Shivaji University, Kolhapur
REVISED STRUCTURE
S.E. COMPUTER SCIENCE AND ENGINEERING
W.E.F. 2014-15.

Semester - III

Sr. No.	Subject	L	T	P	Total	Theory Marks		TW	POE	Oral	Total Marks
						Written	Online				
1	Applied Mathematics	3	1	-	4	50	50	25	-	-	125
2	Discrete Mathematical Structures	4	1	-	5	50	50	25	-	-	125
3	Data Structures	4	-	-	4	50	50	-	-	-	100
4	Data Communications	4	-	-	4	50	50	-	-	-	100
5	Microprocessors	3	-	2	5	50	50	25	-	50	175
6	Programming Lab - I	2	-	4	6	-	-	50	50	-	100
7	Soft skills	-	-	2	2	-	-	50		25	75
	Total	20	2	8	30	250	250	175	50	75	800

Semester - IV

Sr. No.	Subject	L	T	P	Total	Theory Marks		TW	POE	Oral	Total Marks
						Written	Online				
1	Automata Theory	3	1	-	4	50	50	25	-	-	125
2	Computer Networks	4	-	2	6	50	50	25	-	50	175
3	Computer Organization	4	-	-	4	50	50	-	-	-	100
4	Operating System-I	3	1	-	4	50	50	25	-	-	125
5	Software Engineering	3	-	-	3	50	50	-	-	-	100
6	Programming Lab - II	2	-	4	6	-	-	50	50	-	100
7	Mini Project	-		2	2	-	-	25	-	50	75
	Total	19	2	8	29	250	250	150	50	100	800

Note:

1. The term work as prescribed in the syllabus is to be periodically and jointly assessed by a team of teachers from the concerned department.
2. In case of tutorials, students of different batches be assigned problems of different types and be guided for the solution of the problem during tutorial session. Problems thus solved be translated into computer programs wherever applicable and executed by respective batches during practical session.
3. The assignments of tutorials and practicals need to be submitted in the form of soft copy and / or written journal.

4. Breakup of term work marks shall be as follows:

    a. Mid-semester test – 5 marks.
    b. End-semester test – 5 marks.
    c. Tutorial assignments and / or practical performance – 15 marks.

5. The theory exam scheme is as under:

    a. All theory papers of SE (CSE) part 1& part 2 of 100 marks will be divided into two parts.
        i. Part-A: 50 marks theory paper similar to the existing theory paper exam. The nature of the questions will be descriptive, analytical and problem solving.
        ii. Part-B: 50 marks computer based exam with multiple choice questions (MCQs) .
    b. The marks obtained in the individual heads should be added and considered as marks of the respective theory paper out of 100 marks.
    c. The questions of part-A and part-B will be based on the entire syllabus of the respective subjects.
    d. The questions in part-B will be of 1 or 2 marks only.
    e. Duration of part-A exam will of 2 hours and that of part-B will be of 1 hour.
    f. The passing scheme for the subject will be similar to existing scheme.
    g. No separate passing head for part-A and part-B.
    h. The scheme of revaluation is not applicable for part-B, however is applicable for part-A
    i. All the existing ordinances will be applicable for passing criteria.

S.E. (Computer Science and Engineering) Semester – III

APPLIED MATHEMATICS

Lectures : 3 hours/week **Theory : 100 marks**
Tutorial : 1 hour/week **Term Work : 25 marks**

Course Objectives:

1) To teach mathematical methodologies and models to develop mathematical skills and enhance thinking power of students.
2) To expose the students to the topics in fuzzy set theory, numerical methods and statistics with an emphasis on the application of solving engineering problems.
3) To prepare students to formulate a mathematical model using engineering skills & interpret the solution in real world.

Unit 1. Curve Fitting: **(6)**

1.1 Lines of regression of bivariate data,
1.2 Fitting of Curves by method of Least-squares.
  1.2.1 Fitting of Straight lines
  1.2.2 Fitting of exponential curves.
  1.2.3 Fitting of Parabolic curves.

Unit 2. Probability Distribution: **(6)**

2.1 Random variable
2.2 Binomial Distribution
2.3 Poisson Distribution
2.4 Normal Distribution

Unit 3. Numerical solution of transcendental & algebraic equations and Numerical Integration **(6)**

3.1 Newton Raphson Method
3.2 Secant method
3.3 Trapezoidal Rule
3.4 Simpson's 1/3 rd rule
3.5 Simpson's 3/8 th rule

Unit 4. Introduction to Fuzzy sets: **(6)**

4.1 Basic concepts of fuzzy sets
4.2 Crisp set and Fuzzy set.
4.3 Membership functions
4.4 Basic operations on fuzzy sets
4.5 Properties of fuzzy sets

Unit 5. Fuzzy Arithmetic: **(6)**

5.1 Fuzzy numbers
5.2 Fuzzy cardinality
5.3 Operations on Fuzzy numbers
5.4 Fuzzy equations of type A + X = B and A.X = B

Unit 6. Assignment Problems: **(6)**

6.1 Definition, Balanced and Unbalanced assignment problems,
6.2 Hungarian method of solving balanced assignment problems.
6.3 Hungarian method of solving unbalanced assignment problems.
6.4 Traveling salesmen problem.

General Instructions:

1. For the term work of 25 marks, batch wise tutorials are to be conducted. The number of students per batch should be 20 i.e. as per University pattern for practical batches.
2. Minimum number of assignments should be 8 covering all topics.

Reference 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. Operations Research by S. D. Sharma
4. Fuzzy sets and Fuzzy Logic by George J. Klir, Bo Yuan.
5. Probability and Statistics for Computer science by James L. Johnon (Wiley Student Edition).

DISCRETE MATHEMATICAL STRUCTURES

Lectures: 4 hrs / week **Theory: 100 marks**
Tutorial: 1 hr / week **Term work: 25 marks**

Course Objectives:

1. To expose the students to the mathematical logic related to Computer science areas.
2. To enhance the problem solving skills in the areas of theoretical computer science.
3. To use the mathematical concepts in the development of computer applications..

Unit 1 : Mathematical logic: (9)

Introduction, statements and notations, connectives – negation, Conjunction, disjunction, conditional, bi-conditional, Statement formulas and truth tables, well formed formulas, Tautologies, Equivalence of formulas, Duality law, Tautological implications, functionally complete sets of connectives, other connectives, Normal and principal normal forms, completely parenthesized infix and polish notations, Theory of Inference for statement calculus – validity using truth table, rules of inference, consistency of Premises and indirect method of proof.

