Shivaji University Kolhapur
Revised Structure and Syllabus
SE (Information Technology)
(With effect from 2008-09)

S.E. Part –I (Semester III)									
No	Subject	L	T	P	Theory	TW	OE	POE	Total
1	Applied Mathematics - I	3	-	-	100	-	-	-	100
2	Data Structure and Algorithms	4	-	4	100	25	-	50	175
3	Digital System and Microprocessor	4	-	2	100	25	-	25	150
4	Theory of Computer Science	3	1	-	100	25	-	-	125
5	Multimedia Techniques	3	-	2	100	25	-	-	125
6	Mini Project-1	-	-	2	-	25	50	-	75
	Total	17	1	10	500	125	50	75	750
S.E. Part -I I (Semester IV)									
1	Applied Mathematics - II	3	-	-	100	-	-	-	100
2	Advanced Microprocessors	3	-	2	100	25	-	25	150
3	Data Communication	3	-	2	100	25	-	-	125
4	Computer Organization and Architecture	3	-	-	100	-	-	-	100
5	Object Oriented Design and Programming	2	-	4	-	25	-	50	75
6	Software Engineering	3	1	-	100	25	-	-	125
7	Mini Project-2	-	-	2	-	25	50	-	75
	Total	17	1	10	500	125	50	75	750

S.E. (Information Technology) – Part I (Semester III)

1. APPLIED MATHEMATICS – I

Teaching Scheme	Examination Scheme
Lectures: 3 hours/week	Theory: 100 marks

SECTION – I

1. Fourier series: **(4)**

Definition, Euler's formulae, Dilchirt's Conditions, Functions having points of discontinuity, change of interval, expansions of odd and even periodic functions, Half range series.

2. Fourier transforms: **(5)**

Fourier transforms, Fourier sine and cosine transforms, complex form of Fourier integral, Finite Fourier sine and cosine transforms.

3. Numerical Analysis: **(4)**

Approximations and round of errors, Truncation errors and Taylor series. Determination of roots of polynomials and transcendental equations by Newton-Raphson and Secant method.

4. Curve Fitting: **(4)**

Fitting of Curves by method of Least-squares, Coefficient of correlation, Spearman's rank correlation coefficient and lines of regression of Bivariate data.

SECTION – II

4. Artificial Variables techniques:

(5)

Artificial Variables, Big M-method, Relation between Primal and Dual L.P.P., Dual simplex method, Solution of Primal L. P. P. using Dual L. P. P.

5. Assignment Problems:

(6)

Definition, Balanced and Unbalanced assignment problems, Hungarian method of solving assignment problems. Traveling salesmen problem.

6. Mathematical Programming: **(5)**

Linear Optimization problems, Standard and Canonical forms, Basic solutions and feasible solutions, Optimal solutions by simplex method.

Text Books:

1. A text book of Applied Mathematics: Vol. I, II and III by J. N. Wartikar & P. N. Wartikar , Vidyarthi Griha Prakashan, Pune.
2. Higher Engineering Mathematics by Dr. B. S. Grewal.
3. Advanced Engineering Mathematics by Erwin Kreyszig.
4. Operations Research by S. D. Sharma
5. Operations Research by T. A. Taha

S.E. (Information Technology) – Part I (Semester III)

2. DATA STRUCTURES AND ALGORITHMS

Lectures: : 4hrs/week
Practical: 4 hrs/week

Theory: 100 marks
T/W: 25 Marks
POE: 50 Marks.

SECTION-I

1. Advanced C Programming: **(4)**

Arrays, Structure, Union, Pointers, Scope & life time of variables, Recursion, File Handling

2. Algorithms and its Analysis: **(8)**

Data structure, algorithms, Abstract Data Type, Representation of Algorithm (Using Pseudo language), algorithm design i.e. Divide and conquer, Greedy Algorithm, Dynamic programming (only review), Analysis of algorithms big O,Ω notations, Best worst, Average case analysis, Space and Time Complexity.

3. Sequential Representation of Linear data structures **(4)**

Stack, Queue, ordered list, priority queues.

4. Linked Representation of Linear Data Structure: **(6)**

Singly, doubly and circular linked list, stack using linked list, Linear and circular queue using linked list.

