Objectives of the Diploma/Bachelor's Programme/Master's Programme

1. **NATURE OF THE PROGRAMME – MCA**
2. **CONDITIONS FOR ADMISSION – As per the norms**
3. **DURATION OF THE PROGRAMME – 3 YEARS**
4. **PROGRAMME OF STUDY– Attached**
5. **STRUCTURE OF THE PROGRAMME – Attached**
6. **EXAMINTAIONS - As per the Norms**
7. **SCHEME OF EXAMINTAIONS – As per the norms**
8. **QUESTION PAPER PATTERN**

   Pattern for Theory Paper - Attached
   Pattern for Computer Laboratory - Attached

9. **PASSING MINIMUM – As per the norms**
10. **GRADING SYSTEM**

    Conversion of Percentage of Marks of Grade points and Letter Grade
    Formulae for the calculation for GPA AND CGPA

11. **EARNING OF CREDITS**
12. **MAXIMUM DURATION FOR THE COMPLETION OF THE PROGRAMME – Five Years**
13. **ATTENDANCE – 50 % is Compulsory**
14. **CLASSIFICATION OF SUCCESSFUL CANDIDATES - Attached**
15. **COMMENCEMENT OF THE REGULATION – As per the norms**
16. **FORMAT FOR THE PREPARATION OF RECORD/PROJECT WORK**

Record of Laboratory work in the case of Mathematical Package exercise
Record of Laboratory work in the case of Programming exercise

17. **LABORATORY WORK AND THE PATTERN OF EVALUATION – Attached**
18. **DETAILS OF SYLLABI FOR VARIOUS COURSES – Attached**

UNIVERSITY OF MADRAS
DEGREE OF MASTER OF COMPUTER APPLICATIONS (M.C.A.)

REVISED REGULATIONS
(To be offered in the Institute of Distance Education)
(To take effect from the Acadamic year 2012-13 onwards)

1. Eligibility for Admission

Candidate who has passed the under-mentioned degree examinations of this University or an examination of other institution recognized by this University as equivalent thereto provided they have undergone the course under 10+2+3 or 11+1+3 or 11+2+2 pattern or under the Open University System, shall be eligible for admission to the M.C.A. Degree Course.

(a) B.C.A/B.E.S/B.Sc. in Computer Science/Mathematics/Physics/ Statistics / Applied Sciences OR (b) B.Com / Bachelor of Bank Management/B.B.A/B.L.M/B.A Corporate Secretary-ship / B.A. Economics/ any other Bachelor's Degree in any discipline with Business Mathematics and Statistics or Mathematics/Statistics in Main/Allied level OR (c) B.Sc. Chemistry with Mathematics and Physics as allied subjects OR (d) B.E/B.Tech./M.B.A OR (e) A Bachelor's Degree in any discipline with Mathematics as one of the subjects at the Higher Secondary level (i.e. in +2 level of the 10+2 pattern)

2. Duration of the Course

The Course duration shall be three years. In order to be eligible for the award of the degree the candidate shall successfully complete the course in a maximum period of five years reckoned from the date of enrolment for the first year of the course.

3. Structure of the Course and Evaluation Pattern

The duration of University examination for theory and practical subjects shall be 3 hours. The maximum mark for each theory is 100 for University Examination. The maximum mark for each practical is 100 University Examination. For project work the marks assigned shall be

Project report	210 marks
Viva-voce	90marks

For the conduct of University Examinations in Practical subjects the University will appoint two external examiners. The evaluation pattern for practical examinations shall be as follows:

Record book : 10 Marks.

Examination: 90 Marks

Project work shall be carried out individually in an R&D section of any Industry or University or in the Institute in which the candidate is studying. The Project Work/Dissertation report shall be submitted through the guide/supervisor to the Director , Institute of Distance Education(IDE) and then to the University. If he/she fails to submit the Project Work/Dissertation within the stipulated date for a particular year, he/she may be permitted with the approval of the Director, IDE to submit the Project Report/Dissertation during the succeeding Years, within the maximum period of **FIVE** years from the date of admission to the first semester. Project/Dissertation evaluation and Viva-Voce shall be conducted by two external examiners.

List of courses, and their Scheme of evaluation are given below:

First Year

S.No.	Course components	Name of Course	Exam.	Max Mark
1	Core-1	Programming in C and Unix	3	100
2	Core-2	Digital Computer Fundamentals	3	100
3	Core-3	System Software	3	100
4	Core-4	Microprocessors and its Applications	3	100
5	Core-5	Object Oriented Programming with C++	3	100
6	Core-6	Data Structures	3	100
7	Non-Major Elective-1	Mathematics for Computer Science	3	100
8	Non Major Elective- 2	Statistical Methods	3	100
9	Core-7	Practical – I: PC Software Lab.	3	100
10	Core-8	Practical –II: Programming in C	3	100
11	Core-9	Practical – III: Data Structures using C++ Lab	3	100
12	Core-10	Practical – IV: Unix and Shell Programming	3	100

Second Year

S.No.	Course components	Name of Course	Exam.	Max Mark
13	Core- 11	Software Engineering	3	100
14	Core- 12	Computer Graphics	3	100
15	Core- 13	Java Programming	3	100
16	Core- 14	Operating Systems	3	100
17	Core- 15	Computer Networks	3	100
18	Core- 16	Database Management Systems	3	100
19	Core -17	Design and Analysis of Algorithms	3	100
20	Core–18	Software Project Management	3	100

21	Extra-Disciplinary	Accounting & Financial Management	3	100
22	Elective	Elective – I	3	100
23	Core- 19	Practical–V: Programming in Java	3	100
24	Core- 20	Practical–VI: Operating Systems Lab.	3	100
25	Core- 21	Practical – VII: RDBMS Lab.	3	100
26	Elect.Lab	Practical – VIII: Based on Elective –I	3	100

Third Year

S.No.	Course components	Name of Course	Exam.	Max Marks
27	Core - 22	Web Technologies	3	100
28	Elective	Elective – II	3	100
29	Elective	Elective – III	3	100
30	Elective	Elective – IV	3	100
31	Core -23	Practical – IX: Web Design Lab.	3	100
32	Core -24	Practical – X: Mini project	3	100
33	Core - 25	Project & Viva-voce	-	210 +90

List of Electives

Elective –I

Multimedia Systems OR DOT NET Programming OR Advanced Java Programming

Elective - II

Managerial Economics OR Object Oriented Analysis & Design OR Data Warehousing and Data Mining

Elective -III

Computer Simulation and Modeling OR Artificial Intelligence OR Information Security

Elective – IV

Operations Research OR Mobile Computing OR Digital Image Processing

4. Passing Requirements

a) For all subjects the passing requirement is as follows: i) candidate secures not less than 50% of marks in University examination(U.E.) and not less than 50% in aggregate of the total maximum marks prescribed in each theory & practical, and in Project work minimum 50% each

in dissertation and Viva-Voce examination and not less than 50% in aggregate of the total maximum marks prescribed, shall be declared to have passed in the respective subject.

b) A candidate who passes in all subjects and in the project work within the maximum period of five years reckoned from the date of admission to the course shall be declared to have qualified for the degree.

c) The relative overall performance of the candidate shall be determined by the overall percentage of Marks obtained in all subjects evaluated as follows:

$$\text{WAM} = \frac{\text{Sum of marks obtained (MO)}}{\text{Sum of maximum marks(MM)}} = \frac{\sum MO_i}{\sum MM_i}$$

where MO_i is the mark obtained in the i^{th} subject & MM_i is the maximum mark prescribed for the i^{th} subject.

This score shall be entered in the transcript given to the candidate on successful completion of the course calculated to two decimal points.

5. Classification of successful candidates

(a) A Candidate who qualifies for the Degree and secures **WAM** of not less than 75% shall be declared to have passed the examination in FIRST CLASS WITH DISTINCTION provided he/she has passed the examination in every subject he/she has registered as well as in the project work in the first appearance.
(b) A candidate who qualifies for the degree as per the regulations for passing requirements and secures a weighted average of not less than 60% shall be declared to have passed the examination in
FIRST CLASS.
(c) All other successful candidates shall be declared to have passed in **SECOND CLASS**.

(d) Only those candidates who have passed all the papers including practical and project work in the first appearance shall be considered for the purpose of **RANKING**.

6. Procedure in the event of failure
(a) If a candidate fails in a particular subject (other than Project work) he/she may reappear for the University examination in the subject in subsequent examinations and obtain passing marks.
(b) In the event of failure in Project Work, the candidate shall reregister for Project Work and redo the Project Work in a subsequent year and resubmit the dissertation afresh for evaluation. The internal assessment marks shall be freshly allotted in this case.
7. Attendance

A candidate who has attendance of less than 50% for personal contact program overall in a year shall not be permitted to take the University examination. Candidates who have less than 50% has to repeat the year from the next year.

8. Provision for Lateral Admission

Candidates with PGDCS of this University or any other University as equivalent thereto, provided he/she satisfies the eligibility condition as above, shall be admitted to the Second year of the M.C.A. Degree Course.

9. PATTERN OF QUESTION PAPER (THEORY)

Time 3 hours Max Marks 100

Part - A: (200 words) 6 Out of 8 questions (6 x 5 = 30 Marks)
At least one question from each unit.

Part –B: (500 words) 7 Out of 10 questions (7 x 10 = 70 Marks)
At least one question from each unit.

PATTERN OF QUESTION PAPER (PRACTICAL)

Time: 3 Hours Max: 100 Marks.

One compulsory problem (may contain subdivisions) to be solved within 3 hours.

Title of the Course		PROGRAMMING IN C AND UNIX					
Paper Number							
Category	Core -1	Year I Year		Credits		Course Code	
Personal Contact Programme Hours per year		Lecture			Lab Practice		Total
		12					12
Pre-requisite		Basic Concepts of Programming and preliminary DOS commands.					
Learning Objectives of the Course		This course introduces the basic programming concepts and fundamentals of Unix					

Course Outline:

Unit 1: Basic Elements of C – Data Types – Operator – Control Statements – Branching, Looping, Nested Control Structures – Prototypes and Functions – Parameter Passing Methods – Recursion – Storage Classes – Library Functions – Arrays – Passing Arrays to Functions – Multi-Dimensional Arrays – Strings Operations – Enumerated Data Types.

Unit-2: Structures –User Defined Data Types – Union - Nested Structure, Passing Structures to Functions – Pointer Concept – Declaration – Accessing Variable through Pointer – Initializing Pointer Variable – Pointers and Functions – Pointers and Arrays – Pointers and Structures – Example Programs using Pointers with Function, Arrays and Structures – Command Line Arguments – Self Referential Structures.

Unit 3: Dynamic Memory Allocation – Operations on Pointers – Singly Linked List – Creation, Insertion and Deletion of Elements – Stack and Queue implementation using Linked List – Concept of Streams – File Handling - File Pointer – High Level File Operations – Opening and Closing of File – Creating, Processing and Updation on Files – Simple File Handling Programs.

Unit-4: Introduction to Unix – Unix Components – Unix Files – File Attributes and Permission – Standard I/O – Redirection – Pipes and Filters – Grep and Stream Editor – Process and Signal Commands

Unit-5 : Shell Programming – Shell Variables – Export, Read, Exit Commands – Control Structures – Arithmetic in Shell Programming – Debugging Scripts – Structure of an AWK Script – AWK Control Structures – Functions in AWK – Executing AWK Scripts with the Shell.

Recommended Text

1) B. W. Kernighan and D. M. Ritchie, 1990, The C Programming Language, Second Edition, PHI, New Delhi.
II) M.G. Venkateshmurthy, 2005, Introduction to Unix & Shell Programming, Pearson Education India, Delhi.

Reference Books

(i) A. N. Kanthane, 2005, Programming with ANSI and Turbo C, Pearson Education, Delhi.

(ii) J. R. Hanly and E. B. Koffman, 2005, Problem solving and program design in C, Fourth Edition, Pearson Education India.

