SCHEME AND DETAILED SYLLABUS
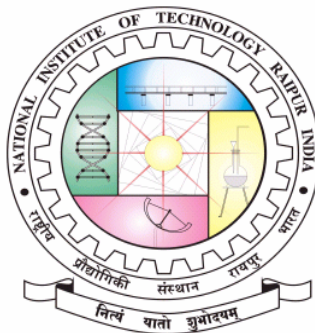
FOR

B.TECH FOUR YEAR DEGREE COURSE

IN

INFORMATION TECHNOLOGY

DEPARTMENT OF INFORMATION TECHNOLOGY

National Institute of Technology Raipur

Chhattisgarh – 492010

SCHEME AND DETAILED SYLLABUS

FOR

B.TECH FOUR YEAR DEGREE COURSE

IN

INFORMATION TECHNOLOGY

(To be applicable for batches admitted from July, 2010 onwards)

(Sudhakar Pandey)	(Rakesh Tripathi)	(Dr. S Verma)
Member, BoS	Member, BoS	Chairman, BoS
Dept. of IT	Dept. of IT	Dept. of IT

Table of Contents

S.No.	Board of Studies	Sub. Code	Subject Name	Periods/week			Examination Scheme					Total Marks	Credits L+(T+P)/2
				L	T	P	TA	FE	SE	T.C.A.	ESE		
1	Information Technology	IT 301	Computational Mathematics	3	1	-	20	15	15	50	70	120	4
2	Information Technology	IT 302	Basic Electronic	3	1	-	20	15	15	50	70	120	4
3	Information Technology	IT 303	Data Structures	4	1	-	20	15	15	50	70	120	5
4	Information Technology	IT 304	Maths - III	3	1	-	20	15	15	50	70	120	4
5	Information Technology	IT 305	Object Oriented Programming Methodologies	3	1	-	20	15	15	50	70	120	4
6	Information Technology	IT 306	Digital Electronics And Logic Design	3	1	-	20	15	15	50	70	120	4
7	Information Technology	IT 391	Data Structure Lab	-	-	3	30	-	-	30	20	50	2
8	Information Technology	IT 392	Basic Electronics Lab	-	-	3	30	-	-	30	20	50	2
9	Information Technology	IT 393	Computer Programming Lab (C++)	-	-	3	30	-	-	30	20	50	2
10	Humanities		Value Education	-	-	2	25	-	-	25	0	25	1
11			Discipline	-	-	-	25	-	-	25	0	25	1
			Total	19	6	11	260	90	90	440	480	920	33

Note : For attendance of a student in every theory and practical class, the teachers are supposed to keep records ultimately in the following format which will be included in the semester mark-sheets.

T.C.A. = Total of Continuous Assessment.

Format for attendance				
Attendance				Category
> 85			----->	High "H"
> 70 & < 85			----->	Medium "M"
> 60 & < 70			----->	Low "L"
< 60			----->	Poor "P"

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492 010
Department of Information Technology
SEMESTER – III

"Computational Mathematics"

Theory Periods: 30   Tutorials: "10"
Credits: 4   Code: IT 301

UNIT I: NUMERICAL SOLUTIONS OF ALGEBRAIC AND TRANSCENDENTAL EQUATIONS

Bisection Method, Regula-Falsi Method, Newton-Raphson Method, Secant Method, Birge-Vieta Method, Bairstow's Method.

UNIT II: NUMERICAL SOLUTIONS OF SIMULTANEOUS LINEAR EQUATIONS

Direct Methods - Gauss Elimination, Gauss-Jordan & Crout's Triangularisation Method, Iterative Methods - Jacobi's, Gauss- Siedal & Successive Over Relaxation Method.

UNIT III: INTERPOLATION WITH EQUAL AND UNEQUAL INTERVALS

Finite differences, Newton's Forward & Backward Difference Formulae, Central Difference Formula, Stirling's Formula, Bessel's Formula, Lagrange's Formula and Newton's Divided Difference Formula.

UNIT IV: NUMERICAL DIFFERENTIATION AND INTEGRATION

Derivatives using Forward, Backward and Central Difference Formulae. Newton-Cote's Quadrature Formula, Trapezoidal rule, Simpson's rules, Weddle's rule.

UNIT V: NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS

Picard's Method, Taylor's Series Method, Euler's Method, Euler's Modified Method, Runge-Kutta Methods, Predictor-corrector Methods- Milne's Method, Adams-Bashforth Method.

Name of Text Books:
1. Numerical Methods in Engineering and Science by Dr. B.S. Grewal, Khanna Publishers.
2. Numerical Methods for Scientific and Engineering Computation by M .K. Jain, S. R. K. Iyengar & R. K.
   Jain, Wiley Eastern Limited.

Name of Reference Books:
1. Numerical Methods for Scientists and Engineers by K. Shankar Rao, Prentice Hall of India.
2. Numerical Methods with C++ Programming, by Somasundaram & Chandrasekaran, Prentice Hall of India.
3. Numerical Methods, by S. S. Shastry, Prentice Hall Inc. India 1998.

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492 010
Department of Information Technology
SEMESTER – III

"Basic Electronics"

Theory Periods: 30   Tutorials: "10"

Credits: 4   Code: IT 302

Unit – I

Introduction, Transport Phenomena in semiconductor, Formation of P-N Junction, Properties of P-N Junction, P-N Junction Diodes; Semiconductor Diodes, V-I Characteristics, Effect of Temperature on V-I Characteristics, Ideal Diode, Diode equation, Diode Resistance, Diode Capacitance: Transition and Diffusion Capacitance.

Unit – II

Rectifying circuits and DC Power Supplies: Load line analysis of diode circuit, Half wave rectifier: Voltage regulation,

Ripple factor, ratio of rectification, Transformer Utilization factor. Full wave rectifier, Bridge rectifier. Filter circuits for power supply: Inductor filter, Capacitor filter, LC filter, Multiple LC filter, CLC or p filter. Zener diode: Break down

mechanism, Characteristics, Specifications, Voltage regulator circuit using zener diode.

Unit - III

Transistor: Introduction, Construction, Types: npn and pnp, Current components. Transistor as an amplifier, Transistor Characteristics, Transistor Circuit Configuration: Common Base (CB) Configuration, Common Emitter (CE) Configuration, Common Collector Configuration (CC), Early Effect. Ebers-Moll Model, Maximum Voltage Ratings.

Unit – IV

Transistor Biasing and Thermal stabilization: The operating point, Bias stability, Stability factor, Emitter bias, Collector – to – base bias, Voltage divider bias with emitter bias, Emitter bypass capacitor. Bias compensation.

Unit – V

Field Effect Transistor (FET): Introduction, Construction, Operation, V-I Characteristics, Transfer Characteristics, Drain Characteristics, Small-Signal Model. Metal Oxide Semiconductor Field Effect Transistor (MOSFET): Introduction, Construction, Operation and characteristics, Depletion MOSFET, Enhancement MOSFET.

Name of Text Books:
1. Integrated Electronics: Analog & Digital Circuit Systems – Jacob Millman & Halkias, TMH.
2. Electronic Devices & Circuits – Allen Mottershead, PHI

Name of Reference Books:
1. Electronic Devices and Circuit Theory – Boylestad & Nashelsky, 8th Ed. PHI.
2. Electronic Devices & Circuit Analysis – K. Lal Kishore, BS Publications

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492 010
Department of Information Technology
SEMESTER – III

"Data Structures"

Theory Periods: 40   Tutorials: "10"
Credits: 5   Code: IT 303

UNIT - I
Introduction to Data Structure: Definition, Types, Basic Operations, ADT, Algorithm: complexity and time space trade-off. Array: representation and address calculation, sparse matrix representation, polynomial representation and operations. **Sorting:** Bubble, Insertion, Selection, Quick, Merge, Radix, Time complexity and Memory requirements.

UNIT - II
Stack: Definition, Static representation and implementation, Operations: push & pop, Notations: infix, prefix and postfix and conversions among them, Application of Stack: Conversion of Infix to prefix and postfix, evaluation of postfix expressions, recursion, etc.
Queue: Static representation and implementation of Linear queue, Operations on queue; add, delete, etc, Problem on linear queue, Circular queue, D-queue, Priority queue, Application of Queues.

UNIT - III
Linked List: Dynamic Representation and Implementation of Singly Linked Lists, Two way header list, Basic operations on linked list, Doubly, Circular, and Circular doubly linked list. Static representation and implementation of singly linked list.
Application of Linked list: Polynomial representation and operations on polynomials, Garbage Collection and compaction etc. Dynamic (linked) representation of stack and queue.

UNIT - IV
Tree: Basic Terminology, Binary tree and types; strictly, complete, skewed, binary expression tree, Representation of binary tree; static and dynamic, Traversals Algorithms; recursive and non-recursive, Threaded binary tree; representation and applications. Binary Search Tree; basic operations on it, AVL tree, basic operations in AVL tree, m-way tree, B-tree; basic operations, B+ tree. Applications of Tree. Heap sort. Max and Min Heap,

UNIT - V
Graph: Basic terminology, types of graphs, representation methods, traversal methods, minimum spanning tree, shortest path algorithms.
Searching Sequential search, Binary search, Hashing: methods, collision, collision resolution techniques; open addressing and chaining, clustering. Comparison of all searching method.

Name of Text Books :
1. Data Structure by Seymour Lipschutz & G. a. Vijayalaksmi Pai (Schaum's outlines).
2. Data Structures using C/C++ by Langsam, Augenstein & Tananbaum (PHI).
3. Data Structures & Program Design by Robert L Kruse (PHI).

Name of Reference books :
1. An Introduction to Data Structures with Application by Tremblay & Sorenson (TMH).
2. Data Structures using C by ISRD Group (TMH).
3. Classic Data Structure by D Samanata, Prentice-Hall of India.
4. Expert Data Structures with C (2nd Editin) by R.B. Patel , Khanna Publishing House.

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492 010
Department of Information Technology
SEMESTER – III

"Maths - III"

Theory Periods: 30   Tutorials: "10"
Credits: 4   Code: IT 304

UNIT I: FOURIER SERIES

Expansion of function as Fourier series, Change of interval, Even and odd functions, Half-range Fourier series, Practical harmonic analysis.

UNIT II: LAPLACE TRANSFORM

Laplace transform of elementary functions, Properties of Laplace transform, Laplace transform of derivatives and
integrals, multiplication by tn and division by t, Laplace transform of periodic functions. Inverse Laplace transform,
Convolution theorem, Application of Laplace transform to solutions of ordinary differential equations.

UNIT III: THEORY OF COMPLEX VARIABLES

Limit, Derivative and Analytic functions; Cauchy-Riemann equations and its applications to flow problems; Complex Integration: Line and Contour integral, Cauchy integral theorem and Integral formula; Taylor series, Laurent series; singularities; Poles and their orders and residues; Evaluation of real definite integrals.

UNIT IV: PARTIAL DIFFERENTIAL EQUATION

Formation of partial differential equations, Equations solvable by direct integration, Lagrange's linear equations, Homogeneous linear differential equations with constant coefficients, Non-homogeneous linear equations, Solution
of partial differential equations by the method of separation of variables.

UNIT V: RANDOM VARIABLES

Discrete and continuous probability distributions, Mathematical expectation, Mean and Variance, Moments, Moment generating function, probability distribution, Binomial, Poisson and Normal distributions.

Name of Text Books :
1. Higher Engg. Mathematics by Dr. B.S. Grewal– Khanna Publishers.
2. Advanced Engg. Mathematics by Erwin Kreyszig – John Wiley & Sons.

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492 010
Department of Information Technology
SEMESTER – III
"Object Oriented Programming Methodologies"

Theory Periods: 30   Tutorials: "10"
Credits: 4   Code: IT 305

Unit – I
Introduction of OOPS and Object Modeling:
Basic concepts of OOP, Benefits of OOP, Objects and classes, links and association, generalization and inheritance, aggregation, abstract class, multiple inheritance, meta data, candidate keys, constraints.

Unit – II
Dynamic Modeling and Functional Modeling:
Events and states, operations, nested state diagrams and concurrency, advanced dynamic modeling concepts, a sample dynamic model; Data flow diagram, specifying operations, constraints, a sample functional model.OMT (object modeling techniques) methodologies, examples and case studies to demonstrate methodologies, comparisons of methodologies, SA/SD, JSD.

UNIT III
Introduction to Object Oriented Languages and Class & Objects :
Object Oriented Languages overviews, Structure of C++ Program, Compiling & Linking, Operators & Expressions, Looping concepts, Arrays & Structures, functions, Specifying a class, Define member function, Scope of class and its member ,Nested Class, Data hiding & encapsulation, Friend function, Array within a class, array of object as function argument, function returning object, static member..

UNIT IV
Constructors & Destructors, Inheritance & Pointer
Constructor function, parameterized multiple constructor, default constructor, copy constructor, const and class, Data conversion between objects of different classes, Destructor function, Polymorphism, function overloading, Operator overloading, Define derived classes, single inheritance, multilevel inheritance, Hierarchical inheritance, Hybrid Inheritance, Pointers to objects, this pointer, Pointers to derived class.

UNIT V
Virtual function, **File I/O & Templates**:
Virtual function, Pure Virtual function, Abstract classes, Files streams, opening & closing a file, read () & write() functions, detecting end-of-file, seekp(), seekg(), tellg(), tellp()function. Introduction to Templates & Exception, Creating and handling Templates and Exception in OOP

Name of Text Books
   1. James Rumbaugh etal, "Object Oriented Modeling and Design", PHI
   2. OOPS with C++ : E. Balagurusamy
   3. OOP with C++: Robort Laphore.

Name of Reference Books
   1. Object Oriented Programming in C++ : StroutStrups.
   2. Programming with C++ : Venugopal .
   3. Programming with C++ : D Ravichandran
   4. Let us C++ : Yashwant Kanetkar.
   5. C++ and OOPs Paradigm by Debasish Jana (PHI)
   6. OOP-P Sengupta & B.B. Choudhari (PHI)
   7. OOP with C++ by M.P. Bhave & S. A. Patekar (Pearson Education)
   8. OOP with C++ : Poonamchanda Sarang (PHI)

"Digital Electronics and Logic Design"

Theory Periods: 30
Credits: 4

Tutorials: "10"
Code: IT306

UNIT I
CODES-Binary codes: Introduction & usefulness, Weighted & Non-weighted codes, Sequential codes, self complementing codes, Cyclic codes, 8-4-2-1 BCD code, Excess-3 code, Gray code: Binary to Gray and Gray to binary code conversion, Error detecting code, Error correcting code, 7-bit Hamming code, ASCII code, EBCDIC code. *Realization of Boolean Expressions:* Reduction of Boolean expressions using laws, theorems and axioms of Boolean Algebra, Boolean expressions and logic diagram, Converting AND/OR/Invert logic to NAND/NOR logic, SOP and POS Forms and their Realization.

UNIT II
MINIMIZATION TECHNIQUES-Expansion of a Boolean expression to SOP form, Expansion of a Boolean expression to POS form, Two, Three & Four variable K-Map: Mapping and minimization of SOP and POS expressions. Completely and Incompletely Specified Functions - Concept of Don't Care Terms; Quine – Mc Clusky Method.

UNIT III
COMBINATIONAL CIRCUITS-*Adder & Subtractor:* Half adder, Full adder, half subtractor, Full subtractor, Parallel Binary adder, Look Ahead carry adder, Serial adder, BCD adder. Code converter, Parity bit generator/Checker, Comparator. *Decoder*: 3-line to 8-line decoder, 8-4-2-1 BCD to Decimal decoder, BCD to Seven segment decoder. *Encoder*: Octal to binary and Decimal to BCD encoder. *Multiplexer*: 2- input multiplexer, 4-input multiplexer, 16-input multiplexer *Demultiplexer:* 1-line to 4-line & 1-line to 8- line demultiplexer, Multiplexer as Universal Logic Function Generator, Programmed Array Logic (PAL). PLA and PLD.

UNIT IV
SEQUENTIAL CIRCUITS-*Flip-Flops & Timing Circuit*: S-R Latch; Gated S-R Latch; D Latch; J-K flip-Flop; T Flip-Flip: Edge Triggered S-R, D, J-K and T Flips-Flops; Master - Slave Flip-Flops; Direct Preset and Clear Inputs. *Shift Registers:* PIPO, SIPO, PISO, SISO, Bi-Directional Shift Registers; Universal Shift register. *Counter:* Asynchronous Counter: Ripple Counters; Design of asynchronous counters, Effects of propagation delay in Ripple counters, Synchronous Counters: 4-bit synchronous up counter, 4-bit synchronous down counter, Design of synchronous counters, Ring counter, Jhonson counter, Pulse train generators using counter, Design of Sequence Generators; Digital Clock using Counters.