SECTION-II

5. Nonlinear Data Structures : (TREES) (4)

Trees: concepts and terminology. Data structure for binary trees. Algorithms for tree traversals, Heaps, binary search trees, AVL tree. B and B++ trees (Theoretical aspects only).

6. Non Linear Data Structures (Graphs): (6)

Concepts and terminology of graph, Representation of graph using adjacency matrix and adjacency list, Graph traversal Techniques (Depth first and Breath first search), shortest path algorithm.

7. Searching Techniques: (6)

Linear search, Binary search, Hashing Techniques, types of Hash functions, Collision resolution techniques, open and closed hashing, Analysis of searching techniques (Best , Average and worst case).

8. Sorting Techniques: (6)

Bubble sort, insertion sort, selection sort, heap sort, Merge sort, quick sort, Analysis of sorting Techniques (Best, Average and worst case).

Text Books:

1. Mastering Algorithms with C by Kyle London (OReilly**)**
2. Understanding pointers in c by Yashwant Kanitkar(BPB)
3. Data structures by Semour Lupshtz, Schaum Series (TMH)
4. Data structures A psendocode. Approach with C.(Thomson)
5. Fundamentals of Computer Algorithms by Horowitz and Sahni.

References :

1. Debugging with GDB – Richard Stallman, Roland Pesch, Stan Shebs.

For section I, refer to Book no: 1, 2 and 5 in syllabus.
For section II refer to Book no: 3, 4 in syllabus.

Lab Work will consist of 18 to 20 experiments to be completed by students in a batch in following topics:

1. Installation and use of GNU C Compiler: vi editor, debugger
2. Overview of gcc commands, compiling, linking, executing c programs on Linux platform, debugging using gdb / ddd and creating make files using make utilities on Linux.
3. Represent polynomial as a circular linked list and write a menu driven program to perform addition, multiplication and evaluation.
4. Write a menu driven program to perform following operation on doubly linked list - Create, insert, delete and display.
5. Create two single or double linked list sort them after creation using pointer manipulation. Merge these two lists into one list without creating a new node. Merged list should be a sorted one.
6. Implement stack as an abstract data type using array or linked list. Use this ADT for expression conversion and evaluation.
7. Represent circular queue using array and write a program to perform following operation – insert, delete and finding front and rear element.
8. Creation of binary tree and perform recursive and non recursive traversals.
9. Represent a given graph using adjacency first and perform DFS and BFS.
10. Implement binary search tree as an abstract data type.
11. Create binary search tree and height of tree, print the leaf nodes.
12. Implementation of simple index file.
13. Insertion and deletion of records from direct access file.

Note:

A student will submit term work in the form of a journal that includes above programs. Each assignment will include analysis of the algorithm with proper documentation. Minimum 10 lab assignments should be carried out on Linux platform.

Term work:

The lab work assignments are to be periodically assessed by the concerned batch teacher. The performance of individual student in a batch in performing the lab assignments will be considered in determining term work marks.

3. Digital Systems and Microprocessor

Lectures: 4Hrs/week. *Theory: 100Marks*
Practical: 2Hrs/week. POE: 25Marks
Term work: 25 Marks.

SECTION-I

1. Fundamentals Concepts: (3)

Introduction to Number systems, Basic gates, NAND & NOR operation. EX-OR operation, Boolean algebra. Practical examples of IC gates.

2. **Combinational Logic Design: (7)**

Min and max terms, K-maps, Solution using K-maps, SOP & POS representation of digital logic and their reduction using K-map, BCD to 7-segment converter, Multiplexer and demultiplexer, Half and Full adder design using gates.

3. Sequential Logic Design: (6)

Various flip flops (R-S, D, J-K, T) using gates, counter using J-K filp-flops, shift Register using flip-flops, study of different ICs (7490, 7495, 74LS138, 7447).

4. Memory Circuits: (5)

ROM, EPROMS, EEPROM, DRAM, function description, Addressing mechanism and Access timing for these circuits.

SECTION-II

5. 8085 Microprocessor Introduction: (5)

Introduction to Microprocessor, Features of 8085, 8085-CPU architecture, Demultiplexing of address and data bus, 8085 clock circuit, Instruction fetching and execution operation of microprocessor.

