AFFILIATED INSTITUTIONS

ANNA UNIVERSITY, CHENNAI

REGULATIONS 2015

CURRICULUM & SYLLABI

M.Sc. SOFTWARE SYSTEMS (5 YEARS)

SEMESTER I

S.NO.	COURSE CODE	COURES TITLE	L	T	P	C
THEORY						
1.	HS7151	English_I	3	0	0	3
2.	MA7151	Trigonometry, Algebra and Calculus	3	1	0	4
3.	PH7151	Applied Physics	3	1	0	4
4.	SS7101	Digital Principles	3	0	0	3
5.	SS7102	Problem Solving Techniques	3	0	0	3
PRACTICAL						
6.	SS7111	Devices Laboratory	0	0	4	2
7.	SS7112	Digital Laboratory	0	0	4	2
8.	SS7113	Computer Practice	1	0	3	2
		TOTAL	**16**	**2**	**11**	**23**

SEMESTER II

S.NO.	COURSE CODE	COURES TITLE	L	T	P	C
THEORY						
1.	HS7253	English II	3	0	0	3
2.	SS7201	Analytical Geometry and Real and Complex Analysis	3	1	0	4
3.	SS7202	Software Engineering	3	0	0	3
4.	SS7203	Computer Architecture	3	0	0	3
5.	SS7204	Programming in C	3	0	0	3
6.	SS7205	COBOL and Data Processing	3	0	0	3
PRACTICAL						
7.	SS7211	C Programming Laboratory	0	0	4	2
8.	SS7212	COBOL Laboratory	0	0	4	2
		TOTAL	**18**	**1**	**8**	**23**

SEMESTER III

S.NO.	COURSE CODE	COURES TITLE	L	T	P	C
THEORY						
1.	MA7352	Partial Differential Equations and Integral Transforms	3	1	0	4
2.	MA7353	Numerical Methods	3	1	0	4
3.	SS7301	Data Structures	3	0	0	3
4.	SS7302	Object Oriented Programming and C ++	3	0	0	3
5.	SS7303	Database Management Systems	3	0	0	3
PRACTICAL						
6.	SS7311	C++ Laboratory	0	0	4	2
7.	SS7312	Data Structures Laboratory	0	0	4	2
8.	SS7313	RDBMS Laboratory	0	0	4	2
		TOTAL	**15**	**2**	**12**	**23**

SEMESTER IV

S.NO.	COURSE CODE	COURES TITLE	L	T	P	C
THEORY						
1.	MA7454	Discrete Mathematics	3	1	0	4
2.	SS7401	Formal Methods in Software Engineering	3	0	0	3
3.	SS7402	Operating System and System Software	3	0	0	3
4.	SS7403	Software Architecture and Design	3	0	0	3
5.	SS7404	Computer Graphics and Multimedia	3	0	0	3
6.	SS7405	Management Information System	3	0	0	3
PRACTICAL						
7.	SS7411	Operating System and System Software Laboratory	0	0	4	2
8.	SS7412	Computer Graphics and Multimedia Laboratory	0	0	4	2
		TOTAL	**18**	**2**	**8**	**23**

SEMESTER V

S.NO.	COURSE CODE	COURES TITLE	L	T	P	C
THEORY						
1.	SS7501	Operations Research	3	1	0	4
2.	SS7502	Computer Networks	3	0	0	3
3.	SS7503	Design and Analysis of Algorithms	3	0	0	3
4.	SS7504	Principles of Data Communication	3	0	0	3
5.	SS7505	Theory of Computation	3	1	0	4
PRACTICAL						
6.	SS7511	Algorithms Laboratory	0	0	4	2
7.	SS7512	Unix Laboratory	0	0	4	2
8.	SS7513	Operations Research and Networks Laboratory	0	0	4	2
		TOTAL	**15**	**2**	**12**	**23**

SEMESTER VI

S.NO.	COURSE CODE	COURES TITLE	L	T	P	C
THEORY						
1.	SS7601	Cloud Computing	3	0	0	3
2.	SS7602	Artificial Intelligence	3	0	0	3
3.	SS7603	Internet Programming	3	0	0	3
4.	SS7604	Object Oriented Analysis and Design	3	0	0	3
5.	SS7605	Environmental Science and Engineering	3	0	0	3
6.		Elective I	3	0	0	3
PRACTICAL						
7.	SS7611	CASE Tools and UML Laboratory	0	0	4	2
8.	SS7612	Internet Programming Laboratory	0	0	4	2
		TOTAL	**18**	**0**	**8**	**22**

SEMESTER VII

S.NO.	COURSE CODE	COURES TITLE	L	T	P	C
THEORY						
1.	SS7701	Software Testing	3	0	0	3
2.	SS7702	Modelling and Simulation	3	0	0	3
3.	SS7703	Data Analytics	3	0	0	3
4.	SS7704	Object Oriented Software Engineering	3	0	0	3
5.		Elective II	3	0	0	3
6.		Elective III	3	0	0	3
PRACTICAL						
7.	SS7711	GUI Applications Laboratory	0	0	4	2
8.	SS7712	Software Laboratory I	0	0	4	2
		TOTAL	**18**	**0**	**8**	**22**

SEMESTER VIII

S.NO.	COURSE CODE	COURES TITLE	L	T	P	C
THEORY						
1.	SS7801	Software Quality Assurance	3	0	0	3
2.	SS7802	Multimedia Systems	3	0	0	3
3.	SS7803	XML and Web Services	3	0	0	3
4.		Elective IV	3	0	0	3
5.		Elective V	3	0	0	3
6.		Elective VI	3	0	0	3
PRACTICAL						
7.	SS7811	Software Laboratory II	0	0	4	2
8.	SS7812	XML and Web Services Laboratory	0	0	4	2
		TOTAL	**18**	**0**	**8**	**22**

SEMESTER IX

S.NO.	COURSE CODE	COURES TITLE	L	T	P	C
THEORY						
1.	SS7901	Software Metrics	3	0	0	3
2.	SS7902	Software Project Management	3	0	0	3
3.	SS7903	Network Security	3	0	0	3
4.	SS7904	Principles of Management	3	0	0	3
5.		Elective VII	3	0	0	3
6.		Elective VIII	3	0	0	3
PRACTICAL						
7.	SS7911	Software Laboratory III	0	0	4	2
		TOTAL	**18**	**0**	**4**	**20**

SEMESTER X

S.NO.	COURSE CODE	COURES TITLE	L	T	P	C
PRACTICAL						
1.	SS7099	Project Work	0	0	32	16
		TOTAL	**0**	**0**	**32**	**16**

Total Credits for the Programme: 217

LIST OF ELECTIVES

S.NO.	COURSE CODE	COURES TITLE	L	T	P	C
THEORY						
1.	SS7073	Software Reuse	3	0	0	3
2.	SS7074	Software Communication and Documentation	3	0	0	3
3.	SS7075	User Interface Design	3	0	0	3
4.	SS7076	Personal Software Process and Team Software Process	3	0	0	3
5.	SS7077	Software Agents	3	0	0	3
6.	SS7078	Real Time Systems	3	0	0	3
7.	SS7079	Component Based Development	3	0	0	3
8.	SS7080	Compiler Design	3	0	0	3
9.	SS7081	Microprocessors	3	0	0	3
10.	SS7082	Network Protocols	3	0	0	3
11.	SS7083	Wireless Technology	3	0	0	3
12.	SS7084	Client Server Computing	3	0	0	3

13.	SS7085	Advanced Database Management Systems	3	0	0	3
14.	SS7086	Data Mining and Data Warehousing	3	0	0	3
15.	SS7087	Cryptography	3	0	0	3
16.	SS7088	Mobile Computing	3	0	0	3
17.	SS7089	Extreme Programming	3	0	0	3
18.	SS7090	Parallel Computing	3	0	0	3
19.	SS7091	Soft Computing	3	0	0	3
20.	SS7092	Software Reliability	3	0	0	3
21.	SS7093	Image Processing	3	0	0	3
22.	SS7094	Computer Vision	3	0	0	3
23.	SS7095	Pattern Recognition	3	0	0	3
24.	SS7096	Design Patterns	3	0	0	3

UNIT I   RHETORICAL FUNCTIONS   9
Definition, Description, Process Description, Comparison, Classification, Stating Problems and Proposing Solutions, Making Lists, Narrating Events, Asking Questions and Answering.

UNIT II   WRITING   9
Paragraph Writing, Coherence and Cohesion, Use of Headings, Letter Writing (Personal Letters, Official Letters, Letters to the Editor), Essay Writing, Note – Making, Use of Symbols and Icons, Abbreviations, Non – verbal Devices, (Flowcharts, Fishbone Diagrams, Tables), Units of Measurements.

UNIT III   READING   9

Texts on the topics given below.
       I.   The Use of Language, Media
      II.   Nature, Its Treasures, Sources of Power
    III.   Threatened Environment- Solutions
    IV.   Genetic Research - GM Food
     V.   Modern High Tech Tools – Computers, Cyber Space.

UNIT IV   SPEAKING AND LISTENING SKILLS PRACTICE,VOCABULARY   9
Questions for Oral Discussion, Role Play Exercises, Word Stress and Pronunciation.
Synonyms, Antonyms, Superordinates, Hyponyms, Compound Nouns, Prepositional Phrases, Prefixes and Suffixes, Use of Reference Words, Sequential Expressions, Discourse Markers, Idioms and Phrases.

UNIT V   GRAMMAR   9
Nouns, Pronouns, Adverbs, Adjectives, Comparative Adjectives, Prepositions, Gerunds, Modal Verbs, Relative Pronouns, Clauses and Phrases, Voice, Sentence Patterns, Simple Present Tense, Present Continuous Tense, Simple Past and Past Continuous Tenses, Formation of Questions, Present Participle, Past Participle – Punctuation.

                                                    TOTAL: 45 PERIODS

TEXTBOOK
1.   V.Chellammal, Learning to Communicate, Kamakhya Publications, Coimbatore, 2002.

REFERENCES
1.   Lakshminarayanan, K.R. English For Technical Communication Vol. 1&2, Chennai: Scitech Publications (India) Pvt. Ltd., 2002
2.   Farhathullah, T.M. English Practice Book For Technical Communication, Chennai: RBA Publications, 2002
3.   Balasubramanian, M. and G.Anbalagan. English for Engineering Students, Kumbakonam R.M.S.: Anuradha Agencies Reprint 2001.

MA7151   **TRIGONOMETRY, ALGEBRA AND CALCULUS**   **L T P C**
                                                                              3 1 0 4

UNIT I   COMPLEX NUMBERS   12

Complex Numbers – Geometric Representation – DeMoivre's theorem and its Applications – Exponential and circular functions – Hyperbolic functions - Inverse hyperbolic functions – Logarithmic functions.

UNIT II   MATRICES   12

Rank of a matrix – Consistency of linear system of equations – Eigenvalues and Eigenvectors – Cayley-Hamilton theorem and its verification – Reduction to diagonal form – Reduction of quadratic form to Canonical form.

UNIT III   FUNCTIONS OF SEVERAL VARIABLES   12

Functions of two or more variables – partial derivatives – Euler's theorem – Total derivative-change of variables – Jacobians – Taylor's Theorem - Maxima and Minima of functions of two Variables.

UNIT IV   INTEGRAL CALCULUS   12

Reduction formulae – Definite integrals – Areas of Cartesian curves – Lengths of curves – volumes of Revolution – Surface areas of revolution.

UNIT V   ORDINARY DIFFERENTIAL EQUATION   12

Linear Differential equations of second order with constant coefficients - method of solution of Linear differential equations – complimentary function – particular integral – simultaneous linear equations with constant coefficients of first order - Cauchy linear equation of homogeneous type – Legendre's linear equation.

                                                                      TOTAL: 60 PERIODS

TEXTBOOK
1. Grewal B.S., "Higher Engineering Mathematics", 43rd Edition, Khanna Publishers, New Delhi, 2014.

REFERENCES

1. Kandasamy.P., Thilagavathy.K. and Gunavathy.K.–Engineering Mathematics, Volume – I, S.Chand & Co., New Delhi, 2001.
2. Veerarajan.T., Engineering Mathematics, Tata McGraw Hill Pub. Co. Ltd., New Delhi 1999.
3. Ramana B. V. , "Higher Engineering Mathematics" ,Tata McGraw Hill Co. Ltd., New Delhi, 11th Reprint, 2010.
4. Bali N.P and Manish Goyal," Engineering Mathematics", Laxmi Publications (P) Ltd., New Delhi, 7th Edition, 2007.
5. Kreyszig E., "Advanced Engineering Mathematics", John Wiley and Sons, 9th Edition, 2014.
6. Ravish R. Singh and Mukul Bhatt, "Engineering Mathematics" , A tutorial approach test MCGraw Hill Private Limited., New Delhi, 2010.

PH7151   **APPLIED PHYSICS**   **L T P C**
                                                                                          3 1 0 4

UNIT I   PROPERTIES OF MATTER   12
Elasticity – stress – strain diagram – factors affecting elasticity – Twisting couple on a wire-shafts – Torsion pendulum – Depression of a cantilever – Uniform and Non Uniform bending-I shape girders-production and measurement of high vacuum – Rotary pump-Diffusion pump- Pirani Gauge-Penning Gauge-Viscosity- Oswald Viscometer – Comparison of viscosity.

UNIT II   ACOUSTICS   12
Acoustics of buildings – Absorption coefficient-Intensity – Loudness – Reverberation time-Sabines's formula – Noise pollution – Noise control in a machine – Ultrasonics – Production – Magnetostriction and piezoelectric methods – Applications of ultrasonics in Engineering and Medicine.

UNIT III   HEAT AND THERMODYNAMICS   12
Thermal conductivity – Forbe's and lee's disc methods – Radial flow of heat-Thermal conductivity of rubber and glass-Thermal insulation in buildings-Laws of thermodynamics – Carno't cycle as heat engine and refrigerator – Carnot's theorem – Idel Otto and diesel engines
– Concept of entropy – Entropy temperature diagram of carnot's cycle.

UNIT IV   OPTICS   12
Photometry – Lummer Brodhum photometer – Flicker photometer – Antireflection coating – Air wedge – Testing of flat surfaces – Michelson's Interferometer and its applications – Photoelasticity and its applications – Sextant – Metallurgical microscopes – Scanning electron microscopes.

UNIT V   LASER AND FIBRE OPTICS   12
Principle and lasers – laser characteristics – Ruby-NdYAG, He-Ne, Co2 and semiconductor lasers – propagation of light through optical fiber-types of optical fiber – applications of optical fibers as optical waveguides and sensors.

TOTAL: 60 PERIODS

TEXTBOOK
1.   Arumugam, M. "Engineering Physics", Anuradha Agencies, 2003.

REFERENCES
1.   Resnik R. and Halliday D. "Physics", Wiley Eastern, 1986.
2.   Nelkon. M. and Parker. P, "Advanced level Physics", Arnald- Heinemann, 1986
3.   Vasudeva. A.S., "Modern Engineering Physics", S.Chand and Co, 1998.
4.   Gaur, R.K. and Gupta, S.L., "Engineering Physics", Dhanpat Rai and Sons, 1988.
5.   Mathur. D.S., "Elements of Properties of Matter", S. Chand and Co., 1989.

SS7101   **DIGITAL PRINCIPLES**   **L T P C**
                                                                                          3 0 0 3
UNIT I   9
Binary Systems: Digital Systems, Binary Numbers, Number Base Conversions, Octal and Hexadecimal Numbers, Complements, Signed Binary Numbers, Binary Codes, Binary Storage and Registers, Binary Logic
Boolean Algebra and Logic Gates : Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Digital Logic Gates.

UNIT II   **9**

Minimization: Map Method, Four Variable, Five Variable MAP, Product of Sum Minimization, Don't Care Conditions, NAND, NOR Implementation, Introduction to HDL.

Combinational Logic : Combinational Circuits, Analysis and Design Procedure, Binary Adder, Subtractor, Decimal Adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexes, HDL for combinational Circuits.

UNIT III   **9**

Synchronous Sequential Logic: Sequential Circuits - Latches, Flip-Flops, Analysis of Clocked Sequential Circuits, HDL for Sequential Circuits, State Reduction and Assignment Design Procedure.

UNIT III   **9**

Registers and Counters: Registers, Shift Registers, Ripple Counters, Synchronous Counters, Other Counters, HDL for Registers and Counter.

UNIT III   **9**

Asynchronous Sequential Circuit : Introduction, Analysis Procedure, Circuits with Latches, Design Procedure, Reduction of State and Flow Tables, Race – Free State Assignment Hazards, Design Example.

TOTAL: 60 PERIODS

TEXT BOOK

1. M.Morrismano, "Digital Design", 3rd edition, Pearson Education, Delhi, 2002.

REFERENCES

1. M.Morris Mano, "Digital Logic and Computer Design", PHI, New Delhi 2002.
2. M.Morri Mano, "Logic and Computer Design Fundamentals", Pearson Education Delhi, 2002.

SS7102   **PROBLEM SOLVING TECHNIQUES**   **L T P C**
                                                                                     3 0 0 3

UNIT I   INTRODUCTION   **9**

Problem solving aspect – Top –down design – Implementation of algorithms – Program verification – Efficiency –Analysis of Algorithms – Fundamental Algorithms – swapping – counting – Factorial Reversing the digits – Base conversion Algorithms.

UNIT II   FACTORING METHODS AND ARRAY TECHNIQUES   **9**

Finding Squart Root – LCM – GCD Generation of Prime Numbers – Random Numbers and Fibonacci Numbers – Array Techniques – Historgramming – Minimum and Maximum numbers – Duplication Removal – Partitioning – Kth smallest Element.

UNIT III   MERGING, SORTING AND SEARCHING   **9**

Two- way Merge Sort – Selection Sort – Exchange Sort – Insertion Sort – Diminishing Increment Sort – Partition Sort – Binary Search – Hash Search – Text Processing – Keyword Searching in text – Text Line Editing – Linear and Sub linear Pattern Search.

UNIT IV   DYNAMIC DATA STRUCTURE ALGORITHMS   **9**

Stack Operations – Queue Operations – Linked List – Insertion Deletion and Search Operation– Binary Tree – Insertion, Deletion and Search.