UNIT V
DIGITAL LOGIC FAMILIES-Introduction; Simple Diode Gating and Transistor Inverter; Basic Concepts of RTL and DTL; *TTL*: Open collector gates, TTL subfamilies, IIL, ECL; MOS Logic: CMOS Logic, Dynamic MOS Logic, Interfacing: TTL to ECL, ECL to TTL, TTL to CMOS, CMOS to TTL, Comparison among various logic families, Manufacturer's specification.

Name of Text Books :
  1. Fundamentals of Digital Circuits: A. Anand Kumar, PHI
  2. Digital Integrated Electronics: H. Taub and D. Schilling: TMH

Name of Reference Books :
  1. Digital Fundamentals: Floyd & Jain: Pearson Education
  2. Digital Electronics: A.P. Malvino: TMH.

Semester: III	Code: IT 391
Subject: Data Structure Lab	
Credits: 2	

List of 10 -15 Assignment/Practical will be allotted by the Instructor in the respective Lab.

Semester: III	Code: IT 392
Subject: Basic Electronics Lab	
Credits: 2	

List of 10 -15 Assignment/Practical will be allotted by the Instructor in the respective Lab.

Semester: III	Code: IT 393
Subject: Computer Programming Lab	
Credits: 2	

List of 10 -15 Assignment/Practical will be allotted by the Instructor in the respective Lab.

Semester: III	
Subject: Value Education	
Credits: 1	

List of 10 -15 Assignment/Practical will be allotted by the Instructor in the respective Lab.

Semester: III	
Subject: Discipline	
Credits: 1	

NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR
DEPARTMENT OF INFORMATION TECHNOLOGY

SEMESTER: IV

S.No.	Board of Studies	Sub.Code	Subject Name	Periods/week			Examination Scheme					Total Marks	Credits (L+T+P)/2
				L	T	P	TA	FE	SE	T.C.A.	ESE		
1	Information Technology	IT 401	Statistical Method & Probability	3	1	-	20	15	15	50	70	120	4
2	Information Technology	IT 402	Discrete Structures	3	1	-	20	15	15	50	70	120	4
3	Information Technology	IT 403	Computer Organization	3	1	-	20	15	15	50	70	120	4
4	Information Technology	IT 404	Principles of Communication System	3	1	-	20	15	15	50	70	120	4
5	Information Technology	IT 405	Theory of Computation	3	1	-	20	15	15	50	70	120	5
6	Information Technology	IT 406	Operating Systems	3	1	-	20	15	15	50	70	120	4
7	Information Technology	IT 491	Operating Systems Lab (Unix)	-	-	3	30	-	-	30	20	50	2
8	Information Technology	IT 492	Computer Programming(Theory of computation) Lab	-	-	3	30	-	-	30	20	50	2
9	Information Technology	IT 493	Communication Lab	-	-	3	30	-	-	30	20	50	2
10	Humanities		Personality Development	-	-	2	25	-	-	25	0	25	1
11			Discipline	-	-	-	25	-	-	25	0	25	1
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Note: For attendance of a student in every theory and practical class, the teachers are supposed to keep records ultimately in the following format which will be included in the semester mark-sheets.

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> 85			----->	High "H"
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> 60 & < 70			----->	Low "L"
< 60			----->	Poor "P"

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010
Department of Information Technology
SEMESTER – IV

"Probability, Statistics and Queuing Theory"

Theory Periods: 30   Tutorials: "10"
Credits: 4   Code: IT 401

UNIT I

Probability: Definitions of probability, Addition theorem, Conditional probability, Multiplication theorem, Bayes theorem of probability and Geometric probability, Random variables and their properties, Discrete Random variable, Continuous Random variable, Probability Distribution, joint probability distributions their properties, Transformation variables, Mathematical expectations, probability generating functions.

UNIT II

Probability Distributions / Discrete distributions: Binomial, Poisson Negative binominal distributions and their properties. (Definition, mean, variance, moment generating function., Additive properties, fitting of the distribution.), Continuous distributions: Uniform, Normal, exponential distributions and their properties. Curve fitting using Principle of Least Squares.

UNIT III

Multivariate Analysis: Correlation, correlation coefficient, Rank correlation, Regression Analysis, Multiple Regression, Attributes, coefficient of Association, χ^2 – test for goodness of fit, test for independence, Sample, populations, statistic, parameter, Sampling distribution, standard error, unbiasedness, efficiency, Maximum likelihood estimator, notion & interval estimation.

UNIT IV

Testing of Hypothesis: Formulation of Null hypothesis, critical region, level of significance, power of the test. Small Sample Tests: Testing equality of .means, testing equality of variances, test of correlation coefficient, test for Regression Coefficient. Large Sample tests: Tests based on normal distribution.

UNIT V

Queuing theory: Queue description, characteristics of a queuing model, study state solutions of M/M/1: α Model,
M/M/1: N Model.

Name of Text Books:
   1. Probability, Statistics and Random Processes by T.Veerarajan, Tata McGraw Hill.

Name of Reference Books:
   1. Probability & Statistics with Reliability, Queuing and Computer Applications by Kishor S. Trivedi , Prentice Hall of India ,1999.
   2. An Introduction to Queuing Systems, S.K. Bose, Kluwer Academic / Plenum Publishers, 2002

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010
Department of Information Technology
SEMESTER – IV

"Discrete Structures"

Theory Periods: 30   Tutorials: "10"

Credits: 4   Code: IT 402

UNIT – I: MATHEMATICAL LOGIC & BOOLEAN ALGEBRA
Basic concept of mathematical logic, Statements, Connectives, Conditional and biconditional statements, Logical equivalence, Logical implication & quantifiers, Basic concept of Boolean Algebra, Properties of Boolean algebra, Boolean functions, Disjunctive & conjunctive normal forms of Boolean functions, First Order Predicate Logic.

UNIT – II: SET THEORY, RELATIONS, FUNCTIONS
Basic concept of set theory, Relations, Properties of relation in a set, Equivalence relation, Composition of relations, Partial order & total order relations, Lattices & Hasse diagram, Introduction to function, Inverse, Identity, Injective, Surjective & Bijective functions, Composition of functions and some special functions.

UNIT – III: GROUP THEORY
Binary Operation, Algebraic Structure, Semi groups, Monoid, Groups, Abelian Groups, Finite Groups, Addition and Multiplication Modulo, Order of Group, Subgroups, Permutation Group, Cyclic Group, Cosets, Lagrange's theorem, some theorems on sub groups, Isomorphism, Automorphism, Homomorphism of groups, Normal Subgroup, Quotient group.

UNIT – IV: GRAPH THEORY
Introduction to graph theory, Types of graphs (Simple, Di-Graph, Non-Directed Graph , MultiGraph , Connected, Regular, Cycle, Cyclic, Acyclic, Complete, Wheel, Bi-partite & Complete Bi-Partite), Complement of Graph, Eulerian, Hamiltonian, Isomorphic graphs, Planarity (Region & Properties), Polyhedral Graph, kuratowski`s theorem, Coloring, Matchings & Coverings, Spanning Tree, Connectivity (Edge & Vertex).

UNIT – V: COMBINATORICS AND PROBABILITY
Permutation and combination, Counting & Summation, Pigeon-hole principle, Mathematical induction, Principle of Inclusion and Exclusion, Generating function, Recurrence relation.
Probability:
Conditional Probability; Mean, Median, Mode and Standard Deviation; Random Variables; Distributions; uniform, normal, exponential, Poisson, Binomial.

Name of Text Books:
1. Elements of discrete mathematics by C.L. Liu, Tata McGraw-Hill, publications.
2. Discrete Mathematical structures, by Bernard Kolman, Robert C. Busby and Sharon Cutler Ross, Pearson Education.

Name of Reference Books:
1. A Text Book of Discrete Mathematics, Swapan Kumar Sarkar, S. Chand & Compeny Ltd.
2. Graph theory with applications to engineering and computer science, by Narsingh Deo, Prentice Hall of India.
3. Discrete mathematics for computer scientists and mathematicians, by J.L. Mott, A. Kandel and T.P. Baker, Prentice Hall of India.
4. Discrete Mathematical Structures with applications to computer science, by J.P. Tremblay and R. Manohar,, Tata McGraw-Hill.

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010
Department of Information Technology
SEMESTER – IV

"Computer Organization"

Theory Periods: 30   Tutorials: "10"

Credits: 4   Code: IT 403

Unit I: Processor Basics
CPU Organization, Fundamental and features, Data representation – Basic formats, Fixed and Floating point representation, Instruction set, formats, types and programming considerations, Addressing modes.

Unit II: Data Path Design
Fixed point arithmetic multiplication algorithms: hardware algorithms, Booth multiplication algorithm, Division algorithm: Hardware algorithm, Divide overflow algorithm, Combinational ALU and Sequential ALU, Floating point arithmetic operations

Unit III: Control Design
Basic concepts, Hard-wired control, Micro Programmed Control, CPU control Unit and Multiplier Control Unit, Pipeline control: Instruction pipelines, Pipeline Performance, Superscalar processing.

Unit IV: Memory Organization
Memory Device Characteristics, RAM Technologies and Serial Access Memories Technology, Multilevel Memory Systems, Address translation and Memory allocation systems, Cache memory: Features, Address mapping.

Unit V: System Organization
Communication method: Basic concepts, Bus control, Programmed I/O, DMA, Interrupts and I/O processors, Parallel Processing: Processor-level Parallelism, Multiprocessor and Fault Tolerance System.

Name of Text Books:
1. Computer System Architecture By, M. Morris Mano Prentice- Hall, 1993.
2. Computer Architecture & Organization By John P. Hayes, McGraw Hill-1998

Name of Reference Books:
1. Structured Computer Organization by Andrew S. Tanenbaum.
2. Computer architecture a quantitative approach, Patterson D. A. and Hennessy, J. L., Second Edition, Morgan Kaufman, 1996.
3. Computer Organization and Architecture, W. Stallings, LPE

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010
Department of Information Technology
SEMESTER – IV

"Principles of Communication System"

Theory Periods: 30   Tutorials: "10"
Credits: 4   Code: IT 404

UNIT – I : Amplitude Modulation System
Need for Modulation, Amplitude Modulation, Amplitude Modulation Index, Modulation Index for Sinusoidal AM, Frequency spectrum for Sinusoidal AM, Average power for Sinusoidal AM, Effective voltage and current for sinusoidal AM, Balanced Modulator, AM demodulation,The Square law demodulator, PLL, Nonsinusoidal modulation, DSBSC Modulation, SSB modulation and generation & demodulation, VSB, FDM.

UNIT – II : Angle Modulation System
Phase and frequency modulation and their relationship. Frequency deviation, spectrum of FM Signal, BW of FM Signal, Effect of modulation on BW, constant BW, FM phasor diagram, Narrow band FM. Armstrong and Parameter variation methods of FM generation and FM demodulators.

UNIT – III : Digital Communication
Sampling theorem, Pulse Modulation: PAM, PPM, PWM, Digital Base Band Modulation technique: Bandwidth of digital data, Base band System, Formatting textual data, messages, characters & symbols, Formatting Analogue information, source of corruption, PCM, Uniform & Non-uniform Quantization, Base band modulation, Correlative Coding, Formatting Analogue information, DPCM, Delta Modulation

UNIT – IV : Digital Modulation Techniques
Fundamentals of Binary ASK, PSK, FSK, Generation & detection of BASK, BPSK, BFSK, Fundamentals of QPSK & DPSK, Generation & detection of QPSK & DPSK, MSK, M-ary PSK signaling schemes, Equalization Principles, Optimum filter, Matched filter, Error probability of various Digital Modulation technique.

UNIT – V : Elements of Information Theory
Average Information, Entropy, Information Rate. Communication Channel. Discrete and Continuous channel, Shannon-Hartley Theorem and its Implications, Channel capacity, Gaussian channel, Bandwidth s/N trade off.
Satellite Communication: Satellite Communication: Components and Block diagram of Satellite communication system,Transponders, Up-link and Down-link budget calculations, Fiber Optic Communication: Principles of light propagation in optical fiber, Losses in fibers, Dispersion.

Name of Text Books:
1. Electronic Communications by Roddy & Coolen, PHI.
2. Electronic Communication System by Kenedy & Davis, TMH
3. Modern Digital & Analogue Communication systems, B.P.Lathi, Ed.-3, Oxford Press.

Name of Reference Books:
1. Principles of Communication system by H.Taub and K.L. Shiling.
2. An Introduction to the Principle of Communication Theory by J.C. Hancock,Mc-Graw Hill.
3. Signal Processing, Modulation and Noise -by Betts, English University Press,London.
4. Communication System-by A.B. Carlson ,Mc-Graw Hill.

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010
Department of Information Technology
SEMESTER – IV

"Theory of Computation"

Theory Periods: 30   Tutorials: "10"
Credits: 5   Code: IT 405

UNIT- I: Machines
Basic machine, FSM , Transition graph, Transition matrix, Deterministic and non-deterministic FSM'S, Equivalence of DFA and NDFA, Mealy & Moore machines, minimization of finite automata, Two-way finite automata.

UNIT- II: Regular Sets and Regular Grammars
Alphabet, words, Operations, Regular sets, Finite automata and regular expression, Pumping lemma and regular sets, Application of pumping lemma, closure properties of regular sets.

UNIT- III: Formal Grammars & Languages
Basic definitions and examples of languages, Chomsky hierarchy, Regular grammars, context free & context sensitive grammars, context free languages, non-context free languages, Chomskey normal forms, binary operations on languages.

UNIT- IV: Turing Machines & Pushdown Automata
TM model, representation and languages acceptability of TM Design of TM, Universal TM & Other modification, composite & iterated TM, Pushdown automata , Acceptance by PDA.
Computability: Basic concepts, primitive & partial recursive function, Recursive function, Decidability, Kleen's theorem.

Unit- V: Undecidibility
Properties of recursive & recursively enumerable languages, Universal Turing machine and an undecidable problem, Rice's theorem & some more undecidable problems.
Computational complexity Theory: Definition, linear speed-up, tape compression & reduction in number of tapes, Hierarchy Theorem, Relation among complexity measures, Transition lemmas & non deterministic hierarchies, properties of general complexity measures, the gap, speed-up, union theorem, Automatic complexity theorem.

Name of Text Books:
  1. John E. Hopcroft, Jeffery Ullman, Introduction to Automata theory, Langauges & computation, Narosa Publishers.

Name of Reference Books:
  1. E.V. Krishnamurthy, Introductory Theory of computer science.
            K.L.P. Mishra, Theory of computer Science, Prentice Hall of India Pvt. Ltd.

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010
Department of Information Technology
SEMESTER – IV

"Operating Systems"

Theory Periods: 30   Tutorials: "10"
Credits: 4   Code: IT 406

UNIT I
Introduction: Operating system and function, Evolution of operating system, Batch, Interactive, Time Sharing and Real Time System, System protection.
Operating System Structure: System Components, System structure, Operating System Services.

UNIT II
Processes: Process concept, Principle of Concurrency, Producer Consumer Problem, Critical Section problem, Semaphores, Classical problems in Concurrency, Inter Process Communication, Process Generation, Process Scheduling.
CPU Scheduling: Scheduling Concept, Performance Criteria Scheduling Algorithm, Evolution, Multiprocessor Scheduling.

UNIT III
Deadlock: Deadlock Characterization, Prevention, Avoidance and Detection, Recovery from deadlock combined approach.
File System: File Concept, File Organization and Access Mechanism, File Directories, File Sharing, Implementation Issues.

UNIT IV
Memory Management: Multiprogramming with fixed partition, Multiprogramming with variable partition, Multiple base register, Paging, Segmentation, Virtual memory concept, Demand paging, Performance, Paged replaced algorithm, Allocation of frames, Thrashing, Cache memory, Organization, Impact on performance.

UNIT V
I/O Management & Disk Scheduling: I/O devices and organization of I/O function, I/O Buffering, Disk I/O, Disk scheduling algorithms,Case study: WINDOWS-NT, Linux, Unix, Inferno

Name of Text Books:
1. Operating System concepts, Silberscatz A and Peterson, J.L, PE- LPE.

Name of Reference Books:
1. 1.Operating System Design & Implementation, Tanenbaum, A.S., PHI.
2. Operating system concepts Galvin, Silberscatz John Weiley & Sons
3. Operating systems H.M.Deital Pearson Education
4. Operating System Concept & Design, Milenkovic M, McGraw Hill.
5. Operation System, Stalling William, Maxwell MCMillan International Editions.