(iii) B. A. Fozougar, R. Failberg, 2003, Unix and Shell Programming, Thomson

Website and e-Learning Source	http://www.cs.cf.ac.uk/Dave/C/CE.html

Title of the Course		**DIGITAL COMPUTER FUNDAMENTALS**					
Paper Number							
Category	Core -2	**Year** I Year		**Credits**		**Course Code**	
Personal Contact Programme Hours per year		**Lecture**			**Lab Practice**	**Total**	
		12				12	
Pre-requisite		Basic Concepts of computer and its Parts.					
Learning Objectives of the Course		This course introduces the basic concepts of digital computer					

Course Outline

Unit 1: Number System – Converting numbers from one base to another – Complements – Binary Codes – Integrated Circuits – Boolean algebra – Properties of Boolean algebra – Boolean functions – Canonical and Standard forms – Logical Operations – Logic gates – Karnaugh Map up to 6 variables – Don't Care Condition – Sum of Products and Products of Sum simplification – Tabulation Method.

Unit-2: Adder – Subtractor – Code Converter – Analyzing a combinational Circuit – Multilevel NAND and NOR circuits – Properties of XOR and equivalence functions – Binary Parallel Adder – Decimal Adder – Magnitude Comparator – Decoders – Multiplexers – ROM – PLA.

Unit 3: Flip Flops – Triggering of flip-flops – Analyzing a sequential circuit – State reduction – excitation tables – Design of sequential circuits – Counters – Design with state equation – Registers – Shift Registers – Ripple and synchronous Counters

Unit-4: Memory Unit – Bus Organization – Scratch Pad memory – ALU – Design of ALU – Status Register – Effects of Output carry – Design of Shifter – Processor Unit – Microprogramming – Design of specific Arithmetic Circuits

Unit-5 : Accumulator – Design of Accumulator – Computer Configuration – Instruction and Data formats – Instruction sets – Timing and Control – Execution of Instruction – Design of Computer – Hardwired control – PLA Control and Microprogram control

Recommended Text

(i) M. Morris Mano, 1994, Digital Logic and computer Design, PHI, New Delhi.

Reference Books

(i) M. M. Mano and C.R.Kime, 2001, Logic and Computer Design Fundamentals, 2nd Edn, Pearson Education, Delhi.

(ii) Givone, 2002, Digital Principles Design, Tata McGraw Hill, New Delhi.

(iii) C. H. Roth , Jr, 2005, Fundamentals of Logic Design ,5 th Edition, Thomson Learning Singapore.

Website and e-Learning Source	http://ebookbrowse.com/digital-computer-fundamentals-ppt-d126392065

Title of the Course		**SYSTEM SOFTWARE**					
Paper Number							
Category	Core-3	**Year** I Year		**Credits**		**Course Code**	

Personal Contact Programme Hours per year	**Lecture**	**Lab Practice**	**Total**
	12		12

Pre-requisite	Basic Concepts of Language processor.
Learning Objectives of the Course	This course introduces the basic concepts language processors required for computing related applications.

Course Outline

Unit 1: Language processors – Language processing activities and fundamentals – Language specification – Development Tools – Data Structures for Language processing- Scanners and Parsers.

Unit 2: Assemblers: Elements of Assembly language programming - Overview of the Assembly process - Design of a Two-pass Assembler - A single pass Assembler for the IBM PC.

Unit 3: Macros and Macro processors – Macro definition, call , and expansion – Nested macro calls – Advanced macro facilities - Design of a macro preprocessor - Compilers: Aspects of compilation .

Unit 4: Compilers and Interpreters – Memory allocation - Compilation of Expressions and Control structures - Code optimization – Interpreters.

Unit 5 : Linkers: Linking and Relocation concepts – Design of a linker – Self relocating Programs – A linker for MS DOS - Linking for over-lays – loaders - Software tools: Software tools for program development - Editors - Debug monitors - Programming environments – User interfaces.

Recommended Text (i) D. M. Dhamdhere, 1999, Systems Programming and Operating Systems, Second Revised Edition, Tata McGraw-Hill, New Delhi.
Reference Books (i) L. L. Beck, 1996, System Software An Introduction to System Programming, 3rd edition, Addison-Wesley.

Website and e-Learning Source	http://www.scribd.com/doc/40423928/System-Software-Notes http://www.edunotes.in/system-software-notes

Title of the Course		**MICROPROCESSORS AND ITS APPLICATIONS**					
Paper Number							
Category	Core -4	**Year** I Year		**Credits**		**Course Code**	
Personal Contact Programme Hours per year		**Lecture**			**Lab Practice**		**Total**
		12					12
Pre-requisite		Basic Concepts of computer architechture.					
Learning Objectives of the Course		This course introduces the basic concepts of Microprocessors and its applications					

Course Outline

Unit 1: Introduction to 8086 assembly language programming - Development steps – Construction - Writing Programs and Development Tools – Standard program structures – simple Programs – Jumps – While-do – repeat-until- Delay loops.

.**Unit 2:** Strings – Procedures – Macros – Instruction Descriptions – Assembler Directives.

Unit 3: 8086 Microcomputer – Observing Bus signals – Minimum mode System – Troubleshooting – 8086 interrupts – Interrupt Applications – Programmable timer/Counter – Interrupt Controller.

Unit 4: Parallel Ports – Handshaking – Interfacing Digital Devices – Analog Interfacing – Industrial Control.

Unit 5 : DMA – DRAMS – Cache Memories – Co-Processors – EDA Tools – 80286 80386 and 80486 microprocessors.

Recommended Text

(i) D. V. Hall , 1992, Microprocessors and Interfacing, Programming and Hardware, 2nd Edition, Tata McGraw-Hill, New Delhi.

Reference Books

(i) K. Udaya Kumar and B.S. Uma shankar, 1998, Advanced Microprocessors and IBM, PC Assembly Language Programming, Tata McGraw-Hill, New Delhi.

(ii) A. P. Mathur, 1989, Introduction to Microprocessors, 3rd Edn., Tata McGraw-Hill, New Delhi.

(iii) Yu Cheng Liu & Glenn A Gibson – 2005-Microcomputer Systems 8086/8088 Family- 2 nd Edition –PHI- New Delhi

Website and e-Learning Source	http://www.berk.tc/micropro/microlinks.htm http://www.scribd.com/doc/20838382/Microprocessor-8085-notes

Title of the Course		**OBJECT ORIENTED PROGRAMMING WITH C++**					
Paper Number							
Category	Core -5	**Year** I Year		**Credits**		**Course Code**	
Personal Contact Programme Hours per year		**Lecture**			**Lab Practice**		**Total**
		12					12
Pre-requisite		Basic Concepts of C programming.					
Learning Objectives of the Course		This course introduces the basic concepts of Programming in C++ for computing related applications					

Course Outline

Unit 1: Introduction to OOP – Overview of C++ - Classes – Structures – Union – Friend Functions – Friend Classes – Inline functions – Constructors – Destructors – Static Members – Scope Resolution Operator – Passing objects to functions – Function returning objects.

Unit 2: Arrays – Pointers – this pointer – References – Dynamic memory Allocation – functions Overloading – Default arguments – Overloading Constructors – Pointers to Functions – Ambiguity in function overloading.

Unit 3: Operator Overloading – Members Operator Function – Friend Operator Function – Overloading some special operators like [ ] , ( ) , a and comma operator – Inheritance – Types of Inheritance – Protected members – Virtual base Class – Polymorphism – Virtual functions – Pure virtual functions.

Unit 4: Class templates and generic classes – Function templates and generic functions – Overloading function templates – power of templates – Exception Handling – Derived class Exception – overhandling generic functions – Exception handling Functions – terminate () unexpected () – Uncaught – exception ()

Unit 5 : Streams – Formatted I/O with ios class functions and manipulators – creating own manipulator – overloading << and >> - File I/O – Name spaces – conversion functions – Array based I/O – Standard Template Library (STL).

Recommended Text

H. Schildt, 2003, C++ The Complete Reference, 4th Edition, Tata McGraw-Hill, New Delhi.

Reference Books

(i) J.P. Cohoon and J.W. Davidson, 1999, C++ Program Design – An Introduction to Programming and Object-oriented Design, 2nd Edition, Tata McGraw-Hill, New Delhi.

(ii) Johnston, 2002, C++ programming today, PHI, New Delhi.

(iii) A. N Kanthane, 2005, Object Oriented Programming with ANSI & Turbo C++ , Pearson Education, New Delhi.

(iv) Farrel , 2001, Object Oriented Programming using C++ , 2 nd Edition, Thomson Learning, Singa[pore.

Website and e-Learning Source	http://www.doc.ic.ac.uk/~wjk/C++Intro/ http://www.fredosaurus.com/notes-cpp/oop-classes/oop.html

Title of the Course		**DATA STRUCTURES**					
Paper Number							
Category	Core-6	**Year** I Year		**Credits**		**Course Code**	
Personal Contact Programme Hours per year		**Lecture**			**Lab Practice**	**Total**	
		12				12	
Pre-requisite		Basic Concepts of memory structure and its organization					
Learning Objectives of the Course		This course introduces the basic data structures for computing related applications					

Course Outline

Unit 1: Abstract data types - asymptotic notations – complexity analysis – Arrays- representation of arrays – operations on arrays – ordered lists – polynomials.

Unit-2: Linked lists: Singly linked list- circular linked lists - doubly linked lists – general lists – stacks -queues - circular queues – Evaluation of expressions.

Unit 3: Trees – Binary Trees – Binary Tree Traversals – Binary Tree Representations – Binary Search Trees – Threaded Binary Trees – Application of Trees (Sets) – Representation of Graphs – Graph Implementation – Graph Traversals- Application of Graph Traversals- Minimum Cost Spanning Trees – Shortest Path Problem

Unit-4: Internal Sorting – Optimal Sorting Time – Sorting Large Objects – Sorting with Tapes- Sorting with Disks.

Unit-5 : Hashing – AVL Trees - Red-Black Trees – Splay Trees – B-Trees.

Recommended Text

(i) E.Horowitz, S. Sahni and Mehta, 1999, Fundamentals of Data Structures in C++, Galgotia, New Delhi

Reference Books

(i) G. L. Heileman, 1996, Data Structures, Algorithms and Object Oriented Programming, Tata McGraw-Hill, New Delhi.

(ii) A.V.Aho, J.D. Ullman, J.E. Hopcraft, 1983, Data Structures and Algorithms, Addison Wesley, Boston.

(iii) S. Sahni , 2001, Data structures , Algorithms & Applications, Tata McGraw-Hill, New Delhi.

(iv) Yedidyah Langsam Augensteil, Tanenbaum, Data Structures using C and C++ , PHI, New Delhi

(v) Gilberg , Forouzan, 2002, Data Structures,Thomson Asia, Singapore.

Website and e-Learning Source		http://www.cs.sunysb.edu/~skiena/214/lectures/ http://sbge.tripod.com/DSIndex.html http://www.innersky.ca/portfolio/c_c++_ds_notes.htm					
Title of the Course		**MATHEMATICS FOR COMPUTER SCIENCE**					
Paper Number							
Category	Non Major/Elective-1	**Year** I Year		**Credits**		**Course Code**	
Personal Contact Programme Hours per year		**Lecture**			**Lab Practice**	**Total**	
		12				12	
Pre-requisite		Basic Concepts of Maths – in Calculus, Algebra etc.					

Learning Objectives of the Course	This course introduces the basic mathematical concepts and Numerical methods for computing related applications.

Course Outline

Unit 1: Mathematical Logic**:** Statement Calculus – Connectives – normal forms – Predicate Calculus – Theory of inference for statement Calculus – Predicate Calculus including theory of inference.

Unit-2: Set Theory: Basic concepts of set theory – relations and ordering – functions –recursion.