6. 8085 Instruction Set: (8)

Instruction formats, Addressing modes, Op-code formats, Classification of Instruction set, Programming technique, Instruction timings, WAIT state, single step and single cycle execution.

7. Interrupt and DMA Transfer: (4)

8085 Interrupts RST5.5,RST6.5,RST7.5, TRAP & INTR. Designing hardware for INTR ,Interrupt priorities, SIM and RIM instruction, DMA transfer, HOLD and HLDA pins for DMA transfer.

8. I/O Operation and interfacing: (6)

Memory organizations Mapping of I/O devices, IN & OUT Instruction with timing diagrams study of 8255 PPI, Interfacing Keyboards, Interfacing Thumbwheel switches.

Text Books:

1. Modern Digital Electronics - R.P. Jain TMH
2. Microprocessor Architecture Programming & Application- Ramesh Gaonkar, Willey Estern.
3. Digital Systems-Principals and Application-Tocci, Widmer, Moss, (Pearson Education)

Reference-Books:

1. Fundamentals of digital circuits – B.Anandkumar
2. Digital Systems & Microprocessor- Douglas Hall MGH
3. Digital Computer Electronics— Malvino PHI.
4. Digital design-Morris Mano (PHI)

Term work:

Term work will consist of minimum of 16 experiments based on following topics.

1. Study of Basic gates.
2. Study of Universal gates.
3. Study of Boolean algebra & De Morgan's theorem using gates.
4. Study of MUX/DEMUX.
5. Study of 74138.
6. Study of R-S and J-K flip-flops
7. Study of counters
8. Interfacing of counters to seven segment display

9. Realization of 4/5 variable K-maps
10. Study of 8085
11. Assembly language programming for 8085 (Arithmetic, Logical and data transfer-Minimum 8 programs)
12. Writing subroutine to perform delay operation of 10 ms.
13. Designing & implementing hardware for INTR
14. Study of 8255. Interfacing using 8255.

S.E. (Information Technology) – Part I (Semester III)

4. THEORY OF COMPUTER SCIENCE

Lectures: : 3 hours / week — Theory: 100 marks
Tutorials: 1 hours / week — T/W: 25 Marks

SECTION-I

1. Mathematical Logic: (6)

Introduction, Statement and Notation, Connectives - negation, conjunction, disjunction, conditional bi-conditional, statements formulas and truth tables, well formed formulas, Tautologies Equivalence of formulas, Duality law, Tautologies, implication functionally complete sets of connectives other connectives, Normal & Principal Norma forms, completely parenthesized infix & polish notations

2. Set Theory: (5)

Basic concepts of set theory, Types of operation on sets ordered pairs, Cartesian product, Representation of discrete structures, Relations, Properties of binary relation Matrix and graph representation, partition and covering of set, Equivalence relation, Composition POSET and Hasses diagram, Functions- types, Inverse and composition of functions, Algebraic Systems and properties(only)

3. Regular Expressions and Regular Languages (5)

Regular expressions, properties, corresponding regular languages, example and applications

SECTION-II

4. Finite Automata: (6)

Definition and representation, Non deterministic FA., NFA with ^ Transition, example and applications

5. Grammars And Parsing: (5)

Definition and Types of Grammars Languages, Derivation trees ambiguity , BNF & CNF notation, Introduction to Pushdown Automata, Top down Parsing, Bottom up Parsing & Examples

6. Turing Machines: (6)

Models of Computation, Definition of TM as language Acceptors, Combining Turning Machines, TM's with doubly infinite tapes, Universal TM and examples

Text Books:

1. Discrete Mathematical structure with applications to computer Science. J.P. Tremblay & R. Manohar (MGH International) (For 1st and 2nd chapter)
2. Introduction to languages and Theory of computations - John C. Martin. (For 3rdto 6th chapter)

Reference Books:

1. Discrete Mathematics' – Liu MGH
2. Foundation of Discrete Mathematics – K.D. Joshi. Willey
3. Theory and problems in Abstract Algebra –Schaum's outline series.
4. Introduction to automata Theory, languages and computations –J.E. Hop craft. & J. D. Ulmann, Addison Wesley.
5. Theory of Computer Science – E.V. Krishnamurthy.