Unit 2 : Set theory (10)

Basic concepts of set theory, types of operations on sets, ordered pairs, Cartesian Product, representation of discrete structures, relation, properties of binary relations, matrix and graph representation, partition and covering of set, equivalence relation, composition, POSET and Hasse diagram, Function – types, composition of functions, Inverse function.

Unit 3 : Algebraic systems (5)

Semigroups and Monoids, properties and examples, Groups: Definition and examples, subgroups and homomorphism.

Unit 4 : Lattices and Boolean algebra (8)

Lattice as POSETs , definition , examples and properties, Lattice as algebraic systems, Special lattices, Boolean algebra definition and examples, Boolean functions, representation and minimization of Boolean functions.

Unit 5 : Graph theory (5)

Basic concepts of graph theory, Storage representation and manipulation of Graphs, PERT and related techniques.

Unit 6: Permutations, Combinations and Discrete Probability (8)

Permutations and Combinations: rule of sum and product, Permutations, Combinations, Algorithms for generation of Permutations and Combinations. Discrete Probability, Conditional Probability, Bayes' Theorem, Information and Mutual Information.

Text Books:

1. Discrete Mathematical Structures with Application to Computer Science - J. P. Tremblay & R. Manohar (MGH International)
2. C. L. Liu and D. P. Mohapatra, "Elements of Discrete Mathematics", SiE Edition, TataMcGraw-Hill, 2008,ISBN 10:0-07-066913-9 (For Unit no 6)

References:

1. Discrete Mathematics - Semyour Lipschutz, MarcLipson (MGH), Schaum's outlines.
2. Discrete Mathematics and its Applications - Kenneth H. Rosen (AT&T Bell Labs) (mhhe.com/rosen)

3. Schaums Solved Problem Series – Lipschutz.
4. Discrete Mathematical Structures – Bernard Kolman, Robert Busby, S.C.Ross and Nadeemur-Rehman (Pearson Education).

Term Work :

It should consist of minimum 10 to 12 assignments based on following guidelines.
In tutorial session, students of different batches be assigned –

a) Different exercise problems and be guided for the solution of the problems AND

b) To write programs in C language on any 4 to 5 following related topics.

1. Generating truth table of a statement
2. Application of bit representation of sets and operations on sets or relations.
3. Conversion of polish expressions.
4. Obtaining the path matrix, paths of different lengths.
5. Different tree traversal methods.
6. Evaluating polynomial expressions using linked lists.
7. Allocation graphs and deadlock detection.
8. PERT related techniques.
9. Algorithms for generation of Permutations & Combinations.

DATA STRUCTURES

Lectures: 4 hrs/week **Theory: 100 marks**

Course Objectives:

1. To make the students familiar with basic data structures.
2. To teach the students to select appropriate data structures in computer applications.
3. To provide the students with the details of implementation of various data structures.

Unit 1: Basics of Data Structures: **(6)**

Overview of C- Basic data types, control structures, array, function, structure, pointers, Time and Space complexity.

Unit 2: Searching and Sorting Techniques: **(10)**

Linear search, binary search, bubble sort, selection sort, insertion sort, merge sort, quick sort, radix sort, heap sort

Hashing – Definition, hash functions, overflow, collision, open and closed hashing, rehashing techniques.

Unit 3: Stacks and Queues: **(7)**

Stacks: Definition, representation, operations, static implementation and applications of stack.

Queues: Definition, representation, operations, static implementation and applications of queue, circular queue, priority queue.

Unit 4: Lists: **(10)**

Definition representation, operations, implementation and applications of singly, doubly and circular linked lists. Implementation of stack and queue using linked lists.

Unit 5: Trees: **(7)**

Basic terminology, representation, binary tree, traversal methods, binary search tree, AVL search tree, B tree, B+ tree, Heaps- Operations and their applications.

Unit 6: Graphs: **(6)**

Basic concept of graph theory, storage representation, graph traversal techniques- BFS and DFS, Graph representation using sparse matrix.

Text Books:

1. Let us C – Yashwant Kanetkar (BPB) (Chapter 1)
2. Schaum's Outlines Data Structures – Seymour Lipschutz (MGH) (Chapter 2 to 6)

Reference books:

1. Data Structure using C- A. M. Tanenbaum, Y. Langsam, M. J. Augenstein (PHI)
2. Data Structures- A Pseudocode Approach with C – Richard F. Gilberg and Behrouz A. Forouzon 2nd Edition

DATA COMMUNICATIONS

Lectures: 4 hrs/ week **Theory: 100 Marks**

Course Objectives:

1. To learn basic concepts and principles of data communication.
2. To expose the students to various Computer Network models and standards.
3. To expose the students to IEEE standards for LAN.

Unit 1:- Introduction

1. Introduction : Data communications, Networks, Protocols & standards (3)
2. Network Models:- Layered Tasks, The OSI model, Layers in the OSI model, TCP/IP protocol suit, ATM reference model. (4)

Unit 2:- Communication Basics

3. Data & Signals :- Analog & Digital, Periodic analog signals, digital signals, Transmission Impairments, Data rate limits & Performance (5)

4. Digital Transmission :- Line coding & line coding schemes (Unipolar, polar & bipolar) Transmission models (3)

Unit3 :- Physical Layer

5. Transmission media :- Guided, Unguided media (4)
6. Network Hardware components:-
   Transceivers & media converters, Repeaters, NIC & PC cards, Bridges, switches, Routers (4)

Unit 4 : Data Link Layer :-

7. Error detection & correction: Block coding, cyclic codes, checksum (3)
8. Data Link Control :- Framming, Flow & error control, stop & wait protocol, sliding window protocol, HDLC protocol. (5)

Unit 5 :- The medium Access control (7)

9. Channel allocation Problem, Multiple Access Protocols, ALHOA, CSMA, collision free protocols, Limited contention protocols.

Unit 6 :- IEEE standards For LANS & MANS :- (8)

10. 802.3 Standard & Ethernet,
    802.4 Standard & Token Bus,
    802.5 Standard & Token Ring,
    Comparison of 802.3, 802.4 and 802.5,
    802.6 standard (DQDB) and 802.2 logical link control.