Unit 3: Algebraic Structures: Semigroups – monoids- grammars and languages – groups and subgroups – Polish experiments and their compilation

Unit-4: Roots of Equations: Graphical Method – Bisection Method – False-Position Method – Fixed-Point Iteration – Newton-Raphson Method – Secant Method – Roots of Polynomials: Conventional Methods – Muller's Method – Bairstow's Method. Algebraic Equations: Gauss Elimination –Gauss-Jordan – LU Decomposition – Matrix Inverse –Gauss-Seidel.

Unit-5 : Numerical Differentiation - Integration: Trapezoidal Rule – Simpson's Rule – Romberg Integration – Differential equations: Taylor's method – Euler's method –Runge-Kutta 2^{nd} and 4^{th} order methods – Predictor – corrector methods.

Recommended Text

(i) J.P. Tremblay and R. Manohar, 1975, Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw-Hill, New Delhi

(ii) S.S. Sastri, 1977, Introductory Methods of Numerical Analysis, Prentice Hall India, New Delhi

Reference Books

(i) J. Truss, 1999, Discrete Mathematics for Computer Scientists, 2^{nd} Edn., Addison Wesley, Boston.

(ii) S. C. Chapra and R. P.Canale, 2002, Numerical Methods for Engineers, Fourth Edition, McGraw Hill International Edition.

(iii) Kolman, Busby and Ross, 2005, Discrete mathematical structures, 5^{th} edition, PHI, New Delhi.

(iv) P.Niyogi, 2003, Numerical Analysis and Algorithms, Tata McGraw Hill, New Delhi.

Website and e-Learning Source	http://tuanthanh8889.softarchive.net/mathematics_and_computer_science_ebooks.540582.html http://ebookee.org/Algorithms-in-Modern-Mathematics-and-Computer-Science_1106641.html

Title of the Course		**STATISTICAL METHODS**					
Paper Number							
Category	Non Major /Elective-2	**Year** I Year		**Credits**		**Course Code**	
Personal Contact Programme Hours per year		**Lecture**			**Lab Practice**		**Total**
		12					12
Pre-requisite		Basic Concepts of statistics					

Learning Objectives of the Course	This course introduces the basic Statistical Methods for computing related applications

Course Outline

Unit 1: Sample spaces - events - Axiomatic approach to probability - conditional probability - Independent events - Baye's formula - Random Variables - Continuous and Discrete random variables - distribution function of a random variables - Characteristic of distributions - Expectation, variance - coefficient of variation, moment generation function - Chebyshev's inequality

Unit 2: Bivariate distribution - conditional and marginal distributions - Discrete distributions - discrete uniform, Binomial poison and geometric Distributions - Continuous distributions - Uniform, Normal, Exponential and Gamma distributions

Unit 3: Correlation coefficient - Rank correlation coefficient of determination - Linear Regression - Method of Least squares - Fitting of the curve of the form $ax + b$, $ax^2 + bx + c$, ab^x and ax^b - multiple and partial correlation (3 - variables only).

Unit 4: Concept of sampling – Methods of sampling - simple random sampling - Systematic sampling and stratified random sampling (descriptions only) - concepts of sampling distributions and standard error - point estimation (concepts only) - Interval Estimation of mean and proportion. Tests of Hypotheses - Critical Region - two types of Errors - Level of significance - power of the test - Large sample tests for mean and proportion - Exact tests based on Normal, t, F and Chi-square distributions

Unit 5 : Basic principles of experimentation - Analysis of variance - one way and two way classifications - computing randomized design - Randomized Block design - Time series Analysis - Measurement of Trend and Seasonal variations

Recommended Text

(i) Mood, A.M., Graybill, F. and Boes, 1974, Introduction to Mathematical Statistics, McGraw-Hill.

(ii) Trivedi, K.S, 1994, Probability and Statistics with Reliability, Queuing and Computer Science Applications. Prentice Hall India, New Delhi.

Reference Books

I. Arnold O. Allen, 1978, Probability, Statistics and Queuing Theory with Computer Science Application.
II. Bajpai, A.C. Calus, I.M. Fairley, J.A., 1979, Statistical Methods for Engineers and Scientists. John Wiley & Sons.
III. Doughlas, C.,Montagomery, Lynwood,A. & Johnson, 1976, Forecasting and Time Series Analysis, Tata McGraw-Hill, New Delhi.
IV. Baisnab, A.P. and Manoranjan Jas, 1993, Elements of Probability and Statistics, Tata McGraw-Hill, New Delhi.
V. Kossack, C.F. and Hensschkec, C.I., Introduction to Statistics and Computer Programming, Tata McGraw-Hill, New Delhi.

Website and e-Learning Source	http://www.maths.manchester.ac.uk/~saralees/notes.pdf http://www.math.mcmaster.ca/canty/teaching/stat2mb3/lectures2.pdf

Title of the Course		**PRACTICAL – I: PC – SOFTWARE LAB.**					
Paper Number							
Category	Core-7	**Year** I Year		**Credits**		**Course Code**	
Personal Contact Programme Hours per year		**Lecture**			**Lab Practice**	**Total**	
					13.5	13.5	
Pre-requisite		Basic concepts of usage of MS-Office tools					
Learning Objectives of the Course		This course gives practical training on PC Software.					

Course outline

Microsoft Word

1. Working with Text Editing using text tools: Character formatting, Paragraph formatting, Images, Picture, Clip art, Shapes and chart, Links and cross-reference, and Header and footer
2. Working with Tabs and Lists
3. Working with Tables
4. Working with page layout: Page setup, Page background and Alignment
5. Mail merge
6. References: Adding footnotes, Citations and bibliography, Captions and index
7. Working with Objects

Microsoft Excel

1. Working with Calculations: Function library and Formula auditing
2. Working with formatting: Picture, Clip art, Shapes and chart, Links and cross-reference, Header and footer and Objects
3. Working with charts
4. Working with Data tools: Sorts and filters, External data and Group and subgroup

Microsoft Access

1. Creating simple tables and working with queries.
2. Creating simple table and working with Forms.
3. Creating simple table and generating reports and labels
4. Creating RDBMS tables and working with queries.
5. Creating RDBMS tables and working with forms.

Creating RDBMS tables and generating reports and labels

Microsoft PowerPoint

1. Working with formatting slides: Inserting illustrations, Inserting Links, Inserting Text, Inserting Media clips, Inserting tables, and Inserting objects
2. Working with design: Page setup, Themes, and Back ground
3. Working with animations: Custom animation and Slide transition
4. Microsoft Outlook Express
5. Configuring email
6. Sending and receiving mails
7. Applying conditions for receiving mails
8. Scheduling
9. Tasks

Recommended Text

(J. Cox, C. Frye, M. Dow, S. Lambert, J. Breppernau, 2008, Step by Step 2007 Microsoft Office System, Prentice Hall).

Reference Books

Website and e-Learning Source	

Title of the Course		**PRACTICAL – II: PROGRAMMING IN C**					
Paper Number							
Category	Core -8	**Year**	I year	**Credits**		**Course Code**	
Personal Contact Programme Hours per year		**Lecture**			**Lab Practice**		**Total**
					13.5		13.5
Pre-requisite		Thorough Knowledge of C Programming					

Learning Objectives of the Course	This course gives practical training on Programming in C.

Course Outline

1. Determining a given number is prime or not.
2. Pascal's triangle
3. String Manipulation
4. Matrix multiplication
5. Finding determinant of a Matrix
6. Checking for tautologies and Contradictions.
7. Euclidean's Algorithm for finding GCD (Towers of Honai).
8. Creating database for telephone numbers and related operations. Use file concepts.
9. Creating database for Mailing addresses and related operations. Use structures.
10. Creating database for web page addresses and related operations. Use pointers.
11. File Processing.
12. Finding roots of equations: Bisection Method.
13. Finding roots of Equations: Newton-Raphson Method.
14. Finding roots of Equations: Secant Method.
15. Solving algebraic equations: Gauss Elimination Method.

Recommended Text

Reference Books

Website and e-Learning Source	

<table>
<tr><td colspan="2">Title of the Course</td><td colspan="6">PRACTICAL –III: DATA STRUCTURES USING C++ LAB.</td></tr>
<tr><td colspan="2">Paper Number</td><td colspan="6"></td></tr>
<tr><td>Category</td><td>Core -9</td><td>Year</td><td>First</td><td>Credits</td><td></td><td>Course Code</td><td></td></tr>
<tr><td colspan="2" rowspan="2">Personal Contact Programme Hours per year</td><td colspan="3">Lecture</td><td>Lab Practice</td><td colspan="2">Total</td></tr>
<tr><td colspan="3"></td><td>13.5</td><td colspan="2">13.5</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="6">Thorough Knowledge of C++ programming</td></tr>
<tr><td colspan="2">Learning Objectives of the Course</td><td colspan="6">This course helps to implement data structures using C++</td></tr>
<tr><td colspan="8">Course Outline
For the implementation of the following problems, the students are advised to use all possible object oriented features. The implementation shall not be based on structured concepts
1. Implementation of Arrays (Single and Multi-Dimensional)
2. Polynomial Object and necessary overloaded operators.
3. Singly Linked Lists.
4. Circular Linked Lists.
5. Doubly Linked Lists.
6. General Lists.
7. Implementation of Stack (using Arrays)
8. Implementation of Queue (Using Pointers)
9. Implementation of Circular Queue (using Arrays and Pointers)
10. Evaluation of Expressions- ITP (Infix to Prefix).
11. Binary Tree implementations and Traversals using recursion.
12. Binary Search Trees.
13. Shortest path (Dijkstra’s)
Search methods in graphs (DFS & BFS) using recursion.</td></tr>
<tr><td colspan="8">Recommended Text</td></tr>
<tr><td colspan="8">Reference Books</td></tr>
<tr><td colspan="2">Website and e-Learning Source</td><td colspan="6"></td></tr>
</table>

Title of the Course		Practical –IV: Unix and Shell Programming					
Paper Number							
Category	Core -10	Year	First	Credits		Course Code	
Personal Contact Programme Hours per year		Lecture			Lab Practice		Total
					13.5		13.5
Pre-requisite		Thorough Knowledge of Unix Shell Programming					
Learning Objectives of the Course		This course gives practical training in Unix and Shell Programming.					

Course Outline

1. Write a script that asks for the user's age. If it is equal to or higher than 18, print a message saying that this user is allowed to drive any vehicle. If the user's age is below 16, print a message telling the user how many years he or she has to wait before legally being allowed to drive.
2. Use an if/then/else construct that prints information about the current month. The script should print the number of days in this month, and give information about leap year if the current month is February.
3. Check whether the given number is Armstrong / prime / perfect or not.
4. Accepts any number of arguments and prints them in the reverse order.
5. Write a script that does the following:
    a. display the name of the script being executed.
    b. Display the first, third and tenth argument given to the script.
    c. Display the total number of arguments passed to the script.
    d. If there were more than three positional parameters, use shift to move all the values 3 places to the left.
    e. Print all the values of the remaining arguments.
    f. Print the number of arguments .

    Note: test with zero, one, three and over ten arguments.

6. Design a menu driven program for rename, remove and copy commands.
7. Check whether the given user has logged in or not.
8. To check file permissions (read/write/execute/exit) and file types (file / directory /size zero)
9. Write a program to get the input from the user whether to read the unread system information or whether to read the already read system information and display all the system information page by page. (using news command- The news command allows a user to read news items published by the system administrator).
10. write a program to get two user inputs (filename and whether to download or upload the file.
11. write a program to get two user inputs – the file name and the column no(n). using cat command, list the nth column from mentioned file.
12. Simulate find command.
13. Remove duplicates words from list / file.
14. To process Electricity Billing system using awk command.
15. To prepare salary report for ABC company using awk command.

Recommended Text

Reference Books

Website and e-Learning Source	

Title of the Course		SOFTWARE ENGINEERING					
Paper Number							
Category	Core-11	Year	II YEAR	Credits		Course Code	
Personal Contact Programme Hours per year		Lecture		Lab Practice		Total	
		12				12	
Pre-requisite		Basic Concepts of software planning.					
Learning Objectives of the Course		This course introduces the concepts of Software Planning, analysis, design and testing.					