Tutorial :

Minimum of 8 assignments will be completed in batches, based on above 6 topics. The assignments will include detailed documentation on problem solving and analysis methods.

Term Work:

The assignments will be periodically assessed by the concerned batch teacher. The performance of individual student for the assignment will be considered for determining the marks for the term work.

S.E. (Information Technology) – Part I (Semester III)

4. THEORY OF COMPUTER SCIENCE

Lectures: : 3 hours / week — Theory: 100 marks
Tutorials: 1 hours / week — T/W: 25 Marks

SECTION-I

1. Mathematical Logic: (6)

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Term Work:

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S.E. (Information Technology) – Part I (Semester III)

5. MULTIMEDIA TECHNIQUES

Lectures: 3 hrs/week **Theory: 100 Marks**
Practical: 2 hrs/week **T.W: 25 Marks**

SECTION-I

1. Introduction to Multimedia and Graphic Devices: (2)
Types of media, what is multimedia**,** Multimedia Elements, Colour Schemes, Picture representation, display devices, display adapters.

2. Transformations: (4)
Basic 2D & 3D transformation- transformation scaling rotation reflection shearing, Multiple transformations, Rotation about an axis parallel to a co-ordinary axis, Rotation about an arbitrary axis in space, Affine and Perspective Geometry

3. Raster Scan Graphics: (4)
Bresenham's line and circle drawing algorithms scan conversion, REL, Frame buffer, Scan converting polygons – Edge fill and seed fill algorithms Antialising and Halftoning.

4. Clipping and Display File Compilation: (3)
Sutherland Cohen line clipping algorithm, Windowing and View porting segmented display file structure and compilation.

5. Hidden Surface and Hidden Line Removal: (3)
Blackface removal algorithm, Z-buffer, Warnock algorithm, Hidden line elimination.

SECTION-II

6. Audio: **(4)**

Basic sound concept, Multimedia system sound, MIDI versus digital audio, Audio file formats (for web), National interchange file formats, Digital Audio softwares.

7. Image/Graphics: **(2)**

Still images, Types of Image, Image Quality, Image Compression, Graphics Softwares, Image file formats (for web),

8. Animation **(4)**

Principals of animation, Methods of Animation, Animation Softwares, Animation file formats (for web) (JPEG, & MPEG standards)

9. Video: **(3)**

Types of Video, Video broadcasting standards, Video Quality, Digital Video Softwares, Video file formats(for web), Video Compression, Video codecs.

10. Multimedia Storage Devices: **(4)**

CD, DVD construction details, recording and reproducing data from CD & DVD. CDROM, COMBO DRIVE, DVD Writer technologies, Types of CD/DVD, comparison between CD and DVD, Pen Drives, I-pods, USB Hard disk.

Text Books:

1. Mathematical elements for Computer Graphics: David F. Rogers, J Alan Adams (MGH)
2. Procedural elements for Computer Graphics: David F. Rogers (MGH)
3. Multimedia and the Web by Calleen Coorough – Thomson (Vikas Publishing House)
4. Multimedia – Making it work 5th edition by Tag Vaughan (TMGH)
5. Multimedia Communication – Pearson Education Fred Halsall.

Reference Books:

1. Principal of Interactive Computer Graphics: Newman Sprout (MGH)
2. Computer Graphics programming approach- Steven Harrington.
3. Computer Graphics- Ham Baker.

Practicals :
Minimum 4 experiments should be performed to understand functioning of topics under section I and Minimum 4 experiments should be performed to understand functioning of topics under section II as above.

Term work :
The lab work assignments are to be periodically assessed by the concerned batch teacher. The performance of individual student in a batch in performing the lab assignments will be considered in determining term work marks.

S.E. (Information Technology) – Part I

6. MINI PROJECT – I

Practicals:2hrs/week

T.W: 25 Marks
O.E.: 50 Marks

Four students (Maximum) in a group will carryout a mini project. A batch of practical / tutorial will be divided into mini project groups. Mini project topics and the work for these groups in the batch will be guided by a teacher for the batch, preferably in topics of following subjects:

i) Data structure & Algorithms
ii) Digital systems & Microprocessors
iii) Theory of Computer Science
iv) Multimedia techniques

The teacher will assess the performance of individual student in the mini project, jointly with a teacher of another batch in the institute. This assessment will be used for determining term work marks of the mini project.

