: The Team, Project Manager, Multimedia Designer, Interface Designer, Writer, Video Specialist, Audio Specialist, Multimedia Programmer, Producer of Multimedia for the Web.

UNIT VI:

Designing and Producing: Designing, Designing the Structure, and Designing the User Interface, Producing, Tracking, Copyrights, Virtual reality designing and modeling (VRML).

The Internet and Multimedia: The Bandwidth Bottleneck, Internet Services, MIME Types, Multimedia on the Web, Web Page Makers and Site Builders, Plug-ins and Delivery Vehicles.

Designing for the World Wide Web: Developing for the Web, The Desktop Workspace and the Small, Device Workspace, Text for the Web, Images for the Web, GIF and PNG Images, JPEG Images, Clickable Buttons, Client-Side Image Maps, Sound for the Web, Animation for the Web, GIF89a - Video for the Web.

Delivering: Testing-Preparing for Delivery, File Archives, Delivering on CD-ROM, Delivering on DVD.

Text Books:

1. Multimedia: Making It Work By Tay Vaughan Eighth Edition, TMH
2. Fundamental of Multimedia - Ze-Nian Li & M. S. Drew ,PHI
3. Multimedia Systems Design - Prabhat k. Andleigh, Kiran Thakra
4. Multimedia Systems - John F. Koegel Buford

Reference Books:

1. Computer Graphics Multimedia and Animation - Malay K. Pakhira PHI, New Delhi - Second edition.
2. Principles of Multimedia by Ranjan Parekh - 2nd Edition TMH.
3. Computer Graphics and Multimedia - Anirban Mukhapathyay, Aruop Chattopadhyay - Vikas Publishing Ltd - Second Edition
4. Multimedia Technology and Applications- David Hillman Galgotia Publications Pvt Ltd.- Second Edition

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ELECTIVE: I

BEIT704T3 BIO-INFORMATICS

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I:

Introduction:

Bioinformatics objectives and overviews, Interdisciplinary nature of Bioinformatics, Data integration, Data analysis, Major Bioinformatics databases and tools. Metadata: Summary and reference systems, finding new type of data online.

UNIT II:

Molecular Biology and Bioinformatics:

Systems approach in biology, Central dogma of molecular biology, problems in molecular approach and the bioinformatics approach, Overview of the bioinformatics applications.

UNIT III:

The Information Molecules and Information Flow:

Basic chemistry of nucleic acids, Structure of DNA, Structure of RNA, DNA Replication, -Transcription, -Translation, Genes- the functional elements in DNA, Analyzing DNA,DNA sequencing. Proteins: Amino acids, Protein structure, Secondary, Tertiary and Quaternary structure, Protein folding and function, Nucleic acid-Protein interaction.

UNIT IV:

Perl:

Perl Basics, Perl applications for bioinformatics- Bioperl, Linux Operating System, Understanding and Using Biological Databases, Java clients, CORBA, Introduction to biostatics.

UNIT V:

Nucleotide sequence data:

Genome, Genomic sequencing, expressed sequence tags, gene expression, transcription factor binding sites and single nucleotide polymorphism. Computational representations of molecular biological data storage techniques: databases (flat, relational and object oriented), and controlled vocabularies, general data retrieval techniques: indices, Boolean search, fuzzy search and neighboring, application to biological data warehouses.

UNIT VI:

Biological data types and their special requirements:

Sequences, macromolecular structures, chemical compounds, generic variability and its connection to clinical data. Representation of patterns and relationships: alignments, regular expressions, hierarchies and graphical models.

Text Books:

1. O'Reilly, "Developing Bio informatics computer skills", Indian Edition's publication.
2. Rastogi, Mendiratta, Rastogi, "Bioinformatics concepts, skills & Applications", CBS Publishers.
3. Rashidi, Hooman and Lukas K. Buehler, "Bioinformatics Basic Applications" CRC Press.
4. "Bioinformatics" , Addison Wesley, Stephen Misner & Stephen Krawetz, "Bioinformatics- Methods & Protocols"

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ELECTIVE: I

BEIT704T4 COMPILER DESIGN

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I:

Introduction To Compilers:

Compilers and translators, structure of realistic compiler, types of compilers, cross compiler, Bootstrapping, Compiler writing tools, Design of Lexical Analyzer, FLEX tool, Parser generator tool: YACC

UNIT II:

Syntax Analysis:

Specification of syntax of programming languages using CFG, Top-Down parser -predictive parser, recursive descent parser, design of LL(1) parser, Bottom-up parsing techniques, LR parsing algorithm, Design of SLR, LARL, CLR parsers, Examples on LL and LR parsers

UNIT III:

Syntax Directed Translation:

Study of syntax directed definition and syntax directed translation schemes, evaluation orders of SDD's , implementation of SDTS, intermediate: postfix syntax tree, TAC, Translation of expression ,Control structures, declaration procedure calls and array reference

UNIT IV:

Storage Allocation And Error Handling:

Runtime Memory Management – Storage Organization, Storage allocation strategies, symbol table management and organization.

Error Detection And Recovery:

Lexical, syntactic, semantic errors, error recovery for LL and LR parsers

UNIT V:

Code Optimization: Principle sources of optimization, importance code optimization techniques, loop optimization, control flow analysis, data flow analysis, loop invariant compilation, induction variable removal, elimination of common Subexpression.