Text Books:-

1. Data Communications and Networking – Behrouz A Forouzan (The McGraw Hill) (ch : 1,2,3,4,5,7,8).
2. Computer Networks – Andrew S. Tanenbaum- (Prentice Hall) (ch:9,10,11) 5th Edition.
3. Computer communications and Networking Technologies – Michael A Gallo (Cengage Learning) (ch:6).

Reference Books :-

1. Data & computer communications :- William Stallings (Pearson Education).
2. Data communication and computer Networks Ajit Pal (PHI Learning) .

MICROPROCESSORS

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

Practicals: 2 hrs/ week **Term work : 25 Marks**

Oral Exam : 50 Marks

Course Objectives:

1. To expose the students to architectures of basic microprocessors.
2. To give the hands on experience on assembly language programming for microprocessors.

Unit 1: Intel 8085 Architecture & Programming (6)

1.1 Architecture of 8085
1.2 Instruction set & Execution in 8085
1.3 Classification of Instructions
1.4 Instruction set of 8085
1.5 Sample Programs
1.6 Assembler
1.7 Assembly Language Programs

Unit 2: Microprocessor and Architecture (6)

2.1 The Microprocessor Based Personal Computer System.
2.2 Internal Microprocessor Architecture
2.3 Real Mode Memory Addressing
2.4 Introduction to Protected Mode memory Addressing
2.5 Memory Paging

Unit 3: Addressing Modes and Data Movement Instructions (6)

3.1 Data Addressing Modes
3.2 Program Memory Addressing Mode
3.3 Stack Memory Addressing Mode
3.4 MOV Revisited
3.5 PUSH/POP
3.6 Load Effective Address
3.7 String Data Transfer
3.8 Miscellaneous Data Transfer Instruction
3.9 Segment Override Prefix
3.10 Assembler Details

Unit 4: Arithmetic, Logic & Program Control Instructions (6)

4.1 Addition ,Subtraction and Comparison
4.2 Multiplication and Division

4.3 BCD and ASCII Arithmetic
4.4 Basic Logic Instructions
4.5 Shift and Rotate
4.6 The Jump Group
4.7 Controlling the Flow of program
4.8 Machine control and Miscellaneous Instructions

Unit 5: Interrupts and The 80386 Microprocessor (6)

5.1 Basic Interrupt Processing
5.2 Hardware Interrupt
5.3 The80386 Microprocessor: The memory System
5.4 Special 80386 Registers
5.5 80386 Memory Management
5.6 Virtual 8086 Mode
5.7 The Memory Paging Mechanism

Unit 6: Pentium , Pentium Pro and Pentium 4 Microprocessor (4)

6.1 The Pentium Microprocessor : The Memory System
6.2 Special Pentium Registers
6.3 Pentium Memory Management
6.4 The Pentium Pro Microprocessor : Internal structure of the Pentium Pro
6.5 The Pentium 4 : Memory Interface, Register Set, Hyper Threading Technology CPUID

Text Books:

1) The INTEL Microprocessors - Architecture ,Programming and Interfacing - Barry B. Brey Seventh Edition (PHI Ltd)
2) Microprocessors and Microcontrollers - N. Senthi Kumar, M. Saravanan and S. Jeevananthan (Oxford University Press)

Reference Books:

1) Microprocessor Architecture, Programming and Applications with 8085 - Ramesh Gaonkar
2) The Microcomputer systems: The 8086/8088 Family - Yu Cheng Liu , Glenn A. Gibson (PHI Ltd)

Term Work :

It should consists of 10 to 12 experiments based on the following guidelines.

a) Experiment No 1 to 6 should be based on 8085 Instruction set – out of which :

Two experiments on : Different 5 to 6 Programs using Data Transfer Instructions.

Two experiments on : Different 5 to 6 Programs using Arithmetic & logic Instructions.
Two experiments on : Different 3 to 4 Programs using Branching Instructions.

b) Experiment No 7 to 12 should be based on 8086, 80286 & 80386 Instruction set using Assembler out of which :

Two experiments on: Different 4 to 5 small Assembly Programs using Addressing Modes and Data Movement Instructions.

Two experiments on: Different 4 to 5 small Assembly Programs using ARTHMETIC, LOGIC & PROGRAM CONTROL INSTRUCTION.

Two experiments on: Different 4 to 5 small Assembly Programs using Bios Interrupts in High Level Language C.

PROGRAMMING LABORATORY- I

Lectures : 2 hrs / week **Term work : 50 marks**
Practical : 4 hrs / week **POE : 50 marks**

Course Objectives:

1. To expose the students to programming constructs of C language.
2. To learn the implementation of various data structures using C.
3. To learn how to write modular and efficient C programs.

Unit 1: An Overview of C : 5

Compilers vs. Interpreters, The Form of a C Program, The Library and Linking, Separate Compilation, Compiling a C Program, C's Memory Map; Expressions – The Basic Data Types, Modifying the Basic Types, Identifies Names, Variables, The Four C Scopes, Type Qualifiers- const, volatile, Storage Class Specifiers; Statements - Selection Statements, Iteration Statements, Jump Statements, Expression Statements, Block Statements.

Console I/O: Reading and Writing Characters, Reading and Writing Strings, Formatted Console I/O, printf(), scanf(), Suppressing Input.

The Preprocessor and Comments

The Preprocessor, #define, #error, #include, Conditional Compilation Directives, #Undef, Using defined, #line

Unit 2: Arrays : 3

Arrays and Strings- Two-Dimensional Arrays, Arrays of Strings, Multidimensional Arrays, Array Initialization, Variable-Length Arrays.

Unit 3: Functions : 4

The General Form of a Function, Understanding the Scope of a Function, Parameter passing, Passing arrays to functions, Function Arguments, argc and argv-Arguments to main(),The return Statement, What Does main( ) Return?, Recursion, Function Prototypes, Declaring Variable Length Parameter Lists, The "Implicit int" Rule, Old-Style vs. Modem Function Parameter Declarations, The inline Keyword.

Unit 4: Pointers : 5

What Are Pointers?, Pointer Variables, The Pointer 0perators, Pointer Expressions, Pointers and Arrays, Arrays of Pointers, Multiple Indirection, Initializing Pointers, Pointers to Functions and structures, C's Dynamic Allocation Functions, restrict-Qualified Pointers, Problems with Pointers.