Course Outline

Unit 1: The Product-The Process-Project Management Concepts-Software Projects And Project Metrics

Unit 2: Software Project Planning-Risk Analysis And Management-Project Scheduling And Tracking-Software Quality Assurance

Unit 3: Software Configuration Management-System Engineering-Analysis Concepts And Principles-Analysis Modeling.

Unit 4: Design Concepts and Principles-Architectural Design-User Interface Design.

Unit 5 : Component level Design-Software Testing Techniques-Software Testing Strategies-Technical Metrics For Software.

Recommended Text.

(i) R. S. Pressman, 2005, Software Engineering A Practitioner's approach, 6th Edition, Tata McGraw-Hill, New Delhi.

Reference Books

(i) I. Sommerville, 2001, Software Engineering, 6th Edition, Addison Wesley**,** Boston.

(ii) Rajib Mal, 2005, -Fundamental of Software engineering , 2 nd Edition , PHI, New Delhi.

(iii) N. E. Fenton, S. L. Pfleenger, 2004, Software Metrics, Thomson Asia, Singapore.

Website and e-Learning Source	http://www.mhhe.com/pressman

Title of the Course		**COMPUTER GRAPHICS**					
Paper Number							
Category	Core - 12	**Year**	II YEAR	**Credits**		**Course Code**	
Personal Contact Programme Hours per year		**Lecture**			**Lab Practice**		**Total**
		12					
Pre-requisite		**Basic Concepts of pixel and its properties**					
Learning Objectives of the Course		This course introduces the basic concepts of Computer Graphics which shall be useful for virtual modeling.					

Course Outline

Unit 1: Introduction to computer Graphics – Video display devices – Raster Scan Systems – Random Scan Systems - Interactive input devices – Hard Copy devices - Graphics software – Output primitives – line drawing algorithms – initializing lines – line function – Circle Generating algorithms – Ellipse Generating algorithms - Attributes of output primitives – line attributes – Color and Grayscale style.

Unit 2: Area fill attributes – Character attributes inquiry function – Two dimensional transformation – Basic transformation – Matrix representation and Homogeneous co-ordinates - Composite transformation – Matrix representation – other transformations – two dimensional viewing – window – to- viewport co-ordinate transformation.

Unit 3: Clipping algorithms – Point clipping -line clipping - polygon clipping – Curve clipping - text clipping – Exterior clipping- Interactive input methods – Physical input devices – logical classification of input devices – Input functions - Interactive picture construction methods – Three dimensional concepts – Three dimensional display methods – parallel projection – perspective projection – Depth cueing – Visible line and surface identification.

Unit 4: Three dimensional transformation – Three dimensional viewing – Projection – Viewing transformation – Implementation of viewing operations – Hidden surface and Hidden line removal – backface removals.

Unit 5 : Three dimensional object representation – Spline representation - Bezier curves and surfaces – B-Spline curves and surfaces.

Recommended Text

D. Hearn and M.P. Baker, 2006 – Computer Graphics 2nd Edition, Pearson Education

Reference Books

(ii) W.M. Neumann and R. F. Sproull, Principles of Interactive Computer Graphics, Tata McGraw-Hill, New Delhi.

(iii) S. Harrington, 1989, Fundamentals of Computer Graphics, Tata McGraw-Hill, New Delhi.

(i) D. F. Rogers, J. A. Adams, 2002, Mathematical elements for Computer Graphics, 2nd Edition, Tata McGraw-Hill, New Delhi.

(ii) D. F. Rogers, 2001, Procedural elements for Computer Graphics, 2nd Edition, Tata McGraw-Hill, New Delhi.

(iii) Foley, Van Dan, Feiner, Hughes, 2000, Computer Graphics, Addison Wesley, Boston

Website and e-Learning Source	http://forum.jntuworld.com/showthread.php?3846-Computer-Graphics-Notes-All-8-Units http://www.cs.kent.edu/~farrell/cg05/lectures/index.html

Title of the Course		**OPERATING SYSTEMS**					
Paper Number							
Category	Core -14	**Year**	II YEAR	**Credits**		**Course Code**	
Personal Contact Programme Hours per year		**Lecture**			**Lab Practice**		**Total**
		12					12
Pre-requisite		**Basic Concepts of functions of operating system**					
Learning Objectives of the Course		This course introduces the fundamental concepts of operating Systems with case studied on Unix and Windows					

Course Outline

Unit 1: Introduction – Multiprogramming - Time sharing - Distributed system - Real-Time systems - I/O structure - Dual-mode operation - Hardware protection _ General system architecture - Operating system services - System calls - System programs - System design and implementation. Process Management: Process concept - Concurrent process - Scheduling concepts - CPU scheduling - Scheduling algorithms, Multiple processor Scheduling

Unit-2: Process Management: Process Synchronization - Critical section - Synchronization hardware - Semaphores, classical problem of synchronization, Interprocess communication. Deadlocks: Characterization, Prevention, Avoidance, and Detection.

Unit 3: Storage management - Swapping, single and multiple partition allocation - paging - segmentation - paged segmentation, virtual memory - demand paging - page replacement and algorithms, thrashing. Secondary storage management - disk structure - free space management - allocation methods – disk scheduling - performance and reliability improvements - storage hierarchy.

Unit-4: Files and protection - file system organization - file operations - access methods - consistency semantics - directory structure organization - file protection - implementation issues - security – encryption

Unit-5 : UNIX and Windows operating systems.

Recommended Text

(i) A. Silberschatz P.B. Galvin, Gange, 2002, Operating System Concepts, 6th Edn., Addison-Wesley Publishing Co., Boston.

Reference Books

(i) H.M. Deitel, 1990, An Introduction to Operating Systems, Addison Wesley Publishing Co., Boston

(ii) D.M. Dhamdhare , 2002, Operating System, Tata McGraw-Hill, New Delhi.

(iii) A.S. Tanenbaum , Operating Systems: Design and Implementation, Prentice-Hall of India, New Delhi.

Nutt, 2005, Operating Systems, 3 rd Edition, Pearson Education, Delhi.

Website and e-Learning Source	http://williamstallings.com/Extras/OS-Notes/notes.html http://cs.nyu.edu/courses/fall00/G22.2250-001/class-notes.html http://pages.cs.wisc.edu/~bart/537/lecturenotes/titlepage.html

Title of the Course		**COMPUTER NETWORKS**					
Paper Number							
Category	Core - 15	**Year**	II YEAR	**Credits**		**Course Code**	

Personal Contact Programme Hours per year	**Lecture**	**Lab Practice**	**Total**
	12		12

Pre-requisite	**Basic Concepts of netwok – LAN, WAN and MAN**
Learning Objectives of the Course	This course gives an insight into various network models and the general network design issues and related algorithms.

Course Outline

Unit 1: Introduction – Network Hardware – Software – Reference Models – OSI and TCP/IP models – Example networks: Internet, ATM, Ethernet and Wireless LANs - Physical layer – Theoretical basis for data communication - guided transmission media

Unit 2: Wireless transmission - Communication Satellites – Telephones structure –local loop, trunks and multiplexing, switching. Data link layer: Design issues – error detection and correction.

Unit 3: Elementary data link protocols - sliding window protocols – Data Link Layer in the Internet - Medium Access Layer – Channel Allocation Problem – Multiple Access Protocols.

Unit 4: Network layer - design issues - Routing algorithms - Congestion control algorithms – IP protocol – IP Address – Internet Control Protocol.

Unit 5 : Transport layer - design issues - Connection management - Addressing, Establishing & Releasing a connection – Simple Transport Protocol – Internet Transport Protocol (TCP) - Network Security: Cryptography.

Recommended Text

(i) A. S.Tanenbaum, 2003, Computer Networks, Fourth Edition, - Pearson Education, Inc, (Prentice hall of India Ltd), Delhi.

Reference Books

(i) B. Forouzan, 1998, Introduction to Data Communications in Networking, Tata McGraw Hill, New Delhi.

(ii) F. Halsall, 1995, Data Communications, Computer Networks and Open Systems, Addison Wessley.

(iii) D. Bertsekas and R. Gallagher, 1992, Data Networks, Prentice hall of India, New Delhi.

(iv) Lamarca, 2002, Communication Networks, Tata McGraw Hill, New Delhi.

Website and e-Learning Source	http://authors.phptr.com/tanenbaumcn4/

Title of the Course		DATABASE MANAGEMENT SYSTEMS					
Paper Number							
Category	Core -16	Year	II YEAR	Credits		Course Code	
Personal Contact Programme Hours per year		Lecture		Lab Practice		Total	
		12				12	
Pre-requisite		Basic Concepts of database and its preliminary features					
Learning Objectives of the Course		This course introduces the concepts of database systems design					

Course Outline

Unit 1: Introduction to Database Systems – Relational Model – Structure – Relational Algebra – Null Values – SQL – Set Operation – Views – Advanced SQL – Embedded SQL – Recursive Queries – The Tuple Relational Calculus – Domain Relational Calculus.

Unit 2: E-R Model – Constraints – E-R- Diagrams Weak Entity Sets – Reduction to Relational Schemes – Relational Database Design – Features of Relational Design – Automatic Domains and First Normal Form – Decomposition using Functional Dependencies – Multivalued Dependencies – More Normal Forms – Web Interface – Object – Based Databases – Structured Types and inheritance in SQL – Table inheritance – Persistent.

Unit 3: Storage and File Structure – RAID – File Organization – Indexing and Hashing – B Tree – B Tree Index files - Static and Dynamic Hashing – Query Processing – Sorting & Join Operators – Query Optimization – Choice of Evaluation Plans.

Unit 4: Transaction Management – Implementation of Atomicity and Durability – Serializability – Recoverability – Concurrency Control – Dead Lock Handling – Recovery System – Buffer Management.

Unit 5 : Database – System Architecture – Client Server – Architectures – Parallel System – Network Types – Distributed Database – Homogeneous and Hetrogeneous Database – Directory System – Case Study – Oracle – MSSQL Server.

Recommended Text

(i) A. Silberschatz, H.F. Korth and S. Sudharshan, 2006, Database System Concepts, 5th Edition, Tata McGraw Hill, New Delhi.

Reference Books

(i) J. D. Ullman,1988,Principles of Database Systems, Galgotia Publishers, New Delhi

(ii) C.J. Date, 1985, An Introduction to Database Systems, Third Edition, Narosa, New Delhi.

(iii) Elmasri and Navathe, 1999, Fundamentals of Database Systems, Third Edition, Pearson Education, Delhi.

(iv) C. Ritchie, 2004, Relational Database Principals, 2 nd Edition,Thomson, Singapore.

Website and e-Learning Source	http://www.cse.iitb.ac.in/dbms/Data/Papers-Local/DBConceptsBook/slide-dir/

Title of the Course		**DESIGN AND ANALYSIS OF ALGORITHMS**					
Paper Number							
Category	Core - 17	**Year**	II YEAR	**Credits**		**Course Code**	
Personal Contact Programme Hours per year		**Lecture**			**Lab Practice**		**Total**
		12					12
Pre-requisite		**Basic Concepts of analysis of problem in different approach and finding the complexity of its algorithm.**					
Learning Objectives of the Course		This course gives an insight into the design and analysis for selected problems.					

Course Outline

Unit 1: Introduction - Definition of Algorithm – pseudocode conventions – recursive algorithms – time and space complexity –big-"oh" notation – practical complexities – randomized algorithms – repeated element – primality testing - Divide and Conquer: General Method - Finding maximum and minimum – merge sort**.**

Unit 2: Divide and conquer contd. – Quicksort, Selection, Strassen's matrix multiplication – Greedy Method: General Method –knapsack problem - Tree vertex splitting - Job sequencing with dead lines – optimal storage on tapes.