UNIT VI:

Code Generation: Problem in code generation, simple code generator, code generation algorithm, register allocation and assignment, code generation from DAG, heuristic ordering of DAGs, Labeling algorithm, peephole optimization

Text Books:

1. Principle of compiler Design: Alfred V. Aho and Jeffery D. Ullman, Narosa Pub.
2. Compilers Principles, Techniques, and Tools: Alfred Aho, Ravi Sethi, J. D. Ullman, 2nd Edition, Pearson
3. Principles and Practice of Compiler Writing: Aho, Sethi and Ullman, Addiison Wesley.
4. Compiler Construction: K. V. N. Sunitha, Pearson Education
5. Compiler Design: O.G. Kakde, 4th Edition, University Science Press.

Reference Books:

1. Principles of Compiler Design: V. Raghavan, TMH.
2. Fundamentals of Compiler Design: A. K. Pandey, S. K. Kataria and Sons, N. Delhi

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ELECTIVE: II

BEIT705T1 SOFTWARE TESTING AND QUALITY ASSURANCE

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I:

Basic concepts of Testing: Need of Testing, Basic concepts- errors, faults, defects, failures, objective of testing, central issue in testing, Testing activities, V-Model, Sources of information for test cases, Monitoring and Measuring Test Execution, Test tools and Automation, Limitation of Testing.

UNIT II:

Unit Testing: Concepts of Unit Testing, Static Unit Testing, Defect Prevention, Dynamic Unit Testing, Mutation Testing, Debugging, Unit Testing in Extreme Programming, Tools for Unit Testing.

UNIT III:

Control Flow Testing: Outline of Control Flow Testing, Control Flow Graphs, Path in Control Flow Graph, Path selection criteria, All path coverage criteria, Statement coverage, Path coverage, Predicate coverage criteria, Generating Test input, Examples of Data selection.

UNIT IV:

Data Flow and System Integration Testing: Introduction Data flow testing, Data flow graph, Data flow testing criteria, Comparison of Data flow test selection criteria. Fundamentals of System Integration: Types of interfaces and interface errors, System integration testing, Software and Hardware integration, Test plan, Off-the shelf component integration and testing.

UNIT V:

System Test Categories and Test Design: Taxonomy of system test, Basic Test, Functionality test, Robustness test, Performance test, Scalability test, Stress test, Load and Stability test, Reliability test, Regression test, Documentation Test. Test Design: Test cases, Necessity of test case documentation, Test case design methods, Functional specification based test case design, Use case bases, Application based test case design, Level of test execution.

UNIT VI:

Acceptance Testing and Software Quality: Types of acceptance testing, Acceptance criteria, Acceptance test plan and execution, Special Tests: Client server testing, Web application testing and Mobile application testing, fire view of software quality, ISO-9126 quality characteristics, ISO-9000:2000 software quality standard, ISO - 9000:2000

fundamentals.

Text Books:

1. Software Testing and Quality Assurance by Kshirsager Naik and Priyadarshini Tripathi (Wiley)
2. Software Testing Concepts and Tools by Nageswara Rao Pusuluri (Dream Tech Press)
3. Software Testing Principles, Techniques and tools, 1st Edition, by M. G. Limaye McGraw Hills

Reference Books:

1. "Foundations of Software Testing" 2E by Aditya P. Mathur , Pearson Education
2. Effective Methods for Software Testing- William E Perry, (Wiley). 2. Software Testing Tools by Dr. K. V. K. K. Prasad (Dream Tech)

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ELECTIVE: II

BEIT705T2 CLUSTER AND GRID COMPUTING

(Theory Credit: 05)

Teaching Scheme:
Lecture: 4 Hours/week
Tutorial: 1 Hour/week

Examination Scheme:
Theory: T (U): 80 Marks T (I): 20 Marks
Duration of University Exam. : 03 Hours

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UNIT I:

Introduction to Cluster Computing, Cluster Middleware: An Introduction, Early Cluster Architecture and High Throughput Computing Clusters, Networking, Protocols and I/O for Clusters, Setting Up and Administering a Cluster

UNIT II:

Cluster Technology for High Availability, Performance Models and Simulation, Process Scheduling, Load Sharing and Load Balancing, Distributed Shared Memory, Case Studies of Cluster Systems: Beowulf, COMPaS, NanOS and PARAM

UNIT III:

Introduction to Grid Architecture, Characterization of Grid, and Grid related standard bodies, Grid types, Topologies, Components and Layers, Comparison with other approaches.

UNIT IV:

System Infrastructure, Traditional paradigms for distributed computing, Web Services, Grid standards: OGSA and WSRF, Introduction to Globus Toolkit 3 and GT 4

UNIT V:

Semantic Grid and Autonomic Computing , Metadata and Ontology in semantic Web , Semantic Web Services, Layered Structure of Semantic Grid , Semantic Grid Activities , Autonomic Computing

UNIT VI:

Basic Services: Grid Security, Grid Monitoring, GMA, Review criteria overview of Grid Monitoring system – Autopilot. Grid Scheduling and Resource Management: Scheduling Paradigms, working of Scheduling

Text Books:

1. Grid and Cluster Computing, Prabhu C.S.R, PHI Learning Private Limited
2. The Grid (Chapter 1,2,3,4,5) Core Technologies by Maozhen Li, Mark Baker (John Wiley and Sons)
3. Cloud Computing for Dummies (Chapter 6,7) by Judith Hurwitz, R.Bloor, M. Kanfman, F. Halper (Wiley India Edition)
4. Cloud Security and Privacy (Chapter 8) by Tim Malhar, S.Kumaraswammy, S.Latif (SPD,O'REILLY)

Reference Books:

1. A networking Approach To Grid Computing by Daniel Minoli (Chapter 1) (John Wiley and Sons, INC Publication)
2. Cloud Computing: A Practical Approach by J. Vette, Toby J. Vette, Robert Elsenpeter (Tata McGraw Hill)
3. Distributed and Cloud Computing, First Edition, Geoffrey C. Fox,Kai Hwang,Jack J. Dongarra, Elsevier India Pvt. Ltd.-New Delhi
4. Distributed Systems: Principles and Paradigms, Second Edition, Andrew S. Tanenbaum, Maarten Van Steen, Person Eduction
5. High Performance Cluster Computing: Architectures and Systems, Vol. 1, Prentice Hall
6. In search of clusters (2nd ed.), Gregory F. Pfister, IBM, Austin, TX, Prentice-Hall

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ELECTIVE: II

BEIT705T3 DIGITAL SIGNAL PROCESSING

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I:

Basic elements of DSP and its requirement, advantage of digital over analog signal processing, Discrete time Signals and Systems, Classification of discrete time Systems, Response of LTI System to various inputs, Sampling Theorem, sampling process and reconstruction , Linear Convolution, Correlation(Auto and Cross).

UNIT II:

Z-Transform: Definition, Properties of Z-Transform, ROC's of Finite length and Infinite length Signals, Theorem of Z-Transform (Initial value and Final value Theorem), system function of LTI system, Relation of Z-Transform with Laplace and Fourier Transform.

Inverse Z-Transform: Power Series expansion, Partial fraction Expansion method causality and stability.

UNIT III:

Frequency Domain description of signal and system, Definition of Fourier transform and properties of Fourier transform, inverse Fourier transform, Definition of discrete Fourier transform and properties of DFT, inverse IDFT, DFT's of typical time signals, Circular Convolution using DFT and IDFT.

UNIT IV:

Design of IIR filter from Analog filter using approximation of derivative, Impulse Invariance, Bilinear Transformation, IIR filter structure: Direct-I, Direct-II, parallel and cascade form

UNIT V:

Design of FIR Filter based on Windows: Rectangular, Hamming, Hanning, Bartlett and blackman Window. FIR filter structure: Direct and cascade form

UNIT VI:

Introduction to FFT algorithm: Decimation in Time-FFT algorithm, Decimation in Frequency-FFT algorithm, Inverse FFT algorithm, Discrete Cosine Transform.

Text Books:

1. J. G. Proakis, Manolakis " Digital Signal Processing : Principle, Algorithms and applications, Pearson Education
2. A. V. Oppenheim, R. W. Schafer, "Discrete Time Signal Processing ", Pearson Education

Reference Books:

1. S. Salivahanana, A Vallaraj, C, Ganapriya" Digital Signal Processing", McGraw Hill

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ELECTIVE: II

BEIT705T4 DIGITAL FORENSIC FOR INFORMATION TECHNOLOGY

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I:

Digital Forensics Fundamentals: What is Digital forensics?, Use of Digital forensics in law enforcement, computer forensics assistance, to human resources/employment proceedings, benefits of professional forensics methodology, steps taken by Digital forensics specialists Cyber Crimes: Definition, motives, and classification of cyber crimes. Modus operandi of cyber crime, types of cyber crimes,

UNIT II:

Computer Forensics Evidence Capture: Data recovery defined, data backup and recovery, the role of backup in data recovery, the data recovery solution Evidence Collection and Data Seizure: evidence, collection options, obstacles, types of evidence, the rules of evidence, volatile evidence, general procedure, collection and archiving, methods of collection, artifacts, collection steps controlling contamination: the chain of custody, Network Forensics: Network forensics overview, performing live acquisitions, developing standard procedures for network forensics, using network tools

UNIT III:

Duplication and Preservation of Digital Evidence: Preserving the digital crime scene computer evidence processing steps, legal aspects of collecting and preserving computer forensic evidence, Computer Forensics Analysis and Validation: Determining what data to collect and analyze, validating forensic data, addressing data, hiding techniques, and performing remote acquisitions

UNIT IV:

Processing Crime and Incident Scenes: Identifying digital evidence, collecting evidence in private sector incident scenes, processing law enforcement crime scenes, preparing for a search securing a computer incident or crime scene, seizing digital evidence at the scene, storing digital evidence, obtaining a digital hash, reviewing a case

UNIT V:

E-mail Investigations: Exploring the role of e-mail in investigations, exploring the roles of the client and server in e-mail, investigating e-mail crimes and violations, understanding e-mail servers, using specialized e-mail forensic tools,

Cell phone and mobile device forensics: Understanding mobile device forensics, understanding Acquisition procedures for cell phones and mobile devices, files present in SIM card, device data, external memory dump, evidences in memory card, operators systems,

Android forensics: Procedures for handling an android device, imaging android USB mass

storage devices, logical and physical techniques

UNIT VI:

Working with Windows and DOS Systems: Understanding file systems, exploring Microsoft file structures, examining NTFS disks, understanding whole disc encryption, windows registry, Microsoft startup tasks, MSDOS startup tasks, virtual machines, Current Forensic Tools: Evaluating computer forensic tool needs, computer forensic software Tools, computer forensic hardware tools, validating and testing forensic software

Text Books:

1. The Basics of Digital Forensics: The Primer for Getting Started in Digital Forensics by John Sammons, Edition 1, Published by Elsevier February 24, 2012, ISBN: 978-1-59749-661-2

Reference Books:

1. Warren G. Kruse II and Jay G. Heiser, "Computer Forensics: Incident Response Essentials", Addison Wesley, 2002.
2. Nelson B, Phillips A, Enfinger F, Stuart C., "Guide to Computer Forensics and Investigations, 2nd ed., Thomson Course Technology, 2006, ISBN: 0-619-21706-5.