Semester: IV	Code: IT 491
Subject: Operating Systems Lab(Unix)	
Credits: 2	

List of 10 -15 Assignment/Practical will be allotted by the Instructor in the respective Lab.

Semester: IV	Code: IT 492
Subject: Computer Programming(Theory of computation) Lab	
Credits: 2	

List of 10 -15 Assignment/Practical will be allotted by the Instructor in the respective Lab.

Semester: IV	Code: IT 493
Subject: Communication Lab	
Credits: 2	

List of 10 -15 Assignment/Practical will be allotted by the Instructor in the respective Lab.

Semester: IV	
Subject: Personality Development	
Credits: 1	

List of 10 -15 Assignment/Practical will be allotted by the Instructor in the respective Lab.

Semester: IV	
Subject: Discipline	
Credits: 1	

NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR
DEPARTMENT OF INFORMATION TECHNOLOGY

SEMESTER: V

S.No.	Board of Studies	Sub.Code	Subject Name	Periods/week			Examination Scheme					Total Marks	Credits L+(T+P)/2
				L	T	P	TA	FE	SE	T.C.A.	ESE		
1	Information Technology	IT 501	Computer Networks	3	1	-	20	15	15	50	70	120	4
2	Information Technology	IT 502	Design Analysis of Algorithms	4	1	-	20	15	15	50	70	120	5
3	Information Technology	IT 503	Microprocessors	3	1	-	20	15	15	50	70	120	4
4	Information Technology	IT 504	Database Management System	3	1	-	20	15	15	50	70	120	4
5	Information Technology	IT 505	Computer Graphics	3	1	-	20	15	15	50	70	120	4
6	Information Technology	IT 50X	Elective I	3	1	-	20	15	15	50	70	120	4
7	Information Technology	IT 591	Computer Graphics Lab	-	-	3	30	-	-	30	20	50	2
8	Information Technology	IT 592	Database Management System Lab	-	-	3	30	-	-	30	20	50	2
9	Information Technology	IT 593	Computer Networks Lab	-	-	3	30	-	-	30	20	50	2
10	Humanities		Managerial Skill	-	-	2	25	-	-	25	0	25	1
11			Technical Visit/ Practical Training	-	-	-	25	-	-	25	0	25	1
			Total	19	6	11	260	90	90	440	480	920	33

Elective I		
Sr.No.	Sub.Code	Subject Name
1	IT 506	Operation Research
2	IT 507	Human Computer Interaction
3	IT 508	Bioinformatics
4	IT 509	Industrial Psychology
5	IT 510	E - Commerce

Note : For attendance of a student in every theory and practical class, the teachers are supposed to keep records Itimately in the following format which will be included in the semester mark-sheets.

T.C.A. = Total of Continuous Assessment.

Format for attendance				
Attendance				Category
> 85			----->	High "H"
> 70 & < 85			----->	Medium "M"
> 60 & < 70			----->	Low "L"
< 60			----->	Poor "P"

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010
Department of Information Technology
SEMESTER – V

"Computer Networks"

Theory Periods: 30   Tutorials: "10"
Credits: 4   Code: IT 501

UNIT I
Course logistics, Introduction to Networks, OSI layers, Inter-layer communication, PHY layer, NRZ, NRZI, Manchester, 4B/5B, framing, error detection, FEC vs ARQ, Stop-and-Wait, inefficiency of stop-and-wait, bit-pipe model,bandwidth-delay-product. Sliding window protocol, Network topologies (bus, ring, star).

UNIT II
Modes of transmission (unicast, broadcast, multicast, anycast), ALOHA, ALOHA analysis, efficiency/throughput, slotted ALOHA. Ethernet PHY properties, cables, CSMA/CD, Ethernet min. frame length requirement, jamming, wireless and lack of collision detection. Wireless CSMA/CA, hidden nodes, RTS/CTS, token ring, Token ring algorithm, Ethernet vs token ring, , Comparison of switching mechanisms, circuit switching, packet switching, virtual circuit switching, source routing, Ethernet bridging, learning bridges, looping issue, Ethernet spanning tree protocol

UNIT III
Distance vector routing algorithm, Counting to infinity problem, Link state routing algorithm, IP addressing, hierarchical routing, what is Internetworking, IP forwarding algo, ARP, DHCP, IP packet format, IP fragmentation and reassembly, Subnetting, CIDR/Supernetting, ICMP, ISPs, Autonomous Systems, ISP relationships, Types of AS, BGP: path vector protocol

UNIT IV
Transport layer functionalities, application expectations and IP delivery semantics, UDP functionality, UDP header; why is reliability at the transport layer different from reliability at the link layer?, TCP features, byte-stream, connection-oriented, TCP header format, 4-tuple, incarnations of a TCP connection, 3-way handshake, initial sequence numbers, TCP state diagram, TCP sliding window, , RTT estimation, Jacobson/Karel's algorithm for RTT estimation, slow-start, congestion avoidance, self-clocking/ack-clocking, TCP Tahoe, Fast retransmit, fast recovery, Resource allocation models, evaluation metrics, queuing models, quality of service.

UNIT V
Real-time applications; classification of applications, Introduction to cryptography and network security, Domain Name System (DNS), Applications: SMTP, RFC622, MIME, Email clients, servers, SMTP gateways, HTTP, persistent TCP connections

Name of Text Books:
1. James F. Kurose and Keith W. Ross, "Computer Networking: A Top-Down Approach Featuring the Internet", Pearson Education, 2003.
2. Andrew S. Tanenbaum, "Computer Networks", PHI, Fourth Edition, 2003.

Name of Reference Books:
1. Larry L.Peterson and Peter S. Davie, "Computer Networks", Harcourt Asia Pvt. Ltd., Second Edition.
2. William Stallings, "Data and Computer Communication", Sixth Edition, Pearson Education, 2000..

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010
Department of Information Technology
SEMESTER – V

"Design Analysis of Algorithm"

Theory Periods: 40   Tutorials: "10"
Credits: 5   Code: IT 502

Unit –I

Analyzing algorithms, Algorithm types, Recurrence Equations, Growth function: Asymptotic notation, Standard notation & common functions, Recurrence relation, different methods of solution of recurrence equations with examples.

Unit –II

Introduction to Divide and Conquer paradigm, Quick and merge sorting techniques, Linear time selection algorithm, the basic divide and conquer algorithm for matrix multiplication Strassen Multiplication and, Red Black tree, Binary Search tree , heap sort, shell & bucket sort.

Unit –III

Overview of the greedy paradigm examples of exact optimization solution (minimum cost spanning tree), Knapsack problem, Single source shortest paths.Overview, difference between dynamic programming and divide and conquer, Applications: Shortest path in graph, Matrix multiplication, Traveling salesman Problem, longest Common sequence.

Unit –IV

Representational issues in graphs, Depth first search & Breath first search on graphs, Computation of biconnected components and strongly connected components using DFS, Topological sorting of nodes of an acyclic graph & applications, Shortest Path Algorithms , Bellman-Ford algorithm, Dijkstra's algorithm & Analysis of Dijkstra's algorithm using heaps, Floyd-Warshall's all pairs shortest path algorithm

Unit –V

The general string problem as a finite automata, Knuth Morris and Pratt algorithms, Linear time analysis of the KMP algorithm, The Boyer-Moore algorithm. Backtracking & Recursive backtracking, Applications of backtracking paradigm ,Complexity measures, Polynomial Vs Nonpolynomial time complexity; NP-hard and NP-complete classes, examples.

Name of Text Books:
1. Coreman, Rivest, Lisserson, : "Algorithm", PHI.
2. Basse, "Computer Algorithms: Introduction to Design & Analysis", Addision Wesley.
3. Horowitz & Sahani, "Fundamental of Computer Algorithm", Galgotia.

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010
Department of Information Technology
SEMESTER – V

"Microprocessors"

Theory Periods: 30

Tutorials: "10"

Credits: 4

Code: IT 503

UNIT I
Review of logic design using MSI/LSI chips such as De-multiplexers/Decoders, Multiplexers, Priority encoders, Registers, Counters, Buffers, Latches. Introduction to functions performed by microprocessor, R/W and ROM memory models, Memory map and addresses, I/O devices, I/O Addressing. The 8085 programming model, Instruction classification, Instruction and data formats, Addressing modes, Data transfer operations, Arithmetic operations, Logic operations, Branch operations, Writing Assembly Language programs, Hand assembly of a program 8085 Microprocessor architecture, Logic pin-out, machine cycles and bus timings

UNIT II
Memory interfacing, Absolute, Partial decoding, Multiple Address range, Interfacing memory with wait states, Interfacing I/O devices, Peripheral I/O, Memory mapped I/O, 8085 single-board microcomputer system. Interfacing of 8085 with 8155/8156 (RAM), 8355/8755 (ROM). Programming techniques with additional instructions, Looping, counting and indexing, Data transfer from/to memory to/from microprocessor, 16-bit arithmetic instructions, Logic operations like rotate, compare, Time delays, Counters, Stack, Subroutine, Call and return instructions. Interrupts, The 8085 interrupt process, multiple interrupt and priorities, vectored interrupts, Restart as software instruction.

UNIT III
Programmable Interfacing devices, Basic concept, 8279 programmable Keyboard/Display interface, 8255A programmable Parallel interface, Interfacing keyboard and display using 8255A, 8254 programmable Interval Timer, 8259A programmable Interrupt Controller, Direct Memory Access (DMA), 8237 DMA Controller. Serial I/O and Data communication, Basic concept in serial I/O, Data communication over telephone lines, Standards in serial I/Os, The 8085-serial I/O lines, 8251A programmable communication interface Microprocessor Applications, Interfacing scanned multiplexed displays and Liquid Crystal Displays, Interfacing a matrix keyboard.

UNIT IV
Architecture and pin configuration of 8086, Instruction Format; Addressing modes Basic 8086 system bus architecture, Minimum mode Configuration, Maximum mode configuration; memory interfacing with 8086 in minimum and maximum mode; System Bus Timings, Bus Standards. Interrupts of microprocessor 8086

UNIT V
Instruction set of 8086 and programming examples, Data Transfer Instruction; Arithmetic Instructions; Branching and Looping Instructions, NOP and Halt, Flag Manipulation Instructions; Logical, Shift and Rotate Instruction. Byte and String Manipulation: String Instructions; REP Prefix, Table Translation, Number Format conversions. Assembler Directives and Operators; Assembly Process; Translation of assembler Instructions. Programming of microprocessor 8086

Name of Text Books:
1. Microprocessor Architecture, Programming and Application by R. S. Gaonkar, Wiley Eastern.
2. Advance Microprocessor and Peripherals (Architecture, Programming & Interfacing) by A. K. Roy & K. M. Bhurchandi – TMH

Name of Reference Books:

1. The Intel Microprocessor – (Architecture, Programming & Interfacing) by Barry B. Bery.
2. Microprocessors and Programmed Logic (2nd Edition), Pearson Education by Kenneth L. Short
3. Microcomputer Systems: The 8086/8088 Family, Yu-Cheng Lieu & Glenn A. Gibson, Prentice Hall India.
4. Microprocessors & Interfacing: Programming & Hardware, Douglas V. Hall, Tata McGraw Hill.

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010
Department of Information Technology
SEMESTER – V
"Database Management System"

Theory Periods: 40

Tutorials: "10"

Credits: 4

Code: IT 504

UNIT-I: Introduction to Database
Advantages of DBMS, Type of Data Models, Classification of DBMS, Schema and instances, DBMS Architecture and Data Independence, Entity- Relationship Model, Attributes and Keys, Relationship Types, Types of Entity, Enhanced E–R Modeling, Specialization and Generalization, Construction & Conversion of E-R Diagram into Tables, Constraints of E-R Diagram, Merits & Demerits of E-R Diagram.

UNIT-II: Database Design
Logical Database design: various Database Design Strategies, Functional Dependencies, Types and Characteristics of FD, inference Rule, closure set of attributes & applications (equivalences & canonical form), Normalization for Relational Databases: Definition, Types of Normalization: First Normal form, Second Normal form, Third Normal form, Boyce-codd normal form, problem related with normal forms & solutions. Multivalued & Join Dependencies, 4th & 5th Normalization, Numerical based on Normal forms, Merits & Demerits of Normalization.

UNIT-III: Structured Query Language
Components of SQL: DDL, DML, DCL, View, Index, Cursors and Triggers, Query Processing: Query processing stages, Query interpretation, Query execution plan, Table scans, Classification Queries, Aggregate function, Use of Group By, Having, Order by Clause, sub queries characteristic & classification, Use of Any, All, Exist & Not Exist operator, join operator, types of join, Structure of a query optimizer.

UNIT-IV: Relational Algebra, Relational Calculus & Transaction Processing
Classification of Relational Algebra operator (Native, Extended and Set Operators), Relational data model concepts, constraints, Relational Calculus: Tuple Relational Calculus & Domain Relational Calculus.
Transaction Processing: Types of failures, ACID property, Six different isolation problems, schedules and recoverability, serialisability of schedules, Levels of transaction consistency, Deadlocks, Nested transaction, Transaction benchmarking.

UNIT –V: Indexes, Concurrency Control & Crash Recovery
File Organizations: Introduction, Secondary Storage Devices, Buffering of Blocks, Structure of Files: Types of Single Level ordered indexes, Multilevel indexes, Dynamics Multilevel indexes using B-trees and B+- Trees.
Concurrency Control: Different type of concurrency control techniques & their comparative analysis, Locking techniques, Time-stamp ordering, Multi-version techniques, Optimistic techniques, Multiple granularity. Integrity, Security, Non-procedural and procedural integrity constraints, Integrity constraints specifications in SQL. Failure classification, Different type of Recovery techniques & their comparative analysis, deferred update, immediate update, Shadow paging, Check points, On-line backup during database updates,

Name of Text Books:
1. Database system concept, Korth & Sudarshan, MH.
2. Introduction to Database Systems, C.J.Date, Pearson Education.

Name of Reference Books:
1. Principles of Database Systems", 2nd Edn., Ullman, J.O, Galgotia Publications.
2. Fundamentals of Database Systems, Elmasri & Navathe, Pearson Education.
3. Database Design Fundamentals, Rishe, PHI.

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010
Department of Information Technology
SEMESTER – V

"Computer Graphics"

Theory Periods: 30   Tutorials: "10"

Credits: 4   Code: IT 505

UNIT- I: OVERVIEW OF GRAPHICS SYSTEM
I/O devices, Raster scan & Random scan system, line and circle generation methods, Filled area primitive, solid area filling algorithms.

UNIT- II: Transformations & Projection
2-D Transformation , basic geometric transformations, Transformation in homogeneous coordinate system, 3-D transformations, Projection: parallel projection, perspective projection, Vanishing points. Line Clipping algorithms; Cohen-Sutherland algorithm, Midpoint subdivision algorithm, Cyrus beck algorithm, Polygon Cliping.

Unit – III: Curve Design
Parametric curves, Need for cubic parametric curves c0, c1, c2 continuity, Bezier curves , Generation though ernstein polynomials, Condition for smooth joining of 2 segments, Convex Hull property, B-Spline Curves: Properties of B-spline curves,Finding Knot vectors-uniform and open uniform , Non-uniform, rational B-splines, Beta splines, Subdividing curves, Drawing curves using forward differences.

UNIT- IV: HIDDEN SURFACE REMOVAL &FRACTALS
Hidden Surface Removal: Back face removal, Floating Horizon method for curved objects, Z-Buffer or depth buffer algorithm, Painters algorithm (Depth sorting method), Binary space partitioning trees, Scan-line algorithm, Warnock's algorithm.
Fractals: self-similar fractals-fractal dimension, Generation of Terrain-random mid point displacement, Grammar based models, Self-squaring fractals.
Soild Modelling: Generation through sweep techniques, Constructive sold geometry, B representations, Octrees, Ray
Tracing & their Theory

UNIT – V: SHADING , COLOR ISSUES AND ANIMATION
Illumination model, Computing reflection vector, Gouraud and Phog shading, Texture mapping & their haracteristics, Handling shadows, Radiosity, Lambert's Law, Modelling transparency, Colour issues: colour model for Images, Additive and Subtractive colour models, Wavelength spectrum, CIE colour standards.
Animation: Procedural animation, morphing, creating key frames, steps for creating animation, Frame by Frame animation

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Name of Text Books:
   1. Computer graphics, Hearn and Baker, PHI
   2. Computer Graphics, Foley, PE-LPE,

Name of Reference Books:
   1. Procedural Elements of Computer graphics, Rogers, McGraw Hill
   2. Computer graphics, Harringtons S., McGraw Hill.
   3. Computer Graphics, Schoum Series.