Unit 3: Dynamic Programming: General Method - multistage graphs – all pairs shortest paths – single source shortest paths - String Editing – 0/1 knapsack. Search techniques for graphs – DFS-BFS-connected components – biconnected components.

Unit 4: Back Tracking: General Method – 8-queens - Sum of subsets - Graph Coloring – Hamiltonian cycles. Branch and Bound: General Method - Traveling Salesperson problem.

Unit 5 : Lower Bound Theory: Comparison trees - Oracles and advisory arguments - Lower bounds through reduction - Basic Concepts of NP-Hard and NP-Complete problems.

Recommended Text

E. Horowitz, S. Sahni and S. Rajasekaran, 1999, Computer Algorithms, Galgotia, New Delhi

Reference Books

(i) G. Brassard and P. Bratley, 1997, Fundamentals of Algorithms, PHI, New Delhi.

(ii) A.V. Aho, J.E. Hopcroft, J.D. Ullmann, !974, The design and analysis of Computer Algorithms, Addison Wesley, Boston.

(iii) S.E.Goodman and S.T.Hedetniemi, 1977, Introduction to the Design and Analysis of algorithms, Tata McGraw Hill Int. Edn, New Delhi.

Website and e-Learning Source	http://www.cise.ufl.edu/~raj/BOOK.html

Title of the Course		SOFTWARE PROJECT MANAGEMENT					
Paper Number							
Category	Core -18	Year	II YEAR	Credits		Course Code	
Personal Contact Programme Hours per year		Lecture			Lab Practice		Total
		12					12
Pre-requisite		Basic Concepts of management of software projects					
Learning Objectives of the Course		This course deals with managerial aspects of software projects					

Course Outline

Unit 1: Introduction to Software Project Management- Software project versus other types of project- problems- management control- Stakeholders- Requirement Specification – Information and control in organizations Introduction to step wise project planning- Select-identify scope and objectives- identify project infrastructure- Analyze project characteristics- products and activities- Estimate effort for each activity- Identify activity risks- Allocate resources- Review/ publicize plan- Execute plan and lower levels of planning. Project evaluation- Introduction – Strategic assessment- technical assessment- cost benefit analysis- cash flow forecasting- cost- benefit evaluation techniques- risk evaluation

Unit 2: Selection of an appropriate project approach- choosing technologies- technical plan contents list- choice of process models- structured methods-rapid application development- waterfall model - process model-spiral model- software prototyping- ways of categorizing prototypes- tools- incremental delivery- selecting process model -Software effort estimation- introduction- where- problems with over and under estimates- basis for software estimating- software effort estimation technique- expert judgement- Albercht function point analysis- Function points Mark II- Object points- procedural code oriented approach- COCOMO -Activity Planning- Objectives- Project schedules- projects and activities- sequencing and scheduling activities- network planning models- formulating a network model- using dummy activities- representing lagged activities- adding time dimension- forward pass- backward pass- identifying the critical path- Activity float- shortening project duration – identifying critical activities-precedence networks

Unit 3: Risk Management- nature of risk- managing- identification-analysis- reducing-evaluating- z values. Resource allocation- nature of resources- requirements-scheduling- critical paths- counting the cost-resource schedule- cost schedule- scheduling sequence. Monitoring and control- creating the frame work- collecting the data- visualizing the progress- cost monitoring-earned value- prioritizing, monitoring-Change control.

Unit 4: Managing contracts- types of contract- stages in contract placement- terms of a contract- contract management- acceptance. Managing people and organizing teams- organizational behaviour background- selecting the right person for the job- instruction in the best methods-motivation- decision making-leadership-organizational structures. Software quality- importance- defining –ISO 9126- practical measures- product versus process quality management- external standards-techniques to help enhance software quality.

Unit 5 : Ethics in Information Technology – an Overview of ethics – Ethics for IT professionals and IT users, Computer and internet crime – privacy-workplace monitoring – advanced surveillance technology.

Recommended Text

(i) B. Hughes and M. Cotterell, 2005, Software Project Management, 4th Edition, Tata McGraw Hill, New Delhi.

(ii) W. Royce,1998, Software Project Management: A Unified Frame Work, Addison Wesley, Boston

(iii) G.Reynolds, 2003, Ethics in Information Technology, Thomson Learning, Singapore.

Reference Books

(i) K. Heldman, 2005, Project Management Professionals, 3rd Edition, Wiley Dreamtech

(ii) Bhforooz & Hudson, 2004, Software Engineering, Oxford Press.

Website and e-Learning Source	http://highered.mcgraw-hill.com/sites/0077109899/information-center-view/

Title of the Course		**ACCOUNTING & FINANCIAL MANAGEMENT**					
Paper Number							
Category	Extra - Disciplinary	**Year**	II YEAR	**Credits**		**Course Code**	
Personal Contact Programme Hours per year		**Lecture**			**Lab Practice**	**Total**	
		12				12	
Pre-requisite		**Basic Concepts of business Accounts**					
Learning Objectives of the Course		This course introduces the basic concepts of accounting and financial management					

Course Outline

Unit 1: Principles of Accounting: Principles of double entry -Assets and Liabilities - Accounting records and systems - Trial balance and preparation of financial statements - Trading, Manufacturing, Profit and Loss accounts, Balance Sheet including adjustments(Simple problems only).

Unit 2: Analysis and Interpreting Accounts and Financial Statements: Ratio analysis - Use of ratios in interpreting the final accounts (trading accounts and loss a/c and balance sheet) - final accounts to ratios as well as ratios to final accounts.

Unit 3: Break-even analysis and Marginal Costing: Meaning of variable cost and fixed cost - Cost-Volume-Profit analysis – calculation of breakeven point, Profit planning, sales planning and other decision – making analysis involving break - even analysis - Computer Accounting and algorithm.(differential cost analysis to be omitted)

Unit 4: Budget/Forecasting: preparation of and Characteristics of functional budgets, Production, sales, Purchases, cash and flexible budgets

Unit 5 : Project Appraisal: Method of capital investment decision making: Payback method , ARR method - Discounted cash flows - Net Present values - Internal rate of return - Sensitivity analysis - Cost of capital.

Recommended Text

Reference Books

i) Shukla M.C. & T.S. Grewal, 1991, Advanced Accounts, S.Chand & Co. New Delhi.

ii) Gupta R.L. & M. Radhaswamy, 1991, Advanced Accounts Vol. II, Sultan Chand & Sons, New Delhi.

III) Man Mohan & S.N. Goyal, 1987, Principles of Management Accounting, Arya Sahithya Bhawan.

IV) Kuchhal, S.C., 1980, Financial Management, Chaitanya, Allahabad.

V) Hingorani, N.L. & Ramanthan, A.R, 1992, Management Accounting, 5th edition, Sultan Chand, New Delhi.

Website and e-Learning Source	http://www.scribd.com/doc/18740959/managementaccountingnotes http://tutor2u.net/revision_notes_accounting.asp http://accountingexplained.com/

Title of the Course		**PRACTICAL –V: PROGRAMMING IN JAVA**					
Paper Number							
Category	Core-19	**Year**	II YEAR	**Credits**		**Course Code**	

Personal Contact Programme Hours per year	**Lecture**	**Lab Practice**	**Total**
		13.5	13.5

Pre-requisite	Thorough Knowledge of Java programming
Learning Objectives of the Course	This course gives practical training in programming in Java.

Course Outline

APPLICATION

1. Determining the order of numbers generated randomly using Random Class.
2. Implementation of Point Class for Image manipulation.
3. Usage of Calendar Class and manipulation.
4. String Manipulation using Char Array.
5. Database Creation for storing e-mail addresses and manipulation.
6. Usage of Vector Classes.
7. Implementing Thread based applications & Exception Handling (Synchronization & asynchronization).

APPLETS

8. Working with Frames and various controls.
9. Working with Dialogs and Menus.
10. Working with Panel and Layout.
11. Incorporating Graphics (Scaling Only).

APPLICATIONS FOR EVENTS HANDLING

13. Application Using jdbc Connectivity
14. HTML to Servlet Applications
15. Servlet to Applet communication

Recommended Text	
Reference Books	
Website and e-Learning Source	

Title of the Course		PRACTICAL VI: OPERATING SYSTEMS LAB					
Paper Number							
Category	Core-20	Year	II YEAR	Credits		Course Code	
Personal Contact Programme Hours per year		Lecture		Lab Practice		Total	
				13.5		13.5	
Pre-requisite		Thorough Knowledge of implementation of operating system concepts					
Learning Objectives of the Course		This course gives practical training in programming for operating system problems.					

Course Outline

1. Inter Process Communication (IPC) using Message Queues.
2. IPC using pipes.
3. Implementations of wait and signal using counting semaphores.
4. Atomic Counter update problem.
5. Signaling processes.
6. Deadlock detection (for processes passing messages)
7. Process Scheduling: FCFS
10. Process Scheduling: Least Frequently Used.
11. Process Scheduling: Round Robin.
12. Producer-Consumer problem with limited buffers.
13. Dining-Philosopher Problem.
14. Reader-Writer problem.
15. Two Process Mutual Exclusion.

Recommended Text

Reference Books

C. Crowley - Operating Systems (A Design Oriented Approach) - TMH - 1998.

Website and e-Learning Source	

Title of the Course		**Practical VII: RDBMS LAB**					
Paper Number							
Category	Core-21	**Year**	II YEAR	**Credits**		**Course Code**	
Personal Contact Programme Hours per year		**Lecture**		**Lab Practice**		**Total**	
				13.5		13.5	
Pre-requisite		Thorough Knowledge of database orient concepts in programming					
Learning Objectives of the Course		This course gives practical training in design and implementation of relational data bases for the selected set of problems.					

Course Outline

Students are advised to use the concepts like Data Normalization, Link between table by means of foreign keys and other relevant data base concepts for developing databases for the following problems. The implementation of each problem should have necessary input screen Menu-driven query processing and pleasing reports. The choice of RDBMS is left to the students. Necessary validations must be done after developing database.

1. Library Information Processing.
2. Students Mark sheet processing.
3. Telephone directory maintenance.
4. Gas booking and delivery system.
5. Electricity Bill Processing.
6. Bank Transactions (SB).
7. Pay roll processing.
8. Inventory
9. Question Database and conducting quiz.
10. Purchase order processing.

Recommended Text

Reference Books

Website and e-Learning Source	

Title of the Course		WEB TECHNOLOGIES					
Paper Number							
Category	Core-22	Year	III Year	Credits		Course Code	
Personal Contact Programme Hours per year		Lecture			Lab Practice		Total
		12					12
Pre-requisite		Basic concepts of Web page and HTML					
Learning Objectives of the Course		This course introduces the features of Web Technologies					

Unit 1: History of the Internet and World Wide Web – HTML 4 protocols – HTTP, SMTP, POP3, MIME, IMAP. World Wide Web Consortium (W3C). Introduction to Web 2.0 – Search, Content Network, User-Generated Content, Blogging, Social Networking, Social Media, Tagging, Social Bookmarking, Rich Internet Applications (RIAs), Web Services, Mashups, Widgets and Gadgets, Location-Based Services, XML, RSS, Atom, JSON and VoIP, Web 2.0 Monetization Models, Web 2.0 Business Models.

Unit 2: XHTML and CSS: Introduction to XHTML - Editing XHTML, W3C XHTML Validation Service, Headings, Linking, Images, Special Characters and Horizontal Rules, Lists, Tables, Forms, Internal Linking, meta Elements. Cascading Style Sheets™ (CSS) - Inline Styles, Embedded Style Sheets, Conflicting Styles, Linking External Style Sheets, Positioning Elements, Backgrounds, Element Dimensions, Box Model and Text Flow, Media Types, Building a CSS Drop-Down Menu, User Style Sheets, CSS-3

Unit 3: Javascript: Introduction to Javascript - Obtaining User Input with prompt Dialogs, Memory Concepts, Arithmetic, Decision Making, Control Statement – Control Structures, Assignment Operators, Increment and Decrement Operators, Counter-Controlled Repetition, Logical Operators. Functions - Modules in JavaScript, Programmer-Defined Functions, Scope Rules, JavaScript Global Functions, Recursion, Arrays – Objects - Math Object - String Object - Date Object, Boolean and Number Objects, document Object, window Object, Cookies. Events- Event Handlers, Event Bubbling.