UNIT V   RECURSIVE ALGORITHMS   **9**

Binary Tree Traversal – Recursive Quick Sort – Towers of Hanoi Problem.

TOTAL: 45 PERIODS

TEXTBOOK

1. Dromey R.G, "How to Solve it by Computer" Prentice Hall of India, Delhi, 1999.

REFERENCES

1. Aho A.V. J.E. Hopcroft and J.D. Ullman, "The Design and Analysis of Computer Algorithms", Pearson Education Delhi, 2001.
2. Sara Baase and Allen Van Gelder, "Computer Algorithms – Introduction to Design and Analysis" Pearson Education Delhi, 2002.

SS7111   **DEVICES LABORATORY**   **L T P C**
0 0 4 2

Semiconductor devices such as PN diode, Zener diode, BJT, SCR, UJT, FET etc, - Characteristic, Parameters and typical applications, Common Transducer Characteristics and application.

TOTAL: 60 PERIODS

SS7112   **DIGITAL LABORATORY**   **L T P C**
0 0 4 2

1.   Binary and BCD counter using 7493
2.   Verification of NAND, NOR, XOR, AND, OR Gate Logic
3.   Parity Generator
4.   Encoder / Coder
5.   Multiplexes / Demultiplexes
6.   Adder / Subtractor
7.   Code Converters
8.   Comparators
9.   Up / Down 4 bit Binary Counter
10.   Up / Down 4 bit Decimal Counter
11.   Shift Register
12.   Ring Counter

TOTAL: 60 PERIODS

SS7113   **COMPUTER PRACTICE**   **L T P C**
                                                                             1 0 3 2

UNIT I   FUNDAMENTALS OF COMPUTERS AND OPERATING SYSTEMS
Evolution of computers – Organization of Modern Digital Computers – Single user Operating System – Multitasking OS – GUI.

UNIT II   OFFICE AUTOMATION

a.   Word Processing

b.   Data Base Management System

c.   Spread Sheet Package

d.   Presentation Software.

                                                                 TOTAL: 60 PERIODS

HS7253   **ENGLISH II**   **L T P C**
                                                                             3 0 0 3

UNIT I   RHETORICAL FUNCTIONS   9
Description, Stating Purposes and Uses, Giving Instructions, Making Recommendations, Bringing out Causal Relations, Writing Checklists.

UNIT II   WRITING   9
Writing Reports and Memos, Paragraph Writing, Coherence and Cohesion, Summary Writing, Rearranging Jumbled - up sentences, Letter Writing (Personal Letters, Official Letters), Writing Job Applications, Bio – data, Writing Biographies - Use of Titles, Non – verbal Devices, (Bar chart, Tables and Pie Chart).

UNIT III   READING   9
Texts on the topics given below.
        o   Architecture
        o   Advertisements and Media
        o   Technological Innovations
        o   Travel and Tourism
        o   Industry and Management

UNIT IV   SPEAKING AND LISTENING SKILLS PRACTICE, VOCABULARY   9
Group Discussion, Reporting, Role Play Exercises, Word Stress and Pronunciation. Technical Words, Reporting Verbs, Idioms and Phrases.

UNIT V   GRAMMAR   9
Infinitives, 'If' clauses, Future Tense, Use of Pronouns and Prepositions, Direct and Indirect Speeches, Simple Past and Simple Past Perfect Tense, Word Formation, Prefixes and Suffixes.

                                                                 TOTAL: 45 PERIODS
TEXTBOOK
1.   V.Chellammal, Learning to Communicate, Kamakhya Publications, Coimbatore, 2002.

REFERENCES
1. Lakshminarayanan, K.R. English For Technical Communication Vol. 1&2, Chennai: Scitech Publications (India) Pvt. Ltd., 2002
2. Farhathullah, T.M. English Practice Book For Technical Communication, Chennai: RBA Publications, 2002
3. Balasubramanian, M. and G.Anbalagan. English for Engineering Students, Kumbakonam R.M.S.: Anuradha Agencies Reprint 2001.

SS7201	ANALYTICAL GEOMETRY AND REAL AND COMPLEX ANALYSIS	L	T	P	C
		3	1	0	4

UNIT I   MULTIPLE INTEGRALS   12

Double integrals – change of order of integration – Area enclosed by plane curves – Triple integrals – Volume of solids.

UNIT II   VECTOR CALCULUS   12

Scalar and vector point functions – vector operator del, gradient, Divergence and curl, line integral – surface integrals – Verification of Gamss divergence – Green's and Stokes theorems.

UNIT III   THREE DIMENSIONAL GEOMETRY   12

Equation of a plane – Equation of a straight line – coplanar lines – shortest distance between two lines – Sphere – Equation of the tangent plane.

UNIT IV   ANALYTIC FUNCTION   12

Function of a complex variable – Analytic functions – Cauchy – Riemann equations – Harmonic functions.

UNIT V   COMPLEX INTEGRATION   12

Cauchy's integral theorem – Cauchy integral formula – Taylor's and laurant's theorem (statement only) – singularities – Cauchy's residue theorem – integration a round a unit circle – Integration a round a semicircle (no poles on real axis).

TOTAL: 60 PERIODS

TEXTBOOKS
1. Grewal B.S., "Higher Engineering Mathematics", 43rd Edition, Khanna Publishers, New Delhi, 2014.
2. Veerarajan.T. Engineering Mathematics (First year & Semester III), Tata McGraw Hill Publication company Ltd., New Delhi, 2006.

REFERENCES
1. Ramana B. V. , "Higher Engineering Mathematics" ,Tata McGraw Hill Co. Ltd., New Delhi,11th Reprint, 2010.
2. Bali N.P and Manish Goyal," Engineering Mathematics", Laxmi Publications (P) Ltd., New Delhi, 7th Edition, 2007.
3. Kreyszig E., "Advanced Engineering Mathematics", John Wiley and Sons, 9th Edition, 2014.
4. Ravish R. Singh and Mukul Bhatt, "Engineering Mathematics" , A tutorial approach test MCGraw Hill Private Limited., New Delhi, 2010.
5. Kandasamy, P. Thilagavathy, K. and Gunavathy, K. Engineering Mathematics, Vol. I and II, S.Chand and Company, New Delhi, 2001.

SS7202   **SOFTWARE ENGINEERING**   **L T P C**
                                                                    3 0 0 3

UNIT I   **9**
Introduction – The Software problem – Software Engineering Problem – Software Engineering
Approach – Summary – Software Process – Characteristics of a Software Process – Software
Development Process – Project Management Process – Software Configuration Management
Process – Process Management Process – Summary.

UNIT II   **9**
Software Requirements Analysis and Specification – Software Requirements – Problem Analysis –
Requirements Specification – Validation – Metrics – Summary.

UNIT III   **9**
Planning a Software Project – Cost Estimation – Project Scheduling – Staffing and Personnel
Planning – Software configuration Management Plans – Quality Assurance Plans – Project Monitoring
Plans – Risk Management – Summary.

UNIT IV   **9**
Function-oriented Design – Design Principles – Module-Level Concepts – Design Notation and
Specification – Structured Design – Methodology – Verification – Metrics – Summary. Detailed Design
– Module specifications – Detailed Design – Verification – Metrics – Summary.

UNIT V   **9**
Coding – Programming Practice – Top-down and Bottom-up - structured programming – Information
Hiding – Programming style – Internal Documentation Verification – Code Reading
– Static Analysis – Symbolic Execution – Code Inspection or Reviews – Unit Testing – Metrics –
Summary Testing – Fundamentals – Functional Testing versus structural Testing – Metrics –
Reliability Estimation – Basic concepts and Definitions – Summary.

                                                          TOTAL: 45 PERIODS

TEXTBOOK
1. Pankaj Jalote, "An Integrated Approach to Software Engineering", Narosa Publishing House,
    Delhi, 2000.

REFERENCES
1. Pressman R.S., "Software Engineering", Tata McGraw Hill Pub. Co., Delhi, 2000.
2. Sommerville, "Software Engineering", Pearson Education, Delhi, 2000.

SS7203   **COMPUTER ARCHITECTURE**   **L T P C**
                                                                    3 0 0 3

UNIT I   **9**
Basic Structure of computers – Functional Units – Bus Structures – Performance – Evolution -
Machine Instructions and programs – Memory operations – Instruction and instruction sequencing –
addressing modes – Basic I/O operations – stacks and queues – subroutines – Encoding of Machine
instructions.

UNIT II   **9**
Arithmetic – Design of fast adders – Binary Multiplication – Division – Floating point numbers and
operations.

UNIT III 9

Processing unit – Fundamental concepts – Execution of a complete instruction – Multiple bus organization – Hardwired control - Microprogrammed control – pipelining – Basic concepts – Hazards – Inference on instruction sets. Data path and control considerations – Performance issues.

UNIT IV 9

Memory System – RAM and ROM – Cache memories – Performance considerations – Virtual memories - secondary storage devices – Associative memories.

UNIT V 9

Input / Output organization – Accessing I/O devices – Interrupts – DMA – Buses – Interface circuits – standard I/O Interfaces.
Case study of one RISC and one CISC Processor.

TOTAL: 45 PERIODS

TEXTBOOK

1. Carl Hamacher, Zvonko Uranesic, Safvat Zaby, "Computer Organisation", 5th edition, McGraw Hill, 2002.

REFERENCES

1. John P Hayes, "Computer Architecture and Organisation", 3rd edition, McGraw Hill, 1998.
2. David A Patterson and John L. Hennessy, " Computer Organisation and Design The Hardware / Software Interface", 2nd edition, Harcourt Asia, Morgan Kaufmann, 2000.

SS7204 **PROGRAMMING IN C** **L T P C**
3 0 0 3

UNIT I 9
Algorithms, Flow Charts, High Level Language for Computers, Writing of Simple Programs.

UNIT II 9
Overview of C, Constants, Variables, Datatypes, Operators and Expressions.

UNIT III 9
Managing Input – Output Operators, Decision Making and Branching – Looping, Arrays.

UNIT IV 9
Handling of Character Strings, User Defined Functions, Structures and Unions, Pointers.

UNIT V 9
File Management in C, Dynamic Memory allocation and Link List, Preprocessor.

TOTAL: 45 PERIODS

TEXTBOOKS

1. V.Rajaraman "Computer Programming in C" Prentice Hall of India, New Delhi, 2001
2. E.Balguruswamy "Programming IN ANSI-C" Ed.2, Tata McGraw Hill Publication Company, New Delhi, 2002

REFERENCES

1. Kamthane, A.N., "Programming with ANSI and Turbo C", Pearson Education, Delhi, 2002.
2. Al Kelley, Iya Pohl., "A Book on C", Pearson Education, Delhi, 2001.
3. Gottfried, B.S., "Schaum's Outline of Theory and Problems of Programming in C", Tata McGraw Hill Pub. Co., Delhi, 1995.
4. Kerninghan, B.W. . and Ritchi, D.M., "The C Programming", Prentice Hall of India, 1998.

SS7205 COBOL AND DATA PROCESSING **L T P C**
3 0 0 3

UNIT I FUNDAMENTALS OF COBOL 9
Introduction – Coding Form – Characteristic – Words – Data Names – Literals – Parts of a COBOL Program – Data Structures – Data Levels – Picture Clause – VALUE and USAGE class – Filler – Basic Input / Output Statements – ACCEPT – DISPLAY – Arithmetic and Data Manipulation – ADD – SUBTRACT – MULTIPLY – DIVIDE – COMPUTE – MOVE statements – REMAMES – Condition Names – String, Unstring and Inspect Statements.

UNIT II BRANCHING, LOOPING AND TABLE HANDLING 9
IF…ELSE Statement – Nested IF…ELSE, GO TO Statement – PERFORM Statement – EXIT Statement – ALTER Statement – Occurs Clause – Table Handling – REDEFINES Clause – SEARCH Statement – SET Verb – Subroutines – Linkage Section – COBOL 85 Features.

UNIT III FILE PROCESSING 9
Sequential Files – File – Control Paragraph – FD Entry – Creation and Updation of Sequential Files – SORT / MERGE – Indexed Sequential Files – Creation- Updation – Relative Files – Creation and Manipulation.

UNIT IV INTRODUCTION TO DAT PROCESSING 9
Data Processing Cycle – Data Organisation – Electronic Computers – Input and Output Devices – File Organisation – Flow Charts – Designing Good Programs – Modular Programming – Top – Down Approach – Structured Programming – Coding Style – Efficiency – Testing.

UNIT V CASE STUDIES 9
Sorting, Searching, Merging, Indexing, Master and Transaction Files – Payroll – Accounts – Inventory – Customer Mailing List – Report Writing – Screen Handling.

TOTAL: 45 PERIODS

TEXTBOOK
1. E.Balagursamy, "COBOL Programming – A Self- Study Text", Macmillan Series in Computer Science, 1997.

REFERENCES
1. M.K.Roy and D.Ghosh Dastidar, "COBOL Programming", Second Edition, Tata McGraw Hill, 1998.
2. A.S.Philipakis and L.J.Kazmier, "Structured COBOL", Tata McGraw Hill Publishing Company Limited, 1993.

SS7211 C PROGRAMMING LABORATORY **L T P C**
0 0 4 2

Implementation of
1. Input / output function
2. Control Functions
3. Functions
4. Arrays
5. Pointers
6. Structures and Unions
7. Files

using case studies on : Roots of a quadratic equation, Measures of location – Matrix Operations – Evaluation of trigonometric functions – Pay roll problems. String operations like substring, concatenation, finding a string from a given paragraph, finding the number of words in a paragraph.

TOTAL: 60 PERIODS

SS7212	COBOL LABORATORY	L T P C
		0 0 4 2

1.   Program for Control Structures IF..ELSE, GO TO, PERFORM.
2.   Program for Arithmetic Verbs and Picture Clause.
3.   Sequential File Updation.
4.   Sorting and Merging.
5.   Indexed Sequential File Updation.
6.   Relative File Updation.
7.   Table Handling.
8.   Table Searching.
9.   Subroutines.
10. Report Writing.
11. Case Studies – Payroll, Student Information System, Income Tax Computations.

TOTAL: 60 PERIODS

MA7352	PARTIAL DIFFERENTIAL EQUATIONS	L T P C
	AND INTEGRAL TRANSFORMS	3 1 0 4

UNIT I   PARTIAL DIFFERENTIAL EQUATIONS   12
Formation of Partial differential equations – Lagrange's linear equation of first order Non linear equation of the first order – Homogeneous linear second order equations with constant coefficients.

UNIT II   FOURIER SERIES   12
Dirichlet's conditions – General Fourier series – Half range series – Parseval's formula.

UNIT III   FOURIER TRANSFORM   12
Fourier integral theorem (statement only) – Fourier Transform – Fourier sine and cosine Transforms - properties – Transforms of simple functions – Parseval's theorem.

UNIT IV   LAPLACE TRANSFORM   12
Transform of elementary functions – Periodic functions – Transform of derivatives – Inverse transform – Evaluation of Integrals by Laplace transform – convolution theorem.

UNIT V   Z- TRANSFORM   12
z – Transform, some standard z – transforms – properties – Initial and final value theorem – convolution theorem – inverse z-transforms.

TOTAL: 60 PERIODS

TEXTBOOKS
1. Veerarajan.T. Engineering Mathematics (for Semester IV), Tata McGraw Hill Publication company Ltd., New Delhi, 2001.
2. Grewal, B.S and Grewal, J.S., Higher Engineering Mathematics, Khanna Publishers, Delhi, 36th Edition, 2001.

REFERENCE
1. Kandasamy, P. Thilagavathy, K. and Gunavathy, K. Engineering Mathematics, Vol. III, S.Chand and Company Ltd., New Delhi, 2002.

MA7353	NUMERICAL METHODS	L T P C
		3 1 0 4

UNIT I   SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS   9+3
Iterative method and Newton - Raphson method for Algebraic and Transcendental Equations. Solutions of linear system by Gaussian, Gauss-Jordan, Jacobi and Gauss-Seidel methods. Inverse of a matrix by Gauss-Jordan method. Eigenvalue of a matrix by Power methods.

UNIT II   INTERPOLATION   9+3
Newton's divided difference formula, Lagrange's formula. Newton's forward and backward difference formulae, Natural Cubic Spline.

UNIT III   NUMERICAL DIFFERENTIATION AND INTEGRATION   9+3
Numerical differentiation with interpolating polynomials, Numerical integration by Trapezoidal and Simpson's 1/3rd rule. Double integrals using Trapezoidal and Simpson's rules.

UNIT IV   INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL
EQUATIONS   9+3
Single Step Methods-Taylor Series, Euler and Modified Euler, methods for first order differential equations, Runge-Kutta method of order four for first and second order differential equations. Multistep Methods-Milne and Adam's-Bashforth predictor and corrector methods for first order differential equations.

UNIT V   BOUNDARY VALUE PROBLEMS FOR ORDINARY AND PARTIAL
DIFFERENTIAL EQUATIONS   9+3
Finite difference solution for the second order ordinary differential equations. Finite difference solution for one dimensional heat equation (explicit scheme), one dimensional wave equation and two dimensional Laplace and Poisson equations.

L: 45 +T:15 = 60 PERIODS

TEXTBOOK
1. Grewal, B.S, and Grewal J.S., "Numerical Methods in Engineering and Science", 39th Edition, Khanna Publishers, New Delhi, 2005.

REFERENCES
1. Sankara Rao, K., "Numerical methods for scientists and Engineers", 3rd Edition, Prentice-Hall of India, New Delhi, 2008.
2. Veerarajan, T. and Ramachandran, T., "Numerical Methods with Programming in C", Tata McGraw-Hill Publishing Company Limited, New Delhi, 2009.
3. John H. Mathews, "Numerical Methods for Mathematics, Science and Engineering", 2rd Edition, Prentice-Hall of India, New Delhi, 2005.
4. Sastry, S. S., "Introductory Methods of Numerical Analysis", 3rd Edition, Prentice-Hall of India, New Delhi, 2004.

SS7301   **DATA STRUCTURES**   **L T P C**
                                                                     3 0 0 3

UNIT I   **9**
Introduction – Structure and Problem Solving – Storage of Information – Linear Data Structures and their sequential storage representation – concepts and Terminology – Storage structure for arrays – Structures and Arrays of Structures – Stacks – Application of Stacks.