Project group will submit hardcopy project report along with project demonstration software in CD and/or project hardware gadget. The oral examination of mini project will be jointly conducted by University appointed examiners on similar lines of conducting other oral examination at second year of Engineering and Technology.

S.E. (Information Technology) – Part II (Semester IV)

1. APPLIED MATHEMATICS – II

Teaching Scheme			Examination Scheme		
Lectures	:	3 hours/week	Theory	:	100 marks

SECTION – I

1. Introduction to Combinatorics.
(6)
Introduction, basic counting, Disjunctive (or) sum rule, sequential rule, permutation and combination, enumeration of permutation and combination pigeonhole principle, The inclusion –exclusion principle, recurrence relations

2. Probability:
(5)
Random variable, Binomial, Poisson, Normal and exponential distributions.

3. Queuing Theory: (6)
Introduction, Queuing systems, Distributions in queuing systems, M/M/1 and M/M/S models.

SECTION – II

4. Introduction to Fuzzy sets:
(5)
Crisp sets, Membership function, Basic types of fuzzy sets, standard fuzzy set operations, crisp sets versus fuzzy sets, representation of fuzzy sets in terms of special fuzzy sets, extension principle.

5. Fuzzy Arithmetic:
(5)
Fuzzy numbers, Linguistic variables, arithmetic operations on Fuzzy numbers.

6. Applications of Fuzzy set to Fuzzy systems:
(6)
Methods of construction, Direct methods with one expert and multiple experts, Indirect methods with one expert and multiple experts, Fuzzy Controller.

Text Books:

6. Probability statistics and Queueing Theory by P. Kandasamy, K. Thilagavathi, K. Gunavathi.
7. Fuzzy sets and Fuzzy Logic by George J. Klir, Bo Yuan.
8. A text book of Applied Mathematics: Vol. I, II and III by J. N. Wartikar & P. N. Wartikar , Vidyarthi Griha Prakashan, Pune.
9. Higher Engineering Mathematics by Dr. B. S. Grewal.

S.E. (Information Technology) – Part II (Semester IV)

2. ADVANCED MICROPROCESSORS

Lectures: 3 hrs/week **Theory: 100 Marks**

Practicals: 2hrs/week **T.W: 25 Marks**

P.O.E.: 25 Marks

SECTION-I

1. 8086 Architecture : (6)

8086 CPU Architecture. EU & BIU activities, Segmentation and address transition, 8086 pin description, 8284 clock generation 8286, 8282, configuration of 8086. Accessing even and add address memory with byte/ word. Software and Hardware interrupts.

2. 8086 Instruction Set: (6)

Addressing modes, data Transfer, arithmetic logical string, i/o instruction, control group of instruction, writing programs using assemble directive and in different module and linking DOS interrupts Printer , VDU, serial, FDC, Add on cards.

3. Minimum & Maximum Mode 8086:

(4)

Multifunction pins of 8086, 8088-Bus controller, IOB mode of 8288, Minimum & Maximum mode Configuration diagram.

4. Modular Programming:

(3)

Linking and relocation, Stacks, procedures, interrupt and interrupt routines, macros, program design, program design examples.

SECTION-II

5. NDP 8087:
(4)
NDP architecture, 8087 data types.

6. 80386, 32-bit Processor (Introductory Level)
(6)
Salient features of 80386DX, Architecture and signal description, Register organization, addressing modes, data types, Real address mode, Protected mode, Segmentation, Paging.

7. 80386 memory management unit: (6)
MMU, virtual memory, descriptor tables GDT, LDT, and IDT.

8. Introduction to Multithreaded technology and Multi core Processors
(3)
CPU Architecture Terminology, Why the move to Dualcore?, Parallelism and its Software Impact, Parallelism Debug.