Unit-4: XML and RSS: Introduction, XML Basics, Structuring Data, XML Namespaces, Document Type Definitions, W3C XML Schema Documents, XML Vocabularies, Extensible Stylesheet Language and XSL Transformations, Document Object Model (DOM) - Modeling a Document: DOM Nodes and Trees, Traversing and Modifying a DOM Tree, DOM Collections, Dynamic Styles

Unit-5 : Rich Internet Application: HTTP Transactions, Multi-tier Application Architecture, Client-Side Scripting versus Server-Side Scripting, Accessing Web Servers, Microsoft Internet Information Services (IIS), Apache HTTP Server, PHP - PHP Basics, String Processing and Regular Expressions, Form Processing and Business Logic, Connecting to a Database, Using Cookies, Dynamic Content, Operator Precedence Chart. Flash-CS3, Flex, Dreamweaver

Recommended Text

Reference Books

1. H. M. Deitel and P. J. Deitel, 2008, Internet & World Wide Web How to Program, 4th Edition , Prentice Hall.
2. D. Hunter, J. Rafter, Joe Fawcett, Eric van der Vlist, Danny Ayers, Jon Duckett, Andrew Watt, Linda McKinnon: 2007, Beginning XML, 4th Edition, Wrox Publications.

Reference Books

1. Harris, 2010, JavaScript Programming, Prentice Hall.
2. N.P. Gopalan and J. Akilandeswari, 2007, Web Technology: A Developer's Perspective, Prentice Hall of India.
3. Jr. Jerry Lee Ford, 2010, HTML, XHTML, and CSS for the Absolute Beginner, Prentice Hall.

Website and e-Learning Source	http://notes.corewebprogramming.com/ http://www.studentshangout.com/topic/161259-web-technologies-complete-notes/

Title of the Course		Web Design Lab					
Paper Number							
Category	Core -23	Year	III Year	Credits		Course Code	
Personal Contact Programme Hours per year		Lecture			Lab Practice	Total	
					13.5	13.5	
Pre-requisite							
Learning Objectives of the Course		This course gives practical training in web design methods					

Course Outline:

1. Write a sample web page that uses the entire basic HTML tags.
2. Write a script to perform simple calculation with two numbers. For example, write a script that asks the user to enter two numbers, obtains the two numbers from the user and output text that displays the sum, product, difference and quotient of the two numbers.
3. Write a script for finding the largest among N numbers.
4. Write a function for displaying any given pattern. For example, write a function square of Asterisks that displays a solid square of asterisks whose side is specified in integer parameter side. For example, if side is 4, the function displays

```
****
****
****
****
```

Incorporate this function into a script that reads an integer value for side from the user at the keyboard and performs the drawing with the square of Asterisks function.

5. Create a multiplication quiz application by generating random numbers. For example , (i) Write a program that will help an elementary-school student learn multiplication. Use Math.random to produce two positive one-digit integers. It should then display a question such as

How much is 6 times 7 ?

The student then types the answer into a text field. Your program checks the student's answer. If it is correct, display the string "Very Good!" and generate a new question. If the answer is wrong, display the string "No. Please try again." And let the student try the same question again repeatedly until the student finally gets it right. A separate function should be used to generate each new question. This function should be called once when the script begins execution and each time the user answer the question correctly.

(ii) Write a script that plays a "guess the number" game as follows: your program chooses the number to be guessed by selecting a random integer in the range 1 to 1000. The script plays the prompt Guess a number between 1 and 1000 next to a text field. The player types a first guess into the text field and clicks a button to submit the guess to the script. If the player's guess is incorrect, your program should display "Too high. Try again". Or "Too low. Try again" to help the player "zero in" on the correct answer and should clear the text field so the user can enter the next guess. When the user enters the correct answer, display "Congratulations. You guessed the number!" and clear the text field so the user can play again.

6. Write a script for matching any given pattern. For example ,Write a script that reads a series of strings and outputs in a XHTML text area only those strings beginning with the character "b". 7. Write a function for simulating built-in function. For example, write your own version of String method indexof and use it in a script. 8. Create a web page that uses .wav files for producing sounds. For example , Download or import five wav files. Create five buttons, each activating a different sound when it is pressed. 9. Create a XML document and use XSL style sheets to display them,. For example ,Create an XML document that marks up the nutrition facts for a package of 'Mr. White's Cookies'. A package of cookies has a serving size of 1 package and the following nutritional value per serving: 260 calories, 100 fat calories, 11 grams of fat, 2 grams of saturated fat, 5 milligrams of cholesterol, 210 milligrams of sodium, 36 grams of total carbohydrates, 2 grams of fiber, 15 grams of sugar, and 5 grams of protein. Name this document nutrition.xml. Load this document into internet Explorer. Write an XSL style sheet that displays the nutritional facts in an XHTML table.
10. Animate a text into shape by tweening. For example,Create a text "Morph" animation using a shape tween. Make the text that appears in the first frame of the animation change into a shape in the last frame. Make the text and the shape different colors. 11. Create web page using Dreamweaver. For example, Create a personal web page using Dreamweaver that features an image and a list of interests. Experiment with different text-formatting options. Link the image to your favorite website.
Recommended Text
Reference Books
Website and e-Learning Source

Title of the Course		**PROJECT & VIVA-VOCE**					
Paper Number							
Category	Core -25	**Year**	III YEAR	**Credits**		**Course Code**	

Personal Contact Programme Hours per year	Lecture	Lab Practice	Total
	9		9
Pre-requisite	**More practiced with doing miniproject**		
Learning Objectives of the Course	This course is to train the student in executing a project and preparing the report of work done.		
Course Outline The project work is to be carried out either in a software industry or in an academic institution for the entire semester and the report of work done is to be submitted to the University.			
Recommended Text			
Reference Books			
Website and e-Learning Source			

Title of the Course		**MULTIMEDIA SYSTEMS**					
Paper Number							
Category	Elective I	**Year**	II YEAR	**Credits**		**Course Code**	

Personal Contact Programme Hours per year	Lecture	Lab Practice	Total
	12		12
Pre-requisite			
Learning Objectives of the Course	This course introduces the basic concepts of Multimedia Systems.		

Course Outline

Unit 1: Introductory Concepts: Multimedia – Definitions, CD-ROM and the Multimedia Highway, Uses of Multimedia, Introduction to making multimedia – The Stages of project, the requirements to make good multimedia, Multimedia skills and training, Training opportunities in Multimedia. Motivation for multimedia usage, Frequency domain analysis, Application Domain.

Unit 2: Multimedia-Hardware and Software: Multimedia Hardware – Macintosh and Windows production Platforms, Hardware peripherals – Connections, Memory and storage devices, Media software – Basic tools, making instant multimedia, Multimedia software and Authoring tools, Production Standards.

Unit 3: Multimedia – making it work – multimedia building blocks – Text, Sound, Images, Animation and Video, Digitization of Audio and Video objects, Data Compression: Different algorithms concern to text, audio, video and images etc., Working Exposure on Tools like Dream Weaver, Flash, Photoshop Etc.,

Unit 4: Multimedia and the Internet: History, Internet working, Connections, Internet Services, The World Wide Web, Tools for the WWW – Web Servers, Web Browsers, Web page makers and editors, Plug-Ins and Delivery Vehicles, HTML, VRML, Designing for the WWW – Working on the Web, Multimedia Applications – Media Communication, Media Consumption, Media Entertainment, Media games.

Unit 5 : Multimedia-looking towards Future: Digital Communication and New Media, Interactive Television, Digital Broadcasting, Digital Radio, Multimedia Conferencing, Assembling and delivering a project-planning and costing, Designing and Producing, content and talent, Delivering, CD-ROM technology.

Recommended Text

12. S. Heath, 1999, Multimedia & Communication Systems, Focal Press, UK.
13. T. Vaughan, 1999, Multimedia: Making it work, 4th Edition, Tata McGraw Hill, New Delhi.
14. K. Andleigh and K. Thakkar, 2000, Multimedia System Design, PHI, New Delhi.

Reference Books

(i) Keyes, "Multimedia Handbook", TMH, 2000.

(ii) R. Steinmetz and K. Naharstedt, 2001, Multimedia: Computing, Communications & Applications, Pearson, Delhi.

(iii) S. Rimmer, 2000, Advanced Multimedia Programming , PHI, New Delhi..

Website and e-Learning Source	http://www.cikon.de/Text_EN/Multimed.html

Title of the Course		**PRACTICAL VIII: MULTIMEDIA SYSTEMS LAB.**					
Paper Number							
Category	Elective Lab	**Year**	II YEAR	**Credits**		**Course Code**	
Personal Contact Programme Hours per year		**Lecture**			**Lab Practice**		**Total**
					13.5		13.5
Pre-requisite							
Learning Objectives of the Course		This course gives practical training in various multimedia software					

Course Outline

List of Practical's in Flash :

(i) To Move an object, to move an object in the path
(ii) Text flip, Text color change,
(iii) Creating a link using texts and objects, change the color of the object.
(iv) Shape Tweening and Using shape hints, Motion tweening, hybrid tweening.
(v) Character Animation, Object Animation, Drawing Images
(vi) An application to show the masking effect.
(vii) Slide show presentation.

List of Practical's in Photoshop:

1. To create a greeting card, Create background picture
2. Text effects, photo effects
3. Color , Buttons
4. Editing Images
5. Designing web page

List of practical's in Dream weaver

1. Text Management
2. Tables – Layers
3. Creating menu bar
4. Creating Pages and sites
5. Animation in images

Recommended Text	
Reference Books	
Website and e-Learning Source	

Title of the Course		**DOT NET PROGRAMMING**					
Paper Number							
Category	Elective I	**Year**	II YEAR	**Credits**		**Course Code**	
Personal Contact Programme Hours per year		**Lecture**			**Lab Practice**	**Total**	
Pre-requisite							
Learning Objectives of the Course		This course introduces the concepts of Windows Programming.					

Course Outline

Unit 1: Exploring Visual Studio IDE – Toolbox Control, user control creation – menus, Toolbars and Dialog boxes. Programming fundamentals - Variables, formulas and .NET Framework-Decision Structures – Loops and Timers.

Unit 2: Debugging Visual Basic programs – Structured Error Handling – Modules and Procedures – Arrays – Collections and System. Collections Namespace. Exploring Text Files and String Processing. Managing windows forms and controls – Inheriting forms and creating base classes.

Unit 3: Database – Introduction to ADO.NET – Bound Controls, SQL Statements, LINQ, Filtering data. Data Representation using the DataGridView control.

Unit 4: Web Application Basics – ASP.NET Application Fundamentals – The Page Rendering Model – Custom Rendering Controls – Composite Controls – Control potpourri – Web Parts – Configuration – Data Binding – Web site navigation – personalization.

Unit 5 : Caching and State management – Session State – Application Data Caching – Caching Output – Diagnostics and Debugging –The HTTP Application class and HTTP Modules – Custom Handlers. ASP.NET Web services- windows communication foundation, Ajax, ASP.NET and WPF Content.