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BEIT706P **SEMINAR ON PROJECT**

(Practical Credit: 02)

Teaching Scheme:
Practical: 2 Hours/week

Examination Scheme:
Practical: P (U): 00 Marks P (I): 50 Marks

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Note:

1. The topic of Seminar on project should be assigned to the students in the group of maximum five students based on recent trends in Information Technology and allied branches.

2. Senior faculty members should work as guide.

3. The research paper publication / presentation in reputed national and international journals / conferences should be given some weightage while evaluation.

4. Seminar reports should be written using technical research writing tools (e.g. Latex) and submitted to the department for internal evaluation.

5. The project should be carried out upto design phase during this semester.

6. The same project has to be considered and extended for eighth semester project head (BEIT805P).

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BEIT801T **DISTRIBUTED SYSTEMS**

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I:

Introduction: Distributed Computing Models, Software Concepts, Hardware Concepts, The Client-Server model, Issues in design of a distributed operating system.

UNIT II:

COMMUNICATION: Introduction to Message Passing, Advantages and features of message passing, Message format, Message Buffering, Remote Procedure Call, Extended RPC Models, Remote Object Invocation, Message Oriented Communication.

UNIT III:

Processes And Synchronization: Threads, code migration, clock synchronization, logical clocks, global state, Election algorithms, mutual exclusion, Distributed transaction.

UNIT IV:

Distributed Deadlock Detection: System model, Resources vs. communication deadlocks, deadlock prevention, avoidance, detection and resolution, Centralized deadlock detection, distributed deadlock detection, path pushing and edge chasing algorithm

UNIT V:

Distributed Shared Memory: Introduction, General architecture of distributed shared memory, Design and implementation, Issues of DSM, Granularity, structure of shared memory space, consistency models, thrashing, advantages of DSM

UNIT VI:

Distributed File System: Introduction, Desirable features of good distributed file system, file models, file accessing, sharing, caching methods, file replication, fault tolerance, Case Study: CORBA(CORBA RMI and Services)

Text Books:

1. Andrew Tanenbaum, Maarten Van Steen, "Distributed System- Principals Paradigm", PHI Publication.
2. Singhal and Shivratri, "Advanced Concept in Operating Systems", McGraw Hill.

BEIT801P DISTRIBUTED SYSTEMS

(Practical Credit: 01)

Teaching Scheme:	**Examination Scheme:**
Practical: 2 Hours/week	**Practical: P (U): 25 Marks P (I): 25 Marks**
	Duration of University Exam. : 02 Hours

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Note:

1. Practicals are based on DISTRIBUTED SYSTEMS syllabus (subject code: BEIT801T)
2. There should be at the most two practicals per unit

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BEIT802T GAMING ARCHITECTURE AND PROGRAMMING

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I:

Core Design: What Is a Game? Games Aren't Everything. Games Mean Gameplay. Creating the Game Spec. Example Game Spec, Initial Design: The Beginning. Hardware Abstraction. The Problem Domain. Thinking in Tokens.

UNIT II:

Use of Technology: The State of the Art. Blue-Sky Research. Reinventing the Wheel. Use of Object Technology, Building Bricks: Reusability in Software, Initial Architecture Design: The Birth of Architecture. The Tier System. Architecture Design.

UNIT III:

Development: The Development Process. Code Quality. Coding Priorities. Debugging and Module Completion. The Seven Golden Gambits. The Three Lead Balloons. GAME PROGRAMMING: Technologies: Display, Mixing 2D and 3D, DirectX, User Interface code, Resource caching, the main loop.

UNIT IV:

Design Practices: Smart & naked pointers, using memory correctly, Game scripting languages, Building your game: Creating a project, source code repositories and version control, Building the game and scripts, User interface programming and input devices: Getting the Device State, Working with the Mouse (and Joystick), Working with the Keyboard, User Interface Components, More Control Properties.

UNIT V:

2D Drawing and DirectX:

2D Drawing and DirectX, Basic 2D Drawing Concepts, Drawing Text, Working with Sprites, Graphics File Formats, Initialization and the Main Loop: Initialization, Some C++ Initialization Pitfalls, Initializing your Game, the Main Loop, Stick the Landing: A Nice Clean Exit.

UNIT VI:

Loading and Caching Game Resources:

Art and Sound Formats, Resource Files, Data Compression, IPac: A Resource File Builder, the Resource Cache, World Design and Cache Prediction, 3D Graphics and 3D Engines: 3D Graphics Pipeline, Setting Up a Project, Using a Scene Graph, 3D Middleware Review, Rolling Your Own 3D Engine.

Text Books:

1. Game Architecture and Programming, Shankarmani, Jain, Sinha, Wiley Publication, India
2. Fundamentals of Game Design, 3rd Edition, Ernest Adams, Pearson Publication

Reference Books:

1. Game Theory: An Introduction, E. N. Barron, Wiley Student Edition.
2. ActionScript 3.0 Game Programming University, 2nd Edition, Gary Rosenzweig, Pearson Education.
3. "Game Architecture and Design", Andrew Rollings and Dave Morris
4. "Professional Game Programming" Mike McShaffry, Dreamtech Press.