Unit 5: Structures, Unions, Enumerations, and typedef : 4

Structures, Arrays of Structures, Passing Structures to Functions, Structure Pointers, Arrays and Structures Within Structures, Unions, Bit-Fields, Enumerations, Using sizeof to Ensure Portability, typedef .

Unit 6: File I/O : 3

File I/O, Standard C vs. Unix File I/O, Streams and Files, File System Basics, fread( ) and fwrite(), fseek() and Random-Access I/O, fprintf( ) and fscanf(), The Standard Streams.

Text Books:

1. Let Us C- Yashvant Kanetkar (BPB Publications)
2. Understanding Pointers in C- Yashvant Kanetkar (BPB Publications)

Reference Books:

1) C The Complete Reference – Herbert Schildt (Tata McGraw-Hill Edition)
2) The C Programming Language- Brian W. Kernighan, Dennis Ritchie (Prentice Hall Software Series)

Term Work:

It should consist of minimum 14 experiments based on the following guidelines and should be conducted in Unix/Linux platform.

1. Implement matrix operation by representing matrix in the form of (a) array (b) linked list. Matrix
   Operation like – Multiplication of matrices, finding the Inverse matrix, singular matrix, upper triangle, lower triangle, symmetric matrix, skew symmetric, triangular matrix etc

2. Implement a C program that will accept a hexadecimal number as input and then display a menu that will permit any of the following operation to be carried out.

(a) Display hex equivalent of one’s complement.

(b) Carry out a masking operation and then display the hex equivalent of the result.

(c) Carry out a bit shifting operation and then display the hex equivalent of the result.

(d) Exit.

If the masking operation is selected, prompt the user for the type of operation (bit wise and bit wise exclusive or bit wise or) and then a (hex) value for the mask. If the shifting operation is selected, prompt the type of shift (left or right) and then the no. of bits to be shifted. Test the program with several different (hex) input values of your own choice. Note: Conversion of different equivalent forms like – binary, octal, decimal and others can also be performed and tested.

3. Define a mask and write the appropriate masking operating for each of the situations described below:

   a. Copy the odd bits (bits 1, 3, 5……15) and place zero in the even-bit location (bit 0, 2, 4, 14) of 16 bit, unsigned integer quantity represented by the variable v. Assume that bit 0 is the rightmost bit.

   b. Strip the msb (the leftmost bit) from an 8-bit character represented by variable c (certain word processor use this bit to control the formatting of the text within a document. Stripping this bit
   i. e. setting it to zero, can transform the word processor documents into a text file consisting of ordinary ASCII characters.)

   c. Copy the odd bits (bits 1, 3, 5,…., 15) and place one's in the even bit locations (bits 0,2,4,…..,14) of a 16 bit unsigned integer quantity represented by variable v. Assume bit 0 is the rightmost bit.
   d. Toggle (invert) the values of bits 1 & 6 of the 16 bit unsigned integer quantity represented by variable v, while preserving all the remaining bits. Assign new bit pattern to v.

4. Implement and compare linear and binary search for any given huge data set <min – 10000>. Data must be float, string.
5. Implement any 2-3 sorting techniques and find the number of comparison required to sort random data –set of around 10000.
6. Write a problem which **a.** Implements pointers to function **b.** has a function having parameters as pointer to function.

7. Implement stack using array and linked list.
8. Implement queue, priority queue, circular queue using array and linked list.
9. Write a program which shows advantages of **(a)** Static variable **(b)** Static function (using multiple C
   files) **(c)** volatile **(d)** Extern (using multiply C files.)
10. Implement hashing and rehashing operating on data like float and string.
11. Implement doubly linked list, Circular linked list, doubly circular linked list.

12. Implement and perform different operation of binary tree, B-tree insertion, deletion, modification, finding the depth of the tree.
13. Create your own library file and header file.
14. Implement all loops. Also implement equivalent loops –for, while, do-while using recursion.
15. Implement Towers of Hanoi and Ackermann's function.

Breakup of term work marks:

Mid-semester **Practical test** – 10 marks.
End-semester **Practical test** – 10 marks.
Practical performance – 30 marks.

SOFT SKILLS

Practicals: 2 hrs /week **Term work: 50 marks**
Oral Exam: 25 marks

Objectives:

1. To enhance the communications skills of the students.
2. To expose the students to basic skills of team work.
3. To inculcate the writing skills necessary for business communications.

Unit I: Communication Skills

Verbal Communication - Effective Communication - Active listening – Articulation- Paraphrasing – Feedback
Non Verbal Communication - Body Language of self and others
Importance of feelings in communication - dealing with feelings in communication
Inter and Intrapersonal communication- Self-esteem and confidence - Assertiveness

Unit II: Importance of Team work

Self Enhancement - importance of developing assertive skills- developing self-confidence – developing emotional intelligence.
Importance of Team work – Team vs. Group - Attributes of a successful team – Barriers involved
Working with Groups – Dealing with People- Group Decision Making
Effective teams – Elements of Team work - Stages in team formation

Unit III: Writing

Introduction to writing, Hallmark of good writing, Writing conventions, business writing, writing a notice, writing styles, e-mail writing, report writing, practice.

Text Books:

1. Developing Communication Skills by Krishna Mohan and Meera Banerji; MacMillan India Ltd., Delhi
2. Essentials of Effective Communication, Ludlow and Panthon; Prentice Hall of India.
3. Seven Spiritual Laws of Success - Deepak Chopra.
4. Good To Great - Jim Collins.

SEMESTER IV

AUTOMATA THEORY

Lectures: 3 hrs/week	**Theory: 100 marks**
Tutorial:1 hr/week	**Term work:25 marks**

Course Objectives:

1. To expose the students to the mathematical foundations and principles of computer science.
2. To strengthen the students' ability to carry out formal and higher studies in computer science.
3. To make the students understand the use of automata theory in Compliers & System programming.
4. To make the **s**tudent aware of mathematical tools, formal methods & automata techniques to computing.

UNIT-I : Mathematical Induction, Regular Languages & Finite Automata: (6)

The Principle of Mathematical Induction Recursive Definitions, Definition & types of grammars & languages, Regular expressions and corresponding regular languages, examples and applications, unions, intersection & complements of regular languages, Finite automata-definition and representation, on-deterministic F.A.,NFA with null transitions, Equivalence of FA's , NFA's and NFA's with null transitions.

UNIT-II: Kleene's Theorem: (3)

Part I & II statements and proofs, minimum state of FA for a regular language, minimizing number of states in Finite Automata.