UNIT II   **9**
Queues – Simulation – Priority Queues Linear Data Structures and their linked storage representation – Pointers and Linked Allocation – Linked Linear Lists – Applications of Linked Linear Lists – Polynomial Manipulation.

UNIT III   **9**
Nonlinear Data Structures – Trees – Definition Operations on Binary Trees – Linked Storage representation for Binary Trees – Applications of Trees – Manipulation of Arithmetic Expressions – Symbol Talk construction.

UNIT IV   **9**
Graphs and their representation – Matrix representation – List structures – Breadth First Search – Depth First Search spanning Trees – Application of Graphs – PERT and Related Techniques.

UNIT V   **9**
Dynamic storage Management – Fixed Block Storage Allocation – First –fit Storage Allocation – Buddy System – File Structures – External Storage Devices – Sequential Files – Structure – Processing Indexed Sequential Files – Structure – Processing Direct Files – Structure Processing.

                                                            TOTAL: 45 PERIODS

TEXT BOOKS
1. Tremblay, J.P., and Sorenson, P.G., "An Introduction to Data Structures with Applications", II edition, Tata McGraw Hill Publication Company Ltd., New Delhi, 2002.
2. E. Balagurusamy, "C and Data Structures", Tata McGraw Hill Pub. Co., New Delhi, 2002.

REFERENCES
1. A.V. Aho, J.E. Hopcroft and J.D. Ullman "Data Structures and Algorithms" Pearson Education Delhi, 2002
2. Nicklaus Wirth, "Algorithms and Data Structures – Programmes" Prentice Hall of India Pvt. Ltd., New Delhi, 2002
3. Y.Langesam, M.J. Augenstein and A.M. Tenenbaum, "Data Structures using C and C++" II edition, Prentice Hall of India, New Delhi, 2002

SS7302   **OBJECT ORIENTED PROGRAMMING AND C++**   **L T P C**
                                                                        3 0 0 3

UNIT I   **9**
Principles of Object Oriented Programming, Simple C++ Program, Tokens, Expressions, Control Structures.

UNIT II   **9**
Functions in C++, Classes and Objects.

UNIT III   **9**
Constructors and Destructors, Operators Overloading and Type Conversion.

UNIT IV   **9**
Inheritance, Extending Classes, Pointers, Virtual Functions and Polymorphism.

UNIT V   **9**
Managing Console Input / Output Operations, Working with Files.

TOTAL: 45 PERIODS

TEXTBOOK
1. E. Balagusamy, "Object Oriented Programming with C++", 2nd edition, Tata McGraw Hill Pub. Co., New Delhi, 2001.

REFERENCES
1. Kamthane, "Object Oriented Programming with ANSI and Turbo C++, Pearson Education, Delhi, 2003.
2. Bjorne Stroustrup, "The C++ Programming Language", Pearson Education, Delhi, 1999.
3. S.B.Lippmann, "The C++ Primer", Pearson Education, Delhi, 1999.
4. Rober Lafore, "Object Oriented Programming in Microsoft C++", Galgotia Publications 1999.

SS7303   **DATABASE MANAGEMENT SYSTEMS**   **L T P C**
                                                                3 0 0 3

UNIT I   INTRODUCTION   **9**
File systems versus Database systems – Data Models – DBMS Architecture – Data Independence – Data Modeling using Entity – Relationship Model – Enhanced E-R Modeling.

UNIT II   STORAGE STRUCTURES   **9**
Secondary storage Devices – RAID Technology – File operations – Hashing Techniques – Indexing – Single level and Multi-level Indexes – B+ tree – Indexes on Multiple Keys.

UNIT III   RELATIONAL MODEL   **9**
Relational Model Concepts – Relational Algebra – SQL – Basic Queries – Complex SQL Queries – Views – Constraints – Relational Calculus – Tuple Relational Calculus – Domain Relational Calculus – overview of commercial RDBMSs – Database Design – Functional Dependencies – Normal Forms – 1NF – 2NF-3NF-BCNF – 4NF-5NF – Database Tuning.

UNIT IV   QUERY AND TRANSACTION PROCESSING   **9**
Algorithms for Executing Query Operations – using Hermistics in Query operations – Cost Estimation – Semantic Query Optimization – Transaction Processing – Properties of Transactions - Serializability – Transaction support in SQL.

UNIT V   CONCURRENCY, RECOVERY AND SECURITY   9

Locking Techniques – Time Stamp ordering – Validation Techniques – Granularity of Data Items – Recovery concepts – Shadow paging – Log Based Recovery – Database Security Issues – Access control – Statistical Database Security.

TOTAL: 45 PERIODS

TEXTBOOK

1. Ramez Elamassri and Shankant B-Navathe, "Fundamentals of Database Systems", Third Edition, Pearson Education Delhi, 2002.

REFERENCES

1. Abraham Silberschatz, Henry F.Korth and S.Sundarshan, "Database System Concepts", Fourth Edition, McGraw Hill, 2002.
2. C.J. Date, "An Introduction to Database Systems", Seventh Edition, Pearson Education Delhi, 2002.

SS7311	**C++ LABORATORY**	**L T P C**
		0 0 4 2

1.   Simple Programs in C++

2.   Create a Complex Number Class with all possible Operators

3.   Create a Vector Class

4.   Create a String Class

5.   Create a Time Class

6.   Create a Date Class

7.   Create a Matrix Class

8.   Create an Employee Class with Derived Classes

9.   Create Lists

10.   File Handling

11.   Operator Overloading

TOTAL: 60 PERIODS

SS7312	**DATA STRUCTURES LABORATORY**	**L T P C**
		0 0 4 2

Arrays and Structures in C, Infix, Postfix, Prefix expressions using stack, Recursion, Linked list, Circular linked list, Queues as circular list, Operation on binary trees – Insort, Quicksort, Heapsort, Shell sort, Sequential search and binary search.

TOTAL: 60 PERIODS

SS7313   **RDBMS LABORATORY**   **L T P C**
                                                                                             0 0 4 2

1.   Data Definition, Manipulation of base Tables and views.

2.   High level programming language extensions.

3.   Front and tools.

4.   Forms – Triggers – Menu Design.

5.   Reports.

                                                                            TOTAL: 60 PERIODS

MA7454   **DISCRETE MATHEMATICS**   **L T P C**
                                                                                             3 1 0 4

UNIT I   MATHEMATICAL LOGIC   12
Statements – connectives – Truth Tables- Equivalence and Implication - normal form – Inference theory for statement calculus – predicate statements – Inference Theory for predicate calculus – Mathematical Induction.

UNIT II   RELATIONS AND FUNCTIONS   12
Equivalence relation – Function – Composition – Identity and Inverse.

UNIT III   GROUPS   12
Definition and Examples – Subgroups – Homomorphism – Cosets and Lagrange's theorem – Normal subgroups – Group Codes.

UNIT IV   RINGS AND FIELDS   12
Basic definition and concepts – Rings - Fields - Polynomial Rings – Field extension.

UNIT V   BOOLEAN ALGEBRA   12
Posets – Lattices – special Lattices – Boolean Algebra.
                                                                            TOTAL: 60 PERIODS
TEXTBOOKS
1.   Trembly, J.P. and Manohar, R. Discrete Mathematical structures in the application to computer science, Tata Mc Graw Hill, New Delhi (for Logic, Groups and Boolean Algebra), 1997.
2.   Alan Dorr, Applied Discrete Structures for Computer Science, Galkotia Publication (for Relation and Functions), 1998.

REFERENCES
1.   Lipschutz, S. and Lipson, M. Discrete Mathematics, Schaum's outlines, Tata McGraw Hill Publication Company Ltd., New Delhi, 2002.
2.   Grimaldi, R.P. Discrete and Combinational Mathematics, Fourth Edition, Pearson Education, New Delhi, 2002.

SS7401   **FORMAL METHODS IN SOFTWARE ENGINEERING**   **L T P C**
                                                                             3 0 0 3

UNIT I   **9**
Software Process Maturity – Software Maturity Framework – Principles of Software Process Change – Software Process Assessment – Initial Process.

UNIT II   **9**
The Repeatable Process – Managing Software Organizations – Project Plan – Software Configuration Management – Software Quality Assurance.

UNIT III   **9**
The Defined Process – Software Standards – Software Inspections – Software Testing – Software Configuration Management – Defining the Software Process – Software Engineering Process Group.

UNIT IV   **9**
The Managed Process – Data Gathering and Analysis – Managing Software Quality.

UNIT V   **9**
The Optimizing Process – Defect Prevention – Conclusion.

TOTAL: 45 PERIODS

TEXTBOOK

1. Watts S.Humphrey, "Managing the Software Process", SEI Services in Software Engineering, Addison Wesley Longman, 2000.

REFERENCES

1. Ian Summerville, "Software Engineering", 6th Edition, Pearson Education, 2003.
2. Rozer Pressman, "Software Engineering ; A Practice men Approach, McGraw Hill, 2002.

SS7402   **OPERATING SYSTEM AND SYSTEM SOFTWARE**   **L T P C**
                                                                             3 0 0 3

UNIT I   **9**
Language Processors – Introduction – Language Processing Activities - Assemblers – Elements of Assembly Language Programming – A simple Assembly Scheme – Pass Structure of Assemblers – Design of a Two Pass Assembler – Macros and Macro Processors – Macro Definition and Call – Macro Expansion – Design of a Macro Preprocessor.

UNIT II   **9**
Introduction – Main frame systems – Desktop Systems – Multiprocessor – Distributed – Clustered – Real - Time-Hand held – Feature Migration – Computing Environments.
Processes Concepts – Scheduling – Operations – Cooperating Processes - Interprocess Communication.

UNIT III   **9**
Threads – Overview – Multithreading Models – Issues CPU Scheduling – Basic Concepts – Scheduling Criteria – Scheduling algorithms – Multiprocessor Scheduling – Real -Time Scheduling Process synchronization Background – The critical section Problem – Synchronization Hardware – Semaphores – Classical Problems of Synchronization – Critical Regions – Monitors.

UNIT IV   **9**
Deadlocks – System Model – Characterization – Methods for handling deadlocks – Deadlock Prevention – Avoidance – Detection – Recovery from deadlocks – Memory Management – Background – Swapping – Contiguous Memory allocation – Paging – Segmentation.

UNIT V   **9**
Virtual Memory – Background – Demand Paging – Page replacement – Allocation of frames – Thrashing – File System Interface – Concept – Access Methods – Directory Structure.

TOTAL: 45 PERIODS

TEXT BOOKS

1. Abraham Silberschatz, Peter BaerGalvin and Greg Gagne, Operating System Concepts, Sixth Edition, John Wiley and Sons and Inc., 2002.
2. D.M. Dhamdhere, "Systems Programming and Operating Systems", Second Revised Edition, Tata McGraw Hill Publishing Company Limited, New Delhi, 2002.

REFERENCES

1. H.M. Deitel, "Operating Systems" Second Edition, Pearson Education Delhi, 2002.
2. A.S. Tanenbaum and A.S. Woodhull "Operating Systems, Design and Implementation", Second Edition Pearson Education Delhi, 2002.
3. John J. Donovan, "Systems Programming" Tata McGraw-Hill Publishing Company Limited, New Delhi, 2002.
4. L.Beek, "System Software, An Introduction to System Programming", Addison Wesley, 2002.

SS7403   **SOFTWARE ARCHITECTURE AND DESIGN**   **L T P C**
                                                       3 0 0 3

OBJECTIVES
- To understand the architecture and quality attributes of the software.
- To understand the design fundamentals and methodologies of the software.
- To learn the tools of architectural design for the current trends.

UNIT I   **INTRODUCTION TO ARCHITECTURE**   **9**
Notion of Architecture – Notion of Software Architecture - Architectural Styles – Description of Software Architecture –Visual Notation – Examples.

UNIT II   **DESIGN FUNDAMENTALS**   **9**
The Basic Concepts of Design – Characteristics of Design Activities – Essential Elements of Design – The Factors that Affect the Design – Design Principles Basic Rules of Software Design – Design Processes

UNIT III   **DESIGN METHODOLOGIES**   **9**
Structured Design – Design Practices – Stepwise Refinement – Incremental Design – Structured System Analysis and Design – Jackson Structured Programming – Jackson System Development – Designing with Objects – User Interface Design.

UNIT IV   **ARCHITECTURAL DESIGN**   **9**
Typical Architectural Design – Data Flow – Independent Components – Call and Return – Using Styles in Design – Choices of Style – Combination of Styles – Architectural Design Space – Theory of Design Spaces – Design Space of Architectural Elements – Design Space of Architectural Styles.

UNIT V   **CASE STUDIES**   **9**
Tools for Architectural design – Case Studies.

TOTAL: 45 PERIODS

OUTCOMES

Upon Completion of the course, the students will be able to
- To reconstruct the software architecture that can be used for an application of your choice.
- Able to design the software using design fundamentals and methodologies.
- To create a good software by using the styles, architectural design space.

REFERENCES:

1. Hong Zhu, "Software Design Methodology From Principles to Architectural Styles", Elsevier, 2005.
2. David Budgen, "Software Design", Second Edition, Pearson Education, 2004.
3. Mary Shaw David Garlan, "Software Architectural Perspectives on an emerging discipline", EEE, PHI 1996.
4. John Robinson, "Software Design for Engineers and Scientists", Newnes, 2004.
5. A. G. Suteliffe, "Human Computer Interface Design", Second Edition Macmillan, 1995.
6. Hassan Gomaa, Software Modeling Design, Cambridge University Press, 2011

SS7404	COMPUTER GRAPHICS AND MULTIMEDIA	L T P C
		3 0 0 3

UNIT I   OVERVIEW OF COMPUTER GRAPHICS AND MULTIMEDIA   9

A Survey of Computer Graphics – Overview of Graphics System – Video Display Devices – Raster-Scan and Random-Scan Systems – Input Devices – Hard Copy Devices – Graphics software – Fractals, Animations.

UNIT II   OUTPUT PRIMITIVES AND 2D TRANSFORMATIONS   9

Point Generation – Line and Circle Generating Algorithms – Area filling algorithm-Scanline Polygon Fill algorithm–Inside outside tests-Boundary fill algorithm-flood fill algorithm-character generation-2D Transformations – Windowing & Clipping – Cohen-Sutherland Line Clipping – Liang-Barsky Line Clipping.

UNIT III   3D GRAPHICS   9

3D Concepts – Representations – Polygon Surfaces – Splines representations and types of splines – 3D Transformations – Projections – Visible Surface Detection Methods – Backface Detection – Scanline Method – Depth-Sorting Method.

UNIT IV   MULTIMEDIA TOOLS AND COMMUNICATIONS   9

Multimedia – Multimedia and Hypermedia – Overview of Multimedia software tools – multimedia authoring and tools – multimedia networks- multimedia network communications and applications-standards for multimedia communications- multimedia over wireless networks.

UNIT V   MULTIMEDIA INFORMATION REPRESENTATION   9

Digitization principles – Text – Unformatted text – formatted text – Hyper text - Images – Graphics – Digitized documents – Digitized pictures - Audio – PCM – CD quality audio – Synthesized audio – Video – Digital video – PC video – text and image compression – audio and video compression.

TOTAL: 45 PERIODS

TEXTBOOKS

1. Hearn, D. and Pauline Baker, M., "Computer Graphics", 2nd Edition, Pearson Education, Asia, Delhi, 2002.
2. Ze-Nian Li and Mark S. Drew, Fundamentals of Multimedia, Pearson Education, 2005.
3. Fred Halsall, Multimedia communications – Applications, Networks, Protocols and Standards, Pearson Education, 2002.

REFERENCES
1. Rogers, D.F., "Procedural Elements for Computer Graphics", 2nd Edition, Tata McGraw Hill Publications, New Delhi, 2001.
2. Foley, J.D. , Andries Van Dam, Feiner, S. K. and Hughes J.F., "Computer Graphics – Principles and Practice", Pearson Education, Asia, Delhi, 2001.
3. Ralf Steinmetz, Klara Nehrstedt, Multimedia, Computing, Communications and Applications, Prentice Hall, 1995.

SS7405	MANAGEMENT INFORMATION SYSTEM	L T P C
		3 0 0 3

UNIT I INTRODUCTION 9
Business Information Systems – Data-Information Systems – Information Systems in Business – Strategic uses of Information Systems – Strategy and strategic moves – Achieving a Competitive Advantages – Information Systems in Business functions – Effectiveness and Efficiency – Manufacturing and Inventory control – Marketing sales and customer service – Human Resources – Enterprise Resource Planning – Groupware and Collaborative work – Applications – Data and knowledge Management – Database Architecture – Web Databases – Data Warehousing – Data Mining – Knowledge Management.

UNIT II INFORMATION TECHNOLOGY IN MANAGEMENT 9
Managers and Their Information Needs – The organizational pyramid – characteristics of Information at different managerial levels – The Nature of Management work – Organizational Structure – Characteristics of Effective Information – Managers and Their Information systems – Information – Politics and power – Organizing Information Systems and services – Sector Books
– Information Systems Architecture and Management – Organizing the IS staff – Challenges for IS Managers and Line Managers – The Information center – Careers in Information Systems.

UNIT III IS IN DECISION MAKING 9
Decision support, Executive and Geographic Information systems – Deciding on Decision Aids – Decision Making in Business – The Decision – Making process – structured and unstructured problems – DSS Components – Sensitivity Analysis – Executive Information Systems – Artificial Intelligence (AI) and Expert Systems – AI in Business – Knowledge Representation Methods – Expert Systems in Action.

UNIT IV PLANNING INFORMATION SYSTEMS 9
Why plan – Approaches to planning – IS planning – The systems Development Life cycle – Prototyping – Computer Aided Software Engineering – Project Management – Systems Development led by end users – Systems Integration – Avenues for Systems Acquisition – Sources of Information – Outsourcing – The IS subsidiary – purchase application – Renting Software – User Application Development.

UNIT V CONTROLS, SECURITY AND APPLICATIONS 9
Goals of Information security – Risks to Information Systems – Controls – Recovery measures – Application of MIS in Decision Making – Organizational Decision making in Manufacturing sector – personnel management – Financial Management – Marketing Management – Applications in Service Sector.