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010
Department of Information Technology
SEMESTER – V

"Operation Research"

Theory Periods: 30   Tutorials: "10"
Credits: 4   Code: IT 506

Unit - I

Introduction: History of operations research, Nature and Scope of operations research, Allocation, assignment and Transportation models, Construction and solution of these models.

Unit - II

Linear Programming: Introduction, Mathematical formulation of the problem, Graphical Solution methods, Mathematical solution of linear programming problem, Slack, and Surplus variables. Matrix formulation of general linear programming problem.

Unit - III

The Simplex Method: Fundamental properties to solution corroboration of extreme points, Simplex algorithm, Computational procedures, Artificial variables, two phase simplex Method, Formulation of linear programming problems and its solution by simplex method, Unrestricted variables, problems of degeneracy, Principle of duality in simplex method, Formation of dual with mixed type of constraints.

Unit – IV

Solution of primal and dual (Solution of dual constraints, Solution of primal also) Sensitivity Analysis.
Integer Programming: Formulation and solution of Integer Programming Problem.
Game Theory: Introduction, Two persons zero sum games, The Maxmini and Minimax principles.

Unit - V

Graphical Solution: Reduction of game problem to LPP, the transportation problem, matrix form of transportation problem, Initial basic feasible solution, Selecting the entering variables, Selecting the leaving variables, Transportation algorithm, Degeneracy in transportation Problem, Inventory Control.

Name of Text Books:
1. Operation Research, Theory and Application by J.K. Sharma, Macmillan India.
2. Quantitative techniques in Management by N.D.Vohra, TMH.
3. Linear Programming by N.P. Loomba.
4. Operation Research: An Introduction by H.A. Taha, PHI.

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010
Department of Information Technology
SEMESTER – V

"Human Computer Interaction"

Theory Periods: 30   Tutorials: "10"
Credits: 4   Code: IT 507

UNIT-I
Introduction: Importance of user Interface – definition, importance of good design, Benefits of good design, A brief history of Screen design.

UNIT-II
The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics - Principles of user interface.

UNIT-III
Design process – Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions. Screen Designing:- Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design.

UNIT-IV
Windows – New and Navigation schemes selection of window, selection of devices based and screen based controls. Components – text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors.

UNIT-V
Software tools – Specification methods, interface – Building Tools. Interaction Devices – Keyboard and function keys – pointing devices – speech recognition digitization and generation – image and video displays – drivers.

Name of Text Books:
1. The essential guide to user interface design, Wilbert O Galitz, Wiley DreamTech.
2. Designing the user interface. 3rd Edition Ben Shneidermann , Pearson Education Asia.

Name of Reference Books:
1. Human – Computer Interaction. Alan Dix, Janet Fincay, Gre Goryd, Abowd, Russell Bealg, Pearson Education.
2. Interaction Design Prece, Rogers, Sharps. Wiley Dreamtech.
3. User Interface Design, Soren Lauesen , Pearson Education.

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010
Department of Information Technology
SEMESTER – V

"Bioinformatics"

Theory Periods: 30

Tutorials: "10"

Credits: 4

Code: IT 508

UNIT I
Why is Bio informatics and why study it? How is large-scale molecular biology data generated, where how can researchers gain access to it, and what is quality of data? Private and future data sources. Meta data: Summary and reference systems, finding New types of data online, likely growth areas.

UNIT II
Biological Bases for Bio informatics, the diversity of life forms, the unifying theme Information storage-nucleic acids, Information expression-Proteins and Biochemical Reaction chains, Nucleic acid, Structure, Structure, Replication, Transcription, Translation.

UNIT III
Proteins-Structure, folding and function, Nucleic acid protein interactions.

UNIT IV
Nucleotide sequence data: Genome, Genomic sequencing, expressed sequence tags, Gene expressions, transcription factor binding sites and single nucleotide polymorphism. Computational representation of molecular biological data storage techniques: (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 V
Biological data types and their special requirements: sequences, macro molecular Structures, chemical compounds, generic variability and connections to clinical data. Representations of patterns and relationships: alignments, regular expressions, Hierarchies and graphical modes.

Name of Text Books:
1. O'Reilly , "Developing Bio informatics Computer Skill" .
2. J.F. Griffths, "An Introduction to Generic Analysis".

Name of Reference Books:
1. Michel Starkey and Ramnath Elaswarapu, "Genomic Protocols".
2. Stephen Misner & Stephen Krawetz, "Bio informatics-Methods and Protocols".
3. Lawrence Hunter-"Artificial Intelligence and Molecular Biology", Free on Web.
4. "DNA & Protein Sequence Analysis- A practical Approach", IRL Press at Oxford University.
5. "Bio Informatics", Addison Wesley.

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010
Department of Information Technology
SEMESTER – V

"Industrial Psychology"

Theory Periods: 30   Tutorials: "10"
Credits: 4   Code: IT 509

UNIT I
Introduction to Industrial Psychology – Definitions & Scope. Major influences on industrial Psychology-Scientific management and human relations schools Hawthorne Experiments Introduction of the term 'Industry' and 'Psychology' – Definitions – nature – importance – scope – factors responsible for psychology – behaviour of an individual in an industry – individual difference.

UNIT II
Individual in Workplace: History of I/O(I/O – Industrial / organization), Research Methods in I/O Criteria: Standards for decision making Predictors: Psychological Assessments Personnel Decisions, Motivation and Job satisfaction , stress management, Organizational culture, Leadership & group dynamics.

UNIT III
Work Environment & Engineering Psychology-fatigue, Boredom, accidents and safety, Job Analysis, Recruitment and Selection – Reliability & Validity of recruitment tests, Work, Motivation, Leadership Job design and organizational development, Union/Management relations Ergonomics and work conditions The changing nature of work .

UNIT IV
Performance Management: Training & Development, Training and development Performance Appraisal Organizations and work teams Organizational behavior Stress and well-being at work Research Methodology for psychology - Assignments based an certain model in the form of field work.

UNIT V
Individual Behaviour and Group Behaviours - Interaction between them – psychology involved in each individual – Necessary suggestions for improving psychology – Group Dynamics – Characteristics of group behaviour.

Name of Text Books:
1. Miner J.B. (1992) Industrial/Organizational Psychology. N Y : McGraw Hill.
2. Blum & Naylor (1982) Industrial Psychology. Its Theoretical & Social Foundations CBS Publication.

Name of Reference Books:
1. Aamodt, M.G. (2007) Industrial/Organizational Psychology : An Applied Approach (5th edition) Wadsworth/Thompson : Belmont, C.A.
2. Aswathappa K. (2008). Human Resource Management (fifth edition) New Delhi : Tata McGraw Hill.

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010
Department of Information Technology
SEMESTER – V

"E-Commerce"

Theory Periods: 30   Tutorials: "10"
Credits: 4   Code: IT 510

UNIT I

Web commerce concepts – the e-commerce phenomenon - electronic marketplace technologies - web based tools for e-commerce - e-commerce softwares - hosting services and packages

UNIT II

Security issues - approaches to safe e-commerce - PKI- biometrics for security in e-commerce – smart cards and applications

UNIT III

Wireless infrastructure – payment agents – mobile agent based systems – digital cash – security requirements for digital cash - Digital cheques, netcheque systems

UNIT IV

Secure electronic transaction- secure online payment – micropayments – industrial epayment systems – challenges and opportunities of e-payment.

UNIT V

Electronic Data Interchange, EDI Applications in Business, EDI and E-Commerce, Standardization and EDI, EDI Software Implementation, Value Added Networks (VANs), Internal Information Systems.

Name of Text Books:
1. Weidong Kou, *Payment Technologies for E-Commerce*, Springer, 2003.
2. Kalakota R. & Whinston A.B., *"Frontiers of Electronic Commerce*", Addison-Wesley, New Delhi
3. Janice Raynolds, The Complete E-Commerce Book, 2/e, CMP Books, 2004.
4. Schneider G. P. & Perry J. T., *Electronic Commerce, Course Technology*, Cambridge
5. Westland J. C. & Clark T.H. K., "*Global Electronic Commerce"*, University Press, 2001.
6. Minoli D. & Minoli E., "*Web Commerce Technology Handbook"*, Tata McGraw Hill, New Delhi

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010
Department of Information Technology
SEMESTER – V

Semester: V	Code: IT 591
Subject: Computer Graphics Lab	
Credits: 2	

List of 10 -15 Assignment/Practical will be allotted by the Instructor in the respective Lab.

Semester: V	Code: IT 592
Subject: Database Management System Lab	
Credits: 2	

List of 10 -15 Assignment/Practical will be allotted by the Instructor in the respective Lab.

Semester: V	Code: IT 593
Subject: Computer Networks Lab	
Credits: 2	

List of 10 -15 Assignment/Practical will be allotted by the Instructor in the respective Lab.

Semester: V	
Subject: Managerial Skills	
Credits: 1	

List of 10 -15 Assignment/Practical will be allotted by the Instructor in the respective Lab.

Semester: V	
Subject: Technical Visit / Practical Training	
Credits: 1	

SEMESTER: VI

S.No.	Board of Studies	Sub.Code	Subject Name	Periods/week			Examination Scheme					Total Marks	Credits L+(T+P)/2
				L	T	P	TA	FE	SE	T.C.A.	ESE		
1	Information Technology	IT 601	Compiler Design	4	1	-	20	15	15	50	70	120	5
2	Information Technology	IT 602	Information Theory & Coding	3	1	-	20	15	15	50	70	120	4
3	Information Technology	IT 603	Internet & Web Technologies	3	1	-	20	15	15	50	70	120	4
4	Information Technology	IT 604	Cellular & Mobile Computing	3	1	-	20	15	15	50	70	120	4
5	Information Technology	IT 605	Software Engineering	3	1	-	20	15	15	50	70	120	4
6	Information Technology	IT 60X	Elective II	3	1	-	20	15	15	50	70	120	4
7	Information Technology	IT 691	Compiler Design Lab	-	-	3	30	-	-	30	20	50	2
8	Information Technology	IT 692	Web Technology Lab	-	-	3	30	-	-	30	20	50	2
9	Information Technology	IT 693	Software Technology Lab	-	-	3	30	-	-	30	20	50	2
10	Humanities		I & E Skill	-	-	2	25	-	-	25	0	25	1
11			Discipline	-	-	-	25	-	-	25	0	25	1
			Total	19	6	11	260	90	90	440	480	920	33

Elective II		
Sr.No.	**Sub.Code**	**Subject Name**
1	IT 606	Industrial Economics & Management
2	IT 607	Advanced Database Management Systems
3	IT 608	Advanced Data Structures and Algorithm
4	IT 609	Multimedia and Virtual Reality
5	IT 610	Neural Network and Fuzzy Logic
6	IT 611	System Analysis and Design

Note : For attendance of a student in every theory and practical class, the teachers are supposed to keep records ultimately in the following format which will be included in the semester mark-sheets.

T.C.A. = Total of Continuous Assessment.

Format for attendance				
Attendance				Category
> 85			----->	High "H"
> 70 & < 85			----->	Medium "M"
> 60 & < 70			----->	Low "L"
< 60			----->	Poor "P"

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010
Department of Information Technology
SEMESTER – VI

"Compiler Design"

Theory Periods: 40   Tutorials: "10"
Credits: 5   Code: IT 601

UNIT –1: INTRODUCTION
Introduction to Compiler, single and multi-pass compilers, Translators, Phases of Compilers, Compiler writing tools, Bootstrapping, Backpatching. Finite Automata and Lexical Analyzer: Role of Lexical Analyzer, Specification of tokens, Recognition of tokens, Regular expression, Finite automata, from regular expression to finite automata transition diagrams, Implementation of lexical analyzer Tool for lexical analyzer LEX, Error reporting.

UNIT-2: SYNTAX ANALYSIS AND PARSING TECHNIQUES
Context free grammars, Bottom-up parsing and top down parsing. Top down Parsing: elimination of left recursion, recursive descent parsing, Predicative Parsing ,Bottom Up Parsing : Operator precedence parsing, LR parsers, Construction of SLR, canonical LR and LALR parsing tables, Construction of SLR parse tables for Ambiguous grammar, the parser generator – YACC, error recovery in top down and bottom up parsing.

UNIT – 3: SYNTAX DIRECTED TRANSLATION & INTERMEDIATE CODE GENERATION
Synthesized and inherited attributes, dependency graph, Construction of syntax trees, bottom up and top down evaluation of attributes, S-attributed and L-attributed definitions ,Postfix notation; Three address codes, quadruples, triples and indirect triples, Translation of assignment statements, control flow, Boolean expression and Procedure Calls.

UNIT- 4: RUNTIME ENVIRONMENT
Storage organization, activation trees, activation records, allocation strategies, Parameter passing symbol table, dynamic storage allocation.

UNIT – 5: CODE OPTIMIZATION & CODE GENERATION
Basic blocks and flow graphs, Optimization of basic blocks, Loop optimization, Global data flow analysis, Loop invariant computations. Issue in the design of Code generator, register allocation, the target machine, and simple Code generator.

Name of Text Books:
1. Compilers-Principles, Techniques and Tools, Alfred V. Aho, Ravi Sethi and Ullman J.D., Addison Wesley.
2. Principle of Compiler Design, Alfred V. Aho, and J.D. Ullman, Narosa Publication.

Name of Reference Books:
1. Compiler design in C, A.C. Holub, PHI.
2. Compiler construction (Theory and Practice), A.Barret William and R.M. Bates, Galgotia Publication.
3. Compiler Design, Kakde.

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010
Department of Information Technology
SEMESTER – VI

"Information Theory and Coding"

Theory Periods: 30   Tutorials: "10"
Credits: 4   Code: IT 602

UNIT I: INFORMATION ENTROPY FUNDAMENTALS

Uncertainty, Information and Entropy – Source coding Theorem – Huffman coding – Shannon Fano coding – Discrete Memory less channels – channel capacity – channel coding Theorem – Channel capacity Theorem.

UNIT II: DATA AND VOICE CODING

Differential Pulse code Modulation – Adaptive Differential Pulse Code Modulation – Adaptive subband coding – Delta Modulation – Adaptive Delta Modulation – Coding of speech signal at low bit rates (Vocoders, LPC).

UNIT III: ERROR CONTROL CODING

Linear Block codes – Syndrome Decoding – Minimum distance consideration – cyclic codes – Generator Polynomial – Parity check polynomial – Encoder for cyclic codes – calculation of syndrome – Convolutional codes.

UNIT IV: COMPRESSION TECHNIQUES

Principles – Text compression – Static Huffman Coding – Dynamic Huffman coding – Arithmetic coding – Image Compression – Graphics Interchange format – Tagged Image File Format – Digitized documents – Introduction to JPEG standards.

UNIT V: AUDIO AND VIDEO CODING

Linear Predictive coding – code excited LPC – Perceptual coding, MPEG audio coders – Dolby audio coders – Video compression – Principles – Introduction to H.261 & MPEG Video standards.

Name of Text Books:
  1. Simon Haykin, "Communication Systems", John Wiley and Sons, 4th Edition, 2001.
  2. Fred Halsall, "Multimedia Communications, Applications Networks Protocols and Standards", Pearson Education, Asia 2002.

Name of Reference Books:
  1. Mark Nelson, "Data Compression Book", BPB Publication 1992.
  2. Watkinson J"Compression in Video and Audio", Focal Press, London, 1995.

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010
Department of Information Technology
SEMESTER – VI

"Internet and Web Technologies"

Theory Periods: 30
Credits: 4

Tutorials: "10"
Code: IT 603

UNIT-I: INTRODUCTION TO INTERNET
Introduction, Evolution of Internet, Internet Applications,Internet Protocol -TCP/IP, UDP, HTTP, Secure Http(Shttp) Internet Addressing – Addressing Scheme – Ipv4 & IPv6, Network Byte Order, Domain Name Server and IP Addresses, Mapping, Internet Service Providers, Types Of Connectivity Such As Dial-Up Leaded Vsat Etc. Web Technologies: Three Tier Web Based Architecture; Jsp, Asp, J2ee, .Net Systems.

UNIT-II: HTML CSS AND SCRIPTING
HTML - Introduction, Sgml, Dtd(Document Type Definition, Basic Html Elements, Tags and usages, HTML Standards , Issues in HTML Dhtml: Introduction Cascading Style Sheets: Syntax ,Class Selector, Id Selector Dom (Document Object Model) & Dso (Data Source Object) Approaches To Dynamic Pages: Cgi, Java Applets, Plug Ins, Active X, Java Script – Java Script Object Model, Variables-Constant – Expressions, Conditions- Relational Operators- Data Types – Flow Control – Functions & Objects-events and event handlers – Data type Conversion & Equality – Accessing HTML form elements.