UNIT-III: Grammars and Languages: (6)

Derivation and ambiguity, BNF & CNF notations, Union, Concatenation and *'s of CFLs, Eliminating production & unit productions from CFG, Eliminating useless variables from a context Free Grammar.

Parsing: (4)

Top-Down, Recursive Descent and Bottom-Up Parsing

UNIT-IV: Push Down Automata: (4)

Definition, Deterministic PDA & types of acceptance, Equivalence of CFG's & PDA's.

UNIT-V: CFL's and non CFL's : (4)

Pumping Lemma and examples, intersections and complements.

UNIT-VI: Turing Machines : (6)

Models of computation, definition of Turing Machine as Language acceptors, combining Turing Machines, Computing a function with a TM

Variations in Turing Machines : (3)

Turing machines with doubly-infinite tapes, more than one tape, Non-deterministic TM and Universal TM.

Text Books:

1. Introduction to Languages & theory of computations—John C. Martin (MGH) –Chapters 1, 2,3,4,5,6,7,8.
2. Discrete Mathematical Structures with applications to Computer Science—J .P.Trembley & R.Manohar (MGH) Chapter 1, 3.

Reference Book:

1. Introduction to Automata Theory, Languages and computation—John E. Hopcraft, Rajeev Motwani, Jeffrey D. Ullman (Pearson Edition).Chapters 1,3,4,5.
2. Introduction to theory of Computations—Michael Sipser (Thomson Books/Cole) Chapters 6,7,8.
3. Theory Of Computation- Vivek Kulkarni, 1st edition OXFORD university Press
4. Theory Of Computation A problem Solving Approach Kavi Mahesh Wiley India.

Term work: It should consist of minimum 10 to 12 assignments based on the topics of the syllabus and exercise problems mentioned in the text books.

COMPUTER NETWORKS

Lectures : 4 hrs / week	**Theory: 100 marks**
Practicals: 2 hrs/ week	**Term work: 25 Marks**
	Oral Exam: 50 Marks

Course Objectives:

1. To learn basic concepts of network architectures.
2. To give hands on exposure to network protocols and application development.
3. To learn basic concepts of quality of services and network security.

Unit I : Network Layer **(7)**

Network Layer Design Issues, Routing Algorithms – Optimality Principle, Shortest Path Routing, Flooding Distance Vector Routing, Link State Routing.

Unit 2 : Logical Addressing **(6)**

IPV4 Addresses, IPV6 Addresses

Unit 3: Congestion Control and QoS : **(5)**

Congestion control: General Principle, Preventing policies, Congestion control in virtual circuit subnet, congestion control in diagram subnet Load shading, Jitter control

Quality of services **(5)**

Quality of services: Requirements, Techniques for achieving good quality services, integrated services, Differentiate services.

Unit 4 : Transport layer **(6)**

The transport service, Elements of transport protocols, Internet transport protocol – UDP, TCP.

Socket : Socket Interface and client server model. **(3)**

Unit 5: Application Layer **(6)**

Name space, Domain Name Space, Distribution of Name Space, DNS in the Internet, Resolution, DNS message , Remote Login (SSH), Electronic mail, FTP, WWW & HTTP.

Unit 6: Security **(6)**

Security : Cryptography – Traditional Ciphers, RSA.

Text Books:

1. Computer Networks – Andrew S. Tanenbaum (Pearson Education) 4th Edition (Chapter 1,3,4,5,7)
2. Data communication and networking – Bebrouz A. Forouzan (The McGraw- Hill) 4th Edition (Chapter 2,8)
3. Internetworking with TCP/IP- D.E. Comer (Pearson) (Chapter 6)

Reference Books:

1. Computer Networking : Principles, Technologies and protocols of network design – Natalia Olifer and victor Olifer (Wiley India Edition)
2. Data communication and computer Network – Ajit pal (PHI Learning)

Term Work: It should consist of minimum 10 experiments based on the following guidelines.

1. Implementation of file transmission using RS-232.
2. Implementation of file transmission using Stop and Wait / Go Back n / Selective Repeat protocol.
3. Implementation of Hamming code / CRC for error detection / recovery.
4. Implementation of any Routing algorithm.
5. Developing a file transfer application using TCP and UDP (socket program).
6. Develop applications to demonstrate Congestion control algorithms.
7. Implementation of Cryptographic algorithms.
8. Develop a network application to identify host id and network id of a remote machine in a IPv4 network. (All class IPs may be tested with).
9. Develop a simple email application.
10. Study of DNS, Remote login. Use of nslookup, dig, ftp, SSH, etc.

COMPUTER ORGANIZATION

Lectures :4 hrs / week **Theory : 100 marks**

Course Objectives:

1. To expose students to basic concepts of computer organization.
2. To provide a comprehensive and self contained view of Computer design from hardware point of view.
3. To make the students aware of overall design and architecture of computer and its organization.
4. To provide pre-requisites for understanding concepts of advanced computer architecture.

Unit I: Basic Computer Organization **(6)**

Evolution of computers - Mechanical era, Electronic computers, Generations, VLSI era , CPU organization , communications, user and supervisor modes, accumulator based CPU, System bus, instruction cycle, types of instruction(zero, one, two and three address machines), IO interface, RISC& CISC, definition, comparison and examples.

Unit II: CPU design **(4)**

Specifications, (memory, speed, frequency etc.) with example, Instruction fetching, decoding, executing, Case Study (architecture, block diagram, instruction sets etc.), Pentium 4 processor, AMD processor.

Unit III: Computer Arithmetic **(12)**

Data Representation, basic formats, storage order, fixed point numbers, binary, signed, decimal, hexadecimal, Floating point numbers, basic formats, normalization, biasing, IEEE754 format, Fixed point arithmetic - Addition and subtraction, overflow, high speed adders, adder expansion, Fixed point multiplication - Two's complement multiplier, Booth's algorithm, Combinational array multiplier, Fixed point division - Restoring, Non restoring algorithm, Combinational array divider, Division by repeated multiplication, Floating point arithmetic - Basic operations, Difficulties, Floating point units, Addition, subtraction, multiplication, division.

Unit IV: Control Design **(6)**

Introduction, multi cycle operation, implementation methods, Hardwired control, design methods, state tables, GCD processor, Classical method, one hot method, Design example-twos complement multiplier control, CPU control unit design.