TOTAL: 45 PERIODS

TEXTBOOKS
1. Effy oz "Management Information Systems", Second Edition, Thomson Learning Course Technology, 2000.
2. W.S. Jawadekar, "Management Information Systems", Tata McGraw Hill Publishing Company, Delhi, 2002.

REFERENCES
1. David Knoenke, "Management Information Systems", Tata McGraw Hill Pub. Co., Delhi, 1989.
2. Landon K.C. and Landon J.P. "Management Information Systems", Maxwell Macmillan Publishing Company, 2001.

SS7411   OPERATING SYSTEM AND SYSTEM SOFTWARE LABORATORY   L T P C
0 0 4 2

A.   Operating System
    1.   Writing device drivers in DOS and UNIX environments
    2.   Performance measures of various processor scheduling methods
    3.   Process creation, Process synchronization & Interprocess communication using semaphores.
    4.   Pipes and message in UNIX environment
B.   System Software
    1.   Creation of symbol table.
    2.   Searching the table of Symbols.
    3.   Implementation of an assembler.
    4.   Linking assembly language with C.
    5.   Developing a simple text editor.
    6.   Developing a simple graphical editor.
    7.   Package development.

TOTAL: 60 PERIODS

SS7412   COMPUTER GRAPHICS AND MULTIMEDIA LABORATORY   L T P C
0 0 4 2

Point Generation – Implementation of Line Algorithms – Implementation of Circle Algorithm – Clipping – Implementation of 2D Transformations – 3D Objects – Sphere, Ellipsoid- implementation of perspective and parallel projection.

The above exercises are to be carried out in open GL environment.   **(9 labs)**

Tweened Animation- Motion tween – Motion along open/closed guided path - Shape tween– Size tween – Color Tween – morphing – Fractal drawing – Image editing tool –Audio and Video Editing tools.   **(9 labs)**

Mini project

TOTAL: 60 PERIODS

SS7501   **OPERATIONS RESEARCH**   **L T P C**
                                                                        3 1 0 4

UNIT I   LINEAR PROGRAMMING   9
Graphical Solution – Simplex Method – Artificial Starting Solution – Primal – Dual Relationships.

UNIT II   APPLICATION OF LINEAR PROGRAMMING   9
Transportation Model – Assignment Model – Tran shipment Models.

UNIT III   NETWORK MODELS   9
Shortest Route Problem – Critical Path Computation – PERT Networks.

UNIT IV   INVENTORY MODELS   9
Deterministic Inventory Models – Static and Dynamic EOQ Models – Continuous review Probabilistic EOQ Model – s-S Policy for single Period Model.

UNIT V   QUEUING SYSTEMS   9
Poisson Process – Pure Birth and Death Models – Single and Multi Server Markovian Queueing Models – Steady state solutions.

TOTAL(45+15): 60 PERIODS

TEXT BOOK
1.   Taha H.A., "Operations Research an Introduction", Prentice–Hall of India, 2002.

REFERENCES
1.   J.K. Sharma, "Operations Research – Theory and Application", Macmillan, 2003.
2.   Hillier, L.S. and G. J. liebaman, Introduction to Operations Research, Tata McGraw Hill Pub. Co., Delhi, 1985.

SS7502   **COMPUTER NETWORKS**   **L T P C**
                                                                      3 0 0 3
UNIT I   9
Foundation – Requirements – Network Architecture – Direct Link Networks – Hardware building Blocks – Encoding – Framing – Error Detection – Reliable Transmission.

UNIT II   9
Direct Link Networks – Ethernet (802.3) – Token Rinks (802.5, FODI) – Packet Switching – switching and Forwarding – Bridges and LAN Switches – Cell Switching (ATM).

UNIT III   9
Internet Working – Simple Internet Working (IP) – Routing.

UNIT IV   9
Internetworking – Global Internet – Multicast

UNIT V   9
End –to-End Protocols – Simple Demultiplexer (UDP) – Reliable Byte Stream (TCP).

TOTAL: 45 PERIODS

TEXTBOOK
1.   Larry L. Peterson and Bruce S. Davie, "Computer Networks", 2nd Edition, Harcourt Asia Pvt. Ltd, Morgan Kaufmann, 1999.

REFERENCES
1. William Stallings, "Data and Computer Communications", Sixth Edition, Prentice Hall of India, 2002.
2. Andrew S.Tanenbaum, "Computer Networks", Fourth Edition, Prentice Hall of India, 2002.

SS7503 **DESIGN AND ANALYSIS OF ALGORITHMS** **L T P C**
3 0 0 3

UNIT I **9**
Introduction – Algorithm – Specification – Performance Analysis – Divide – And Conquer – General Method – Binary Search – Finding the Maximum and Minimum – Merge Sort – Quick Sort.

UNIT II **9**
The Greedy Method – General Method – Knapsack Problem – Tree Vertex Splitting Dynamic Programming – General Method – Multistage Graphs – All pairs shortest paths – Single – Source Shortest paths – The travelling salesperson problem – Flow shop scheduling.

UNIT III **9**
Basic Traversal and Search Techniques – Binary Trees – Graphs – Connected Components and Spanning Trees – Biconnected Components.

UNIT IV **9**
Backtracking – General Method – 8 Queens Problem – Graph Coloring - Branch and Bound – Method – 0/1 Knapsack Problem.

UNIT V **9**
NP-Hard and NP-Complete Problem – Basic Concepts – Cooke's Theorem – NP-Hard Problems – Clique Decision Problem - Job Shop Scheduling – Code generation with Common Subexpressions – Approximation Algorithms – Introduction – Absolute Approximations – E- Approximations.

TOTAL: 45 PERIODS

TEXTBOOK
1. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, "Computer Algorithms", Galgotia Publications Pvt. Ltd., 2002.

REFERENCES
1. Sara Baase and Allen Van Gelde "Computer Algorithms, Introduction to Design and Analysis", III edition, Pearson Education Delhi, 2002.
2. Aho, Hoporoft and Ullman "The Design and Analysis of Computer Algorithm", Pearson Education Delhi, 2001.

SS7504 **PRINCIPLES OF DATA COMMUNICATION** **L T P C**
3 0 0 3
UNIT I **BASICS OF COMMUNICATION** **9**
Basics of AM, FM and PM Block Diagram, Concepts of AM, FM modulators and demodulators - Pulse modulation systems - Pulse amplitude modulation - Sampling, Quantisation, Quantisation error.

UNIT II **INFORMATION THEORY AND CODING** **9**
Discrete Messages - Concepts of entropy and information rate - Shannon's theorem - channel capacity - Orthogonal signals and their use - Introduction to coding - Coding and Decoding - Algebraic codes, burst error correction codes - Convolution coding and decoding.

UNIT III   DATA TRANSMISSION CONCEPTS   9

Concepts and Terminology- Analog and Digital transmission, Transmission impairments - Transmission media - Synchronous/Asynchronous transmission - Line Configurations - interfacing.

UNIT IV   DATA ENCODING   9

Digital data Digital signals - Variations of NRZ and biphase - Digital data Analog signals - ASK, FSK, PSK, QPSK - Analog Data Digital signals - PCM, DM.

UNIT V   DATA LINK CONTROL   9

Flow control, Error control - HDLC, Multiplexing.

TOTAL : 45 PERIODS

TEXTBOOKS

1.   Taub and Schilling, "Principles of Communication Systems", Tata Mc Graw Hill, Delhi, 2002.
2.   William Stallings, "Data and Computer Communications", Sixth Edition, Pearson Education, Delhi, 2002.

REFERENCE

1.   Prakash C. Gupta, "Data Communications", Prentice Hall of India, Delhi, 2002.

SS7505   THEORY OF COMPUTATION   L T P C
**   3 1 0 4**

UNIT I   LANGUAGE AND FINITE AUTOMATA   12

Alphabets and Languages – Finite representation of Languages – Deterministic and Nondeterministic finite automata – Finite automata and regular expressions – Languages that are and are not regular.

UNIT II   CONTEXT – FREE LANGUAGES   12

Context free grammars – parse trees – Pushdown automata – Pushdown automata and context free grammars – Languages that are and are not context – free.

UNIT III   TURING MACHINES   12

The definition of a Turing Machine – Computing with Turing Machines – Extensions of the Turing Machine – Random access Turing machines – Nondeterministic Turing machines – Grammars.

UNIT IV   UNDECIDABILITY   12

Universal Turing Machines – The halting Problem – Undecidable problems about Turing achines – Unsolvable problems about grammars.

UNIT V   COMPLEXITY AND NP-COMPLETENESS   12

The Class –P- The class NP.

TOTAL : 60 PERIODS

TEXTBOOK

1. Lewis, H.R. and Papadimitrou, C.H, "Elements of the Theory of Computation", Pearson Education, Delhi, Second Edition, 1998.

REFERENCES

1. Martin. J, "Introduction to Languages and Theory of Computation", McGraw Hill Company, 3rd International Edition, 2003.
2. Hopcraft, J.E. Motrani, R and Ullman, J.D, "Introduction to Automata Theory Languages and Computation", second edition, Pearson education, Delhi,2002.
3. Mishra, K.L.P and Chandrasekaran, "Theory of Computer Science", 3rd Edition, Printice Hall of India, New Delhi, 2003.

SS7511   **ALGORITHMS LABORATORY**   **L T P C**
                                                                          0 0 4 2

Implementation of following problems using C

1. Binary Search Algorithm
2. Finding Maximum and Minimum of a given list
3. Mergesort
4. Quicksort using divide-and-conquer algorithm
5. Shortest path algorithms (any 2 algorithms)
6. Traversals and Searching in Graphs
7. Minimal Spanning Tree Algorithm

TOTAL : 60 PERIODS

SS7512   **UNIX LABORATORY**   **L T P C**
                                                                          0 0 4 2

1.   Inter Process Communication (IPC) using Message Queue.
2.   IPC using pipes.
3.   Implementation of wait and signal using counting semaphores.
4.   Implementation of wait and signal using binary semaphores.
5.   Atomic counter update problem.
6.   Counting Semaphores at the user level using binary semaphores.
7.   Signaling Processes.
8.   Deadlock detection (for process passing messages).
9.   Process Scheduling FCFS.
10. Process Scheduling : Least Frequently Used.

TOTAL: 60 PERIODS

SS7513   **OPERATIONS RESEARCH AND NETWORKS LABORATORY**   **L T P C**
                                                                     0 0 4 2

A.   OPERATIONS RESEARCH LABORATORY
1.   Solving inequalities using simplex, two-phase, dual simplex methods.
2.   Solving the transportation problems using north-west corner rule, row-minimum, matrix-minimum.
3.   Solving assignment problem using Hungarian method.
4.   To find the critical path for the given PERT and CPM network.

B.   NETWORKS LABORATORY
1.   Working with Java Scripts.
2.   Creating ActiveX Controls.
3.   OLE Server.
4.   OLE Container
5.   Working with URL Monikers.
6.   Creating an ISAPI Extension
7.   Creating an ISAPI Filter.
8.   Building IIS Application
9.   Data-Driven DHTML Application.
10.   ActiveX Documents.

TOTAL: 60 PERIODS

SS7601   **CLOUD COMPUTING**   **L T P C**
                                                                    3 0 0 3
OBJECTIVE

- To understand the concept of cloud and utility computing
- To understand the various issues in cloud computing
- To familiarise themselves with the lead players in cloud
- To appreciate the emergence of cloud as the next generation computing paradigm
- To be able to set up a private cloud
  At the end of this course the student should be able to
- Appreciate the new computing model called cloud computing and why its creating such a hype in the 21st century;
- Use the open source cloud services;
- Understand that one of the major issues in uasge of public cloud is security;
- Is expected to deploy a private cloud and understand the issues currently prevailing.

UNIT I   INTRODUCTION   9
Evolution of cloud computing – Need for cloud computing - Benefits - Limitations - Migration into Cloud - Basics of virtualization - Desktop virtualization - Server virtualization - Case study: VMware - Basics of web services - Key concepts

UNIT II   CLOUD ARCHITECTURE   9
Three-layer cloud computing architecture - On-demand provisioning - Elasticity in cloud Cloud Computing Services – Infrastructure-as-a-Service – Software-as-a-Service –Platform-as-a-Service - Cloud providers - Cloud deployment models

UNIT III   ISSUES IN CLOUD   9
Federation in cloud - Four levels of federation - Privacy in cloud - Security in cloud - Software-as-a-Service security - Case study: Aneka - Service level agreements

UNIT IV   CLOUD STORAGE   9

Overview of cloud storage - Cloud storage providers - Case studies: Walrus - Amazon S3 - Cloud file system – Map Reduce - Case study: Hadoop

UNIT V   CLOUD DEPLOYMENT TOOLS   9

Study of open source cloud platforms - Eucalyptus - Nimbus - Open Nebula

TOTAL: 45 PERIODS

TEXT BOOKS:
1. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing: A Practical Approach", Tata McGrawHill, 2009.
2. John W.Rittinghous, James F.Ransome, "Cloud Computing: Implementation, Management and Security", CRC Press, 2010

REFERENCES:
1. Danielle Ruest and Nelson Ruest, 'Virtualization: A Beginner's Guide", McGraw Hill, 2009.
2. Leonard Richardson, Sam Ruby, "RESTful Web Services Web services for the real world", O'REILLY, 2007.
3. Katarina Stanoevska-Slabeva, Thomas Wozniak, Santi Ristol, "Grid and Cloud Computing - A Business Perspective on Technology and Applications", Springer, 2009.
4. Tom White, "Hadoop: The Definitive Guide", O'REILLY Media, 2009.
5. Rajkumar Buyya, James Broberg, Andrzej Goscinski, "Cloud Computing -Principles and Paradigms", John Wiley and Sons, 2011.
6. James E. Smith, Ravi Nair, "Virtual Machines: Versatile Platforms for Systems and Processes'', Elsevier/Morgan Kaufmann, 2005.
7. www.open.eucalyptus.com/
8. http://opennebula.org
9. www.nimbusproject.org
10. http://www.nimbusproject.org/files/riteau_CCA11.pdf

SS7602   **ARTIFICIAL INTELLIGENCE**   **L T P C**
                                                                     3 0 0 3

UNIT I   INTRODUCTION   9

Artificial Intelligence Definition – Importance of Artificial Intelligence – Knowledge based Systems – Knowledge Representation – State space search – Production systems – Artificial Intelligence Programming Language – PROLOG – Heuristic search - Depth First Breadth first – Hill climbing – 4th algorithms – Game Playing.

UNIT II   KNOWLEDGE REPRESENTATION   9

Prepositional Logic – Clause form – Predicate logic – Resolution – Inference Rules – Unification – Semantic networks – frames – conceptual dependency – Scripts – Representing Knowledge using rules.

UNIT III   SYMBOLIC REASONING AND UNCERTAINTY   9

Non monotanic Reasoning – Truth maintenance systems – closed world assumption – modal and temporal Logics – Bayes Theorem - certainty factors – Baycsian networks – Dempster – Shafer Theory – Fuzzy logic.

UNIT IV **NATURAL LANGUAGE PROCESSING AND DISTRIBUTED ARTIFICIAL INTELLIGENCE** **9**

Overview of Linguistics – grammars and Languages – Basic parsing techniques – semantic Analysis and representation structures – Natural language generation – natural language systems – Distributed Reasoning systems – Intelligent agents.

UNIT V **EXPERT SYSTEMS** **9**

Architecture – Non production systems Architectures – Knowledge acquisition and validation – Knowledge system building tools – Types of Learning – General Learning model – Learning by induction – Generalization and specialization – Inductive bias – Explanation based Learning.

TOTAL: 45 PERIODS

TEXTBOOKS
1. Dan W. Patterson, "Introduction to Artificial Intelligence and Expert Systems", Prentice Hall of India, Delhi, 2001.
2. Elaine Rich and Kevin Knight, "Artificial Intelligence" Tata McGraw Hill, Delhi, 2001.

REFERENCE
1. George F Luger, "Artificial Intelligence, structures and strategies for complex problem solving", Pearson Education Delhi, 2001.

SS7603 **INTERNET PROGRAMMING** **L T P C**
3 0 0 3

UNIT I **INTRODUCTION** **9**

Java Features – comparison of Java with C and C++ - Java and Internet – Java Environment – Java Program structure – Java Tokens – Implementing a Java Program – Java Virtual Machine – Constants – Variables – Data Types – Scope of Variables – Type casting – Operators and expressions – Decision Making, Branching and Looping.

UNIT II **CLASSES AND ARRAYS** **9**

Defining a class – Constructors – Methods – overloading – static Members – Nesting of Methods – Overriding methods – Final Classes – Abstract Class – Visibility control – Arrays – creating an array – Two Dimensional arrays – Strings – String Arrays – String Methods – String Buffer Class – Vectors – Wrapper Classes.

UNIT III **INHERITANCE, INTERFACES AND PACKAGES** **9**

Defining a subclass – Subclass constructor – Multilevel inheritance – Hierarchical Inheritance – Defining Interfaces – Extending Interfaces – Implementing Interfaces – Java APF Packages – creating a package – Accessing and Using a package – Adding a class to a package – Hiding Classes.

UNIT IV **MULTITHREADING EXCEPTION HANDLING AND FILES CREATING THREADS** **9**

Extending the Thread class – Thread Life cycle – Thread Exception – Thread priority – Synchronization – Runnable Interface – Exceptions – Throwing own Exceptions – Concepts of streams – stream classes – Byte Stream Classes – Character stream Classes – Using Streams – Using file Class –Other Stream Classes.

UNIT V **APPLET PROGRAMMING** **9**

Difference between Application and Applets – Applet Life cycle – creating an Executable Applet – Designing a Web Page – Adding Applet to HTML File – Passing Parameters to Applets.

TOTAL: 45 PERIODS

TEXTBOOK

1. E. Balagurusamy, "Programming with Java – A primer", Second Edition, Tata McGraw Hill Publishing Company, Delhi, 2002.