Text Books:

1. 8086/8088 Microprocessor Family – Liu Gibson (MGH)
2. Microprocessor interfacing and assembly language programming –Douglas Hall.(MGH)
3. Advanced Microprocessors & Peripherals- A.K.Ray, K.M. Bhurchandi (MGH)-Chapter-6
4. Advanced 80836 programming –Turley (TMH)

Reference- Books

1. 8086/8088 Family design programming and interfacing –John Uffenbeck (PHI)
2. The INTEL Microprocessor.
3. An introduction to 8086/8088 assembly language programming for beginners- N.M. Morris.
4. Intel 8086, 80836 Manual , www.intel.com.
5. Multithreaded technology and Multi core Processors : Dr. Dobb's Journal- Software Tools for the Professional Programmer – May 2005. (For Chapter 8)

Term work:
It will consist of minimum eight experiments based on following topics:

1. Assembly language programming for 8086 :
   Use of MUL/DIV, XLAT and
   STRING processing instructions.

2. Use of ROM-BIOS services:
   Study and use of Interrupts.

S.E. (Information Technology) – Part II (Semester IV)

3. DATA COMMUNICATION

Lectures: 3 Hrs/Week **Theory: 100 Marks**
Practical: 2 Hrs/Week **Term Work: 25 marks**

Section-I

1. Data Communication Fundamentals: **(4)**

Data transmission concept and terminology, therotical basis for data communication, analog and digital data transmission, Transmission impairments, Data rate limits, performance.

2. Data Encoding: **(5)**

Analog data –analog signals- Modulation ,Digital data-digital signals, digital data–analog signals(ASK,FSK,PSK,QPSK,QAM,MSK),analog data –digital signals-sampling and quantization-PAM,PCM , spread spectrum, Modem.

3. Data Communication Interface: **(4)**

Parallel and serial transmission, Asynchronous and Synchronous transmission, line configuration, interfacing.

4. Multiplexing and Switching Methods: **(5)**

Frequency & wavelength division multiplexing, synchronous and statistical Time division multiplexing, Circuit switching, message and packed switching, Structure of switch.

Section-II

5. Network Models: (5)

Uses of Computer Networks, Network Hardware and topologies, Introduction to LAN, WAN, MAN, Inter-network, Internet, network software, Layered tasks, Reference models- ISO's OSI model, and TCP/IP reference model, Example network- ATM model, Intranet, Extranet.

6. Physical Layer: (5)

Theoretical basic for Data Communication-1) Fourier analysis 2) Bandwidth limited signals.3) Max Data rate of a channel. The transmission media-Guided media-Twisted pair, Base band & Broad band coaxial cable, Fiber optics. Unguided media –Radio waves, Microwaves, Infrared.

7. Networking Components: (5)

Cabling and connector standard, Network interface card, Manageable Switches (Layer2, Layer3), Bridges, Routers, Concentrators, Hubs, Repeaters, Gateways.

Text Books:

1) Data Communications and networking - Behrouz A. Forouzan (4^{th} Edition)(McGraw hill companies)
2) Data and Computer Communications –Williams Stallings(5^{th} Edition) (PHI)
3) Computer Networks-A.S.Tenebaum. (3^{rd} Edition) (PHI).

Practical:

Students in batches will submit minimum 8 experiments on following topics

1. Study of modulation. Detailed study of Modem.
2. Detailed study of RS-232C and other serial communication Standards, Bioscom.
3. Detailed study of USB.
4. Detailed study of multiplexing and switching.
5. Detailed study of Reference models –OSI, TCP/IP.
6. Detailed study of Topologies.
7. Study of Transmission Media.
8. Study of Networking components and their technical standards Components like cables, connectors, Network interface cards, hub, switch, router, gateway, etc.

9. Assigning exercise problems of the books mentioned and guiding for their solution.

Term work:

The practical assignments are to be periodically assessed by a concerned teacher of the Practical batch. The performance in the assignments will be internally judged for the term work marks.

S.E. (Information Technology) – Part II (Semester IV)

4. COMPUTER ORGANISATION AND ARCHITECTURE

Lectures: 3hrs/week **Theory: 100 Marks**

SECTION-I

1. Design Methodology: (6)

Introduction to system modeling design levels of combinational and sequential circuit design, Register level design, Register transfer languages, Design methods at processor level-components, Design techniques, Queuing models, Simulation.

2. Processors Design: (5)

Processor organization, Information representation, Instruction sets, Instruction formats, Instruction types and implementation. RISC, CICS , and Vector processor concepts.