Unit V: Micro programmed control **(6)**

Basic concepts, control unit organization, parallelism in microinstructions, Microinstruction addressing, timing, Control unit organization, Design example- twos complement, multiplier control, Control field encoding, encoding by function, multiple microinstruction formats.

Unit VI: Memory Organization **(10)**

Types of memory, Memory systems, multilevel, address translation, memory allocation, Caches, Associative memory, direct mapping, set associative addressing.

Text Books :

1. Computer Architecture and Organization - John P Hayes (MGH) 3rd Edition.
2. Computer Systems Organization & Architecture – John D. Carpinelli (Pearson Education)

References:

1. Computer Organization - Hamacher Zaky (MGH).
2. http://cse.stanford.edu/class/sophomore-college/projects-00/risc/risccisc/(RISC vs CISC)
3. http://www.cpu-world.com/sspec/
4. http://www.intel.com/technology/itj/q12001/pdf/art_2.pdf (The Micro architecture of Pentium 4)
5. http://www.amd.com/us-en/assets/content_type/white_papers_and_tech_docs/30579_AMD_Processor_Evaluation_Guide3.1.pdf (AMD Processor Performance Evaluation Guide

OPERATING SYSTEM – I

Lectures: 3 hrs/week	**Theory: 100 marks**
Tutorial:1 hr/week	**Term work:25 marks**

Course Objectives:

1. To make the students understand basic concepts of operating system.
2. To expose the students to various functions of the Operating system and their usage.
3. To give hands on exposure to Linux commands and system calls.

UNIT I: **Overview of OS** (6)

1.1 Abstract view of an operating system
1.2 Fundamental principles of OS operations
1.3 OS interaction with the computer and user programs
1.4 Efficiency ,system performance and user service
1.5 Batch Processing System
1.6 Multiprogramming System
1.7 The Time Sharing System
1.8 The Real Time Operating System
1.9 Distributed operating system
1.10 Operation of OS, Operating system with monolithic structure
1.11 Virtual machine operating system
1.12 Kernel based operating system, Microkernel based operating system

UNIT II: Processes, Threads and Synchronization (6)

2.1 Processes and programs
2.2 Implementing processes
2.3 Threads
2.4 Process synchronization
2.5 Race condition, Critical Section, Synchronization approaches
2.6 Classic process synchronization problems
2.7 Semaphores, Monitors
2.8 Case studies of Process Synchronization

UNIT III: Process Scheduling (6)

3.1 Scheduling terminology and concepts
3.2 Non preemptive scheduling policies
3.3 Preemptive scheduling policies
3.4 Long, Medium and short term scheduling
3.5 Performance analysis of scheduling Policies

UNIT IV: Deadlock (6)

4.1 What is deadlock
4.2 Deadlock in resource allocation
4.3 Handling Deadlocks : Deadlock Detection and Resolution
4.4 Deadlock prevention
4.5 Deadlock avoidance

UNIT V: Memory Management (6)

5.1 Managing the memory hierarchy
5.2 Memory allocation to a process
5.3 Heap Management
5.4 Contiguous Memory Allocation and Non Contiguous Allocation
5.5 Segmentation and Segmentation with paging
5.6 Virtual memory basics, Demand paging
5.7 Page replacement policies
5.8 Controlling memory allocation to a process

UNIT VI: File systems and I/O systems (6)

6.1 Overview of file processing
6.2 Files and file operations
6.3 Fundamental file organizations and access methods
6.4 Overview of I/O system
6.5 I/O hardware, Application I/O interface
6.6 Kernel I/O subsystem
6.7 Transforming I/O request to h/w operation

Text Books:

1. Operating Systems - A Concept Based approach - Dhananjay M Dhamdhere (TMGH).
2. Operating System Concepts - Abraham Silberschatz, Peter B. Galvin & Grege Gagne (Wiley)

Reference Books:

1) Unix Concepts and Applications – Sumtabha Das (TMGH).
2) Operating System : Concepts and Design - Milan Milenkovic (TMGH)
3) Operating System with case studies in Unix, Netware and Windows NT - Achyut S. Godbole (TMGH).

Term work: The tutorials should be conducted on the following guidelines.

1. Six assignments should be based on theoretical / analytical concepts, preferably from the exercises of the books covering all topics of the syllabus.

2. Four assignments should on usage of Unix / Linux commands and system calls concerned with General purpose utilities, file system, handling ordinary files, basic file attributes, the Shell, the Process and Filters using regular expressions as mentioned in the reference book at serial no. 1. These assignments should be practically conducted during the tutorial sessions.

SOFTWARE ENGINEERING

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

Course Objectives:

1. To expose the students to basic concepts & principles of software engineering.
2. To make the student aware of the importance of SDLC in their project development work.
3. To expose the students to software testing techniques and software quality management.

Unit 1: The software Problem **(6)**

1.1 cost, schedule & Quality
1.2 Scale and change
1.3 Software Processes: Process & Project, Component Software Processes, Software Development process Modules, Project Management Process.

Unit 2: Requirements Analysis & specification **(5)**

2.1 Requirements gathering & Analysis
2.2 Software Requirements Specifications
2.3 Formal System Development Techniques

Unit 3 : Software Planning & Scheduling **(6)**

3.1 Responsibilities of Software Project Manager
3.2 Project Planning
3.3 Project Scheduling
3.4 Project Staffing
3.5 People CMM
3.6 Risk Management

Unit 4: Design **(6)**

4.1 Design Concepts
4.2 Function Oriented Design

4.3 Object Oriented Design
4.4 Detail Design
4.5 Verification
4.6 Metrics

Unit 5: Coding & Testing (7)

5.1 Coding & Code Review
5.2 Testing
5.3 Unit Testing
5.4 Black Box Testing
5.5 White Box Testing
5.6 Program Analysis Tools
5.7 Integration Testing
5.8 System Testing

Unit 6: Software Reliability & Quality Management (6)

6.1 Reliability
6.2 Software Quality
6.3 Software Quality Management System
6.4 ISO 9000
6.5 SEI capability Maturity Model
6.6 Six Sigma
6.7 Agile software Development & Extreme Programming
6.8 Agile Project Management

Text Books:-

1) Software Engineering : A precise Approach - Pankaj Jalote (Wiley India) (Unit 1, 4).
2) Fundamentals of Software Engineering - Rapit Mall (3rd Edition)(PHI) (Unit 2, 5, 6).
3) Software Engineering by Jan Sommerville (9th Edition) Pearson (Unit 6, 7 & 6.8).
4) Software Engineering Principles & Practices by Rohit Khurana ITLESL (2nd Edition) Vikas Publishing House Pvt. Ltd. (Unit 3).