REFERENCE

1. Herbert Schildt, "The complete Reference – Java 2", Fifth Edition, Tata McGraw Hill Publishing Company, Delhi, 2002.

SS7604 **OBJECT ORIENTED ANALYSIS AND DESIGN** **L T P C**
3 0 0 3

UNIT I **OBJECT BASIS** **9**

Object Oriented Philosophy – Object – Object State, behaviors and methods. Encapsulation and information hiding Class Relationship among classes polymorphism, aggregation, object containment, meta classes.

UNIT II **OBJECT ORIENTED METHODOLOGIES** **9**

Rumbaugh object Model, Booch methodology Jacobson methodology, patterns, frame works and unified approach.

UNIT III **OBJECT ORIENTED ANALYSIS** **9**

Business object analysis use case driven approach – use case model. Object analysis – CRC cards – Noun phrase approach Identifying object relationships and methods.

UNIT IV **OBJECT ORIENTED DESIGN** **9**

On design process – Design axioms – design patterns – designing classes. Case study.

UNIT V **UML AND PROGRAMMING** **9**

Introduction to unified modeling language – UML diagrams – class diagrams and use case diagrams – State and dynamic models. Case study to inventory, sales and banking.

TOTAL: 45 PERIODS

TEXTBOOK

1. Ali Bahrami, "Object Oriented Systems Development" Irwin-McGraw Hill, New Delhi, International editions, 1999.

REFERENCES

1. Martin Fowler, Kendall Scott, "UML Distilled-Applying the standard Object Modeling Language", Addition Wesley, 1977.
2. Gredy Booch, "Object Oriented Analysis and Design with applications", II edition, Addition Wesley, 1994.

SS7605 **ENVIRONMENTAL SCIENCE AND ENGINEERING** **L T P C**
3 0 0 3

AIM

To create awareness in every engineering graduate about the importance of environment, the effect of technology on the environment and ecological balance and make them sensitive to the environment problems in every professional endeavour that they participates.

OBJECTIVE

At the end of this course the student is expected to understand what constitutes the environment, what are precious resources in the environment, how to conserve these resources, what is the role of a human being in maintaining a clean environment and useful environment for the future generations and how to maintain ecological balance and preserve bio-diversity. The role of government and non-government organization in environment managements.

UNIT I ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY 14

Definition, scope and importance of environment – need for public awareness - concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers – energy flow in the ecosystem – ecological succession – food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to biodiversity definition: genetic, species and ecosystem diversity – biogeographical classification of India – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – Biodiversity at global, national and local levels – India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity.

Field study of common plants, insects, birds
Field study of simple ecosystems – pond, river, hill slopes, etc.

UNIT II ENVIRONMENTAL POLLUTION 8

Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – soil waste management: causes, effects and control measures of municipal solid wastes – role of an individual in prevention of pollution – pollution case studies – disaster management: floods, earthquake, cyclone and landslides.

Field study of local polluted site – Urban / Rural / Industrial / Agricultural.

UNIT III NATURAL RESOURCES 10

Forest resources: Use and over-exploitation, deforestation, case studies- timber extraction, mining, dams and their effects on forests and tribal people – Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. case studies – Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles.

Field study of local area to document environmental assets – river / forest / grassland / hill / mountain.

UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT 7

From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting, watershed management – resettlement and rehabilitation of people; its problems and concerns, case studies – role of non-governmental organization-environmental ethics: Issues and possible solutions – climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies. – wasteland reclamation – consumerism and waste products – environment production act – Air (Prevention and Control of Pollution) act – Water (Prevention and control of Pollution) act – Wildlife protection act – Forest conservation act – enforcement machinery involved in environmental legislation- central and state pollution control boards- Public awareness.

UNIT V   HUMAN POPULATION AND THE ENVIRONMENT   6

Human population growth and environmental constrains, Environmental ethic in population growth-variation among nations – population explosion – family welfare programme – environment and human health – human rights – value education – HIV / AIDS – women and child welfare – role of information technology in environment and human health – Case studies.

TOTAL: 45 PERIODS

TEXTBOOKS

1. Gilbert M.Masters, "Introduction to Environmental Engineering and Science", 2nd edition, Pearson Education (2004).
2. Benny Joseph, "Environmental Science and Engineering", Tata McGraw-Hill, New Delhi, (2006).

REFERENCES

1. R.K. Trivedi, "Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards", Vol. I and II, Enviro Media.
2. Cunningham, W.P. Cooper, T.H. Gorhani, "Environmental Encyclopedia", Jaico Publ., House, Mumbai, 2001.
3. Dharmendra S. Sengar, "Environmental law", Prentice hall of India PVT LTD, New Delhi, 2007.
4. Rajagopalan, R, "Environmental Studies-From Crisis to Cure", Oxford University Press (2005).

SS7611   **CASE TOOLS AND UML LABORATORY**   **L T P C**
                                                                     0 0 4 2

1. Familiarization of features of any one of the standard UML case tool.
2. Capturing key functional requirements as Use cases and class diagram for online ticket / hotel reservation systems, student information system, sales and marketing system, banking system and inventory tracking system.
3. Interacting diagrams, state chart diagrams etc for systems in 2.
4. Implementation using any one of object oriented languages like Java, C++ for systems in 2.
5. Component diagrams, deployment diagrams for system in 2.
6. Unit test case, integration test case for systems in 2.

TOTAL: 60 PERIODS

SS7612   **INTERNET PROGRAMMING LABORATORY**   **L T P C**
                                                                     0 0 4 2

            (2 Experiments under each of the following)
1.   Client side / Server side scripting programs for the Web Pages.
2.   Experiments with Active / JAVA server pages.
3.   Socket Programming.
4.   JAVA Servlets
5.   On-line Transactions – Database connectivity

TOTAL: 60 PERIODS

SS7701   **SOFTWARE TESTING**   **L T P C**
                                                                              3 0 0 3

UNIT I   **9**
Assessing Software Testing Capabilities and Staff competencies – Staff – Roles-Defects – Business Perspective – Quality of Test Process and Testers – Summary.
Building a Software Testing Environment – Building a Software Testing Strategy – Strategic Risks – Economics – Problems – Economics of System Development Life Cycle Testing – Organizational Issue – Policy – Structured Approach – Strategy – Methodology – Status – Summary.

UNIT II   **9**
Establishing a Software Testing Methodology – Defects – Reduce the Cost – Verification and Validation – Functional and Structural – Workbench Concept – Considerations in Developing Testing Methodologies – Tactics Checklist – Summary.
Determining Software Testing Techniques – Tool Selection Process – Selecting Techniques / Tools – Structured System Testing Techniques.

UNIT III   **9**
Functional System Testing Techniques – Unit Testing Techniques – Functional Testing and Analysis – Functional Testing – Test Factor / Test Technique Matrix – Summary Selecting and Installing Software Testing Tools – Testing Tools – Selecting and Using the Tools – Managers – Summary.

UNIT IV   **9**
The Eleven–Step Testing Process Overview – Cost of Computer Testing – Life Cycle Testing-concept – Verification and Validation – Introducing the Eleven-Step Process – Workbench requirement Skills – Summary.
Assess Project Management Development Estimate and Status – Overview – Objective – Concerns – Workbench – Develop Test Plan - Overview – Objective – Concerns – Workbench – Requirement Phase Testing -Overview – Objective – Concerns – Workbench – Design Phase Testing - Overview – Objective – Concerns – Workbench – Program Phase Testing – Overview – Objective – Concerns – Workbench – Execute Test and Record Results - Overview – Objective – Concerns – Workbench – Acceptance Test - Overview – Objective – Concerns – Workbench – Report Test Results - Overview – Objective – Concerns – Workbench – Testing Software Installation - Overview – Objective – Concerns – Workbench – Test Software Changes - Overview – Objective – Concerns – Workbench – Evaluate Test Effectiveness - Overview – Objective – Concerns – Workbench.

UNIT V   **9**
Testing Specialized Systems and Application – Client / Server Systems - Overview – Objective – Concerns – Workbench – Rapid Application Development - Overview – Objective – Concerns – Workbench – Adequacy of System Documentation - Overview – Objective – Concerns – Workbench – Web Based Systems - Overview – Objective – Concerns – Workbench – Off-the Shelf Software - Overview – Objective – Concerns – Workbench – Multi platform Environment - Overview – Objective – Concerns – Workbench – Security - Overview – Objective – Concerns – Workbench – Data Warehouse - Overview – Objective – Concerns – Workbench.

                                                                       TOTAL: 45 PERIODS

TEXTBOOK
1.   William E.Perry, "Effective Methods for Software Testing", John Wiley and Sons, Inc., 2000.

REFERENCE
1.   P.C. Jorgensen, "Software Testing A craft Man's Approach", CRC Press, 1999.

SS7702   **MODELLING AND SIMULATION**   **L T P C**
                                                                              3 0 0 3

UNIT I   INTRODUCTION   9
Advantages and Disadvantages, Systems - Components of a system - Types of System -Model of a System - Simulation examples.

UNIT II   MODELS IN SIMULATION   9
Statistical Models – Distrete Distributions – Continuous Distributions – Empirical Distributions, Poisson Process, Queueing models – characteristics, Queueing notations, Simulation Techniques, Monte – Carlo Simulation.

UNIT III   RANDOM NUMBERS   9
Properties of Random numbers, generation of random numbers, Techniques for generating random numbers, tests for random numbers, ^{2} test, Runs test, Poker test, Kolmogrov Simrnov test, Random – Variate generation – Inverse transform method, Exponential Random Variates, uniform random variates, Poisson Random variates, Binomial Random Variates, Normal Random Variates.

UNIT IV   SIMULATION LANGUAGES   9
Comparison and selection of simulation languages, study of any one simulation language (Simulation using C++, GPSS, Arena).

UNIT V   ANALYSIS OF SIMULATION DATA   9
Input Modeling – Data Collection, identifying distribution with data, parameter estimation, Goodness-Fit test, selecting input models without data, Multivariate and Time series input models. Verification and Validation of Input Models – Model Building, Verification and Validation. Output Analysis for a Single system - Types of Simulation and Model Stochastic Nature of output Data.

                                                                      TOTAL: 45 PERIODS

TEXTBOOK
1. Jerry Banks, John S. Carson, Barry L. Nelson, David M.Nicol, Discrete – Event System Simulation Prentice Hall of India, Delhi, 2002.

REFERENCES
1. Geoffrey Gordon, System Simulation, Prentice Hall of India, Delhi, 2002
2. Shannon, System Simulation, The art and Science, Prentice Hall of India, Delhi, 1975.
3. J. Sehriber, Simulation using GPSS-Thomas John Wiley, Singapore, 1991.

SS7703   **DATA ANALYTICS**   **L T P C**
                                                                              3 0 0 3

OBJECTIVE
- This course deals with evolving multidimensional massive data sets and the various analysis which may be performed on it.

UNIT I   INTRODUCTION TO BIG DATA   8
Introduction to Big Data Platform – Challenges of conventional systems - Web data – Evolution of Analytic scalability, analytic processes and tools, Analysis vs reporting - Modern data analytic tools, Statistical concepts: Sampling distributions, resampling, statistical inference, prediction error.

UNIT II   DATA ANALYSIS   12
Regression modeling, Multivariate analysis, Bayesian modeling, inference and Bayesian networks, Support vector and kernel methods, Analysis of time series: linear systems analysis, nonlinear dynamics - Rule induction - Neural networks: learning and generalization, competitive learning, principal component analysis and neural networks; Fuzzy logic: extracting fuzzy models from data, fuzzy decision trees, Stochastic search methods.

UNIT III   MINING DATA STREAMS   8
Introduction to Streams Concepts – Stream data model and architecture - Stream Computing, Sampling data in a stream – Filtering streams – Counting distinct elements in a stream – Estimating moments – Counting oneness in a window – Decaying window - Realtime Analytics Platform(RTAP) applications - case studies - real time sentiment analysis, stock market predictions.

UNIT IV   FREQUENT ITEMSETS AND CLUSTERING   9
Mining Frequent itemsets - Market based model – Apriori Algorithm – Handling large data sets in Main memory – Limited Pass algorithm – Counting frequent itemsets in a stream – Clustering Techniques – Hierarchical – K- Means – Clustering high dimensional data – CLIQUE and PROCLUS – Frequent pattern based clustering methods – Clustering in non-euclidean space – Clustering for streams and Parallelism.

UNIT V   FRAMEWORKS AND VISUALIZATION   8
MapReduce – Hadoop, Hive, MapR – Sharding – NoSQL Databases - S3 - Hadoop Distributed file systems – Visualizations - Visual data analysis techniques, interaction techniques; Systems and applications:
TOTAL: 45 PERIODS

OUTCOMES:
The student should be made to:
- Apply the statistical analysis methods.
- Compare and contrast various soft computing frameworks.
- Design distributed file systems.
- Apply Stream data model.
- Use Visualisation techniques

TEXTBOOKS
1. Michael Berthold, David J. Hand, Intelligent Data Analysis, Springer, 2007.
2. Anand Rajaraman and Jeffrey David Ullman, Mining of Massive Datasets, Cambridge University Press, 2012.

REFERENCES
1. Bill Franks, Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with advanced analytics, John Wiley & sons, 2012.
2. Glenn J. Myatt, Making Sense of Data, John Wiley & Sons, 2007 Pete Warden, Big Data Glossary, O'Reilly, 2011.
3. Jiawei Han, Micheline Kamber "Data Mining Concepts and Techniques", Second Edition, Elsevier, Reprinted 2008.

SS7704   OBJECT ORIENTED SOFTWARE ENGINEERING   L T P C
                                                                                                        3 0 0 3

UNIT I   9
System Development as industrial process – System life cycle – Object Orientations - Object Oriented System Development – Object Oriented Programming.

UNIT II   9
Architecture – Model building – Model architecture – requirements model – analysis model – Design Model – Implementation Model – Test Model.

UNIT III   9
Analysis – Requirements Model – Analysis Model.

UNIT IV 9

Construction – Design Model – Block Design – Working with construction.

UNIT V 9

Real Time Specialization – Classification – Analysis – Construction – Testing – Verification – Data specilization – ODBMS – Components Definition – Use – Management – Testing unit testing – integration testing – system testing – process.

TOTAL: 45 PERIODS

TEXTBOOK

1. Ivar Jacobson, "Object –Oriented Software Engineering", Pearson Education, Delhi, 2002.

REFERENCE

1. Roger S. Pressman, "Software Engineering", Fifth Edition, McGraw-Hill Internal Edition, Singapore, 2001.

SS7711   **GUI APPLICATIONS LABORATORY**   **L T P C**
                                                                          0 0 4 2

1. Dialog based applications with common controls and ActiveX Controls

2. Applications with menus and toolbars

3. Database Applications to Add, Delete, Modify and View Records

4. Applications with document/view architecture (SDI, MDI)

5. Applications with serialization

6. Database connectivity.

7. Application of all above concepts.

TOTAL: 60 PERIODS

SS7712   **SOFTWARE LABORATORY I**   **L T P C**
                                                                          0 0 4 2

1. Preparation of Project Management Plan.
2. Using any of the CASE tools, Practice requirement analysis and specification for different firms.
3. Case study of cost estimation models.
4. Practice object oriented design principles for implementation.
5. Practice function oriented design.
6. Practice creating software documentation for all the phases of software development life cycle with respect to any real time application.
7. Simulate a tools for path testing principles.
8. Simulate a tools for testing based on control structures.
9. Simulate a tools that reflects black box testing concepts

TOTAL: 60 PERIODS

SS7801   **SOFTWARE QUALITY ASSURANCE**   **L T P C**
                                                                               3 0 0 3

UNIT I   **9**
Introduction to software quality – Software modeling – Scope of the software quality program – Establishing quality goals – Purpose, quality of goals – SQA planning software – Productivity and documentation.

UNIT II   **9**
Software quality assurance plan – Purpose and Scope, Software quality assurance management – Organization – Quality tasks – Responsibilities – Documentation.

UNIT III   **9**
Standards, Practices, Conventions and Metrics, Reviews and Audits – Management, Technical review – Software inspection process – Walk through process – Audit process – Test processes – ISO, cmm compatibility – Problem reporting and corrective action.

UNIT IV   **9**
Tools, Techniques and methodologies, Code control, Media control, Supplier control, Records collection, Maintenance and retention, Training and risk management.

UNIT V   **9**
ISO 9000 model, cmm model, Comparisons, ISO 9000 weaknesses, cmm weaknesses, SPICE – Software process improvement and capability determination.

                                                                        TOTAL: 45 PERIODS

TEXTBOOK

1. Mordechai Ben – Meachem and Garry S.Marliss, "Software Quality – Producing Practical, Consistent Software", International Thompson Computer Press, 1997.

REFERENCES
1. Watt. S. Humphrey, "Managing Software Process", Addison – Wesley, 1998.
2. Philip.B.Crosby, "Quality is Free : The Art of making quality certain", Mass Market, 1992.

SS7802   **MULTIMEDIA SYSTEMS**   **L T P C**
                                                                               3 0 0 3

UNIT I   **9**
Overview – Multimedia and Personalized computing – emerging applications – convergence of computers. Communication and entertainment products – perspective and chanllenges – Architecture and issues for distributed multimedia systems – synchronization and QOS – Standards and framework.

UNIT II   **9**
Digital Audio representation and processing – representation, Transmission and processing of saved – audio signal processing – digital music making – Brief survey of speech recognition and generation Video Technology – raster scanning – colour fundamentals and Video performance measurements – Artifacts – Video equipment – TV standards.

UNIT III   **9**
Digital Video and image compression – introduction – video compression techniques – JPEG – H.261 – MPEG – DVI Technology –Time Based media representation and delivery – models of time – Time and multimedia requirements – support.

UNIT IV   **9**

O.S. support for continuous media applications – limitations in workstation O.S. – New OS support – experiments using real time mach – middle ware system services architecture – media stream protocol.

UNIT V   **9**

Multimedia Devices, Presentations services and the user interface – multimedia services and window system, client, device control – Tool kits – Multimedia file systems and information models – File system support – data models – multimedia presentation and authoring – current state of the industry – Design paradigms and user interfaces.

TOTAL: 45 PERIODS

TEXTBOOK

1. John F. Koegel Bufend , "Multimedia systems", Pearson Education, Delhi, 2002.

REFERENCES

1. Vaughan. T, "Multimedia making it work", Fifth edition, Tata McGraw Hill, 2001.
2. K.R. Rao, Zoron S. Bojkovil, Dragarad A. Milovanovic, "Multimedia Communication Systems", Printice Hall, India, Pvt. Ltd., 2002.