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BEIT802P GAMING ARCHITECTURE AND PROGRAMMING

(Practical Credit: 01)

Teaching Scheme:
Practical: 2 Hours/week

Examination Scheme:
Practical: P (U): 25 Marks P (I): 25 Marks
Duration of University Exam. : 02 Hours

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Note:

1. Practicals are based on GAMING ARCHITECTURE AND PROGRAMMING syllabus (subject code: BEIT802T)
2. Students are suggested to choose at least One game idea, possibly:
    1. Single player (Puzzle, Educational, Strategy etc.)
    2. Multiplayer (Adventure, fighting, sports etc.)

    Then work on both the ideas covering following aspects:
    1. Feasibility and Design
    2. Planning for each stage with objective to achieve.
    3. Technical Architecture
    4. Component building
    5. Integration and testing
    6. Complexity level
    7. Review (This can taken from other students of same class or junior class).
3. Following are the Open Source Game Engine Tools recommended for implementation.
    1. GDevelop
    2. PlayConvas
    3. Unity
    4. Aleph One
    5. Adventure Game Studio
    6. Crystal Space
    7. Delta 3D
    8. Game Play 3D and many more

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ELECTIVE: III

BEIT803T1 EMBEDDED SYSYTEMS

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I:

Introduction to Embedded System:

Introduction, Embedded system vs General computing system, History of embedded system, Processor embedded into a system, Embedded hardware units and devices in a system, Embedded software in a system, examples in a embedded system, Embedded SoC, Complex system design and processors, Design process in ES, Formalization of system design, Classification of Es, Skills required in Embedded system design, Characteristics and quality attributes of Embedded system.

UNIT II:

Embedded System Design:

Hardware and Software design, Co-design, Embedded Software development Tools: In Circuit Emulators, Cross compilers, cross assemblers and tool chain, linker locator, Address resolution, PROM programmer, Rom Emulator. Memories: EPROM, PROM, Flash.

UNIT III:

RTOS for Embedded System:

Architecture of the kernel, Tasks and Task Scheduler, Threads , ISR, Multiprocessing and Multitasking, Semaphore and Shared Data, Mutex, Mailboxes, Message Queue, Events, Pipes, Timers, Signals, Memory Management, RTOS Task Scheduling Models, Interrupt Latency, Response of the task, OS Security issues, Introduction to Android.

UNIT IV:

Devices and Communication:

Serial Communication devices, Parallel device port, Buses: I^2C, UART, USART, CAN Bus, Devices: Wireless Devices, Timer and Counting Devices, Watch Dog Timer, Real Time Clock, Network Embedded System.

UNIT V:

Programming for Embedded System:

Software programming in assembly language (ALP) and High Level language 'C', C program element: Header and Source Files, Preprocessor Directives, Macros and Functions, Data Types, Data Structures, Modifiers, Statements, Loops and Pointers, Object Oriented Programming, Embedded Programming in C++, Embedded Programming in Java.

UNIT VI:

Microcontroller 8051:

Introduction, Architecture, Memory Management, Addressing Modes and Instruction Sets, I/O Ports, Timers/Counters, Routing Interface with OS, Wireless Communication Protocol, Routing Methodologies

Text Books:

1. Embedded System Architecture, Programming and Design by Raj Kamal, 3rd Edition TMH.
2. Introduction to Embedded System by Shibu K. V. 3rd Edition TMH.
3. The 8051 Microcontroller Based Embedded System By Manish K. Patel TMH.
4. An Embedded Software Primer by David E. Simon (Pearson Edu. Asia).
5. 8051 Microcontroller and Embedded System by Muhammad Ali Mazidi, Janice Mazidi, Janice Gillispie Mazidi, Pearson Edition.
6. Embedded / Real Time Systems: Concepts, Design and Programming (Black Book) By Dr. K. V. K. K. Prasad Dreamtech Press.
7. Embedded Systems Engineering, C. R. Sarma, University Press.

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ELECTIVE: III

BEIT803T2 DIGITAL IMAGE PROCESSING

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I:

DIGITAL IMAGE FUNDAMENTALS

Elements of digital image processing systems, Vidicon and Digital Camera working principles, Elements of visual perception, brightness, contrast, hue, saturation, mach band effect, Image sampling, Quantization, dither, Two-dimensional mathematical preliminaries, 2D transforms - DFT, DCT, KLT, SVD.

UNIT II:

IMAGE ENHANCEMENT

Histogram equalization and specification techniques, Noise distributions, Spatial averaging, Directional Smoothing, Median, Geometric mean, Harmonic mean, Contra harmonic mean filters, Homomorphic filtering, Color image fundamentals - RGB, HSI models, Color image enhancement.

UNIT III:

IMAGE RESTORATION

Image Restoration - degradation model, unconstrained restoration - Lagrange multiplier and constrained restoration, Inverse filtering-removal of blur caused by uniform linear motion, Wiener filtering, Geometric transformations-spatial transformations.

UNIT IV:

IMAGE SEGMENTATION

Edge detection, Edge linking via Hough transform, Thresholding, Region based segmentation, Region growing, Region splitting and merging, Segmentation by morphological watersheds, basic concepts, Dam construction, and Watershed segmentation algorithm.

UNIT V:

IMAGE COMPRESSION

Need for data compression, Huffman, Run Length Encoding, Shift codes, Arithmetic coding, Vector Quantization, Transform coding, JPEG standard, MPEG

UNIT VI:

FEATURE EXTRACTION

Representation, Topological Attributes, Geometric Attributes Description, Boundary-based Description, Region-based Description, Relationship, Object Recognition, Deterministic Methods, Clustering, Statistical Classification, Syntactic Recognition, Tree Search, Graph Matching.

Text Books:

1. Rafael C. Gonzalez, Richard E. Woods, Digital Image Processing, Pearson Education, Third Edition, 2008.
2. Anil K. Jain, Fundamentals of Digital Image Processing', Pearson 2002.