References:-

1) Software Engineering - Concepts & Practices -- Ugrasen Suman (Cenage Learning)
2) Software Engineering Fundamentals -- Behforooz & Hudson (Oxford : Indian Edition 1st)

PROGRAMMING LABORATORY– II

Lectures: 2 hrs/week **Term Work: 50 Marks**
Practical: 4 hrs/week **POE: 50 Marks**

Course Objectives:

1. To expose the students to concepts of object oriented paradigm.
2. To make the students understand the use of the programming constructs of C++.
3. To give hands on exposure to develop applications based on concepts of Discrete Mathematical Structures and Data Structures using Object-Oriented approach.

Unit 1: Fundamentals of Object Oriented Programming (5)

An Overview of C++ - The Origins of C++, Encapsulation, Polymorphism, Inheritance, Function Overloading, Operator Overloading, Constructors & Destructors, C++ key words.

Classes& Objects - Relation of Classes, Structures & Union, Friend Functions, Friend Classes, Inline Functions, Parameterized constructors, Static class members, Scope resolution operators, Passing objects to functions, nested classes, and local classes.

Unit 2: Arrays & Pointers (3)

Arrays of objects, Pointers to objects, Type checking C++ Pointers, This Pointer, Pointers to derived types, Pointers to class members, Dynamic allocation operators- new & delete operators.

Unit 3: Inheritance (3)

Single Inheritance, Multilevel Inheritance, Multiple Inheritances, Hybrid Inheritance, Hierarchical Inheritance, Virtual base classes.

Unit 4: Polymorphism (3)

Overloading - Function overloading, Overloading constructor function, copy constructors, Operator overloading using friend function, Overloading new & delete operators, overloading some special operators like [],(),->,Comma operator.

Virtual Functions- Pure virtual function, calling virtual function through a base class, Abstract classes, Early vs Late binding.

File and Streams: Streams, String I/O, Character I/O, Object I/O, I/O with multiple objects, File pointers and redirections. C++ streams, C++ stream classes, RTTI, Namespace fundamentals, STL containers, STL algorithms, STL iterators. (4)

Unit5: Templates & Exception Handling: (6)

Templates - Generic classes, Generic functions, Applying generic functions, type name &export keyword, power of templates.

Exception Handling – Fundamentals, Handling derived class exceptions, exception handling options: catching, throwing & handling of the exception.

Text Books:

1. The Complete Reference: C++ - Herbert Schildt (TMGH) Fourth Edition
2. Object-Oriented Programming in C++ - Rajesh K. Shukla (Wiley) India Edition

Reference Books:

1. Object Oriented Programming in Turbo C++ - Robert Lafore (Galgotia)
2. Object Oriented Programming with C++ - Sourav Sahay (Oxford) Second Edition

Term work:

It should comprise of minimum 14 experiments. Students of different batches should implement different programs based on the following guidelines in UNIX / Linux platform.

(A) 6 assignments should consist of implementing ALL following concepts- Constructor, Destructor, Function overloading, Constructor overloading, Operator overloading, Multiple inheritance, Multilevel inheritance, Static variables, Function in class, Virtual function, Virtual class, Virtual destructor, Function template, Friend class and function, File handling, Templates, STL

(B) 4 assignments on implementing object oriented programs for the problems of Discrete Mathematical Structure of SE-I(CSE), like –

1. Representing a Set in bit form and implementing the set operation like-Union, Intersection, Relative Complement, symmetric difference etc.
2. Conversion of Polish expressions.
3. Obtaining path matrix and paths of different lengths.
4. Evaluating polynomial expression (PE) using linked list and performing operations on PE like Multiplication, addition subtraction, etc.
5. Check dead lock for any given resource allocation graph.

(C) 4 assignments on implementing the data structures like-

1. Implement sorting /searching algorithms using function template and virtual function.
2. Implement stack / queue using class template.
3. Implement B/B ++ tree and performing operation on the tree using object oriented concepts.
4. Create a linked list as an object. Perform merging of two objects (linked lists) and splitting of object. (Use operator overloading).
5. Implement hashing and rehashing (considering occurrence of overflow).

MINI PROJECT

Practical: 2 hrs/week **Term Work: 25 Marks**
Oral Exam: 50 Marks

Course Objectives:

1. To expose the students to use the engineering approach to solve the real time problems.
2. To learn the skills of team building & team work.
3. To develop the logical skills and use of appropriate data structures for solving the engineering problems and puzzles.

Platforms: Free and Open source softwares.

Description:

The mini project should be undertaken preferably by a group of 3-4 students who will jointly work and implement the project. The mini project must be based upon the problem statements as that of programming contest (Advanced Computing Machines – Inter-Collegiate Programming Contest : ACM-ICPC). The problems can be referred from the web links concerned with ACM-ICPC. The group will select a problem with the approval of the guide and prepare the solution guidelines for its implementation. The same should be put in the form of synopsis (3 to 5 pages), stating the usage of logic, algorithms and suitable data structures necessary for implementation of the solution. Further the group is expected to complete analysis of problem by examining the possible different inputs to the system and the corresponding outputs. The term work submission is to be done in the form of a report containing the details of the problem, solution techniques, implementation details, input-output scenarios and the conclusion. The project must be implemented in C/C++. Graphics is optional for GUI.

Term Work Assessment:

The term work assessment will be done jointly twice in a semester by a panel of teachers appointed by the department. The term marks distribution should be as following.

1) Mid Term assessment - *5 marks.*
2) End term assessment - *5 marks*.
3) Final Performance evaluation is to be done by guide - *15 marks*

External Oral Exam:

The external oral examination will be conducted by the examiners appointed by the University.

Equivalent subjects at SE (CSE) – I & II Pre-revised course to the Revised course of S. E. (CSE) Sem -III & IV.