Recommended Text

1) M. Halvorson, 2009, Microsoft Visual Basic 2008 Step by Step, Prentice Hall of India.
2) G. Shepherd, 2009,Microsoft ASP.NET 3.5 step by step, Prentice Hall of India

Reference Books

1. B. Evjen, S. Hanselman, D. Rader, 2008, Beginning ASP.NET 3.5 in C# and VB, Wrox Publications.
2. M. MacDonald, 2007, Beginning ASP.NET in VB 2008 from Novice to professional, second edition, Aprèss Publications

Website and e-Learning Source	http://docserve.wordpress.com/2011/04/18/complete-dot-net-notes/

Title of the Course		**PRACTICAL VIII: DOT NET PROGRAMMING LAB.**					
Paper Number							
Category	Elective-LAB	**Year**	II YEAR	**Credits**		**Course Code**	
Personal Contact Programme Hours per year		**Lecture**			**Lab Practice**		**Total**
					13.5		13.5
Pre-requisite							

Learning Objectives of the Course	This course gives practical training in DOT NET programming

Course Outline

1) Write a VB.NET Desktop application and demonstrate the following (a) Link Label control that opens a web browser in your Visual basic applications (b) Dialog box controls, toolbars and menus.
2) Write a VB.NET desktop application to demonstrate error handling and debugging options.
(3) Write a VB.NET desktop application to demonstrate .NET framework classes with mathematical methods.
(4)Write a suitable VB.NET Desktop application and demonstrate the following: (a) Input Box (b)List Box(c)Masked Textbox
(5)Write a VB.NET desktop application to demonstrate how to use a Timer control to create a logon program with a password time-out feature
(6) Write a VB.NET desktop application to demonstrate how to create and manipulate large integer arrays. And Demonstrates the Array. sort and Array. Reverse methods and how to use a Progress Bar control to give the user visual feedback during long sorts.
(7)Write a VB.NET desktop application to demonstrate a simple note-taking utility that demonstrate the how to manage Open. Copy, save As, Insert Date, Sort Text, and Exit commands in a program.
(8)Write a VB.NET desktop application to demonstrate how controls are added to a windows form at run time by using program code (not the designer).
(9)Write a VB.NET desktop application to demonstrate the graphics methods in the system.Drawing namespace, including DrawEcllipse, Fill Rectangle, and DrawCurve.
(10)Write a VB.NET desktop application to demonstrate how to create new classes, properties, and method.
(11)Write a VB.NET desktop application to demonstrate how ADO.NET is used to establish a connection to a MSAccess database and show how the DataGridView control is used to display multiple tables of data on a form. Also demonstrate how navigation bars, datasets, and table adapters are interconnected and bound to objects on a form.
(12)Create a web application and demonstrate rendering control tags and server-side controls and user controls.
(13)Create a web application and demonstrate control validation, the TreeView, and the MultiView/View Controls.
(14)Create a web applications and demonstrate databinding to several different controls, including the GridView. Also illustrate loading and saving data sets as XML and XML schema.
(15)Create a web application and demonstrate session state within a web application.

Recommended Text	
Reference Books	
Website and e-Learning Source	

Title of the Course		ADVANCED JAVA PROGRAMMING					
Paper Number							
Category	Elective I	Year	II YEAR	Credits		Course Code	
Personal Contact Programme Hours per year		Lecture			Lab Practice		Total
		12					12
Pre-requisite							

Learning Objectives of the Course	This course gives an insight into advanced features of Java

Course Outline

Unit 1: Servlet overview – the Java web server – your first servlet – servlet chaining – server side includes- Session management – security – HTML forms – using JDBC in servlets – applet to servlet communication.

Unit 2: Java Beans :The software component assembly model- The java beans development kit-developing beans – notable beans – using infobus - Glasgow developments - Application Builder tool- JAR files-Introspection-Bound Properties-Persistence-customizers - java beans API.

Unit 3: EJB**:** EJB architecture- EJB requirements – design and implementation – EJB session beans- EJB entity beans-EJB Clients – deployment tips, tricks and traps for building distributed and other systems – implementation and future directions of EJB-Variable in perl- perl control structures and operators – functions and scope

Unit 4: RMI – Overview – Developing applications with RMI: Declaring & Implementing remote interfaces-stubs & skeletons, Registering remote objects, writing RMI clients –Pushing data from RMI Servlet – RMI over Inter-ORB Protocol

Unit 5 : JSP –Introduction JSP-Examining MVC and JSP -JSP scripting elements & directives-Working with variables scopes-Error Pages - using Java Beans in JSP Working with Java Mail-Understanding Protocols in Java mail-Components-Java mail API-Integrating into J2EE-Understanding Java Messaging Services-Transactions.

Reference Books

(i) K. Moss, 1999, Java Servlets, Second edition, Tata McGraw Hill, New Delhi.

(ii) D. R.Callaway,1999, Inside Servlets, Addison Wesley, Boston

(iii) Joseph O'Neil, 1998, Java Beans from the Ground Up, Tata McGraw Hill, New Delhi.

(iv) TomValesky, Enterprise JavaBeans, Addison Wesley.

(v) Cay S Horstmann & Gary Cornell, Core Java Vol II Advanced Features, Addison Wesley.

Website and e-Learning Source	http://www.ecst.csuchico.edu/~amk/foo/csci611/notes/

Title of the Course		**ADVANCED JAVA PROGRAMMING LAB.**					
Paper Number							
Category	Elective Lab I	**Year**	**II year**	**Credits**		**Course Code**	
Personal Contact		**Lecture**			**Lab Practice**	**Total**	

Programme Hours per year		13.5	13.5
Pre-requisite			
Learning Objectives of the Course	This course gives practical training in Advanced java programming		
Course Outline (i) HTML to Servlet Applications (ii) Applet to Servlet Communication (iii) Designing online applications with JSP (iv) Creating JSP program using JavaBeans (v) Working with Enterprise JavaBeans (vi) Performing Java Database Connectivity. (vii) Creating Web services with RMI. (viii) Creating and Sending Email with Java Building web applications			
Recommended Text			
Reference Books			
Website and e-Learning Source			

Title of the Course		**MANAGERIAL ECONOMICS**					
Paper Number							
Category	Elective II	**Year**	III Year	**Credits**		**Course Code**	
Personal Contact		**Lecture**			**Lab Practice**	**Total**	

Programme Hours per year	12		12
Pre-requisite			
Learning Objectives of the Course	This course introduces the basic concepts of Managerial Economics		

Course Outline

Unit 1: Definition-The market system - the consumer and the producer, determination of the price in the market place - demand and supply schedules. The concepts of elasticity and market equilibrium, Consumer equilibrium - Risk and uncertainty

Unit 2: The firm - profit maximization - Fixed and variable costs - Long run and short run costs. Determination of output. The market structure - perfect competition-monopoly and oligopoly

Unit 3: The monetary system - the market for money. Interest rates. The capital market - banks, stock exchange - the fiscal system – public revenue and public expenditure-taxes and deficit financing – monetary and fiscal policies.

Unit 4: The economy - a concept of national income - aggregate demand - supply and income determination. The multiplier and accelerator. Savings and investment. The trade cycle and its control. International trade and the balance of payments

Unit 5 : Pricing policies - Objectives of pricing policies, pricing decisions profit polices - aims – alternative profit policies - profit Maximization for long run

Recommended Text

Reference Books

1. Samuelson, and R. Nordhus, 1989, Economics. Tata McGraw Hill.
2. Joel Dean, 1993, Managerial Economics, Prentice Hall of India, New Delhi.
3. Harper, Reo, Zudak, Management Economics.
4. Spencer, M.H, Managerial Economics, 3rd Edn.

Website and e-Learning Source	http://www.comp.nus.edu.sg/~ipng/mecon/sg/01int_sg.pdf

Title of the Course		**OBJECT ORIENTED ANALYSIS & DESIGN**					
Paper Number							
Category	Elective	**Year**	III Year	**Credits**		**Course Code**	

Personal Contact Programme Hours per year	**Lecture**	**Lab Practice**	**Total**
	12		12

Pre-requisite	
Learning Objectives of the Course	This course introduces the basic concepts of Object Oriented Analysis and Design.

Course Outline

Unit 1: System Development - Object Basics - Development Life Cycle - Methodologies - Patterns - Frameworks - Unified Approach – UML

Unit-2: Use-Case Models - Object Analysis - Object relations - Attributes - Methods - Class and Object responsibilities - Case Studies.

Unit 3: Design Processes - Design Axioms - Class Design - Object Storage - Object Interoperability - Case Studies

Unit-4: User Interface Design - View layer Classes - Micro-Level Processes - View Layer Interface - Case Studies.

Unit-5 : Quality Assurance Tests - Testing Strategies - Object orientation on testing - Test Cases - test Plans - Continuous testing - Debugging Principles - System Usability - Measuring User Satisfaction - Case Studies.

Recommended Text

(i) A. Bahrami, 1999, Object Oriented Systems Development, Tata McGraw Hill International Edition.

Reference Books

(i) G. Booch, 1999, Object Oriented Analysis and design, 2nd Edition, Addison Wesley, Boston

(ii) R.S.Pressman, 2005, Software Engineering, 6th Edition, Tata McGraw Hill, New Delhi.

(iii) Rumbaugh, Blaha, Premerlani , Eddy, Lorensen, 2003, Object Oriented Modeling And design , Pearson education, Delhi.

Website and e-Learning Source	http://www.sts.tu-harburg.de/teaching/ws-98.99/OOA+D/entry.html

Title of the Course		**DATA WAREHOUSING AND DATA MINING**					
Paper Number							
Category	Elective II	**Year**	III Year	**Credits**		**Course Code**	
Personal Contact Programme Hours per year		**Lecture**			**Lab Practice**	**Total**	
		12				12	

Pre-requisite	
Learning Objectives of the Course	This course introduces the basic concepts of data warehousing and data mining

Course Outline

Unit 1: Introduction: Data Mining tasks – Data Mining versus Knowledge Discovery in Data bases – Relational databases – Data warehouses – Transactional databases – Object oriented databases – Spatial databases – Temporal databases – Text and Multimedia databases – Heterogeneous databases - Mining Issues – Metrics – Social implications of Data mining

Unit 2: Data Preprocessing: Why Preprocess the data – Data cleaning – Data Integration – Data Transformation – Data Reduction – Data Discretization

Unit 3: Data Mining Techniques: Association Rule Mining – The Apriori Algorithm – Multilevel Association Rules – Multidimensional Association Rules – Constraint Based Association Mining

Unit 4: Classification and Prediction: Issues regarding Classification and Prediction – Decision Tree induction – Bayesian Classification – Back Propagation – Classification Methods – Prediction – Classifiers accuracy.

Unit 5 : Clustering Techniques: cluster Analysis – Clustering Methods – Hierarchical Methods – Density Based Methods – Outlier Analysis – Introduction to Advanced Topics: Web Mining , Spatial Mining and Temporal Mining

Recommended Text

(i) J. Han and M. Kamber , 2001, Data Mining: Concepts and Techniques, Morgan Kaufmann, .New Delhi.

Reference Books

(i) M. H.Dunham, 2003, Data Mining : Introductory and Advanced Topics , Pearson Education, Delhi.
(ii) Paulraj Ponnaiah, 2001, Data Warehousing Fundamentals, Wiley Publishers.
(iii) S.N. Sivananda and S. Sumathi, 2006, Data Mining, Thomsan Learning, Chennai.

Website and e-Learning Source	i. http://www. academicpress.com ii. http://www.mkp.com

Title of the Course		**COMPUTER SIMULATION AND MODELING**					
Paper Number							
Category	Elective III	**Year**	III Year	**Credits**		**Course Code**	
Personal Contact Programme Hours per year		**Lecture**			**Lab Practice**		**Total**
		12					12
Pre-requisite							
Learning Objectives of the Course		This course introduces the basic concepts of Computer Simulation and Modeling					

Course Outline

Unit 1: Introduction to Simulation -Simulation Examples: Simulation of queuing systems, inventory systems and other examples - General Principles: Concepts in discrete event system simulation - List Processing**.**

Unit 2: Programming Languages for Simulation: FORTRAN, GPSS. Simulation of Queueing Systems: Queueing System Characteristics - Queueing Notation - Transient and Steady-State Behaviour of Queues - Long-Run Measures of Performance of Queueing Systems - Steady- State Behaviour of Infinite-Population Markovian Models - Network of Queues

Unit 3: Random-Number Generation: Properties of Random Numbers - Generation of Pseudo-Random Numbers - Techniques for Generating Random Numbers - Tests for Random Numbers. Random Variate Generation: Inverse Transformation Technique:- Uniform Distribution - Exponential Distribution - Weibull Distribution - Triangular Distribution - Empirical Continuous Distribution - Discrete Distribution - Direct Transformation for the Normal Distribution - Convolution Method for Erlang Distribution - Acceptance-Rejection Technique: Poisson Distribution - Gamma Distribution.