SS7803   **XML AND WEB SERVICES**   **L T P C**
        3 0 0 3

OBJECTIVIES

- To learn the basics of XML technology.
- To understand the background of distributed information system.
- To analyze and design a web service based application.
- To learn the security features of web services and service composition.

UNIT I   **XML FUNDAMENTALS**   **9**

XML – structuring with schema DTD – XML Schema – XML Processing DOM – SAX – Presental XSL – Transformation XSLT – XPath – XQuery.

UNIT II   **DISTRIBUTED INFORMATION SYSTEM**   **9**

Distributed information system – Design of IB – Architecture of IB – Communication in an IS – Middleware RPC – TP monitors – Object brokers – Message oriented middleware – EAI – EAI Middleware – Workflow – Management – benefits and limitations – Web technologies for Application Integration.

UNIT III   **WEB SERVICES**   **9**

Web Services – Definition – Web Services and EAI – Web Services Technologies – web services Architecture – SOAP – WSDL – UDDI – WS-Addressing – WS-Routing – WS-Security – WS-Policy – Web Service invocation framework - web services using java – WS using .NET - mobile web service.

UNIT IV   **XML SECURITY**   **9**

XML Security and meta framework - XML signature – XML Encryption – SAML – XKMS – WS-Security – RDF – semantic Web service.

UNIT V   **SERVICE COMPOSITION**   **9**

Service Coordination and Composition coordination protocols – WS-Coordination – WS-Transaction – RosttaNet – ebXML –WSCI – Service Composition – Service Composition Models – Dependencies between coordination and composition – BPEL – Current trends.

TOTAL: 45 PERIODS

OUTCOMES

Upon Completion of the course, the students should be able to:
- Create, validate, parse, and transform XML documents.
- Design a middleware solution based application.
- Develop web services using different technologies.
- Compose set of web services using BPEL.

REFERENCES

1. Gystavo Alonso, Fabio casasi, Hareemi kuno, vijay machiraju, "Web Services – Concepts, Architecture and Applications", Springer, 2004.
2. Ron Schmelzer etal, "XML and Web Services", Pearson Education, 2002.
3. Sandeep Chatterjee and James Webber, "Developing Enterprise web services: An Architect's and Guide", Practice Hall, 2004.
4. Freunk p.coyle, "XML, web Services and the Data Revolution", Pearson, 2002.

SS7811	SOFTWARE LABORATORY II	L T P C
		0 0 4 2

1. Simulate a process maturity model for a function ie., test the function at various loads.
2. mplement some of the software quality assurance factors.
3. Practice software configuration management principles.
4. Implement a tool for data gathering.
5. Develop a tool for process analysis and modelling.
6. Simulate a model that takes care of personnel training in software industry.
7. Implement a capability maturity model for any of the software firm.
8. Simulate the defect prevent model.
9. Case Study – Software standards for different phases of software development life cycle.

TOTAL: 60 PERIODS

SS7812	XML AND WEB SERVICES LABORATORY	L T P C
		0 0 4 2

1. XML document creation.
2. Importing and Exporting XML document in database.
3. XSL Transformation
4. Internal and External DTD creation
5. XML Schema creation
6. Parsing XML document using DOM/SAX parser.
7. Web Service creation using JAX-WS
8. Web Service creation using JAX-RS
9. Web Service creation using .NET
10. JAXB Marshaling and Unmarshaling

A possible set of applications may be the following:
    a. Currency Conversion
    b. Temperature Conversion c. Ticket Booking
    d. Dictionary

TOTAL: 60 PERIODS

SS7901   **SOFTWARE METRICS**   **L T P C**
                                                                               3 0 0 3

UNIT I   MEASUREMENT THEORY   9

Fundamentals of measurement – Measurements in Software Engineering – Scope of Software metrics – Measurement theory – Goal based framework – Software measurement validation.

UNIT II   DATA COLLECTION AND ANALYSIS   9

Empirical investigation – Planning experiments – Software metrics data collection – Analysis methods – Statistical methods.

UNIT III   PRODUCT METRICS   9

Measurement of internal product attributes – Size and structure – External product attributes – Measurement of quality.

UNIT IV   QUALITY METRICS   9

Software quality metrics – Product quality – Process quality – Metrics for software maintenance – Case studies of Metrics Program – Motorola – HP and IBM.

UNIT V   MANAGEMENT METRICS   9

Quality management models – Rayleigh Model – Problem Tracking report (PTR) model – Reliability growth model – Model evaluation – Orthogonal defect classification.

TOTAL: 45 PERIODS

TEXTBOOKS

1. Normal. E – Fentor Shari Lawrence Pfllegar, "Software Metrics", International Thomson Computer Press, 1997.
2. Fenter Norman, E., "Software Metrics ; A Rigorous approach", Chapmen & Hall, London, 1991.

REFERENCES

1. Stephen H.Kin, "Metric and Models in Software Quality Engineering", Addison Wesley 1995.
2. William. A. Florac and Aretitor D Carletow, " Measuring Software Process", Addison – Wesley, 1995.

SS7902   **SOFTWARE PROJECT MANAGEMENT**   **L T P C**
                                                                                  3 0 0 3

OBJECTIVES:

- To develop an awareness of the need for project planning and management
- To apply professional attitudes and techniques to managing a project
- Explain the stages in the system development lifecycle and the activities that are carried out to implement an IT application;
- Demonstrate an understanding of steps needed to build and maintain effective development teams;
- Explain the procedures needed to monitor, control and report upon an IT development project;
- Discuss and where appropriate apply the principles of project risk management.
- Explain the ways in which appropriate quality attributes of the products of an IT development project can be assessed and assured.

UNIT I   FUNDAMENTALS   9
Conventional software management - Evolution of software economics - Improving software economics - Conventional Vs Modern software project management.

UNITII   SOFTWARE MANAGEMENT PROCESS FRAMEWORK   9
Lifecycle phases - Artifacts of the process - Model based software architectures -Workflows of the process - Checkpoints of the process.

Lifecycle phases - Artifacts of the process – model based software architectures workflows of the process checkpoints of the process.

UNIT III   SOFTWARE MANAGEMENT DISCIPLINES   9
Iterative process planning - Organization and Responsibilities - Process automation - Process control and process instrumentation - Tailoring the process.
Project planning - Scheduling - Tracking and Control - Time and Cost overruns - Project organization - Staffing - Group working - Team dynamics.

UNIT IV   MANAGED AND OPTIMIZED PROCESSES   9
Quality management and ISO 9000 quality assurance method - Configuration management - Quality reviews - Software standards - Tracking of defects - Process improvements - SCI/CMM models - Other process models - Data gathering and analysis Principles of data gathering - Data gathering process - Software measures - Data analysis - Managing software quality - Defect prevention.

UNIT V   CASE STUDIES   9
COCOMO Cost estimation model - Change metrics -Case studies.

TOTAL: 45 PERIODS

TEXTBOOKS
1. Bob Hughes, Mike Cotterell, "Software Project Management", Fifth edition, Tata McGraw Hill, 2009.
2. Walker Royce "Software Project Management A Unified Framework", Pearson Education, 2004.

REFERENCES
1. Ramesh Gopalaswamy, "Managing Global Software Projects", Tata McGraw Hill,   2001.
2. Humphrey Watts, "Managing the software process", Addison Wesley, 1989.

SS7903   NETWORK SECURITY   L T P C
**   3 0 0 3**
UNIT I   9
Introduction – Primer on a Networking – Active and Passive Attacks – Layers and Cryptography – authorization – Viruses, worms. The Multi level Model of Security – Cryptography – Breaking an Encryption Scheme – Types of Cryptographic functions – secret key Cryptography – Public key Cryptography – Hash algorithms.
Secret key cryptography – Data encryption standard – International Data Encryption Algorithm (IDEA) Modes 4 Operations – Encrypting a Large message – Electronic code book, cipher block chaining, OFB, CFB, CTR – Generating MACs – Multiple Encryption DES.

UNIT II   9
Introduction to public key algorithms – Model of arithmetic – Modular addition, Multiplication, Exponentiation. RSA – RSA Algorithm – RSA Security – Efficiency of RSA – Public Key cryptography Standard (PKCS) - Digital Signature Standard – DSS Algorithm – Working of Verification procedure – Security and DSS – DSS controversy – Zero Knowledge proof systems.

UNIT III   **9**

Authentication – Overview of authentication systems – password based authentication – Add nets based authentication – cryptographic authentication protocols – who is seeing authenticate – passwords as cryptographic keys – Eaves dropping and server database reading – Trusted intermediaries – Session key establishment.

Authentication of people – passwords – online – off line password of using – Eavesdropping – passwords and careless users – Initial Password distribution – Authentication tokens.

UNIT IV   **9**

Standards and IP security – Introduction to Kerberos – Tickets and Ticket granting tickets. Configuration - logging into the network – replicated KDCs.

Overview of IP security – security associations – security association database - security policy database, AH and ESP – Tunnel Transport mode why protect - IP Header IPV4 and IPV6, NAT, Firewalls, IPV4, IPV6 Authentication Header – ESP - reason for having Authentication Header.

UNIT V   **9**

Network Security Application – Email Security – distribution lists – store and forward – security services for email – establishing keys privacy – authentication of the source – massage Integrity – Non-Repudiation – Proof of submission – Proof of delivery. Message flow confidentially – Anonymity – Names and Addresses.

Firewalls – packet filters – application level gateway – encrypted tunnels – comparisons why firewalls don't work – denial of service attacks. Web security – Introduction – URLs/URIs – HTTP – HTTP digest authentication. Cookies – other web security problems.

TOTAL : 45 PERIODS

TEXTBOOK

1. Charlie Kaufman, Radia Perlman and Mike Speciner "Network Security : Private Communication in a Public Work", Second Edition, Pearson Education, Delhi, 2002.

REFERENCES

1. William Stallings, "Network Security : Essentials Applications and Standards", Pearson Education, Delhi, 2002.
2. Hans, "Information and Communication Security", Springer Verlag, 1998.
3. Derek Atkins, "Internet Security", Tech media, 1998.

SS7904	PRINCIPLES OF MANAGEMENT	L T P C
		3 0 0 3

UNIT I   THE BASICS OF MANAGEMENT THEORY AND PRACTICE   **9**

Definition – Relevance – Various approaches – Classical and Modern – Functions of a Manager – Business Environment – Management Ethics and Value System.

UNIT II   PLANNING   **9**

Definition – Steps in planning – importance – Types of plan – Nature of objectives – forecasting – Decision making under certainty, uncertainty and risk.

UNIT III   ORGANISING   **9**

Definition – Nature of organising – Departmentation – Line / Staff Authority – Centralisation Vs Decentralisation staffing – Definition – Process – Performance Appraisal.

UNIT IV   LEADING   9

Definition – Leadership models – Motivation – theories of motivation – Communication process – Types – Models – Barriers – Effective Communication.

UNIT V   CONTROLLING   9

Definition – Importance – Budgetary and Non-budgetary controlling models – Management by objectives – Management by exception – Control techniques and Information technology.

TOTAL: 45 PERIODS

TEXTBOOKS

1. Koontz Harold and Weihrich Heinz, Essentials of Management – McGraw Hill, Fifth Edition, 1990.
2. Tripathi, Principles of Management, McGraw Hill, Second Edition, 1991.

REFERENCES

1. Burton Gene and Thakur Manab, Management Theory – Principles and Practice, 1996.
2. Chandra Bose, Principles of Management and Administration, Prentice Hall, 2001.
3. Robbins, Management, Seventh Edition, Pearson Education, Delhi, 2002.

SS7911   SOFTWARE LABORATORY III   L T P C
                                                                                            0 0 4 2

1.   Implement all the phases of software developments life cycle using any of the commercially.
2.   Implement reusability features.
3.   Design and develop application object oriented models.
4.   Practice component object model.
5.   Implement a tool for knowledge based software engineering.
6.   Practice the concepts and principles of data engineering.
7.   Develop a tool that implements reverse engineering.
8.   Practice the reengineering concepts and principles.

TOTAL: 60 PERIODS

SS7099   PROJECT WORK   L T   P C
                                                                                            0 0 32 16

The project will be of one semester duration. The students will be sent to different organizations involved in science communication activities as per interest and specialization of students, mostly located in the place of the study. They will have to carry out a research project related to the area of interest and submit a research project report at the end of the semester. The students shall defend their dissertation in front of experts during viva-voce examination.

SS7073   **SOFTWARE REUSE**   **L T P C**
                                                                                        3 0 0 3

UNIT I   INTRODUCTION   9

Organizing Reuse – Introduction – Motivation for Reuse – Reuse driven organizations – Managing a reuse project – the characteristics of reuse of projects – Roles in reuse projects – Adopting a project to reuse – Reuse tools.

UNIT II   REUSE METRICS   9

Managing a repository – The REBOOT component model – Classification – Configuration management of the repository – Managing the repository – Computer supported cooperative working – Process metrics for reuse – Product metrics – Cost estimation – Forming a reuse strategy – Assessing reuse maturity.

UNIT III   REUSABLE COMPONENTS   9

Practicing reuse – Generic reuse development process – Develop for reuse – Develop with reuse – Testing reusable components – Object oriented components – Technique and life cycles – Object oriented development for reuse – Architectural design for reuse – Detailed design for reuse – Implementation for reuse – Verification, test and validation.

UNIT IV   REUSE PHASES   9

Development with reuse – with reuse specific activities – Common reuse processes – Phases of development with reuse – Impact of reuse on development cycle.

UNIT V   CLEAN ROOM SOFTWARE ENGINEERING   9

Re-engineering for reuse – Methodology – Retrieving objects in non-object oriented code – Measurements – Tools support for reengineering - Over view of clean room software engineering – Phases in clean room method – Box structures algorithms – Adapting the box structures.

                                                                          TOTAL: 45 PERIODS

TEXTBOOKS

1. Even-Andre'Karisson, "Software Reuse – A Holistic Approach, John Wiley and Sons, 1996.
2. Karma McClure, "Software Reuse Techniques – Additional reuse to the systems development", Prentice Hall, 1997.

REFERENCES

1. Ivar Jacobson, Martin Griss and Patrick Johnson, "Software Reuse ; Architecture, Process and Organization for business success", ACM press / Addison Wesley, New York, 1997.

SS7074   **SOFTWARE COMMUNICATION AND DOCUMENTATION**   **L T P C**
                                                                                        3 0 0 3

UNIT I   BASIC CONCEPTS   9

Importance of communication and documentation ; Different types of communications ; Spoken communication ; written communication ; Different types of documentation.

UNIT II   SPOKEN INDIVIDUAL SPOKEN COMMUNICATION   9

Elements of good individual communication – getting over nervousness – organizing one self – characteristics of effective communication – augmenting spoken words by actions and other means – other aspects of spoken communication like speeches; presentation; use of visual aids.

UNIT III   GROUP COMMUNICATION   9

Meeting – Effective participation – effective management of meetings – preparing minutes – "Virtual" meetings – audio conference – video conference – use of collaboration tools.

UNIT IV   DIFFERENT TYPES OF WRITTEN COMMUNICATION   9

Principles of effective written communication – differences between written communication and spoken communication – resume writing – email; effective email techniques – proposals – contracts – user guides – external technical documentation for software – internal software technical documentation – users guides – letters and different types of letters – legal issue.

UNIT V   TECHNOLOGY AND STANDARDS   9

Use of various tools and technologies – need for standardization – role of processes and standards in documentation – on-line help – Impact of internet on documentation – common challenges in the harnessing of technology ; course summary.

TOTAL: 45 PERIODS

TEXTBOOKS
1. Huckin, et al, Technical Writing and Professional Communication, McGraw Hill, 1991.
2. Ron Ludlow and Fergus Panton, The Essence of Effective Communication, PHI (P) Ltd., New Delhi, 1995.

REFERENCES
1. W.R. Gordin and Edward W. Mammen : The Art of Speaking Made Simple, Rupa & Co.,1982.
2. Sushil Bahl : Business Communication Today, Response Books, New Delhi, 1996.
3. Eyre, Effective Communication Made Simple, W.H. Allen, London, 1979.
4. Gloria Wilson and Garry Bitter, Learning Media Design (Text and CD Rom), PHI (P) Ltd., New Delhi, 1998.
5. Simmon Collin – Multimedia Made Simple Asian Books (P) New Delhi, 1996.
6. Bennet – Illustrated World of DTP Dreamland Publications, New Delhi, 1998.

SS7075	USER INTERFACE DESIGN	L T P C
		3 0 0 3

UNIT I   9
Introduction – A taxonomy of software design – Goal Directed design – User's Goal – The essence of user interface design. The three models – manifest model – visual interface design – visual processing – visual patterns – restricting the vocabulary – canonical vocabulary and domain knowledge.
Form – Idioms and affordances – history of rectangles on the screen – windows with a small w – lord of the files – storage and retrieval systems – choosing platforms.

UNIT II   9
Behavior of Presentation – orchestration and flow – Techniques for inducing and maintaining flow – characteristic of good user interfaces – postures and types – states of windows – different types of tasks – idiocy – The weapon of Interface Design – task coherence.

UNIT III   9
The Interaction – pointing and clicking – mouse operations – Selection – object verb – concrete and discrete data – insertion and replacement – mutual exclusion – additive and group selection
– visual indications. Direct manipulation manipulating Gizmos – repositioning – resizing and reshaping
– arrowing – direct – manipulation visual feedback – drag and drop.

UNIT IV 9
Cast effects – menus meaning – menus and dialog boxes – dialog box etiquette – toolbars – Gizmos – Types of Gizmos – Entry and display Gizmos – New Gizmos.

UNIT V 9
Protecting user – eliminating dialog and error boxes – managing exceptions – alerts – audible feedback – undo – troubles – redo – special undo functions. Command vectors – installation – configuration – personalization.

TOTAL: 45 PERIODS

TEXTBOOKS

1. Alan Cooper, "The Essentials of User Interface Design", IDG Books, 1995.
2. Ben Schneider Man, "Designing the User Interface", Addition Wesely, 2000.