UNIT-III: XML
What is XML – Basic Standards, Schema Standards, Linking & Presentation Standards, Standards that build on XML, Generating XML data, Writing a simple XML File, Creating a Document type definition, Documents & Data ,Defining Attributes & Entities in the DTD ,Defining Parameter Entities & conditional Sections, Resolving a naming conflict, Using Namespaces, Designing an XML data structure, Normalizing Data, Normalizing DTDS.

UNIT-IV: INTERNET SECURITY & FIREWALLS
Security Threats From Mobile Codes, Types Of Viruses, Client Server Security Threats, Data & Message Security, Various electronic payment systems, Introduction to EDI, Challenges–Response System, Encrypted Documents And Emails , Firewalls: Hardened Firewall Hosts, Ip- Packet Screening, Proxy Application Gateways, Aaa (Authentication ,
Authorization And Accounting).

UNIT-V: WEBSITE PLANNING & HOSTING
Introduction, Web Page Lay-Outing, Where To Host Site, Maintenance Of Site, Registration Of Site On Search Engines And Indexes, Introduction To File Transfer Protocol, Public Domain Software, Types Of Ftp Servers (Including Anonymous),Ftp Clients Common Command. Telnet Protocol, Server Domain, Telnet Client, Terminal Emulation. Usenet And Internet Relay Chat.

Name of Text Books:
1. Internet & Intranet Engineering,- Daniel Minoli, TMH.
2. Alexis Leon and Mathews Leon – Internet for Every One, Tech World.

Name of Reference Books:
1. Eric Ladd, Jim O'Donnel –"Using HTML 4, XML and JAVA"-Prentice Hall of India 1999.
2. "Beginning Java Script "– Paul Wilton – SPD Publications –2001.
3. Frontiers of Electronics of Commerce, Ravi kalakota & Andrew B. Whinston
4. Addison WesleyAdvance Java– Gajendra Gupta , firewall Media

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010
Department of Information Technology
SEMESTER – VI

"Cellular and Mobile Computing"

Theory Periods: 30   Tutorials: "10"
Credits: 4   Code: IT 604

Unit – I

Introduction, issues in mobile computing, overview of wireless telephony: cellular concept, GSM: air-interface, hannel structure, location management: HLR-VLR, hierarchical, handoffs, channel allocation in cellular systems, CDMA, GPRS.

Unit - II

Wireless Networking, Wireless LAN Overview: MAC issues, IEEE 802.11, Blue Tooth, Wireless multiple access protocols, TCP over wireless, Wireless applications, data broadcasting, Mobile IP, WAP: Architecture, protocol stack, application environment, applications.

Unit – III

Data management issues, data replication for mobile computers, adaptive clustering for mobile wireless networks, File system, Disconnected operations.

Unit - IV

Mobile Agents computing, security and fault tolerance, transaction processing in mobile computing environment.

Unit – V

Ad Hoc networks, localization, MAC issues, Routing protocols, global state routing (GSR), Destination sequenced distance vector routing (DSDV), Dynamic source routing (DSR), Ad Hoc on demand distance vector routing (AODV), Temporary ordered routing algorithm (TORA), QoS in Ad Hoc Networks, applications.

Name of Text Books:
1. J. Schiller, Mobile Communications, Addison Wesley.
2. A. Mehrotra , GSM System Engineering.
3. M. V. D. Heijden, M. Taylor, Understanding WAP, Artech House.
4. Charles Perkins, Mobile IP, Addison Wesley.
5. Charles Perkins, Ad hoc Networks, Addison Wesley.

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010
Department of Information Technology
SEMESTER – VI

"Software Engineering"

Theory Periods: 30   Tutorials: "10"
Credits: 4   Code: IT 605

UNIT I: SOFTWARE PROCESS
Introduction – Software life cycle models(waterfall, incremental, spiral, WINWIN Spiral, evolutionary, prototyping, object oriented, component based development). Software Development Process System – Verification and Validation, System engineering hierarchy, computer based system.

UNIT II: SOFTWARE REQUIREMENTS
Functional and non-functional requirements , user and system requirement, requirement engineering, process feasibility studies, elicitation and analysis, validation and management, software prototyping – prototyping in the software process , rapid prototyping techniques , user interface prototyping , SRS.

UNIT III: DESIGN CONCEPTS AND PRINCIPLES
Design process and concepts – modular design , design heuristic, design model and document. Architectural design- software architecture data design , architectural design transformation and transaction mapping. User interface design – user interface design principles, monitoring and control system. SCM – need for SCM, version control , introduction to SCM process , software configuration items.UML – components & features, Formal Technical Reviews(FTR), Configuration Audit.

UNIT IV: TESTING AND MAINTENANCE
Taxonomy of software testing – levels , test activities , types of s/w tests – black box testing , white box testing, testing boundary condition, structural testing, test coverage criteria. Based on data flow mechanisms – regression testing. s/w testing strategies – strategic approach and issues , unit testing, integration testing, validation testing, system testing and debugging,SQA, CMM software maintenance, Reengineering, Reverse Engineering, cyclomatic complexity, s/w quality metrics

UNIT V: INTRODUCTION TO SOFTWARE PROJECT MANAGEMENT
Measures and measurements – s/w complexity and size measure- data and logic structure measure information flow measure. Software cost estimation – function oriented models, COCOMO model, Delphi method, defining a task network, Scheduled Earned Value Analysis, Error Tracking, Software changes, program evolution dynamics software maintenance, Architectural evolution Taxonomy of CASE Tools. Recent trends and development in software engineering, challenges of software engineering in distributed and mobile system.

Name of Text Books:
1. Software Engineering – A practitioner's approach, Roger S. Pressman, McGraw-Hill international Edition, 5th
   edition , 2001
2. Object Oriented Modelling & Design, Remgaugh J. Blaha, M. Premeralant, W. Eddy F. and Lorsen W .(PHI)

Name of Reference Books:
1. Software engineering, Ian Sommervile, Person Education Aisa, 6th edition , 2000
2. An Integrated Approach to Software Engineering, Pankaj Jalote, Springer Verlag
3. Software Engineering – An Engineering Approach, James F. Peters and Witold Pedryez, Johan Wiley and Sons, New Delhi, 2000.
4. Sams teach urself UML in 24 hours , 3rd edition , Joseph Schmuller , 2004.

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010
Department of Information Technology
SEMESTER – VI

"Industrial Economics and Management"

Theory Periods: 30   Tutorials: "10"
Credits: 4   Code: IT 606

UNIT- I
Introduction: Nature and Significance of Economics .Meaning Of Science, Engineering and Technology and their relationship with economic development.

UNIT -II
Basic Concept: The Concept of Demand and Supply. Elasticity of Demand and Supply. Indifference Curve Analysis, Price Effect, Income Effect ,Substitution Effect.

UNIT -III
Money and Banking: Function of Money, Value of Money, Inflation and measures to control it, Brief Idea of functions of Banking Systems, Viz Commercial and Central Banking, Business Fluctuations.

UNIT- IV
Introduction to Management: Definition , Nature ,and Significance of Management, Evaluation of Management thought, Contributions of Max Weber, Taylor and Fayol.

UNIT- V
Human Behaviour: Factors of Individual Behaviour ,Perception ,Learning and Personality Development, Interpersonal Relationship and Group Behaviour.

Name of Text Books:

1. Dewett,K.K /Modern Economic Theory/S.Chand & Co.
2. Luthers Fred/Organizational Behaviour.
3. Prasad L.M/Principal of Management.

"Advance Database Management Systems"

Theory Periods: 30   Tutorials: "10"
Credits: 4   Code: IT 607

UNIT - I: DISTRIBUTED DATABASE DESIGN

Design strategies, Distribution design issues, Fragmentation, Allocation, Oracle DDB design, Distributed database system architecture, Date's rule for DDBS.

UNIT - II: DATA REPLICATION & QUERY PROCESSING IN DDBS

Classification of replica control strategies, Consistency & Request ordering, The Gossip Architecture, Process groups & ISIS, Replication in Oracle, Query optimization in Centralized system, Objective of query processing, Query decomposition, Distributed query optimization algorithms, Query optimization in Oracle.

UNIT - III: TRANSACTION PROCESSING & RECOVERY

Centralized & client server architecture, server systems architectures, parallel & distributed systems, distributed data storage, Transaction property, distributed transactions, commit protocols, concurrency control in distributed database,availability ,heterogeneous distributed databases, Distributed deadlock management, recovery concepts, recovery techniques based on deferred update & on immediate update shadow paging, The ARIES Recovery
Algorithm, Recovery in multi-database systems, database backup and recovery from catastrophic failures, Reliability concept & measure, Site failure & network portioning, directory systems, Database recoveryin Oracle.

UNIT- IV: SECURITY MANAGEMENT & PL/SQL

Various aspect of database security, Basic model of database access control, TCSEC Policy identification, Security models, Identification-Authentication- Authorization, Statistical databases, Data encryption, Security in Oracle, JDBC, Purpose of PL/SQL, PL/SQL block, structure & type, PL/SQL syntax & programming.

UNIT - V: DIFFERENT DATABASES

Parallel databases: Introduction, I/O parallelism. Interquery-intraquery intraoperationinteroperation parallelism design of parallel systems. Client/Server DBS, Oracle DBMS, Distributed processing in Oracle, Oracle network protocols, Network administration in Oracle. Theory of OO databases, Multimedia databases, Real time databases.

Name of Text Books:
1. Database system concepts , 4th edition, Silberschatz-Korth-Sudarshan, MH.
2. Fundamentals of database systems 3rd edition, Elmasri & Navathe, Pearson education.

Name of Reference Books:
1. Database concepts & systems ,2nd edition , Ivan Bayross, SPD.
2. Database Management System, Rajesh Narang, PHI.
3. An Introduction to database systems, 7th edition, C.J. Date , Pearson education.

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010
Department of Information Technology
SEMESTER – VI
"Advance Data Structures and Algorithm"

Theory Periods: 30   Tutorials: "10"
Credits: 4   Code: IT 608

Unit I
Algorithms, performance analysis-time complexity and space complexity,O-notation, Omega notation and Theta notation, Review of basic data structures - the list ADT, stack ADT, queue ADT, implementation using template classes in C++, sparse matrix representation.

Unit II
Dictionaries, linear list representation, skip list representation, operations- insertion, deletion and searching, hash table representation, hash functions, collision resolution-separate chaining, open addressing-linear probing, quadratic probing, double hashing, rehashing,extendible hashing, comparison of hashing and skip lists.

Unit III
Priority Queues – Definition, ADT, Realizing a Priority Queue using Heaps, Definition, insertion, Deletion, Application-Heap Sort, External Sorting- Model for external sorting, Multiway merge, Polyphase merge.

Unit IV
Search trees (part I) : Binary search trees, definition, ADT, implementation, operations-searching, insertion and deletion, Balanced search trees- AVL trees, definition, height of an AVL tree, representation, operations-insertion, deletion and searching.
Search trees (part II) : Introduction to Red –Black trees and Splay Trees, B-Trees-B-Tree of order m, height of a B-Tree, insertion, deletion and searching, Comparison of Search Trees.

Unit V
Divide and Conquer: General method, applications – Binary search, merge sort, quick sort, Strassen's matrix multiplication, Efficient non recursive tree traversal algorithms, Biconnected components. Disjoint set operations, union and find algorithms.
Greedy method and Dynamic programming: General method (Greedy), Minimum cost spanning trees, Job sequencing with deadlines, General method (Dynamic Programming), Optimal binary search trees, 0/1 knapsack problem, Ordering Matrix Multiplications

Name of Text Books:
1. Data Structures and Algorithm Analysis in C++, Mark Allen Weiss, Pearson Education, second edition.
2. Data structures, Algorithms and Applications in C++,S.Sahni,University press (India) pvt ltd, 2nd edition, Orient Longman pvt.ltd.

Name of Reference Books:

1. Data structures and Algorithms in C++, Michael T.Goodrich, R.Tamassia and D.Mount, Seventh Edition, John Wiley.

2. Data Structures and Algorithms in C++, Third Edition, Adam Drozdek, Thomson.

3. Problem solving with C++, The OOP, Fourth edition, W.Savitch, Pearson education.

4. C++, The Complete Reference, 4th Edition, Herbert Schildt, TMH.

5. Data structures using C and C++, Langsam, Augenstein and Tanenbaum, PHI/Pearson Education.

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010
Department of Information Technology
SEMESTER – VI

"Multimedia and Virtual Reality"

Theory Periods: 30   Tutorials: "10"
Credits: 4   Code: IT 609

UNIT-I INTRODUCTION:
Concept of Non-Temporal and Temporal Media. Basic Characteristics of Non-Temporal Media; Images, Graphics, Text Basic Characteristics of Temporal Media: Video, Audio, Animation, Hypertext and Hypermedia.
Presentations: Synchronization, Events, Scripts and Interactivity, Introduction to Authoring Systems.

UNIT-II COMPRESSION TECHNIQUES:
Basic concepts of Compression. Still Image Compression.: JPEG Compression., Features of JPEG2000.
Video Compression: MPEG- 1&2 Compression Schemes, MPEG-4 Natural Video Compression.
Audio Compression: Introduction to speech and Audio Compression, MP3 Compression Scheme, Compression Of synthetic graphical objects.

UNIT-III MULTIMEDIA SYSTEMS ARCHITECTURE:
General Purpose Architecture for Multimedia Support: Introduction to Multimedia PC/Workstation Architecture, Characteristics of MMX instruction set, I/O systems: Overview of USB port and IEEE 1394 interface, Operating System Support for Multimedia Data: Resource Scheduling with real-time considerations, File System, I/O Device Management.

UNIT-IV MULTIMEDIA INFORMATION MANAGEMENT:
Multimedia Database Design, Content Based Information Retrieval: Image Retrieval, Video Retrieval, Overview of MPEG-7, Design of video-on-Demand Systems.

UNIT-V VIRTUAL REALITY:
Introduction to Virtual Reality and Virtual Reality Systems, Related Technologies: Tele-operation and Augmented Reality Systems Interface to the Virtual World-Input; Head and hand trackers, data globes, hap tic input devices. Interface to the Virtual World- Output, Stereo display, head-mounted display, auto stereoscopic displays, holographic displays, hap tic and force feedback, VRML Programming; Modeling objects and virtual environments Domain Dependent applications: Medical, Visualization, Entertainment, etc.

Name of Text Books:
1. Multimedia Technology, TAY Vaughan, McGraw-Hill

Name of Reference Books:
1. Multimedia Concept & Practice, Hartman & Carey, PHI
2. Virtual Reality Systems, John Vince, Addison Wesley.

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010
Department of Information Technology
SEMESTER – VI

"Neural Networks and Fuzzy Logic"

Theory Periods: 30   Tutorials: "10"
Credits: 4   Code: IT 610

UNIT-1 Introduction to Artificial Neural Networks:
Elementary Neurophysiology, Biological Neuron, Biological and Artificial Neuron Models, characteristics of ANN, Historical developments, Neural Networks viewed as directed graphs, Feedback from neurons to ANN, Artificial Intelligence and Neural Networks, McCulloch-Pitts Model, Network Architectures, Recurrent Networks, Topologies, overview of Single-layered Feed forward Networks and Multi-layered Feed- forward Networks.

UNIT-2 Learning and Training and Associated Memories
Classification Taxonomy of ANN, Different Learning strategy-Supervised and Unsupervised learning, Reinforcement, Learning rules, Memory models, Stability and Convergence, Activation and Synaptic Dynamics, Competitive, Error-Correction Learning, Associative Memory, Hebbian Learning, General concept of associated memory, Bidirectional Associated memory (BAM) architecture, BAM Training algorithm, Hopfield Network Architecture, Discrete and continuous versions, Storage and recall algorithm, stability analysis.

UNIT-3 A Survey of Neural Network Models:
Single-layered Feed Forward Neural Networks- Perceptron model– least mean square algorithm (Rosenblat Algorithm), ADALINE-algorithm and applications Multi-layered Feed Forward Neural Networks-Perceptron model – Backpropagation Algorithm, XOR – Problem, The generalized Delta rule, BPN Applications, MADALINE – Algorithm and applications, Self Organizing Feature map algorithm, Learning Vector Quantization, Counter Propagation Network.

UNIT-4 Applications:
Application and Architecture of Complex Pattern Recognition: ART/ART-1, ART-2, Cognitron – Structure & training, Neocognitron architecture – Data processing-performance – addition of lateral inhibition & feedback to the neocognitron, Character Recognition and Handwritten Digit recognition, Simulated Annealing, Support Vector machines.