3. Arithmatic Operation: (5)

Fixed point arithmetic, Algorithms for addition, subtraction, multiplication & division, Floating point arithmetic.

SECTOIN-II

4. Control Units: (6)

Hardwired control units- organization and operation, Micro programmed control units, microgram decoder sequencer, Interrupt and branch instruction processing, Instruction sequencing interpretation.

5. Memory Organization: (6)

Virtual memory –memory hierarchies, main memory allocation segmentation, paging paged segmentation, high speed memories- interleaved memories, Associative memories.

6. Programmed I/O, DMA, Interrupt I/O, IOP, CPU-IO interaction. (5)

Text Book:
1. Computer Architecture & Organization- J. P. Hayes. (MGH)

Reference:
1. Computer Organization- Hamacher Zaky. (MGH)
2. Computer Architecture & Organisation An Integrated Approach , Miles Murdocca, Vincent Heuring Wiley India Edition.

S.E. (INFORMATION TECHNOLOGY) PART – II (Semester IV)

5. Object Oriented Design and Programming:

Lectures: 2 Hours per Week **Term Work: 25Marks**
Practical: 4 Hours per Week **POE: 50 Marks**

1. Fundamentals of programming languages:
(1)
Editors, Macro processors, Compilers- TCC, GCC, Interpreter, Linker, Loader

2. Object Oriented programming:
(2)
Object, class, Data hiding, Data abstraction, Polymorphism, Inheritance etc.

3. Functions-
(2)
declaration, definition, call by value ,call by reference and call by pointer, default arguments, inline functions, return types, returning by reference

4. C++ as object oriented langauge :

a. Class and object

(1)

Access specifiers – public, private, protected, constructor, destructor

b. **Inheritance**

(2)

Multiple and multilevel inheritance, Scope and access control mechanism of members, overriding of member functions, public private inheritance

c. Polymorphism- static

(1) Function over loading

d. Polymorphism- dynamic

(3)

Operator overloading - <<. >>, [ ]**, =, ==,** ++ overloading unary, binary, arithmetic operators. Virtual function, Pure virtual function, Virtual base class**,** abstract class.

e. **Data conversion**

(2)

static variable, static function, friend function, friend class

f. Java as oop

(1)

5. Pointers

(3)

Basics of memory management, New and delete operators, Overloading new and delete operators, Pointer to object, Pointer to pointer, this pointer.

6. Files and Streams

(2)

Streams, String I/O,character I/O,Object I/O, I/O with multiple objects, file pointers redirection , command line arguments.

7. Advanced C++ features-

(2)

Template functions and classes, Exception handling, Multithreading, Standard Template library

Text Books:

1) Object Oriented programming in Turbo C++ Robert Lafore (Galgotia)
2) C++ Programming with language –Bjarne Stroustrup (AT & T)
3) C++ Cookbook- D.Ryan Stephens,Christoper Diggins, Jonathan Turkanis, Jeff Cogswell (SPD,O'reilly)

Reference Books:

1) C++ programming –John Thomas Berry(PHI)
2) programming with C++ -D.Ravichandran(TMGH)
3) programming with C++ - Schaum's Outline series
4) Debugging with GDB – Richard Stallman, Roland Pesch, Stan Shebs.

Laboratory Work:

Minimum 12 Experiments are to be performed in batches, on above topics.

Term works

It should comprise detailed documentation on the above 12 experiments. Students in batches should implement programs based on the following topics preferably on Linux platform. Each batch should have different assignments in the selected topics.

1. Constructor, destructor, constructor overloading
2. Function overloading
3. Operator overloading
4. Multiple and multilevel inheritance
5. Virtual function, virtual base class
6. Static variable, Static functions
7. Pointers- new, delete operators
8. Friend function, friend class
9. Templates
10. Exception Handling
11. Multithreading
12. STL

The performance of a student in a batch will be periodically assessed by the concerned batch teacher. The assessment will be considered for determining term work marks.