REFERENCES

1. Jacob Nielson, "Usability Engineering", Academic Press, 1993.
2. Alan Dix et al, Human, "Computer Interaction", Prentice Hall, 1993.

SS7076	PERSONAL SOFTWARE PROCESS	L T P C
	AND TEAM SOFTWARE PROCESS	3 0 0 3

UNIT I   INTRODUCTION 9
Software Engineering – Time management – Tracking Time – Period and Product Planning – Product Planning – Product size – Managing you time – Managing Commitments – Managing schedules.

UNIT II   PLANNING 9
The project plan – The software development process – Defects – Finding defects – The code review checklist – Design defects – Product quality – Process quality.

UNIT III   TSP STRTEGY 9
Team software process overview – The logic of the team software process – Launching a team project – The development strategy – The development plan – Defining the requirements.

UNIT IV   PRODUCT IMPLEMENTATION 9
Designing with teams – Product implementation – Integration and system testing – The postmortem.

UNIT V   TEAM MANAGEMENT 9
The team leader role – Development manager role – The planning manager role – The quality – Process manager role – The support manager role.

TOTAL: 45 PERIODS

TEXT BOOKS
1. Watt S Humphrey, "Introduction of Personal Software Process", Addison Wesley, 2000.
2. Watt S Humphrey, "Introduction to team software process", Addison Wesley, 2000.

SS7077   **SOFTWARE AGENTS**   **L T P C**
                                                                                              3 0 0 3

UNIT I   AGENTS – OVERVIEW   9
Agent Definition – Agent programming Paradigms – Agents Vs Objects – Aglet – Mobile Agents –
Agent Frameworks – Agent Reasoning.

UNIT II   JAVA AGENTS   9
Processes – threads – daemons – Components – Java Beans – ActiveX – Sockets, RPCs –
Distributed Computing – Aglets Programming – Jini Architecture – Actors and Agents – Typed and
proactive messages.

UNIT III   MULTIAGENT SYSTEMS   9
Interaction between agents – Reactive Agents – Cognitive Agents – Interaction protocols – Agent
coordination – Agent negotiation – Agent Cooperation – Agent Organization – Self-interested agents
in electronic commerce applications.

UNIT IV   INTELLIGENT SOFTWARE AGENTS   9
Interface Agents – Agent Communication Languages – Agent Knowledge representation – Agent
adaptability – Belief Desire Intension – Mobile Agent Applications.

UNIT V   AGENTS AND SECURITY   9
Agent Security Issues – Mobile Agents Security – Protecting Agents against Malicious Hosts –
Untrusted Agents – Black Box Security – Authentication for agents – Security issues for aglets.

TOTAL: 45 PERIODS

TEXTBOOKS
1. Bradshaw, Software Agents, MIT Press, 2000.
2. Richard Murch, Tony Johnson, Intelligent Software Agents, Prentice Hall, 2000.

REFERENCES
1. Bigus & Bigus, Constructing Intelligent agents with Java, Wiley, 1997.
2. Russel & Norvig, Artificial Intelligence: a modern approach, Prentice Hall, 1994.

SS7078   **REAL TIME SYSTEMS**   **L T P C**
                                                                                              3 0 0 3

UNIT I   9
Introduction – Characterizing real time system and task performance measures real time systems –
Estimating program run time – Task assignment and schedule classical Uni. – processor scheduling
algorithm, Uni-processor scheduling of IRTS task, Task assignment, mode changes.

UNIT II   9
Pragramming Languages and tools – Desired Language characteristics, Data type control structures,
facilitating hierarchical decomposition packages, Run time error handling, Overloading and generics,
Multitasking, Low level programming, Task Scheduling, Time specification Programming,
Environmental, Run time supports.

UNIT III   9
Real Time databases – basic definition, Real time Vs General purpose Database, main memory
database, Transaction priorities, Transaction aborts concurrency control issues, Disk scheduling
algorithms, Improving predictability, maintaining serialization consistency, Databases for hand real
time systems.

UNIT IV **9**

Real time communication – Introduction, Network topologies, Protocols, Fault tolerance – introduction, Fault Types, Fault detection, Fault and error containment, Redundancy, Data diversity, Reversal checks, Integrated failure handing.

UNIT V **9**

Reliability evaluation techniques – Obtaining parameter values, Reliability models for hardware redundancy, Software error models, tasking time into account.
Clock synchronization : Clocks, A non-fault tolerant synchronization algorithms, impact of faults, fault tolerance synchronization hardware, synchronization in software.

TOTAL: 45 PERIODS

TEXTBOOK

1. C.M.Krishna and Kang G.Shin, "Real Time Systems", McGraw Hill International Edition.

REFERENCES

1. Stuart Bennett, " Real Time Computer Control, An Introduction", Prentice Hall Internation Edition, 1988.
2. Peter D.Lawrence, "Real Time Micro-Computer System Design, An Introduction", Konrad Manch, McGraw Hill, 1988.
3. S.T.Allworth and R.N.Zobel, "Introduction to Real Time Software Design", Macmillan Education, Second edition, 1987.

SS7079 **COMPONENT BASED DEVELOPMENT** **L T P C**
3 0 0 3

UNIT I **INTRODUCTION** **9**

What is CBD? – Industrialization of software development, CBD drivers and benefits, technology evolution, components and network computing.

UNIT II **FUNDAMENTALS** **9**

Basic concepts of CBD Scenarios for CBD, evolution or revolution?, build, find and use components and objects.

UNIT III **MODELS** **9**

Basic concepts of object models Components and interfaces, working with interfaces, component and interface modeling, specification models, domain modeling, describing classes, patterns and frameworks.

UNIT IV **USING CBD** **9**

Categorizing & deploying components, CORBA, DCOM.

UNIT V **FRAMEWORKS** **9**

Class libraries, encapsulated components, software frameworks, pre-built applications.

TOTAL: 45 PERIODS

TEXTBOOK

1. Clemens Szyperski, Component Software – Beyond object – oriented programming, Addison – Wesley, 1998.

REFERENCES
1. Kuth Short, Component Based Development and Object Modeling, Sterling Software, 1997.
2. Robert ortali and Dam Harkey, Client / Server Programming with Java and Corba, John Wiley & Sons, 1998.

SS7080   **COMPILER DESIGN**   **L T P C**
                                                                     3 0 0 3

UNIT I   **9**
Introduction to Compiling – Compilers – Analysis of the Source Program – The Phases of a Compiler – Cousins of a Compiler – The grouping of Phases – Compiler Construction Tools – Lexical Analysis – Role – Input Buffering – Specification of Tokens – Recognition – Finite Automata – Regular expression to an NFA.

UNIT II   **9**
Syntax Analysis – Role – Context – Free Grammars – Writing a Grammar – Top down parsing – Bottom –up parsing – Operator precedence parsing.

UNIT III   **9**
Run-Time environments – Source language issues – Storage organization – Storage – Allocation Strategies – Access to non local names – Parameter passing – Symbol Tables.

UNIT IV   **9**
Intermediate Code Generation – Intermediate Languages – Declaration – Assignment Statements – Boolean Expression – Case Statements – Back Patching - Procedure Calls.

UNIT V   **9**
Code Generation – Issues – Run-Time Storage Management – Basic blocks and flow graphs - Next – use information - A simple code generator – Register allocation and assignment. Code optimization – Introduction – The Principal Sources of Optimization – Optimization of basic blocks – Loops in Flow Graphs.

TOTAL: 45 PERIODS

TEXTBOOK

1. A.V.Aho, R.Sethi, J.D.Ullman, "Compilers – Principles, Techniques and Tools" Pearson Education Delhi, 2002.

REFERENCES

1. Allen Holub.I, "Compiler Design in C" Prentice Hall of India, Delhi, 2002.
2. D.M.Dhamdhere, "Systems Programming and Operating Systems", Tata McGraw Hill Company, Delhi, 2002.

SS7081   **MICROPROCESSORS**   **L T P C**
                                                                     3 0 0 3
UNIT I   **9**
Introduction – Comparison of Micro Computers, Mini Computers and Large Computers – The 8085 microprocessor – Architecture – Example of an 8085 based Microcomputer – Memory Interfacing.

UNIT II 9

The 8085 Programming Model – Instruction Classification – Formats – Instruction Set – Assembly Language Programming – Example Programs.

UNIT III 9

Interfacing Input/Output Devices. Interrupts – 8085 interrupts – Interrupt Controller – DMA Transfer – DMA Controller.

UNIT IV 9

Programmable Interface Devices – 8255 DPI, 8279 Keyboard - Display Controller – Serial Input/Output and Data Communication – 8251 USART – 8253 Timer.

UNIT V 9

Applications – ADC/DAC Interface – Traffic Light Controller – Interfacing Keyboard and Server – Segment Displays – Bidirectional Transfer between two microcomputers – Introduction to higher level processor and micro controllers.

TOTAL: 45 PERIODS

TEXTBOOK
1. Ramesh S.Gaonkar, "Microprocessor Architecture, Programming and Applications with the 8085", 4th Edition, Penram International Publishing (India) Pvt. Ltd., 1999.

REFERENCES
1. Douglas V. Hall "Microprocessors and Interfacing", Tata McGraw Hill, 1999.
2. Gilmore, "Microprocessor – Principles & Applications", Tata McGraw Hill, 2nd Edition, 1997.

SS7082   **NETWORK PROTOCOLS**   **L T P C**
                                                                        3 0 0 3

UNIT I 9

Internet Protocol : Routing IP Datagrams – Error and Control Messages (ICMP), Reliable Stream Transport Service (TCP) : TCP State Machine, Response to congestion – congestion, Tail Drop and TCP – Random Early Discard, Routing : Exterior Gateway Protocols and Autonomous Systems (BGP)

UNIT II 9

Internet Multicasting – Mobile IP – Bootstrap And Auto configuration (BOOTP, DHCP).

UNIT III 9

The Domain Name System (DNS) – Applications: Remote Login (TELNET, Rlogin) – File Transfer and Access (FTP, TFTP, NFS).

UNIT IV 9

Applications: Electronic Mail (SMTP, POP, IMAP, MIME) – World Wide Web (HTTP) – Voice and Video over IP (RTP).

UNIT V 9

Applications: Internet Management (SNMP) – Internet Security and Firewall Design (Ipsec) – The Future of TCP / IP (IPV6).

TOTAL: 45 PERIODS

TEXTBOOK

1. Douglas E.Comer, "Internetworking with TCP / IP – Principles, Protocols and Architectures, Fourth Edition, Prentice – Hall of India, Delhi, 2002.

REFERENCES

1. Uyless Black, 'Computer Networks – Protocols, Standards and Interfaces", Second Edition, Prentice – Hall of India, Delhi, 2002.
2. Udupa, "Network Management System essentials", McGraw Hill, 1999.

SS7083	WIRELESS TECHNOLOGY	L T P C
		3 0 0 3

UNIT I 9

Characteristics of the Wireless Medium – Introduction – Radio Propagation Mechanisms – Path Loss Modeling and Signal Coverage – Channel Measurement and Modeling Techniques – Simulation of the radio Channel – What is db.
Applied Wireless Transmission Techniques. Short distance Base Band – UWB Pulse – carrier modulated – Digital Cellular Transmissions – Spread spectrum Transmissions.
High speed modems for spread spectrum Technology coding Techniques for wireless Transmissions.

UNIT II 9

Wireless Medium Access Alternatives – Fixed Assignment Access for Voice- Oriented Networks. Random access for data oriented Networks - Integration of Voice and Data Traffic. Introduction to Wireless Networks – Wireless Network Topologies – Cellular Topology – Cell fundamentals - Capacity expansion techniques – Network Planning for CDMA Systems.

UNIT III 9

Mobility Management – Radio Resources and Power Management – Security in Wireless Networks GSM and TDMA Technology - Introduction to GSM – Mechanisms to support a mobile environment – communications in the infrastructure.

UNIT IV 9

CDMA technology – Reference Architecture – IMT 2000 - Mobile Data Networks – Data oriented CDPD Network – GPRS and Higher data rates - SMS in GSM – Mobile Application Protocols.

UNIT V 9

IEEE 802.11 WLAN – Physical layer – MAC sub layer – MAC Management Sub layer – Adhoc Networking – IEEE 802.15 – Home RF – Bluetooth – Wireless Geo location – Wireless Geo location System Architecture.

TOTAL: 45 PERIODS

TEXTBOOK

1. Kaveh Pahlavan, Prashant Krishnamurthy "Principles of Wireless Networks", Pearson Education Delhi, 2002.

REFERENCES

1. Theodore S.Rappaport, "Wireless Communications : Principles and Practice", Pearson Education Delhi, 2002.
2. William Stallings, "Wireless Communications and Networks", Pearson Education Delhi, 2002.
3. Martyn Mallick, "Mobile and Wireless Design Essentials", Wiley, 2003.
4. Kamilia Feher, "Wireless Digital Communications", Prentice Hall of India, Delhi, 2002.

SS7084   **CLIENT SERVER COMPUTING**   **L T P C**
                                                                       3 0 0 3

UNIT I   **9**
Basic concepts of Client / Server – Upsizing Down sizing – Right sizing – Characteristics – File servers – Database servers – Transactions servers – Groupware servers – Object Client/Servers – Web Servers – Middleware.
Client / Server building blocks – Operating System services – Base services – External services – server scalability – Remote procedure calls – Multiservers.

UNIT II   **9**
SQL Database servers – server architecture – Multithread architecture – Hybrid architecture – stored Procedures – Triggers – Rules – Client / Server Transaction Processing – Transaction models – Chained and nested transactions – Transaction processing monitors – Transaction Management Standards.

UNIT III   **9**
Database Connectivity solutions : ODBC – The need for Database connectivity – Design overview of ODBC – Architecture – components – Applications – Driver Managers – Drivers – Data sources – ODBC 2.5 and ODBC 3.0.

UNIT IV   **9**
Visual C++: The Windows Programming Model – GDI – resource based programming – DLL and OLE Applications – Visual C++ components – frame work / MFC class Library – basic event handling – SDI – Appwizard – ClassWizard – Model and Models dialogues – other controls – Examples.

UNIT V   **9**
Multiple Document Interface – Data Management with Microsoft ODBC – OLE client – OLE server – Client / Server Data Exchange format – Dynamic Data Exchange.

                                               TOTAL: 45 PERIODS

TEXTBOOKS
1. Robert Orfali, Dan Harkey and Jerri Edwards, Essential Client / Server Survial Guide, John Wiley and sons Inc. 1998.
2. David J. Kruglinski, Inside Visual C++, Microsoft Press 1992.

REFERENCES
1. Boar, B.H., Implementing Client / Server Computing ; A Strategic Perspectre, McGraw Hill, 1993.
2. Bouce Elbert, Client / Server Computing, Artech. Press, 1994.
3. Alex Berson, Client / Server Architecture, McGraw Hill, 1996.

SS7085   **ADVANCED DATABASE MANAGEMENT SYSTEMS**   **L T P C**
                                                                      3 0 0 3

UNIT I   **9**
Introduction‑Relational Database Concepts – Query Processing – Query Optimization – Transaction Concepts - Properties of Transactions – Serializability – Concurrency Control – Lock Based Protocols – Time Stamp Based Protocols – Recovery Systems – Log Based Recovery – Advanced Recovery Techniques.

UNIT II   **9**
Distributed And Parallel Databases - Homogeneous and Hetrogeneous Databases – Distributed Data Storage – Distributed Transactions – Commit Protocols – Concurrency Control – Distributed Query Processing – Parallel Databases – I/O Parallelism – Inter Query and Intra Query Parallelism – Inter and Intera Operation Parallelism – Design of Parallel Systems.

UNIT III   **9**

Object-Based Databases And XML - Object Oriented Databases – Complex Data Types – 00 Data Model – 00 Languages – Persistence – Object Relational Databases – Nested Relations – Inheritance – Reference Types – Querying with Complex Types – Functions and Procedures – XML – Structure of XML - Data XML Document Schema – Querying and Transformation – Application Program Interface – Storage of XML Data – XML applications.

UNIT IV   **9**

Administration advanced Querying and retrieval - Performance Turing – performance Benchmarks – Decision support Systems – Data Analysis and OLAP – Data Mining – Data Warehousing – Information Retrieval Systems.

UNIT V   **9**

Special Purpose Databases - Temporal Databases – Deductive Databases – Mobile Databases – Multimedia Databases – Spatial Databases – Active Databases.

TOTAL: 45 PERIODS

TEXTBOOK
1. Abraham Silberschatz, Henry F.Korth and S.Sudarshan, "Database System Concepts", Fourth Edition, McGraw Hill, 2002.

REFERENCES
1. Raghu Ramakrishnan and Johannes Gehrke, "Database Management Systems", McGraw Hill, 2000.
2. Ramez Elmasri and Shamkant B.Navathe, "Fundamentals of Database Systems", Pearson Education Delhi, 2002.

SS7086   **DATA MINING AND DATA WAREHOUSING**   **L T P C**
                                                                        3 0 0 3

UNIT I   DATA MININING – INTRODUCTION   **9**

Data mining – introduction – information and production factor – Data mining Vs query tools – Data mining in marketing – Self learning computer systems – Concept learning – Data learning – Data mining and the data warehouses.

UNIT II   KNOWLEDGE DISCOVERY PROCESS   **9**

Knowledge discovery process – Data selection – Cleaning – Enrichment – Coding – Preliminary analysis of the data set using traditional query tools – Visualization techniques – OLAP tools – Decision trees – Association rules – Neutral networks – Genetics algorithms – KDD (Knowledge Discover in Databases) environment.

UNIT III   DATAWAREHOUSE – ARCHITECTURE   **9**

Data warehouse architecture – System process – Process architecture – Design – Database schema – Partitioning strategy – Aggregations – Data marting – Meta data – System and data warehouse process managers.

UNIT IV   HARDWARE AND OPERATIONAL DESIGN   **9**

Hardware and operational design of data warehouse – Hardware architecture – Physical layout – Security – Backup and recovery – Service level agreement – Operating the data warehouse.

UNIT V   PLANNING, TUNING AND TESTING   9

Capacity planning – Tuning the data warehouse – Testing the data warehouse – Data warehouse features.