UNIT-5 Neural Fuzzy Systems:
Introduction to classical sets-properties, Operations and relations ;Introduction to Fuzzy sets, membership, uncertainty, operations, relations, cardinalities, Examples of Fuzzy logic, Defuzzyfication to crisps sets and its methods, Fuzzy Associative memories, Fuzziness in neural networks and examples – Fuzzy logic control and fuzzy classification.

Name of Text Books:
1. Artificial Neural Networks by B. Yagna Narayan, PHI
2. Neural Networks Fuzzy Logic & Genetic Alogrithms by Rajshekaran & Pai, Prentice Hall
3. Principles of Soft Computing by S. N. Sivanandam, S. N. Deepa, Wiley-India.
4. Introduction to Neural Networks using Matlab 6.0 by S.N. Sivanandam, S Sumathi, S.N. Deepa, TMH.

Name of Reference Books:
1. Neural Networks by James A. Freeman and David M. Strapetuns, Prentice Hall,.
2. Neural Network & Fuzzy System by Bart Kosko, PHI.
3. Neural Network Design by Hagan Demuth Deale Vikas Publication House

"System Analysis and Design"

Theory Periods: 30   Tutorials: "10"
Credits: 4   Code: IT 611

UNIT I

Concepts of data and information, System Concepts, Components of a system, Characteristics of a system, Types of systems: closed systems, open systems, man made systems.

UNIT II

Information Systems, Types of information Systems: Transaction processing systems, Management information systems, Decision support systems, Expert systems. Computer based information systems (CBIS), Feasibility study.

UNIT III

Systems development life cycle model, Iterative waterfall model, Prototype model, Incremental model, Spiral model.

UNIT IV

Systems Analysis and Design, Classical and Structured approaches, Structured Analysis tools: DFD, Data dictionary, Decision tree etc., Systems Design, input/output design, Software Design and Documentation tools: HIPO and Warnier / Orr Diagrams.

UNIT V

System testing and quality assurance. System Implementation. HW/SW selection, Conversion, Software Maintenance. Activity network. CPM, PERT, Gantt Chart, Recent trend in systems analysis and design.

Name of Text Books:
  1. H. George, Valacich, *Modern Systems Analysis and Design*, Pearson, 2nd Ed, 2005.
  2. J. A. Senn, *Analysis and Design of Information Systems*, McGraw Hill, 1989.

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010
Department of Information Technology
SEMESTER – VI

Semester: VI	Code: IT 691
Subject: Compiler Design Lab	
Credits: 2	

List of 10 -15 Assignment/Practical will be allotted by the Instructor in the respective Lab.

Semester: VI	Code: IT 692
Subject: Web Technology Lab	
Credits: 2	

List of 10 -15 Assignment/Practical will be allotted by the Instructor in the respective Lab.

Semester: VI	Code: IT 693
Subject: Software Technology Lab	
Credits: 2	

List of 10 -15 Assignment/Practical will be allotted by the Instructor in the respective Lab.

Semester: VI	
Subject: I & E Skills	
Credits: 1	

List of 10 -15 Assignment/Practical will be allotted by the Instructor in the respective Lab.

Semester: VI	
Subject: Discipline	
Credits: 1	

NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR
DEPARTMENT OF INFORMATION TECHNOLOGY

SEMESTER: VII

S.No.	Board of Studies	Sub.Code	Subject Name	Periods/week			Examination Scheme					Total Marks	Credits L+(T+P)/2
				L	T	P	TA	FE	SE	T.C.A.	ESE		
1	Information Technology	IT 701	Management Information System	3	1	-	20	15	15	50	70	120	4
2	Information Technology	IT 702	Artificial Intelligence & Expert Systems	4	1	-	20	15	15	50	70	120	5
3	Information Technology	IT 70X	Elective III	3	1	-	20	15	15	50	70	120	4
4	Information Technology	IT 70Y	Elective IV	3	1	-	20	15	15	50	70	120	4
5	Information Technology	IT 791	Artificial Intelligence & Expert Systems Lab	-	-	3	30	-	-	30	20	50	2
6	Information Technology	IT 792	Management Information System Lab	-	-	3	30	-	-	30	20	50	2
7	Information Technology	IT 793	Practical Training	-	-	-	50	-	-	50	0	50	2
8	Information Technology	IT 794	Minor Project	-	-	12	100	-	-	100	50	150	6
9	Information Technology	IT 795	Seminar and Report Writing	-	-	2	50	-	-	50	0	50	1
			Total	13	4	20	340	60	60	460	370	830	30

Elective III & VI		
Sr.No.	Sub.Code	Subject Name
1	IT 703	Digital image processing
2	IT 704	Advanced Computer architecture
3	IT 705	Fault Tolerant System
4	IT 706	Decision Support System
5	IT 707	Natural Language Processing
6	IT 708	Robotics
7	IT 709	Distributed System & Parallel Processing
8	IT 710	Pattern Reorganization
9	IT 711	Computational Intelligence

Note : For attendance of a student in every theory and practical class, the teachers are supposed to keep records Itimately in the following format which will be included in the semester mark-sheets.

T.C.A. = Total of Continuous Assessment.

Format for attendance				
Attendance				Category
> 85			----->	High "H"
> 70 & < 85			----->	Medium "M"
> 60 & < 70			----->	Low "L"
< 60			----->	Poor "P"

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010
Department of Information Technology
SEMESTER – VII

"Management Information System"

Theory Periods: 30   Tutorials: "10"
Credits: 4   Code: IT 701

UNIT - I: MANAGEMENT & ORGANIZATIONAL SUPPORT SYSTEMS FOR DIGITAL FIRM
Definition of MIS; Systems approach to MIS: MIS and Human factor considerations, concept of organizational information sub-system, MIS & problem solving. Information Technology Infrastructure for digital firm. Related Case Studies.

UNIT - II: INFORMATION SYSTEMS & BUSINESS STRATEGY
Information Management. Who are the users? Managers, Decision making & information System, Evolution of Computer based information system (CBIS), Model of CBIS. Changing role of Information systems in organization: Trend to End-User computing, justifying the CBIS, Achieving the CBIS, Managing the CBIS, Benefits & Challenges of
CBIS implementation. Strategic Information System, Business level & Firm level Strategy, Case Studies.

UNIT - III: INFORMATION SYSTEMS IN THE ENTERPRISE
Systems from Management & Functional perspective & their relationship: Executive Support System, Decision Support System, Sales & Marketing Information System, Manufacturing Information System, Human-Resource Information System. Finance & Account Information System. Case Studies.

UNIT - IV: INFORMATION TECHNOLOGY FOR COMPETITIVE ADVANTAGE:
Firm in its environment, the information resources, who manages the information resources? Strategic planning for information resources. End-User Computing as a strategic issue, Information resource management concept. Knowledge management & their work system, Business value of information system Related Case Studies.

UNIT - V: INTERNATIONAL INFORMATION SYSTEM:
Managing International Information Systems: IIS architecture, Global business drivers, challenges, and strategy: divide, conquer, appease, cooptation, business organization, problems in implementing global information systems,
Understanding ethical and social issues related to systems, ethics in information society, and Moral dimensions of information systems.

Name of Text Books:
1. MIS managing the digital firm, Kenneth C. Laudon & Jane P. Laudon (Pearson Education).
2. MIS, Suresh K. Basandra (Wheelers).

Name of Reference Books:
1. Introduction to computer Information System for Business, Mark G. Simkin. S. Chand & Co., 1996.
2. Analysis & Design of Information Systems, James A. Senn. MC Graw-Hill International edition, 1989.
3. Analysis and Design of information system , V.Rajaraman(PHI)

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010
Department of Information Technology
SEMESTER – VII
"Artificial Intelligence and Expert Systems"

Theory Periods: 40   Tutorials: "10"
Credits: 5   Code: IT 702

UNIT-I: GENERAL ISSUES AND OVERVIEW OF AI
The AI problems; what is an AI technique; Level of model, criteria for success, Characteristics of AI applications, Problem Solving, State Space Search, Production systems, Control strategies: forward and backward chaining, Problem characteristics, Production System characteristics, issues in the design of search program, Data driven and goal driven search, Exhaustive searches: Depth first & Breadth first search.

UNIT-II: HEURISTIC SEARCH TECHNIQUES
Heuristics & Heuristic function, Heuristic Search – Generate & test, Hill climbing; Branch and Bound technique; Best first search & A* algorithm; AND/OR Graphs; Problem reduction and AO* algorithm; Constraint Satisfaction problems, Means End Analysis.

UNIT-III: KNOWLEDGE REPRESENTATION
Introduction to knowledge representation-Propositional calculus, First Order Predicate Calculus, conversion to clause form, Unification ,Theorem proving by Resolution, Natural Deduction ,Inference Mechanisms Horn's Clauses; Knowledge representation issues-Representation and mapping, Approaches to Knowledge representation, Frame Problem, Structured knowledge representation-Semantic Networks Frame representation and Value Inheritance; Conceptual Dependency and Scripts. Introduction to Agent based problem solving.

UNIT-IV: REASONING UNDER UNCERTAINITY & APPLICATIONS OF AI
Source of Uncertainty, Probabilistic Reasoning and Uncertainty; Probability theory; Bayes Theorem and Bayesian networks, Certainty Factor, Dempster-Shafer theory, Non Monotonic Reasoning, Truth maintenance Systems, Overview of Fuzzy Logic.
Natural language processing: overview, Basic steps followed for the NLP, concept of NLP, Parsing, machine translation, **Planning** Overview - An Example Domain: The Blocks Word; Component of Planning Systems; Goal Stack Planning (linear planning); Non-linear Planning using constraint posting. **Learning**, Rote Learning; Learning by Induction, Learning in Problem Solving, Explanation based learning and Discovery.

UNIT-V: GAME PLAYING, AI Languages & EXPERT SYSTEMS
Game Playing Minmax search procedure; Alpha-Beta cut-offs; Additional Refinements, AI Programming Languages: Introduction to LISP and PROLOG, Syntax and Numeric Functions; List manipulation functions, programming in Lisp/Prolog, Iteration and Recursion. Introduction to Expert Systems, characteristics, Architecture of Expert Systems, Development of Expert System, Software Engineering and Expert System, Expert System Life Cycle model, Expert System Shells; Knowledge Acquisition; Case Studies: MYCIN,

Name of Text Books:
1. Elaine Rich and Kevin Knight: Artificial Intelligence- Tata McGraw Hill.
2. Dan W.Patterson, Introduction to Artificial Intelligence and Expert Systems- Prentice Hall of India.
3. Joseph C Giarratano, Gary D Riley: Expert System Principles & Programming, 4th Edition.

Name of Reference Books:
1. Nils J.Nilsson: Principles of Artificial Intelligence- Narosa Publishing house.
2. Artificial Intelligence: A Modern Approach, Stuart Rusell, Peter Norvig, Pearson Education, 2nd Edition.
3. Artificial Intelligence, Winston, Patrick, Henry, Pearson Education.
4. Artificial Intelligence by Gopal Krishna , Janakiraman.

"Digital Image Processing"

Theory Periods: 30   Tutorials: "10"
Credits: 4   Code: IT 703

Unit I: Introduction

Image formation model, Spatial & Gray level resolution, Image enhancement in special domain: Piecewise transformation functions, Histogram equalization, Histogram specification, image averaging, spatial filters- smoothing and sharpening, Laplacian filter, Canny edge detector.

Unit II: Image enhancement in frequency domain & Image Segmentation

2D discrete fourier transform & its inverse, filtering in frequency domain, Ideal & Gaussian low pass filters, High pass filtering, FFT, Line detection, Edge detection, Edge linking & boundary detection, Thresholding, Region based segmentation.

Unit III: Morphological Image Processing

Logic operations involving binary image, Dialation & Erosion, Opening & Closing, Applications to Boundary extraction, region filling, connected component extraction.

Unit IV: Image Compression:

Coding redundancy- Huffman coding, LZW coding, run length coding, Lossy compression- DCT, JPEG, MPEG, video compression.

Unit V: Image Representation & 3D:

Boundary descriptors, Shape numbers, Texture, Projective geometry, Correlation based and feature based stereo correspondence, shape from motion, optical flow.

Name of Text Books:
1. Ganzalez and Woods, Digital Image Processing, Pearson education.
2. Sonka and Brooks, Image Processing, TSP ltd,

Name of Reference Books:
1. Jain and Rangachar, Machine Vision, MGH.
2. Schalkoff, Digital Image Processing, John Wiley and sons.

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010
Department of Information Technology
SEMESTER – VII

"Advanced Computer Architecture"

Theory Periods: 30   Tutorials: "10"
Credits: 4   Code: IT 704

Unit - I: Introduction
Parallel Computing, Parallel Computer Model, Program and Network Properties, Parallel Architectural Classification Schemes, Flynn's & Feng's Classification, Performance Metrics and Measures, Speedup Performance Laws: Multiprocessor System and Interconnection Networks; IEEE POSIX Threads: Creating and Exiting Threads, Simultaneous Execution of Threads, Thread Synchronization using Semaphore and Mutex, Canceling the Threads.

Unit – II: Pipelining and Memory Hierarchy
Basic and Intermediate Concepts, Instruction Set Principle; ILP: Basics, Exploiting ILP, Limits on ILP; Linear and Nonlinear Pipeline Processors; Super Scalar and Super Pipeline Design; Memory Hierarchy Design: Advanced Optimization of Cache Performance, Memory Technology and Optimization, Cache Coherence and Synchronization Mechanisms.

Unit – III: Thread and Process Level Parallel Architecture
Introduction to MIMD Architecture, Multithreaded Architectures, Distributed Memory MIMD Architectures, Shared Memory MIMD Architecture, Clustering, Instruction Level Data Parallel Architecture, SIMD Architecture, Fine Grained and Coarse Grained SIMD Architecture, Associative and Neural Architecture, Data Parallel Pipelined and Systolic Architectures, Vector Architectures.

Unit – IV: Parallel Algorithms
PRAM Algorithms: Parallel Reduction, Prefix Sums, Preorder Tree Traversal, Merging two Sorted lists; Matrix Multiplication: Row Column Oriented Algorithms, Block Oriented Algorithms; Parallel Quicksort, Hyper Quicksort; Solving Linear Systems: Gaussian Elimination, Jacobi Algorithm; Parallel Algorithm Design Strategies.

Unit –V: Developing Parallel Computing Applications
OpenMP Implementation in 'C': Execution Model, Memory Model; Directives: Conditional Compilation, Internal Control Variables, Parallel Construct, Work Sharing Constructs, Combined Parallel Work-Sharing Constructs, Master and Synchronization Constructs; Run-Time Library Routines: Execution Environment Routines, Lock Routines, Timing Routines; Simple Examples in 'C'. Basics of MPI.

Name of Text Books:
1. Kai Hwang," Advance Computer Architecture", TMH.
2. Matthew, "Beginning Linux Programming", SPD/WROX.
3. Hennessy and Patterson," Computer Architecture: A Quantitative Approach", Elsevier.
4. Dezso and Sima, "Advanced Computer Architecture", Pearson.
5. Quinn, "Parallel Computing: Theory & Practice", TMH.
6. Quinn, "Parallel Programming in C with MPI and Open MP", TMH Open MP Specification and Usage

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010
Department of Information Technology
SEMESTER – VII

"Fault Tolerant System"

Theory Periods: 30   Tutorials: "10"
Credits: 4   Code: IT 705

UNIT - I

Fundamental Concepts: Definitions of fault tolerance, fault classification, fault tolerant attributes and system structure.
Fault-Tolerant Design Techniques: Information redundancy, hardware redundancy, and time redundancy.

UNIT-II
Dependability Evaluation Techniques: Reliability and availability models: (Combinatorial techniques, Fault-Tree models, Markov models), Performability Models.
Architecture of Fault-Tolerant Computers (case study): General-purpose systems, high-availability systems, long-life systems, critical systems.

UNIT - III
Software Fault Tolerance: Software faults and their manifestation, design techniques, reliability models.

UNIT - IV
Fault Tolerant Parallel/Distributed Architectures: Shared bus and shared memory architectures, fault tolerant networks.

UNIT - V
Recent topics in fault tolerant systems: Security, fault tolerance in wireless/mobile networks and Internet.