S.E. (Information Technology) – Part II (Semester IV)

6. SOFTWARE ENGINEERING

Lectures: 3 hrs/week Theory: 100 marks
Tutorial: 1 hr/week T.W. : 25 marks

SECTION-I

1. Introduction : **(3)**
The S/W problem, S/W engg. Problem, S/W Engg. Approaches

2. S/W requirement analysis and specification:
(3)
S/W requirement, Problem analysis, Requirement Specification, Validation, Metrics.

3. Function Oriented Design: **(3)**
Design principles, module level concepts, Design notation and specification, Structured design methodology, Verification.

4. Object Oriented Design:
(3)
OO Analysis and OO Design Concepts, Design Notation and specification Design
Methodology, module specification Detailed design.

5. Software Testing Techniques and Strategies:
(5)
S/W Testing Fundamentals, Control Structure Testing, Black box testing, White box testing, Strategic approach to software testing, Unit testing, Integration testing, Validation testing, System testing

SECTION-II

6. The project planning:
(6)
The project planning Infrastructure:- Process database, process capability baseline process Assent and the body of knowledge system,
Effort estimation and scheduling, Estimation and scheduling concepts Effort estimation scheduling.

Quality Planning: - Quality concepts, Qualitative Quality management planning, Defect prevention planning.
Risk Management: - Concepts of risk and risk management assessment Risk control.

7. Managing S/W projects:
(3)
Processes and project management and the CMM project management process, Tanning for project managers, SEPG support to projects.

8. Project Execution and closure:
(2)
Review the Reviews, the Review process Data collection Monitoring and control.

9. Project monitoring and control:
(5)
Project tracking, milestone analysis, Activity –level Analysis using SPC, Defect Analysis and prevention, Process monitoring and Audit.

Text Books:
1. Software Project Management in practice- Pankaj Jalote.
2. An integrated to S/W Engineering. Second edition
Narosa Publication House – Pankaj Jalote.

References:
1. Software Engineering – Practioner Approach - Roger S. Pressman.

Tutorial :

Students will carryout assignments in batches for the tutorial.

Case studies shall be based on the text books and reference book given in syllabus.

For tutorials brainstorming sessions, group discussions and presentations shall be used in the teams of not more than 4 students to study of software life cycle.

Any Standard Open source CASE tools for Requirements, Design and Testing shall also be exercised for mini projects.

The performance of a student in a batch will be periodically assessed by the concerned batch teacher. The assessment will be considered for determining term work marks.

S.E. (Information Technology) – Part II (Semester IV)

7. MINI PROJECT – I I

Practical: 2hrs/week

T.W: 25 Marks
O.E.: 50 Marks

Four students (Maximum) in a group will carryout a mini project. A batch of practical / tutorial will be divided into mini project groups. Mini project topics and the work for these groups in the batch will be guided by a teacher for the batch, preferably in topics of following subjects:

v) Advanced Microprocessors
vi) Data Communication
vii) Computer Organization and Architecture
viii) Object Oriented Design and Programming
ix) Software Engineering

The teacher will assess the performance of individual student in the mini project, jointly with a teacher of another batch in the institute. This assessment will be used for determining termwork marks of the mini project.

Project group will submit hardcopy project report along with project demonstration software in CD and/or project hardware gadget. The oral examination of mini project will be jointly conducted by University appointed examiners on similar lines of conducting other oral examination at second year of Engineering and Technology.

The equivalence of the subject of Information Technology at S.E. Part – I & II course Pre-Revised to Revised course under the faculty of engineering and technology.

(to be implemented from 2008-09)

S.E. Part – I (Information Technology)		
Sr. No.	**Pre-Revised**	**Revised**
1	Applied Mathematics – I	Applied Mathematics – I
2	Foundation of Computer Science	Theory of Computer Science
3	Principles of Electronic Communications	Two more chances
4	Data Structures	Data Structures & Algorithms
5	Electronic Systems	Two more chances
6	Computer Skills – I	Mini Project – I
S.E. Part – II (Information Technology)		
1	Applied Mathematics – II	Applied Mathematics – II
2	Computer Graphics	Two more chances
3	Computer Networks – I	Data Communication
4	Microprocessors	Digital Systems & Microprocessors (subject of SE(IT) part- I)
5	Systems Programming	Two more chances
6	Object Oriented Design & Program	Object Oriented Design & Programming
7	Computer Skills – II	Mini Project – II