TOTAL: 45 PERIODS

TEXTBOOKS
1. Pieter Adriaans, Dolf Zantinge, "Data Mining", Addison Wesley, 1996.
2. Sam Anahory, Dennis Murray, "Data Warehousing in the real world", Addison Wesley, 1996.

SS7087   CRYPTOGRAPHY   L T P C
                                                                           3 0 0 3

UNIT I   CONVENTIONAL ENCYRTION   9
Conventional encryption model – DES – RC 5 – Introduction to AE 5 – Random number generation.

UNIT II   NUMBER THEORY AND PUBLIC KEY CRYPTOGRAPHY   9
Modular arithmetic – Euler's theorem – Euclid's algorithm – Chinese remainder theorem – Primality and factorization – Discrete logarithms – RSA algorithm – Difie heimann key exchange.

UNIT III   MESSAGE AUTHORISATION AND HASH FUNCTIONS   9
Hash functions – Authentication requirements – authentication function – Message Authentication codes – Secure Hash Algorithms.

UNIT IV   DIGITAL SIGNATURE AND AUTHENTICATION PROTOCOLS   9
Digital Signature – Authentication Protocols – Digital Signature Standard.

UNIT V   NETWORK SECURITY   9
Prettry good privacy – S/MIME-IP Security Overview – Web Security.

TOTAL: 45 PERIODS

TEXTBOOK
1. Stallings, W., "Cryptography and Network Security Principles and Practice", Pearson Education, Delhi, 2003.

REFERENCES
1. E. Biham and A. Shamir, "Differential Crypt analysis of the data encryption standard", Springer Veriag, 1993.
2. D. Denning, "Cryptography and data security", Addition Wesley, 1982.
3. N. Kobliz, A course in Number Theory and Cryptography, Springer Verlag, 1994.

SS7088   MOBILE COMPUTING   L T P C
                                                                           3 0 0 3

UNIT I   INTRODUCTION   9
Mobile and Wireless Devices – Simplified Reference Model – Need for Mobile Computing – Wireless Transmissions – Multiplexing – Spread Spectrum and Cellular Systems – Medium Access Control – Comparisons.

UNIT II   TELECOMMUNICATION SYSTEMS   9
Telecommunication Systems – GSM – Architecture – Sessions – Protocols – Hand Over and Security – UMTS and IMT-2000 – Satellite Systems.

UNIT III   WIRELESS LAN   9
IEEE S02.11 – Hiper LAN – Bluetooth – MAC layer – Security and Link Management.

UNIT IV   MOBILE IP   9
Goals – Packet Delivery – Strategies – Registration – Tunneling and Reverse Tunneling – Adhoc Networks – Routing Strategies.

UNIT V   WIRELESS APPLICATION PROTOCOL   9
Wireless Application Protocol (WAP) – Architecture – XML – WML Script – Applications.

TOTAL: 45 PERIODS

TEXT BOOK
1.   Jochen Schiller, "Mobile Communications", Pearson Education, Delhi, 2000.

REFERENCE
1.   Sandeep Singhal, Thomas Bridgman, Lalitha Suryanarayana, Danil Mouney, Jari Alvinen, David Bevis, Jim Chan and Stetan Hild, " The Wireless Application Protocol : Writing Applications for the Mobile Internet", Pearson Education Delhi, 2001.

SS7089   EXTREME PROGRAMMING   L T P C
**   3 0 0 3**

UNIT I   9
Introducing C# - Understanding .Net: The C# environment – Overview of C# - Literals, ariables and Data Types – Operators and Expressions.

UNIT II   9
Decision Making, Branching and Looping – if, if…else, switch, …? : operators, while, do, for, foreach and jump in loops, Methods in C# - declaring methods, the main method, invoking methods, nesting methods, method parameters, pass by value and pass by reference, output parameters, Variable argument lists – Overloading methods.

UNIT III   9
Arrays – Creating an array, Variable size arrays, Array list class – Manipulating Strings – Structures, Nested Structures – Enumerations, Initialization, base types and type conversion.

UNIT IV   9
Classes and Objects – Definition, Creating objects, Constructors and destructors, Nesting, Overloaded constructors, Inheritance and Polymorphism – classical, multilevel, hierarchical inheritances, Subclass, Subclass constructors, Overriding methods, Abstract Classes and Methods, Interfaces, Interfaces and Inheritance – Operator Overloading.

UNIT V   9
Delegates – Declaration Methods, Initialization and Invocation, Multicast delegates, I/O operations – Console Input/Output, Formatting, Errors and Exceptions, Type of Errors – Exceptions – Exception for debugging.

TOTAL: 45 PERIODS

TEXTBOOK

1. E. Balagurusamy, Programming in C#, Tata Mc-Graw Hill Publishing Company, New Delhi, 2002.

REFERENCES

1. Selvi, T. A Text book on C# : A Systematic approach to object oriented programming, Pearson Education, Delhi, 2003.
2. Lippman, C# Primer, 3rd Edition, Pearson Education, Delhi, 2002.
3. Liberty, J. Programming C#, Second Edition, O'Reilly & Associates Inc., California, 2002.
4. Albahari, B. Prayton, P. and Marill, B. C# Essentials, O'Reilly & Associates Inc., California, 2002.

SS7090   **PARALLEL COMPUTING**   **L T P C**
                                                               3 0 0 3

UNIT I   **9**
Paralle Computer Models : Multiprocessors and Multi computers – Multi Vector and SIMD Computers - PRAM and VLSI models – Program and Network properties – Program Flow Mechanism – System Interconnection Architectures – Parallel processing Applications – speedup performance.

UNIT II   **9**
Hardware Technologies : Processor and Memory Hierarchy : speed processor Technology – Super scalar and Vector Processors memory Hierarchy Technology – Virtual Memory Technology – Bus, shared Memory organization.

UNIT III   **9**
Processor Development Techniques : Linear Pipeline Processors non-linear pipeline processors – Instruction peipline Design : Introduction instruction phases, Mechanism for Instruction pipeline, dynamic instruction scheduling – Arithmetic pipeline deign: Computer Arithmetic principles, Multifunctional Arithmetic pipelines – Super scalar and super pipeline design.

UNIT IV   **9**
Parallel and Scalable Architectures : Multiprocessor system connection – Cache coherence and synchronization mechanisms : The cache Coherence problem, Snoopy Bus Protocols, Directory based protocols – Message – passing mechanisms – multi vector multiprocessors compound vector processing – SIMD computer organizations – Principles multithreading – Fine-grain multi computers – Scalable and multithread architectures.

UNIT V   **9**
Parallel Programming Software – Parallel programming models – parallel languages and compliers – dependence analysis of data arrays – mode optimization and scheduling – parallel programming environments - multiprocessor UNIX design goals – master-slave and multithreaded UNIX multi computer UNIX extensions.

TOTAL: 45 PERIODS

TEXTBOOKS

1. Kai Hwang and Faye A Briggs, "Computer Architecture Parallel Processing", McGraw Hill, 1985.
2. Michel J Quinn, "Parallel Computer Theory and Practice", McGraw Hill, 1994.

REFERENCES

1. Kai Hwang, "Advanced Computer Architecture – Parallelism, Scalability, Programmability", McGraw Hill, 1993.
2. Joel M. Crichlow, "An Introduction to distributed and parallel computing", 2nd Edition, PHI, 1997.
3. Kogge P.M, "The architecture of pipelined computers", McGraw Hill, 1981.
4. S.Lakshmivarahan, Sudharshan K. Dhall, "Analysis and design of Parallel algorithms", McGraw Hill, 1990.

SS7091   **SOFT COMPUTING**   **L T P C**
                                                                    3 0 0 3

UNIT I   INTRODUCTION   9
Soft computing paradigms – Neural network – Fuzzy type – Derivation free optimization methods of genetics algorithms – Soft computing characteristics.

UNIT II   FUZZY LOGIC   9
Sets – Properties – Arithmetics - Members function – Fuzzy relations – Relation equations – Fuzzy measures – Types of uncertainty – Members of uncertainties – Measures of fuzziness – Probabilities Possibility – Measures of fuzzy events.

UNIT III   NEURAL COMPUTING   9
Neuron modeling – Learning in Simple Neuron – Perception earning curve – Proof – Limitations of perception.

UNIT IV   NEURAL NETWORKS   9
Multi-level perception – Algorithms – Visualizing network behaviour – B:PN – Self organizing network – Kohenen algorithms – Hopfield network – Adaptive resonance theory – Pattern classification.

UNIT V   GENTIC ALGORITHMS   9
Introduction – Biological terminology – Search space and fitness landscapes – Elements of genetic algorithms – Genetic algorithms in problem solving.
                                                    TOTAL: 45 PERIODS
TEXTBOOKS
1.   Kauffmann. A., "Theory of Fuzzy Subsets", Academic Press, 1989.
2.   R.Beale C.T.Jacson, "Neural Computing- An introdution", Adam Hilger, 1990.
3.   Melanie Mitchell, "An Introduction to Genetic Algorithms", Prentice Hall of India, 1996.

REFERENCES
1.   J.S.Jang, C.T.Sun, E. Mizutani, "Neuro – Fuzzy and Soft Computing", Matlah Curriculam Series, Prentice International, 1997.
2.   Simon Havkin, "Neural Networks – A Comprehensive Foundation", Prentice Hall of Inda, 1994.

SS7092   **SOFTWARE RELIABILITY**   **L T P C**
                                                                    3 0 0 3
UNIT I   INTRODUCTION TO SOFTWARE RELIABILITY   9
Software Reliability Definitions - software disasters - Errors - faults - failures - different views of software reliability – software requirements specification - Causes of unreliability in software - Dependable systems: reliable, safe, secure, maintainable, and available - Software maintenance.

UNIT II   SOFTWARE RELIABILITY IMPROVEMENT   9
The phases of a Software Project - Monitoring the development process – The software life cycle models - software engineering - Structured Analysis and structured Design - Fault tolerance - Inspection - Software cost and schedule.

UNIT III   SOFTWARE QUALITY MANAGEMENT   9
Software quality modeling - Diverse approaches and sources of information - Fault avoidance, removal and tolerance - Process maturity levels (CMM) - Software quality assurance (SQA) - Monitoring the quality of software - Total quality management (TQA) - Measuring Software Reliability - The statistical approach - Software reliability metrics.

UNIT IV   SOFTWARE RELIABILITY TECHNIQUES AND TOOLS   9

Data Trends - Complete prediction Systems - overview of some software reliability models - The recalibration of the models - Analysis of model accuracy - Reliability growth models and trend analysis - Software Costs Models - Super models.

UNIT V   SOFTWARE RELIABILITY ENGINEERING PRACTICE   9

Testing and maintaining more reliable software –logical testing – functional testing – algorithm testing – regression testing - fault tree analysis – failure mode effects and critical analysis – reusability - case studies.

TOTAL: 45 PERIODS

TEXTBOOKS

1. J.D. Musa, A. Iannino and K.Okumoto, Software Reliability, Measurement, Prediction, Application, McGraw Hill, 1990.
2. J.D. Musa, Software Reliability Engineering, McGraw Hill, 1998.

REFERENCES

1. Michael R. Lyer, Handbook of Software Reliability Engineering, McGraw Hill, 1995.
2. Xie, M., Software Reliability Modelling, World Scientific, London, 1991.

SS7093   IMAGE PROCESSING   L T P C
**   3 0 0 3**
UNIT I   9

Introduction – Problems and applications – Two dimensional systems and mathematical preliminaries Linear systems and shift invariance – Fourier transform – Properties – Fourier series – Matrix theory results – Block matrices and kronecker products.

UNIT II   9

Image perception – light, luminance, brightness and contrast – MTF of visual systems – Monochrome vision models – Image fidelity criteria – color representation.
Digital image sampling and quantization – 2D sampling theory – Image reconstruction from samples, Band limited images, sampling theorem, Nuquist rate, Abasing and filled over frequencies – Image quantization – Optimum mean square quantizer.

UNIT III   9

Image enhancement – point operations – contrast structuring, clipping and thresholding etc – Histogram modeling – Spairal operations – special averaging and low pass filtering, Directorial smoothing, median filtering, Replication, Linear interpolation, Magnification and interpolation (Zooming) – false color and pseudo color.

UNIT IV   9

Image restoration – Image observation models – Inverse and wiener filtering – Least square filters – Image analysis – Edge detection – Boundary extraction – Boundary representation – Region representation – Image segmentation – Classification techniques – Image understandings.

UNIT V   9

Image data compression – Pirel coding – PCM, Entrophy coding, Runlength, Bitplane extraction – Predictive techniques – Delta modulation line by line DCPM etc – Interface – Coding of two tone images.

TOTAL: 45 PERIODS

TEXTBOOK
1. Anil K.Jain – Fundamentals of digital image processing – Prentice Hall information and System Science series, 1989.

REFERENCES
1. Pratt W.K., Digital Image Processing, 2nd Edition, John Wiley & Sons, 1991.
2. Rosenfied A. and Kak, A.C. Digital picture processing, Vol. I & II, academic press 1982.
3. Nick Efford – Digital Image Processing a practical introduction using Java – Addison Wesley / Benjamin Cummings, 2000.

SS7094   **COMPUTER VISION**   **L T P C**
                                                                                      3 0 0 3
UNIT I   DIGITAL IMAGE PROCESSING FUNDAMENTALS   **9**
Digital image representation – An image model – Digital image processing transforms – Overview of L-Transforms and Fourier Transforms.

UNIT II   IMAGE PROCESSING AND SEGMENTATION   **9**
Image enhancement and image restoration – Histogram modification techniques – Image smoothening – Image sharpening – Algebraic approach to restoration – Constrained and unconstrained restorations – Image encoding – Image segmentation and description – Point and region dependent techniques.

UNIT III   BOUNDARY DETECTION   **9**
Edge finding – Surface orientation – Optical flow – Design – Growing.

UNIT IV   IMAGE REPRESENTATION   **9**
Texture – Texture as pattern recognition problem – Two and Three dimensional geometric structures – Boundary representations – Regions representation – Shape properties – Knowledge representation and use.

UNIT V   MATCHING AND INFERENCE   **9**
Semantic nets – Matching – Inference – Computer reasoning – Production systems – Active knowledge – Goal achievement.
                                                                          TOTAL: 45 PERIODS
TEXTBOOK
1. Rosenfeld A and Kak A.C., "Digital Picture Processing", Academic Press, 1982.
2. Ballard B and Brown B, "Computer Vision", Prentice Hall Inc., N.J., 1982.

REFERENCES
1. Winston.P.H.(Ed.), "The Psychology of Computer Vision", McGraw Hill, 1975.
2. Yoshiaki Shirai, "Three Dimensional Computer Visison", Springer – Verlag, New York, 1987.

SS7095   **PATTERN RECOGNITION**   **L T P C**
                                                                           3 0 0 3

UNIT I   INTRODUCTION   7

Pattern and feature – Training and learning in pattern recognition system – Pattern recognition approaches – Statistical pattern recognition – Syntactic pattern recognition – Neural pattern recognition – Reasoning driven pattern recognition – Discriminant functions – Linear and Fisher's discriminant functions.

UNIT II   STATISTICAL PATTERN RECOGNITION   10

Gaussian model – Supervised learning – Parametric estimation – Maximum likelikhood estimation – Bayesian parameters estimation – Perceptron algorithm – LMSE algorithm – Problem with Bayes approach – Pattern classification by distance functions – Maximum distance pattern classifier.

UNIT III   CLUSTER ANALYSIS   8

Unsupervised learning – Clustering for unsupervised learning and classification – C- means algorithm – Hierarchical clustering procedure – Graph theoretic approach to pattern clustering – Validity of clustering solutions.

UNIT IV   SYNTACTIC PATTERN RECOGNITION   8

Elements of formal grammer – String generation as pattern description – Recognition of syntactic description – Parsing – Stochastic grammer and applications – Graph based structural representation.

UNIT V   FEATURE EXTENTION AND RECENT ADVANCES   12

Entropy minimization – Karhunen – Loeve transformation – Neural network structures for pattern recognition – Unsupervised learning – Self organizing networks – Fuzzy pattern classifiers – Genetic algorithms – Application to pattern recognition.

                                                                 TOTAL: 45 PERIODS

TEXTBOOKS
1. Richard. E.G., Johnsonbaugh and Jost.S. "Pattern Recognition and Image Analysis", Prentice Hall of India Pvt. Ltd., New Delhi, 1999.
2. Duda R.O. and Hart P.E., "Pattern Classification and Scene Analysis", Wiley, New York, 1973.
3. Morton Nadler and Eric Smith P.,"Pattern Recognition Engineering", John Willey and Sons, New York, 1993.
4. Tou and Gonzalez R.," Pattern Recognition Principles", Addision Wesley, 1974.

REFERENCES
1. Rober J. Schalkoff, "Pattern Recognition – Statistical, Structural and Neural Approaches", John Wiley & Sons Inc, New York, 1992.
2. Melanie Mitchell, "An Introduction to Genetic Alogrithms", Prentice Hall of India Pvt Ltd., New Delhi, 1988.

SS7096   **DESIGN PATTERNS**   **L T P C**
                                                                          3 0 0 3

UNIT I   INTRODUCTION   9
History and origin of patterns – Pattern envy and ethics – Prototyping – Testing.

UNIT II   DESIGN PATTERNS   9
Kinds of pattern – Quality and elements – Patterns and rules – Creativity and patterns.

UNIT III   FRAMEWORKS   9
Algorithms and frameworks for patterns.

UNIT IV   CATALOGS   9
Patterns catalogs and writing patterns.

UNIT V   ADVANCED PATTERNS   9
Anti-patterns – Case studies in UML and CORBA.

TOTAL: 45 PERIODS

TEXTBOOKS
1. Eric Gamma, Richard Helm, Ralph Johnson, John Vlissides, Grady Booch, Design Patterns, Addison Wesley, 1995.
2. Craig Larman, Applying UML and Patterns Prentice Hall, 1998.

REFERENCES
1. Thomas Mowbray and Raphel Malveaux, CORBA and Design Patterns, John Wiley, 1997.
2. William J Brown et al, Anti-Patterns: Refactoring Software, Architectures and Projects in Crisis, John Wiley, 1998.