Name of Text Books:
1. Fault-Tolerant Computer System Design D.K. Pradhan, 2003
2. Design and Analysis of Fault-Tolerant Digital Systems B.W.Johnson, Addison-Wesley, 1989
3. Fault-Tolerant Computing, Theory and Techniques, Volumes I and II D.K. Pradhan, Prentice Hall, 1986
4. Reliable Computer Systems: Design and Evaluation D.P.Siewiorek and R.S.Swartz, Digital Press, 1992
5. Probability and Statistics with Reliability, Queueing and Computer Science Application K.S.Trivedi, Prentice Hall, 1982

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010
Department of Information Technology
SEMESTER – VII

"Decision Support System"

Theory Periods: 30   Tutorials: "10"
Credits: 4   Code: IT 706

Unit-I

Strategic, tactical and operational. Consideration of organizational structures. Mapping of databases, MIS, EIS, KBS, expert systems, OR modeling systems and simulation, decision analytic systems onto activities within an organization. Extension to other 'non organizational' areas of decision making. Relationship withknowledge management systems

Unit-II

Studies of human cognition in relation to decision making and the assimilation of information. Cultural issues. Implications for design of decision-making support. Communication issues.

Unit -III

Normative, descriptive and prescriptive analysis: requisite modeling. Contrast with recognition primed decision tools.

Unit -IV

Database, MIS, EIS, KBS, Belief nets, data mining. OR modeling tools: simulation and optimization. History, design, implementation: benefits and pitfalls. Risk assessment, Decision analysis and strategic decision support.

Unit -V

Group decision support systems and decision conferencing. Intelligent decision support systems: tools and applications. Cutting-edge decision support technologies. History, design, implementation: benefits and pitfalls. Deliberative e-democracy and e-participation

Name of Text Books:
1. P.R. Kleindorfer, H.C. Kunreuther, P.J.H. Schoemaker "Decision Sciences: an integration perspective' Cambridge University Press 1993
1. G.M. Marakas, Decision support Systems in the 21st Century, Prentice Hall, 1999.

Name of Reference Books:
1. E. Turban and J.E. Aronson (2001) Decision support Systems and Intelligent Systems. 6th Edition. PHI
2. V.S.Janakiraman and K.Sarukesi, Decision Support Systems, PHI
3. Efrem G. Mallach, Decision Support and Data Warehouse Systems, tata McGraw-Hill Edition

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010
Department of Information Technology
SEMESTER – VII

"Natural Language Processing"

Theory Periods: 30   Tutorials: "10"
Credits: 4   Code: IT 707

Unit - I

Introduction to Natural Language Processing, Different Levels of language analysis, Representation and understanding, Linguistic background.

Unit - II

Grammars and parsing, Top down and Bottom up parsers, Transition Network Grammars, Feature systems and augmented grammars, Morphological analysis and the lexicon, Parsing with features, Augmented Transition Networks.

Unit -III

Grammars for natural language, Movement phenomenon in language, Handling questions in context free grammar, Hold mechanisms in ATNs, Gap threading, Human preferences in parsing, Shift reduce parsers, Deterministic parser, Statistical methods for Ambiguity resolution

Unit - IV

Semantic Interpretation, word senses and ambiguity, Basic logical form language, Encoding ambiguity in logical from, Thematic roles, Linking syntax and semantics, Recent trends in NLP.

Unit – V

Language Model: the Milton Model , THE META MODEL, Vision for the Future', Strategies , NLP Change Techniques ,Principle-based NLP, Reframing , Chunking Patterns

Name of Text Books:
1. James Allen, Natural Language Understanding, Second Edition, 2003, Pearson Education.
2. D Juraffsky, J H Martin, Speech and Language Processing, Pearson Education.

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010
Department of Information Technology
SEMESTER – VII

"Robotics"

Theory Periods: 30   Tutorials: "10"
Credits: 4   Code: IT 708

Unit- I

The scope of industrial robotics – definition of an industrial robot – need for industrial robots, Applications – fundamentals of robot technology, automation and robotics, robot anatomy, work volume, precision of movement End effectors, sensors.

Unit- II

Robot Programming – methods – interlocks textual languages – characteristics of robot level languages, characteristics of task level languages

Unit- III

Puma robot Arm Control – Computed Torque Technique – Near minimum time control – Variable structure control – Non – linear decoupled feedback control – Reserved motion control – Adaptive control.

Unit- IV

Robot cell design and control – Remote centre compliance – safety in robotics.

Unit- V

Advanced robotics, advanced robotics in space – specific features of space robotics systems – long term technical developments – advanced robotics in underwater operations, Robotics technology for the future – future applications

Name of Text Books:
1. Barry Leatham Jones, " Elements of Industrial Robotics" Pitman Publishing, 1987 .

Reference Books
1. Mikell P. Groover , Mitchell Weiss, Roger N . Nagel, Nicholas G. Odrey, "Industrial Technology , Programming and applications" , Mc Graw Hill Book Company, 1986
2. Fu K.S. , Gonzalez R.C. and Lee C.S.G , "Robotics – Control, Sensing , Vision and applications" , McGraw Hill International Editions , 1987**.**
3. Bernard Hodges and Paul Hallam, "Industrial Robotics" , British Library Cataloging in Publication, 1990.

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010
Department of Information Technology
SEMESTER – VII

"Distributed System and Parallel Processing"

Theory Periods: 30   Tutorials: "10"
Credits: 4   Code: IT 709

UNIT I
Concept of Distributed system, Centralized Computing, Advantages of Distributed systems over centralized system, Examples of Distributed Systems. Architectural model of Distributed Systems, Centralized Architectures, Decentralized Architecture, Hybrid Architecture, Security in Distributed Systems. Concept of clock in Distributed System, Limitation of Distributed System, Clock synchronization, Lamport's Logical Clock, Vector Clocks, Causal ordering of messages- Birman-Schiper Stephen Protocol, Schiper Eggli Sandoz Protocol, Chandy- Lamport's Global State Recording Algorithm, Termination Detection Algorithm.

UNIT II
Distributed Mutual Exclusion, Mutual Exclusion in single computer system Vs Distributed, Concept of Critical Section, Non Token-based algorithm- Central Coordinator Algorithm, Lamport's Algorithm, Ricart-Agrawala Algorithm, Maekawa's Algorithm, Token based algorithm- Token Ring Algorithm, Suzuki-kasami's Broadcast Algorithm, Singhal's Heuristic Algorithm, Raymonds Tree based Algorithm.
Distributed deadlock detection: Control organization- Centralized Vs Distributed, Completely centralized, The Ho-Ramamoorthy , one-phase algorithm, Distributed- path pushing, edge chasing, Diffusion computation based, Global state detection based algorithm, Hierarchical – The Menasce-Muntz Algorithm, The Ho-Ramamoorthy Algorithm, Deadlock Resolution.
Agreement protocol: System model, The Byzantine Agreement problem, Solution to the Byzantine Agreement problem- Lamport Shostak-Pease Algorithm, Dolev et al. algorithm, Applications of Agreement algorithm- Fault tolerant clock synchronization, Atomic commit.

UNIT III
Distributed Storage, Name Services, Transaction, Distributed Transaction, Replication, Recovery in Distributed System, Commit protocol- The Two-Phase commit protocol, Voting Protocol- Static Vs Dynamic voting.

UNIT IV
Computational demands, advantages of parallel systems. Flynn's classification, controlled parallelism and scalability. Topologies: Mesh, binary tree, Hyper tree, Cube Connected cycles, shuffle-Connected Exchange; Uniform Memory Access (UMA & Non uniform Memory Access (NUMA) Multi processor System.PARAM Model of Parallel Computation, PARAM Algorithms; Parallel Reductions, Prefix sum, List Ranking, Merging of Two Sorted List.

UNIT V
Algorithm for parallel machine- Parallel Algorithm Introduction, Models of Parallel Computation, Parallel Prefix Computation, Parallel Merging, Parallel Searching, Parallel Sorting, Matrix Multiplication.

Name of Text Books:
1. G. Couloris, "Distributed System, Concept & Design," Addison Wesley 1994.
2. Tanenbaum, "Distributed Systems," PHI.
3. P. K. Sinha, "Distributed Operating Systems," PHI.
4. Michel J. Quinn, " Parallel Computing: Theory and Practice," McGraw-Hill.

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010
Department of Information Technology
SEMESTER – VII

"Pattern Recognization"

Theory Periods: 30   Tutorials: "10

Credits: 4   Code: IT 710

UNIT-I INTRODUTION

Introduction to statistical - syntactic and descriptive approaches - features and feature extraction - learning - Bayes Decision theory - introduction - continuous case - 2-category classification - minimum error rate classification - classifiers - discriminant functions - and decision surfaces - error probabilities and integrals - normal density - discriminant functions for normal density

UNIT-II ESTIMATION AND LEARNING

Parameter estimation and supervised learning - maximum likelihood estimation - the Bayes classifier - learning the mean of a normal density - general bayesian learning - nonparametric technic - density estimation - parzen windows - k-nearest neighbour estimation - estimation of posterior probabilities - nearest - neighbour rule - k-nearest neighbour rule

UNIT-III FUNCTIONS

Linear discriminant functions - linear discriminant functions and decision surfaces - generalized linear discriminant functions - 2-category linearly separable case - non-separable behavior.

UNIT-IV PROGRAMMING PROCEDURES

Linear programming procedures - clustering - data description and clustering - similarity measures - criterion functions for clustering

UNIT-V GRAMMAR AND LANGUAGE

Syntactic approach to PR - introduction to pattern grammars and languages - higher dimensional grammars - tree, graph, web, plex, and shape grammars - stochastic grammars - attribute grammars - parsing techniques - grammatical inference

Name of Text Books:
1. Duda & Hart P.E, Pattern Classification And Scene Analysis, John Wiley and Sons, NY

Name of Reference Books:
1. Gonzalez R.C. & Thomson M.G., Syntactic Pattern Recognition - An Introduction, Addison Wesley
2. Fu K.S., Syntactic Pattern Recognition And Applications, Prentice Hall, Englewood cliffs, N.J.

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010

Department of Information Technology
SEMESTER – VII

"Computational Intelligence"

Theory Periods: 30   Tutorials: "10"
Credits:4   Code: IT 711

UNIT-I
Artificial Intelligence: History and Applications, Production Systems, Structures and Strategies for state space search- Data driven and goal drivensearch, Depth First and Breadth First Search, DFS with Iterative Deepening,Heuristic Search- Best First Search, A* Algorithm, AO* Algorithm, Constraint Satisfaction, Using heuristics in games- Minimax Search, Alpha BetaProcedure.

UNIT-II

Knowledge representation - Propositional calculus, Predicate Calculus, Theorem proving by Resolution, Answer Extraction, AI Representational Schemes- Semantic Nets,

UNIT-III

Conceptual Dependency, Scripts, Frames, Introduction to Agent based problem solving. Machine Learning- Symbol based and Connectionist, Social and Emergent models of learning,

UNIT-IV

The Genetic Algorithm- Genetic Programming, Overview of Expert System Technology- Rule based Expert Systems, Introduction to Natural Language Processing.

UNIT-V

Languages and Programming Techniques for AI- Introduction to PROLOG and LISP, Search strategies and Logic Programming in LISP, Production System examples in PROLOG.

Name of Text Books:
1. George F Luger, *Artificial Intelligence- Structures and Strategies for Complex Problem Solving,* 4/e, 2002, Pearson Education.

Name of Reference Books:
1. E. Rich, K.Knight, *Artificial Intelligence*, 2/e, Tata McGraw Hill
2. S Russel, P Norvig, *Artificial Intelligence- A Modern Approach*, 2/e, Pearson Education, 2002
3. Winston. P. H, *LISP*, Addison Wesley
4. Ivan Bratko, *Prolog Programming for Artificial Intelligence*, 3/e, Addison Wesley, 2000

Semester: VII	Code: IT 791
Subject: Artificial Intelligence & Expert Systems Lab	
Credits: 2	

List of 10 -15 Assignment/Practical will be allotted by the Instructor in the respective Lab.

Semester: VII	Code: IT 792
Subject: Management Information System Lab	
Credits: 2	

List of 10 -15 Assignment/Practical will be allotted by the Instructor in the respective Lab.

Semester: VII	Code: IT 793
Subject: Practical Training	
Credits: 2	

Semester: VII	Code: IT 794
Subject: Minor Project	
Credits: 6	

Semester: VII	Code: IT 795
Subject: Seminar and Report Writing	
Credits: 1	

NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR
DEPARTMENT OF INFORMATION TECHNOLOGY

SEMESTER: VIII

S.No.	Board of Studies	Sub.Code	Subject Name	Periods/week			Examination Scheme					Total Marks	Credits L+(T+P)/2
				L	T	P	TA	FE	SE	T.C.A.	ESE		
1	Information Technology	IT 801	Data Mining & Ware Housing	3	1	-	20	15	15	50	70	120	4
2	Information Technology	IT 802	Cryptography	4	1	-	20	15	15	50	70	120	5
3	Information Technology	IT 80X	Elective V	3	1	-	20	15	15	50	70	120	4
4	Information Technology	IT 80Y	Elective VI	3	1	-	20	15	15	50	70	120	4
5	Information Technology	IT 891	. Net Laboratory	-	-	3	30	-	-	30	20	50	2
6	Information Technology	IT 892	Unix / Linux Shell Scripting	-	-	3	30	-	-	30	20	50	2
7	Information Technology	IT 893	Major Project	-	-	16	100	-	-	100	100	200	8
8	Information Technology		Discipline	-	-	-	50	-	-	50	-.	50	1
			Total	13	4	22	290	60	60	410	420	830	30

Elective V & VI		
Sr.No.	**Sub.Code**	**Subject Name**
1	IT 803	Advanced Computer Networks
2	IT 804	Mobile Adhoc Networks
3	IT 805	Distributed Multimedia
4	IT 806	Real Time System
5	IT 807	Cyber Crime & Laws
6	IT 808	Genetic Algorithm
7	IT 809	Enterprise Resource Planning
8	IT 810	Quantum Computing

Note : For attendance of a student in every theory and practical class, the teachers are supposed to keep records ltimately in the following format which will be included in the semester mark-sheets.

T.C.A. = Total of Continuous Assessment.

Format for attendance				
Attendance				Category
> 85			----->	High "H"
> 70 & < 85			----->	Medium "M"
> 60 & < 70			----->	Low "L"
< 60			----->	Poor "P"

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010
Department of Information Technology
SEMESTER – VIII

"Data Mining and Ware Housing"

Theory Periods: 30   Tutorials: "10"
Credits: 4   Code: IT 801

UNIT- I Overview and Concepts:
Need for data warehousing, Basic elements of data warehousing, Data Warehouses and Data Marts, Trends in data warehousing. Planning And Requirements: Project planning and management, Collecting the requirements. Architecture And Infrastructure: Architectural components, Infrastructure and metadata.

UNIT- II Data Design and Data Representation:
Principles of dimensional modeling, Star Schema, Star Schema Keys, Dimensional modeling advanced topics: Snowflake Schema, Aggregate Fact Tables, Data extraction, transformation and loading, data quality ,data quality tools.

UNIT- III Information Access and Delivery:
Matching information to classes of users, Information Delivery Tools, OLAP in data warehouse :OLAP Models, Features and Functions, Data warehousing and the web. Implementation And Maintenance: Physical design process ,Indexing the data warehouse, data warehouse deployment, Security, backup and recovery, growth and maintenance.

UNIT- IV Data Mining- Introduction:
Basics of data mining, Data Mining Primitives, Languages, and System Architectures: Data mining primitives, Query language, Designing GUI based on a data mining query language ,Knowledge Discovery in Databases(KDD): KDD Process, Architectures of data mining systems. Data Mining Applications.

UNIT –V Data Mining Techniques and Web Mining:
Data Mining Algorithm: Association rules ,Classification and Prediction ,Association Rules-Market Basket Analysis, Tree Based Algorithms, Classification- CART, Naïve Bayes Techniques, Neural Based Techniques, Content Mining, Web Structure Mining, Web Usage mining .Introduction to Spatial mining, Data generalization and summarization-based characterization.

Name of Text Books:
1. Prabhu,Data ware housing- concepts, Techniques, Products and Applications, Prentice hall of India
2. Soman K P, "Insight into Data Mining: Theory & Practice" , Prentice hall of India.
3. M.H. Dunham, "Data Mining Introductory and Advanced Topics", Pearson Education.

Name of Reference Books:
1. Paulraj Ponniah, "Data Warehousing Fundamentals", John Wiley.
2. Gupta, "Introduction To Data mining with Case Studies", PHI.
3. Ralph Kimball, "The Data Warehouse Lifecycle toolkit", John Wiley.

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010
Department of Information Technology
SEMESTER – VIII

"Cryptography"

Theory Periods: 40   Tutorials: "10"
Credits: 5   Code: IT 802

UNIT I

Introduction to Security attacks, services And mechanisms, Introduction to cryptology, Classical Encryption techniques , Cipher Principles, Data Encryption Standard , Block Cipher Design Principles and Modes of Operation - Evaluation criteria for AES, AES Cipher, Triple DES, Placement of Encryption Function, Traffic Confidentiality.