Reference Books:

1. Kenneth R. Castleman, Digital Image Processing, Pearson, 2006
2. Rafael C. Gonzalez, Richard E. Woods, Steven Eddins,' Digital Image Processing using MATLAB', Pearson Education, Inc., 2004.
3. D. E. Dudgeon and RM. Mersereau, Multidimensional Digital Signal Processing', Prentice Hall Professional Technical Reference, 1990.
4. William K. Pratt, Digital Image Processing' , John Wiley, New York, 2002
5. Milan Sonka etaI, 'IMAGE PROCESSING, ANALYSIS AND MACHINE VISION', Brookes/Cole, Vikas Publishing House, 2nd edition, 1999,

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ELECTIVE: III

BEIT803T3 PATTERN RECOGNITION

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I:

Pattern Classifier: Overview of Pattern recognition, Discriminant functions, supervised learning, parametric estimation, Maximum Likelihood Estimation,

UNIT II:

Bayes Classifier: Bayesian parameter Estimation, Problems with Bayes approach, Pattern classification by distance functions, Minimum distance pattern classifier.

UNIT III:

Clustering: Clustering for unsupervised learning and classification Clustering concept, C Means algorithm, Hierarchical clustering, Graph theoretic approach to pattern Clustering, Validity of Clusters.

UNIT IV:

Feature Extraction and Structural Pattern Recognition: KL Transforms, Feature selection through functional approximation, Binary selection, Elements of formal grammars, Syntactic description, stochastic grammars, Structural representation.

UNIT V:

Hidden Markov model and Support Vector Machine: State machine, Hidden Markov model, Training, Classification, Support vector machine, Feature Selection.

UNIT VI:

Recent Advances:

Fuzzy logic, Fuzzy Pattern Classifier, Pattern classification using genetic algorithms, Case study using Fuzzy pattern classifier and perception

Text Books:

1. M. Narasimha Murthy and V. Susheela Devi, "Pattern Recognition", Springer 2011
2. S. Theodoridis and K. Koutroumbas, "Pattern Recognition", 4th Ed., Academic Press, 2009.
3. Robert J. Schalkoff, "Pattern Recognition Statistical, Structural and Neural Approaches", John Wiley and Sons Inc., New York, 1992.
4. C. M. Bishop, "Pattern Recognition and Machine Learning", Springer, 2006.

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ELECTIVE: III

BEIT803T4 MACHINE LEARNING

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I:

Introduction:

Machine Learning, Machine Learning Foundations, Overview, applications, Types of machine learning, basic concepts in machine learning, Examples of Machine Learning , Applications, Linear Models for Regression, Linear Basis Function Models, The Bias, Variance Decomposition, Bayesian Linear Regression, Bayesian Model Comparison

UNIT II:

Supervised Learning:

Linear Models for Classification, Discriminate Functions, Single layer neural network, linear reparability, general gradient descent, perception learning algorithm, multi-Layer perception: two-layers universal approximations, back propagation learning, important parameters, Margin of a classifier, dual perception algorithm, learning non-linear hypotheses with perception.

UNIT III:

Unsupervised Learning: Clustering, K-means, EM, Mixtures of Gaussians, The EM Algorithm in General, Model selection for latent variable models, high-dimensional spaces, The Curse of Dimensionality, Dimensionality Reduction, Factor analysis, Principal Component Analysis, Probabilistic PCA, Independent components analysis. Neural Networks, Feed-forward Network Functions, Error Back, propagation, Regularization , Mixture Density and Bayesian Neural Networks, Kernel Methods, Dual Representations , Radial Basis Function Networks. Ensemble methods, Bagging, Boosting

UNIT IV:

Instance-Based Learning:

Nearest neighbor classification, k-nearest neighbor, nearest neighbor error probability Machine, Machine learning concepts and limitations: Learning theory, formal model of the learnable, sample complexity, learning in zero-bayes and realizable case, VC-dimension, fundamental algorithm independent concepts, hypothesis class, target class, inductive bias, Occam's razor, empirical risk, limitations of inference machines, approximation and estimation errors, Tradeoff.

UNIT V:

Support Vector Machine (SVM): Kernel functions, implicit non-linear feature space, theory, zero-Bayes, realizable infinite hypothesis class, finite covering, margin-based bounds on risk, maximal margin classifier. Machine learning assessment and Improvement: Statistical model selection, structural risk minimization, bootstrapping, bagging, boosting.

UNIT VI:

Advanced Learning:

Sampling, Basic sampling methods, Monte Carlo, Reinforcement Learning, K-Armed Bandit-Elements, Model-Based Learning, Value Iteration, Policy Iteration. Temporal Difference Learning, Exploration Strategies, Deterministic and Non-deterministic Rewards and Actions, Eligibility Traces, Generalization, Partially Observable States, the Setting-Example, Semi - Supervised Learning. Computational Learning Theory: Mistake bound analysis, sample complexity analysis, VC dimension. Occam learning, accuracy and confidence boosting

Text Books:

1. Machine Learning – Tom M. Mitchell, - MGH
2. Ethem Alpaydin, "Introduction to Machine Learning", Prentice Hall of India, 2005

Reference Books:

1. Christopher Bishop, "Pattern Recognition and Machine Learning" Springer, 2006
2. Kevin P. Murphy, "Machine Learning: A Probabilistic Perspective", MIT Press, 2012
3. Stephen Marsland, "Machine Learning –An Algorithmic Perspective", CRC Press, 2009

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ELECTIVE: IV

BEIT804T1 CYBER SECURITY

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I:

Introduction: Cyber Crime; definitions, An origin of the Word, cyber crime - and information security, who are criminals? classification of cyber crimes; email spoofing, spamming, cyber defamation, internet time theft, salami attack or salami technique, data diddling, forgery, web jacking, news group spam or crimes emanating from usenet NewsGroup, Industrial spying or Industrial Espionage, hacking, online fraud, Pronography offenses, software piracy, Computer Sabotage, email bombing, mail bombs, usenet NewsGroup as a source of cyber crimes, computer network intrusion, password sniffing, credit crad fraud, identity theft.