Unit 4: Input Data Analysis: Data Collection - Identifying the Distribution with Data - Parameter Estimation - Goodness-of- Fit Tests: Chi-Square Test - Kolmogorov-Smirnov Test; Selecting Input Models without Data - Multivariate and Time-Series Input Models. Verification and Validation of Simulation Models: Model Building, Verification and Validation - Verification of Simulation Models - Calibration and Validation of Models:- Face Validity - Validation of Model Assumptions - Validating Input-Output Transformations - Input-Output Validation using Historical Input Data - Input-Output . Validation using a Turing Test.

Unit 5 : Output Data Analysis: Stochastic Nature of Output Data - Types of Simulation with respect to Output Analysis - Measures of Performance and their Estimation - Output Analysis for Terminating Simulations - Output Analysis for Steady-State Simulation

Recommended Text

1. J. Banks, J. S.Carson II and B. L. Nelson, 1995, Discrete-Event System Simulation, 2nd Edition, Prentice Hall of India, New Delhi.

Reference Books

1. Averill M.Law and W.David Kelton, 1991, Simulation Modeling & Analysis, 2nd Edn., Tata McGraw Hill.
2. Geoffrey Gardon, 1992, System Simulation, 2nd Edn., Printice Hall of India.
3. Narsingh Deo, 1979, System Simulation with Digital Computers, Prentice Hall of India.
4. C.Dennis Pegden, Robert E.Shannon and Randall P.Sadowski, 1995, Introduction to Simulation using SIMAN, 2nd Edn., Tata McGraw-Hill.

Website and e-Learning Source		(i). URL: http://www.bcnn.net					
Title of the Course		**ARTIFICIAL INTELLIGENCE**					
Paper Number							
Category	Elective III	**Year**	**III year**	**Credits**		**Course Code**	
Personal Contact Programme Hours per year		**Lecture**			**Lab Practice**	**Total**	
		12				12	
Pre-requisite							

Learning Objectives of the Course	This course introduces the concepts of machine learning.

Course Outline

Unit 1: Introduction - Intelligent Agents- Problem Solving - by Searching - Informed Search and Exploration - Constraint Satisfaction Problems - Adversarial Search

Unit 2: Knowledge and Reasoning - Logical Agents - First-Order Logic - Inference in First-Order Logic - Knowledge Representation

Unit 3: Planning – Planning and Acting in the Real World - Uncertain knowledge and reasoning - Uncertainty - Probabilistic Reasoning - Probabilistic Reasoning Over Time - Making Simple Decisions - Making Complex Decisions

Unit 4: Learning - Learning from Observations - Knowledge in Learning - Statistical Learning Methods - Reinforcement Learning

Unit-5: Communicating, Perceiving, and Acting - Communication - Probabilistic Language Processing - Perception – Robotics.

Recommended Text

(i) Stuart Russell and Peter Norvig, 2003, Artificial Intelligence: A Modern Approach, 2nd Edition, Prentice Hall of India, New Delhi.

Reference Books

(i) Elaine Rich and Kevin Knight, 1991, Artificial Intelligence, 2nd Edition, Tata McGraw-Hill, New Delhi.

(ii) Herbert A. Simon, 1998, The Sciences of the Artificial Intelligence, 3rd Edition, MIT Press. N.J. Nilson, 1983, Principles of AI, Springer Verlag

Website and e-Learning Source	http://aima.eecs.berkeley.edu/slides-pdf/

Title of the Course		**INFORMATION SECURITY**					
Paper Number							
Category	Elective III	**Year**	**III Year**	**Credits**		**Course Code**	
Personal Contact Programme Hours per year		**Lecture**			**Lab Practice**	**Total**	
		12				12	
Pre-requisite							

Learning Objectives of the Course	This course studies on some basics of Information Security

Course Outline

Unit 1: Introduction: Security- Attacks- Computer criminals- Method of defense Program Security: Secure programs- Non-malicious program errors- Viruses and other malicious code- Targeted malicious code- Controls against program threats

Unit 2: Operating System Security: Protected objects and methods of protection- Memory address protection- Control of access to general objects- File protection mechanism- Authentication: Authentication basics- Password- Challenge-response- Biometrics.

Unit 3: Database Security: Security requirements- Reliability and integrity- Sensitive data- Interface- Multilevel database- Proposals for multilevel security

Unit 4: Security in Networks: Threats in networks- Network security control- Firewalls- Intrusion detection systems- Secure e-mail- Networks and cryptography- Example protocols: PEM- SSL- Ipsec.

Unit 5: Administrating Security: Security planning- Risk analysis- Organizational security policies- Physical security - Legal- Privacy- and Ethical Issues in Computer Security - **P**rotecting programs and data- Information and law- Rights of employees and employers- Software failures- Computer crime- Privacy- Ethical issues in computer society- Case studies of ethics

Recommended Text

1. C. P. Pfleeger, and S. L. Pfleeger, Security in Computing, Pearson Education, 4th Edition, 2003
2. Matt Bishop, Computer Security: Art and Science, Pearson Education, 2003.

Reference Books

1. Stallings**,** Cryptography & N/w Security: Principles and practice, 4th Edition,2006
2. Kaufman, Perlman, Speciner, Network Security, Prentice Hall, 2nd Edition, 2003
3. Eric Maiwald, Network Security : A Beginner's Guide, TMH, 1999
4. Macro Pistoia, Java Network Security, Pearson Education, 2nd Edition, 1999
5. Whitman, Mattord, Principles of information security, Thomson, 2nd Edition, 2005

Website and e-Learning Source	http://www.cs.gsu.edu/~cscyqz/courses/ai/aiLectures.html http://www.eecs.qmul.ac.uk/~mmh/AINotes/

Title of the Course		**OPERATIONS RESEARCH**					
Paper Number							
Category	Elective IV	**Year**	III Year	**Credits**		**Course Code**	
Personal Contact Programme Hours per year		**Lecture**			**Lab Practice**		**Total**
		12					12

Pre-requisite	
Learning Objectives of the Course	This course introduces the basic concepts of resource management techniques.

Course Outline

Unit 1: Linear Programming - Formulation - Graphical solution (2 variables only) of LPP - Development of simplex method - Artificial variable Techniques - Big - M method - Two phase method - Revised simplex method

Unit 2: Duality in Linear Programming and its formulation - Dual simplex method - Bounded variables method - Applications of LPP - Transportation problem - Assignment Problem - Traveling Salesman Problem.

Unit 3: Integer Programming Problem (IPP) - cutting plane Algorithm - Branch and Method of solving IPP - Dynamic programming problem and its characteristics - Deterministic Dynamic programming problem

Unit 4: Sequencing problem - processing n jobs through two machines and three machines - processing n jobs through m machines - processing 2 jobs through m machines - project scheduling by PERT/CPM - Difference between PERT and CPM - Constructing the network - critical path analysis - Float of an Activity - Three time Estimated for PERT - Project cost by CPM

Unit 5 : Stochastic processes - Classification of stochastic processes - Discrete parameter Markov chains - continuous parameter Markov chains - Birth and death processes - Queuing models and its characteristics - classification of Queuing models - (M/M/1) : (FCFS) (Birth and death model)

Recommended Text

(i) Taha, H.A, 1995, Operations Research, 3rd Edition, Prentice Hall of India, New Delhi.
(ii) Trivedi K.S, 1994, Probability and Statistics with Reliability, Queuing and Computer Science Applications, Prentice Hall of India, New Delhi.

Reference Books

(i) Sharma J.K, 1989, Mathematical Models in Operations Research, Tata McGraw Hill, New Delhi.

Website and e-Learning Source	http://www.universalteacherpublications.com/univ/cs51contents.htm http://www-scf.usc.edu/~ise330/2003/handouts/

Title of the Course		**MOBILE COMPUTING**					
Paper Number							
Category	Elective IV	**Year**	III Year	**Credits**		**Course Code**	
Personal Contact Programme Hours per year		**Lecture**			**Lab Practice**		**Total**
		12					12
Pre-requisite							

Learning Objectives of the Course	This course introduces the basic concepts of mobile computing

Course Outline

Unit 1: Introduction - Mobile and Wireless Devices – Simplified Reference Model – Need for Mobile Computing –Wireless Transmissions –Multiplexing – Spread Spectrum and Cellular Systems- Medium Access Control – Comparisons

Unit 2: Telecommunication Systems – GSM – Architecture – Sessions –Protocols – Hand Over and Security – UMTS and IMT – 2000 – Satellite Systems.

Unit 3: Wireless Lan - IEEE S02.11 – Hiper LAN – Bluetooth – Security and Link Management.

Unit 4: Mobile network layer - Mobile IP – Goals – Packet Delivery – Strategies – Registration – Tunneling and Reverse Tunneling – Adhoc Networks – Routing Strategies.

Unit 5: Mobile transport layer - Congestion Control – Implication of TCP Improvement – Mobility – Indirect – Snooping – Mobile – Transaction oriented TCP - TCP over wireless – Performance.

Recommended Text

(i) J. Schiller, 2003, Mobile Communications,2nd edition, Pearson Education, Delhi.

Reference Books

(i) Hansmann, Merk, Nicklous, Stober, 2004, Principles of Mobile Computing, 2nd Edition, Springer (India).

(ii) Pahlavan, Krishnamurthy, 2003, Principle of wireless Networks: A unified Approach, Pearson Education, Delhi.

(iii) Martyn Mallick, 2004, Mobile and Wireless Design Essentials, Wiley Dreamtech India Pvt. Ltd., New Delhi.

(iv) W.Stallings, 2004, Wireless Communications and Networks, 2nd Edition, Pearson Education, Delhi.

Website and e-Learning Source	http://www.sharemca.com/mca-notes-semester-5.php

Title of the Course		**DIGITAL IMAGE PROCESSING**					
Paper Number							
Category	Elective IV	**Year**	III Year	**Credits**		**Course Code**	
Personal Contact Programme Hours per year		**Lecture**			**Lab Practice**		**Total**
		12					12

Pre-requisite	
Learning Objectives of the Course	This course introduces the various concepts related to Digital Image Processing

Course Outline

Unit 1: Introduction – steps in image processing, Image acquisition, representation, sampling and quantization, relationship between pixels. – color models – basics of color image processing.

Unit 2: Image enhancement in spatial domain – some basic gray level transformations – histogram processing – enhancement using arithmetic , logic operations – basics of spatial filtering and smoothing.

Unit 3: Image enhancement in Frequency domain – Introduction to Fourier transform: 1-D, 2 –D DFT and its inverse transform, smoothing and sharpening filters.

Unit 4: Image restoration: Model of degradation and restoration process – noise models – restoration in the presence of noise- periodic noise reduction.. Image segmentation: Thresholding and region based segmentation.

Unit 5 : Image compression: Fundamentals – models – information theory – error free compression –Lossy compression: predictive and transform coding. JPEG standard.

Recommended Text

(i) R.C. Gonzalez, R.E.Woods, 2002, Digital Image processing, 2nd Edition, Pearson Education.

Reference Books

(i) Anil K. Jain, 1994, Fundamentals of Digital image Processing, 2nd Edition, Prentice Hall of India, New Delhi.

(ii) Pratt. W.K., Digital Image Processing, 3rd Edition, John Wiley & Sons.

(iii) Rosenfled A. & Kak, A.C, 1982, Digital Picture Processing, vol .I & II, Academic Press.

Website and e-Learning Source	(i) http://www.imageprocesssingplace.com/DIP/dip-downloads/