UNIT II

Key Management, Diffie-Hellman key Exchange, Elliptic Curve Architecture and Cryptography, Introduction to Number Theory, Confidentiality using Symmetric Encryption, Public Key Cryptography and RSA.

UNIT III

Authentication requirements , Authentication functions, Message Authentication Codes, Hash Functions , Security of Hash Functions and MACs, MD5 message Digest algorithm, Secure Hash Algorithm, Authentication Protocols,Digital Signature Standard.

UNIT IV

Authentication Applications: Kerberos , X.509 Authentication Service , Electronic Mail Security – PGP – S/MIME   .
UNIT V

Web security: security socket layer & transport layer security, secure electronic transaction (SET)
System security: intruders, viruses and related threads, firewall design principles.

Name of Text Books:
1. William Stallings, "Cryptography And Network Security – Principles and Practices", Prentice Hall of India, Third Edition 2003.
2. Behrouz Forouzan, "Cryptography and Network Security" Tata McGraw-Hill ,1e (special Indian Edition), 2007.

Name of Reference Books
1. Atul Kahate, "Cryptography and Network Security", Tata McGraw-Hill, 2003.
2. Bruce Schneier, "Applied Cryptography", John Wiley & Sons Inc, 2001.
3. Charles B. Pfleeger, Shari Lawrence Pfleeger, "Security in Computing", Third Edition, Pearson Education, 2003.
4. Menezes, A.J.; Van Oorschot, P.C.; Vanstone, S.A. Handbook of applied cryptography. CRC Press, 1997.

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010
Department of Information Technology
SEMESTER – VIII

"Advanced Computer Networks"

Theory Periods: 30   Tutorials: "10"
Credits: 4   Code: IT 803

UNIT I

Internet design philosophy, Layering and the end-to-end design principle, Adaptive link layer mechanisms for error-prone channels, Consistent overhead byte stuffing

UNIT II

Internet Service Providers (ISPs) and peering, BGP, instability and convergence issues, IGP convergence, traffic engineering, Fair queuing, packet scheduling

UNIT III

TCP congestion avoidance, TCP variants, Integrated services (IntServ) and Differentiated services (DiffServ), RSVP: Resourse reSerVation Protocol

UNIT IV

Queuing Theory, Traffic Engineering, Multi-Protocol Label Switching (MPLS), IP Next generation, IPv6, IP Next Layer (IPNL).

UNIT V

Overlay networks, P2P networks, Web server systems, Web caching, Internet traffic modeling, Internet measurements, simulation issues, Network coding techniques, Network address translation issues, IPv6

Text Books:
1. Huitema, C., Routing in the Internet, 2nd ed., Prentice-Hall, 2000. Keshav, S., An Engineering Approach to Computer Networking, Addison-Wesley, 1997.
2. Kurose and Ross, ``Computer Networking: A Top-Down Approach,'' Addison-Wesley, 2000.
3. Peterson and Davie, ``Computer Networks: A Systems Approach,'' 2nd ed., Morgan Kaufmann, 2000.
4. A collection of manuscripts and research papers will be also made available to students.

Reference:
1. Stevens, ``UNIX Network Programming, vol. 1: Networking APIs: Sockets and XTI,'' 2nd ed., Prentice-Hall, 1997.
2. Tanenbaum, A., Computer Networks, 3rd ed., Prentice-Hall, 1996. Wright and Stevens, TCP/IP Illustrated v.2, Addison-Wesley.

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010
Department of Information Technology
SEMESTER – VIII

"Mobile Adhoc Networks"

Theory Periods: 30   Tutorials: "10"
Credits: 4   Code: IT 804

Unit - I

Introductory concepts. Different models of operation. Various applications of MANET, Destination-Sequenced Distance Vector protocol - overview, route advertisement, extending base station coverage. Properties of DSDV protocol.

Unit - II

Dynamic Source Routing protocol - overview and properties, DSR route discovery, route maintenance. Support for heterogeneous networks and mobile IP. Multicast routing with DSR.

Unit - III

Ad Hoc On-Demand Distance-Vector protocol - properties, unicast route Establishment, multicast route establishment. Broadcast. Optimizations and Enhancements.

Unit - IV

Link Reversal Routing - Gafni-Bertsekas algorithm, lightweight mobile routing algorithm. Temporally ordered routing algorithm.

Unit - V

Preserving battery life of mobile nodes - Associativity based routing, effects of beaconing on battery life. Recent trends in MANET.

Name of Text Books:
1. Charles E. Perkins, "Ad Hoc Networking" Addison-Wesley Professional.
2. Prasant Mohapatra , Srikanth Krishnamurthy, "AD HOC NETWORKS: Technologies and Protocols" Springer.

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010
Department of Information Technology
SEMESTER – VIII

"Distributed Multimedia"

Theory Periods: 30   Tutorials: "10"
Credits: 4   Code: IT 805

UNIT I
Multimedia Data Modeling: Modeling Time-Based Media , Document Model Issues for Hypermedia, Introduction to Multimedia Software Engineering, Towards a Theory of Active Index,
Multimedia Information Retrieval: Introduction, Sigma Query Language, Content-Based Indexing and Retrieval, Video and Image Content Representation, Video Segmentation for Video Data Management.

UNIT II
Multimedia Interface: Visual Interfaces to Multimedia Databases (Presentation methodologies and tools, Teleconferencing tools) ,Multimedia Interfaces - Multimedia Content Indication , Extensible Markup Language XML, X-SMILES and SMIL.

UNIT III
Memory and Database Management: Introduction: Dependency relations for Multimedia Databases, Memory and Database Management: Codecs, Design of Large-Scale Multimedia-on-Demand Storage Servers and Storage Hierarchies.

UNIT IV
Multimedia Communications: Introduction, Introduction to MPEG Multimedia Communications-Synchronization , Adlet: Active Document for Adaptive Information Integration, Transformation and Exchange of Multimedia Objects in Distributed Multimedia Systems.

UNIT V
Prototype Systems: ImageDatabasePrototypes,VideoDatabaseSystems-RecentTrendsThird-Generation Distributed Hypermedia Systems.

Text Book :
1. The Handbook of Multimedia Information Management, edited by W. Grosky, R. Jain and R. Mehrotra, Prentice-Hall PTR, 1997, ISBN 0-13-207325-0.

Reference Book:
1. S. K. Chang and E. Jungert, Symbolic Projection for Image Information Retrieval and Visual Reasoning, Academic Press, 1996 (ISBN 0-12-168030-4).

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR, CG 492010
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SEMESTER – VIII

"Real Time System"

Theory Periods: 30   Tutorials: "10"
Credits: 4   Code: IT 806

UNIT I
Introduction: Concept of Real Time System, Issues in real time computing, Performance measures of Real Time System, Issues in Real Time Computing, Performance measures of Real time Systems, Real Time Application.
Task Assignment and Scheduling: Different task model, Scheduling hierarchy, offline vs Online Scheduling, Clock Drives.

UNIT II
Model of Real Time System: Processor, resources, temporal parameter, Periodic Task Model, Sporadic Task Model, Precedence Constraints and Data Dependencies, Scheduling hierarchy.
Scheduling of Periodic Task: Assumptions, fixed versus dynamic priority algorithms, schedulability test for fixed priority task with arbitrary deadlines.

UNIT III
Scheduling of Aperiodic and Sporadic Tasks: Assumptions and approaches, deferrable, sporadic servers, slack stealing in deadline driven and fixed priority systems. Two level schemes for integrated scheduling, Scheduling for applications having flexible constrains.
Resources and Resource Access Control: Assumptions on resources and their usage, resource contention, resource access control (Priority Ceiling Protocol, Priority Inheritance protocol, Slack Based Priority Ceiling Protocol, Preemption Ceiling Protocol).

UNIT IV
Multi Processor Scheduling: Model of multi processor and distributed systems, Scheduling algorithms for end to end periodic tasks in homogeneous/heterogeneous systems, Predictability and validation of dynamic multiprocessor system.

UNIT V
Real time Communication: Model of real time Communication, Priority base service For switched network, Weighted Round Robin Service, Medium access Control Protocol, Real Time Protocol.

Books and References:
1. Jane .W. S. Liu "Real Time Systems" Pearson Education.
2. Krishna .C.M "Real Time Systems" Mc-Graw Hill Publication.

Theory Periods: 30   Tutorials: "10"
Credits: 4   Code: IT 807

UNIT I: INTRODUCTION TO CYBERSPACE AND CYBERCRIMES
Cyber Space: Understanding Cyber Space, Defining Cyber Laws Jurisdiction in Cyber Space**:** Concept of Jurisdiction, Internet Jurisdiction, Indian Context of Jurisdiction .**Understanding Cyber Crimes:** Defining Crime, Crime in context of Internet – Actus Reus/ Mens Rea, Types of crime in Internet, Computing damage in Internet crime**. Cyber Crimes**: Fraud, Hacking, Mischief, Trespass, Defamation, Stalking, Spam. Web hosting and web Development agreement, Legal and Technological Significance of domain name.

UNIT II: IT ACT 2000
Overview of IT Act 2000, Amendments and Limitations of IT Act, Digital Signatures, **Cryptographic Algorithm**: Public Cryptography, Private Cryptography; **Electronic Governance**: Legal Recognition of Electronic Records, Legal Recognition of Digital Signature; Certifying Authorities, Network Service Providers Liability, Cyber Regulations Appellate Tribunal, Penalties and Adjudication; Alternative Dispute Resolution , Online Dispute Resolution (ODR).

UNIT III: TRADEMARKS AND PATENTS
Legal Issues in Internet and Software Copyright: Jurisdiction Issues and Copyright, Infringement, Remedies of Infringement, Multimedia and Copyright issues, Software Piracy, **Patents:** Understanding Patents, International context of Patents ,Indian Position on Computer related Patents.
Trademarks: Understanding Trademarks, Trademark Law in India, Infringement and Passing Off, Trademarks in Internet, Domain name registration, Domain Name Disputes & WIPO.

UNIT IV: CYBER LAW AND RELATED LEGISLATION
IT Act and Civil Procedure Code, IT Act and Criminal Procedural Code, **Relevant Sections** : Relevant Sections of Indian Evidence Act, Relevant Sections of Bankers Book Evidence Act, Relevant Sections of Indian Penal Code, Relevant Sections of Reserve Bank of India Act; Law Relating To Employees And Internet, Hierarchy of courts.

UNIT V: E-COMMERCE AND LEGAL ISSUES
Electronic Money, Regulating e-transactions, Role of RBI and Legal issues, Transnational Transactions of E-Cash, Credit Card and Internet, Laws relating to Internet credit cards, Secure Electronic Transactions, Electronic Data Base and its Protection.

Text Books:
  1. Cyber law simplified : Vivek Sood , Tata McGraw Hill Education Pvt Ltd , 2001, fifth reprint 2009.
  2. Cyber Laws: Intellectual property & E Commerce, Security- Kumar K, dominant Publisher.
  3. Information Security policy &implementation Issues, NIIT, PHI.

Reference:
  1. 1.Cyber CRIME notorious Aspects of the Humans & net Criminals activity in Cyber World Barna Y Dayal D P Dominant Publisher.
  2. Cyber Crime Impact in the new millennium, Marine R.C. Auther press.
  3. Spam Attack, Cyber Stalking & abuse, Barna Y, Dayaal D P Dominant publisher.
  4. Frauds & Financial crisis in Cyber space, Barna Y, Dayal D P , Dominant publisher.
  5. Information Security , NIIT: PHI.

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SEMESTER – VIII

"Genetic Algorithm"

Theory Periods: 30   Tutorials: "10"
Credits: 4   Code: IT 808

Unit I

Introduction and Overview, Pervasiveness of the Problem of Program Induction, Introduction to Genetic Algorithms, The Representation Problem for Genetic Algorithms, Overview of Genetic Programming, Detailed Description of Genetic Programming, Introductory Examples of Genetic Programming.

Unit II

Computer implementation, Data structure, Reproduction, Crossover, Mutation, Mapping objective function to fitness form, fitness scaling, coding, Discritization, constraints

Unit III

Amount of Processing Required to Solve a Problem, Non randomness of Genetic Programming, Symbolic Regression Q Error-Driven Evolution, Control Q Cost-Driven Evolution, Evolution of Emergent Behavior, Evolution of Subsumption, Entropy-Driven Evolution, Evolution of Strategy, Co-Evolution

Unit IV

Risc of genetic algorithm, Genetic algorithm application of historical interest, Function optimization, improvement in basic techniques, current application of genetic algorithms.

Unit V

Parallelization of Genetic Programming, Ruggedness of Genetic Programming, Extraneous Variables and Functions, Operational Issues, Review of Genetic Programming Comparison with Other Paradigms

Text Books:
1. 1."Genetic algorithm in search optimization and machine learning", David E Goldberg

Reference Book:
1. 2."An Introduction to genetic Algorithms ", Milanie Mitchell MIT Press

"Enterprise Resource Planning"

Theory Periods: 30   Tutorials: "10"
Credits: 4   Code: IT 809

UNIT I: INTRODUCTION TO ERP

Overview – Benefits of ERP – ERP and Related Technologies – Business Process Reengineering – Data Warehousing – Data Mining – On–line Analytical Processing – Supply Chain Management.

UNIT II: ERP IMPLEMENTATION

Implementation Life Cycle – Implementation Methodology – Hidden Costs – Organizing Implementation – Vendors, Consultants and Users – Contracts – Project Management and Monitoring.

UNIT III: BUSINESS MODULES

Business Modules in an ERP Package – Finance – Manufacturing – Human Resource – Plant Maintenance – Materials Management – Quality Management – Sales and Distribution.

UNIT IV: ERP MARKET

ERP Market Place – SAP AG – PeopleSoft – Baan Company – JD Edwards World Solutions Company – Oracle Corporation – QAD – System Software Associates.

UNIT V: ERP – PRESENT AND FUTURE
Turbo Charge the ERP System – EIA – ERP and E–Commerce – ERP and Internet – Future Directions in ERP.

Name of Text Books:
1. Alexis Leon, "ERP Demystified", Tata McGraw Hill, 1999.
2. Joseph A. Brady, Ellen F. Monk, Bret J. Wangner, "Concepts in Enterprise Resource Planning" , Thomson
   Learning, 2001.

Name of Reference Books:
1. Vinod Kumar Garg and N.K .Venkata Krishnan, "Enterprise Resource Planning – concepts and Planning", Prentice Hall, 1998.
2. Jose Antonio Fernandez, " The SAP R /3 Hand book", Tata McGraw Hill, 1998.
3. Fu, "SAP BW: A Step by Step Guide", First Edition, Pearson Education, 2003.

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SEMESTER – VIII

"Quantum Computing"

Theory Periods: 30   Tutorials: "10"
Credits: 4   Code: IT 810

UNIT I

Review of Linear Algebra. The postulates of quantum mechanics. Review of Theory of Finite Dimensional Hilbert Spaces and Tensor Products.

UNIT II

Models of computation – Turing machines. Quantifying resources. Computational complexity and the various complexity classes. Models for Quantum Computation. Qubits. Single and multiple qubit gates. Quantum circuits. Bell states. Single qubit operations. Controlled operations and measurement. Universal quantum gates.

UNIT III

Quantum Algorithms – Quantum search algorithm - geometric visualization and performance. Quantum search as a quantum simulation. Speeding up the solution of NP Complete problems. Quantum search as an unstructured database. Grover's and Shor's Algorithms.

UNIT IV

Introduction to Quantum Coding Theory. Quantum error correction. The Shor code. Discretization of errors, Independent error models, Degenerate Codes.

UNIT V

The quantum Hamming bound. Constructing quantum codes – Classical linear codes, Shannon entropy and Von Neuman Entropy.

Name of Text Books:
1. 1. Nielsen M.A. and I.L. Chauang, Quantum Computation and Quantum Information, Cambridge University Press, 2002.

Name of Reference Books:
1. Gruska, J. Quantum Computing, McGraw Hill, 1999.

2. Halmos, P. R. Finite Dimensional Vector Spaces, Van Nostrand, 1958.

Semester: VIII	Code: IT 891
Subject: .Net Laboratory	
Credits: 2	

List of 10 -15 Assignment/Practical will be allotted by the Instructor in the respective Lab.

Semester: VIII	Code: IT 892
Subject: Unix / Linux Shell Scripting	
Credits: 2	

List of 10 -15 Assignment/Practical will be allotted by the Instructor in the respective Lab.

Semester: VIII	Code: IT 893
Subject: Major Project	
Credits: 8	

Semester: VIII	
Subject: Discipline	
Credits: 1	