UNIT II:

Introduction, categories of cyber crime, how criminals plan the attack: Reconnaissance, passive and active attacks, scamming/scrutinizing gathered information, attack (Gaining and maintaining the system access, Social engineering, classification of social engineering, cyber stalking, types of stalkers, cases reported on cyber stalking, how stalking works? Real life incidents of cyber stalking, cyber cafe and cyber crimes, fuel for cyber crimes, Botnet, attack vector, cloud computing: why cloud computing? types of services, cyber crime and cloud computing.

UNIT III:

Cyber crime: Mobile and wireless devices: Introduction proliferation of mobile and wireless devices trained in mobility, credit card fraud in mobile and wireless computing era - types and technique of credit card fraud, security challenges posed by mobile devices, registry selling for mobile devices, authentication service security - cryptographic security for mobile devices, LDAP security for handheld mobile computing devices, RAS security for mobile devices, Media player control security, networking API security for mobile computing applications, attacks on mobile phone - mobile phone theft, mobile viruses, mishing, vishing, hacking Bluetooth mobile devices, security implications for organizations, managing diversity and proliferation of hand-held devices, unconventional or stealth storage devices threats through cost and stolen devices. Protecting data on lost devices educating the laptop user, organizational measures of handling mobiles, device related security issues, organizational security policies and measures in mobile computing era.

UNIT IV:

Tools and methods used in Cyber crime: Introduction proxy servers and ananymizers phishing, password cracking - online attacks, offline attacks, strong, weak and rand password, random password, key loggers and spywares: s/w key loggers hardware key loggers, anti loggers, spywares, virus and worms, types of virus, Trojan horse and

backdoors: backdoors, protection from Trojan horse, steganography, DoS and DDos attacks, SQL injection buffer overflow, attacks on wireless networks.

UNIT V:

Phishing and Identity theft: Introduction, phishing - methods of phishing, phishing techniques, spear phishing, types of phishing scams, phishing toolkit and spy phishing, phishing counter measures, Identity theft (ID theft) - Personally Identifiable Information (PII), types of identity theft, techniques of ID theft, Identity theft: counter measures, how to efface your Identity.

UNIT VI:

Cybercrime AND Cyber-security: The legal perspectives - Introduction, cybercrime and the legal landscape around the world, why do we need cyber laws: Indian context, The Indian Act, challenges of Indian law and cyber crime scenario in India, consequences of not adverting the weakness in Information Technology ACT, digital signature and the Indian ACT, Amendments to the Indian ACT, cybercrime and punishment, cyber laws, technology and student: Indian Scenario.

Text Books:

1. Naina Godbole, Sunil Belapure, "Cyber Security - Understanding Cybercrime, Computer forensic and legal perspective", Wiley India Pvt. Ltd.

Reference Books:

1. Thomas J. Mowbray, "Cyber security Managing systems- Conducting, Testing and Investigating Intrusion", Wiley

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ELECTIVE: IV

BEIT804T2 CLOUD COMPUTING

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I:

Defining Cloud Computing: Cloud computing in a nutshell, cloud type - NIST Model, cloud cube model, deployment model, service model, Characteristics of cloud computing, cloud computing stack, open stack.

UNIT II:

Understanding Services and Virtualization Technology:

Understanding services and applications, defining Infrastructure as a Service (IaaS), Platform as a service, Software as a Service, Identity as a Service, Compliance as a Service, Using virtualization technologies, Load balancing and virtualization, understanding Hypervisors, understanding machine Imaging, porting applications, Salesforce.com versus Force.com, SaaS versus PaaS.

UNIT III:

Using Cloud Platform:

Using Google web services, using Amazon web services, using Microsoft cloud services, Aneka integration of private and public cloud

UNIT IV:

Cloud Migration:

Broad approaches to migration, seven steps model of migration, mobbing applications to the cloud, Applications in the cloud, Application in cloud API

UNIT V:

Cloud Security and Storage:

Securing the cloud, securing data, working with cloud based storage - measuring the digital universe, provisioning cloud storage, Exploring cloud back-up solutions

UNIT VI:

Cloud Computing Tools and Future Cloud:

Open source cloud computing platform - Eucalyptus, Open Nebula, Programming in the cloud Map Reduce Dryad. Future cloud - Future trends in cloud computing, defining the mobile market, using Smart phones with the cloud.

Text Books:

1. "Cloud Computing Bible", Barrie Sosinsky; Wiley India Pvt. Ltd.
2. "Cloud Computing - Principals and Paradigms", Rajkumar Buyya, James Broberg, Andrzej Goscinski; Wiley India Pvt. Ltd.
3. Cloud Computing, A Hands on Approach, Bahga, Madisetti, University Press,
4. "Mastering Cloud Computing", Rajkumar Buyya, Christian Vecchiola, S. Thamarai Selvi, Tata McGraw Hill.

Reference Books:

1. "Cloud Computing - A practical approach for learning and implementation", A. Shrinivasan, J. Suresh; Pearson
2. "Cloud Computing - Fundamentals, Industry approach and trends", Rishabh Sharma; Wiley India Pvt. Ltd.

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ELECTIVE: IV

BEIT804T3 E-COMMERCE AND ENTERPRISE RESOURCE PLANNING

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I:

Introduction to electronics-commerce: The scope of E-COM, definition of E-COM, E-COM and trade cycle, electronic market, electronic data interchange, internet commerce, E-Commerce in perspective, the value chain, supply chains. Electronic Commerce Software: What kind of software solutions do you need? Marketing smarts, hosting services, basic packages, midrange package, enterprise solutions for large firms.

UNIT II:

Business to Business Electronics-commerce: Inter-organizational transactions, electronics markets, electronic data interchange (EDI), EDI-technology, EDI and business, inter organizational e-com. Business to consumer electronic commerce: consumer trade transactions, the elements of e-commerce– elements, e-visibility, the e-shop, online payment, delivering the goods, after sales service, internet e-com security, a website evolution mode.

UNIT III:

Electronics payment system: The basics of electronic payment systems. Electronics cash, electronics wallets, smart cards, credit and charge cards. The environment of electronic commerce: international legal, ethical and tax issues: International nature of electronic commerce, the legal environment of electronic commerce, taxation and E-COM, business plans for implementing E-COM: Planning the E-Commerce project, managing electronic commerce implementation.

UNIT IV:

Introduction to ERP: ERP: An Overview, Enterprise – An Overview, ERP architecture, ERP 2 tier and 3 tier Architecture, Benefits of ERP, Risks of ERP, ERP and Related Technologies, Business Process Reengineering (BPR), Data Warehousing, Data Mining, OLAP, SCM,CRM

UNIT V:

ERP Implementation Lifecycle, Implementation Methodology, ERP project Teams, Vendors, Consultants and Users, Contracts with Vendors, Consultants and Employees, Project Management and Monitoring , Success and Failure Factors of an ERP Implementation.

UNIT VI:

The Business Module: Business Modules of an ERP package, Finance, Manufacturing Human Resources, Plant maintenance, Materials Management, Quality management Sales and Distribution, Case study for Architecture and integration of SAP ERP, ERP PRESENT AND FUTURE :-ERP and e-Commerce, ERP Internet and WWW, ERP and E-Business

Text Books:

1. E-Commerce by David Whitely (McGrew Hill Pub.)
2. Electronics-Commerce by Gary P. Schneider and James T. Perry. (COURSE TECHNOLOGY Thomson Learning)
3. Alexis Leon, "ERP Demystified", Tata McGraw Hill, New Delhi, 2000
4. E-business and E-commerce management strategy, implementation and practice, 5th Edition, Dave Chaffey, Pearson Education
5. Enterprise Resource Planning by Parag Diwan and Sunil Sharma (Pentagon Press.)

Reference Books:

1. Vinod Kumar Garg and Venkitakrishnan N K, "Enterprise Resource Planning – Concepts and Practice", PHI, New Delhi, 2003
2. Business on the net by K. N. Agarwal, A. Lal, Deekjha Agarwal (Macmillan Pub.)
3. The Architecture of SAP ERP: Understand how successful software works by Jochen Boeder, Bernhard Groene

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ELECTIVE: IV

BEIT804T4 WIRELESS SENSOR NETWORKS

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I:

Introduction to wireless Sensor Network:

Network Characteristics, Network application, Network design challenges, Sensor network architectural elements, WSN standards, IEEE 802.15.4, Zig-bee.

UNIT II:

Basic Wireless Sensor Technology:

Sensor node structures, Sensor network architecture, Classification of WSN, Protocol Stack for WSN.

UNIT III:

Medium Access Control:

Fundamental MAC Protocol, MAC design for WSN, S-MAC, DS-MAC, MS-MAC, Traffic adaptive medium access, Self organizing MAC.

UNIT IV:

Routing in WSN:

Data dissemination and gathering, Routing challenges and design issues in WSN, Routing strategies, Flooding and it's variants, Low energy adaptive clustering, Geographical routing.

UNIT V:

Transport Protocol:

Traditional transport protocol, Transport protocol design, Authenticity: Message authentication code, Signature, Authenticating public key, Broadcast and Multicast authentication.

UNIT VI:

Network Management and Operating System for WSN:

Traditional network management models, network management design issues, Example of management architecture: MANNA, Operating system design issues, Operating System: Tiny OS, Mate OS, Magnet OS.

Text Books:

1. Kazem Sohraby, Daniel Minoli, Taieb Znati, "Wireless Sensor Networks Technology, Protocols & Application", Wiley Student Edition
2. Jun Zheng, Abbas Jamalipour, "Wireless Sensor Network, A Network Perspective", Wiley Student Edition.

References Books:

1. Waltenegus Dargie, Christian Poellabauer, "Fundamentals of Wireless Sensor Networks, Theory and Practice", Wiley Student Edition.

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BEIT805P **PROJECT**

(Practical Credit: 04)

Teaching Scheme:
Practical: 2 Hours/week

Examination Scheme:
Practical: P (U): 75 Marks P (I): 75 Marks
Duration of University Exam. : 02 Hours

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Note:

1. The topic of the project decided in seventh semester should be considered and extended to implementation and testing phases.

2. The research paper publication / presentation in reputed national and international journals / conferences should be given some weightage while evaluation.

3. The project report should be written using technical research writing tools (e.g. Latex) and submitted to the department for internal as well as external evaluation.

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