SE (CSE) Part – I

Sr.no.	**SE (CSE) –I (Pre-Revised)**	**Equivalent / Replacement subject**
1	Applied Mathematics	Applied Mathematics of SE (CSE) Sem-III (Rev)
2	Discrete Mathematical Structures	Discrete Mathematical Structures of S.E(CSE) Sem-III (Revised)
3	Data Structures	Data Structures of S.E(CSE) Sem-III (Revised)
4	Computer Networks-I	Data Communication of SE (CSE) Sem-III (Rev)
5	Digital Systems & Microprocessors	Microprocessors of S.E.(CSE) Sem-III (Revised)
6	Programming Lab-I	Programming Lab-I of S.E(CSE) Sem-III (Revised)
	S.E. (CSE) Part – II	
Sr.no.	**SE (CSE) –I (Pre-Revised)**	**Equivalent / Replacement subject**
1	Automata Theory	Automata Theory of S.E (CSE) Sem-III (Revised)
2	Computer Networks-II	Computer Networks of S.E(CSE) Sem – IV (Revised)
3	Computer Organization	Computer Organisation of SE (CSE) Sem – IV (Revised)
4	Advanced Microprocessors	Advanced Microprocessors
5	Software Engineering	Software Engineering of S.E.(CSE) Sem-IV (Revised)
6	Programming Lab-II	Programming Lab-II of S.E(CSE) Sem-IV (Revised)

Advanced Microprocessors

Lectures : 4 hrs / week   Theory : 100 marks

Section – I

1. The Processors: 8086 –Architectures, pin Diagrams and Timing Diagrams:

Register organization of 8086,Architecture,Signal descriptions of 8086,Physical memory organization, General bus operation, I/O addressing capability, Special Processor activities, Minimum mode 8086 System and timings, Maximum mode 8086 System and timings. (5)

2. 8086 Instruction Set and Assembler Directives: Machine language Instruction Formats, Addressing modes 8086, Instruction set of 8086, assembler directives and operators. (2)

3. Special Architectural Features and Related Programming: Introduction to stack, Stack structure of 8086, Interrupts and interrupt service routines, Interrupts cycle of 8086, Non mask-able interrupt, Mask-able interrupt(INTR). (5)

4. 80286-80287 -- A Microprocessor with Memory Management and Protection: Salient features of 80286, Internal Architecture of 80286, Signal description of 80286, Real addressing modes, Protected virtual address mode (PVAM), Privilege, Protection. (5)

Section:-II

5. Interrupts and The 80386 Microprocessor : Basic Interrupt Processing, Hardware Interrupt; The80386 Microprocessor: The memory System ; Special 80386 Registers; 80386 Memory Management : Virtual 8086 Mode , The Memory Paging Mechanism (6)

6. Recent Advances in microprocessor Architectures—A Journey from Pentium Onwards: Salient features of 80586(Pentium), A few relevant concepts of computer architecture, system architecture, Branch prediction, Enhanced instruction set of Pentium, What is MMX?, Intel MMX Architecture, MMX data type, Salient points about multimedia application programming, Journey of Pentium-Pro and Pentium- II, Pentium-III (P-III)---The CPU of the next millennium. (9)

7**.** Pentium , Pentium Pro and Pentium 4 Microprocessor : The Pentium Microprocessor : The Memory System; Special Pentium Registers; Pentium Memory Management; The Pentium Pro Microprocessor : Internal structure of the Pentium Pro; The Pentium 4, Memory Interface, Register Set, Hyper Threading Technology CPUID (4)

Text book:-

1. Advanced Microprocessors And Peripherals -- A.K.Roy, K.M.Bhurchandi (TMGH) 2nd Edition.

Reference books:-

1. Microprocessors and Interfacing -- Douglas V Hall (TMGH)Revised 2nd Edition.
2. The INTEL Microprocessors - Architecture ,Programming and Interfacing - Barry B. Brey Seventh Edition (PHI Ltd)
3. Microprocessors and Microcontrollers - N. Senthi Kumar, M. Saravanan and S. Jeevananthan (Oxford University Press).

Shivaji University, Kolhapur

REVISED STRUCTURE

T.E. Computer Science & Engg. (Semester – V & VI)

W.E.F. 2015-16.

Semester – V

Sr. No.	Subject	L	T	P	Total	Theory Marks		TW	POE	Oral	Total Marks
						Written	Online				
1	Computer Graphics	3	-	2	5	50	50	50	-	-	150
2	System Programming	3	-	2	5	100	-	50	-	25	175
3	Object Oriented Modeling and Design	3	-	-	3	50	50	-	-	-	100
4	Computer Algorithms	4	1	-	5	100	-	25	-	-	125
5	Network Technologies	4	-	-	4	50	50	-	-	-	100
6	Programming Lab - III	2	-	4	6	-	-	50	50	-	100
7	Business English	-	1	-	1	-	-	25	-	25	50
	Total	**19**	**2**	**8**	**29**	**350**	**150**	**200**	**50**	**50**	**800**

Semester – VI

Sr. No.	Subject	L	T	P	Total	Theory Marks		TW	POE	Oral	Total Marks
						Written	Online				
1	Compiler Construction	3	-	2	5	50	50	25	-	-	125
2	Operating System - II	3	-	2	5	100	-	25	-	-	125
3	Database Engineering	4	-	2	6	50	50	25	50	-	175
4	Storage Networks	3	-	-	3	100	-	-	-	-	100
5	Information Security	3	1	-	4	100	-	25	-	-	125
6	Programming Lab - IV	2	-	2	4	-	-	25	50	-	75
7	Domain Specific Mini-Project	-	-	2	2	-	-	25	-	50	75
	Total	**18**	**1**	**10**	**29**	**400**	**100**	**150**	**100**	**50**	**800**

Note:

5. The term work as prescribed in the syllabus is to be periodically and jointly assessed by a team of teachers from the concerned department.
6. In case of tutorials, students of different batches be assigned problems of different types and be guided for the solution of the problem during tutorial session. Problems thus solved be translated into computer programs wherever applicable and executed by respective batches during practical session.
7. The assignments of tutorials and practicals need to be submitted in the form of soft copy and / or written journal.
8. Breakup of term work marks shall be as follows:
    a. For subjects having term work marks 25 -

        Mid-semester test – 5 marks.
        End-semester test – 5 marks.
        Tutorial assignments and / or practical performance – 15 marks.

b. For subjects having term work marks 50 –

- Mid-semester test – 10 marks.
- End-semester test – 10 marks.
- Tutorial assignments and / or practical performance – 30 marks.

5. The theory exam scheme is as under:

- 5.1 : For online exam the scheme to be followed is as under –

a. As mentioned in the structure above, **Three** theory papers of TE (CSE) Sem-V and **Two** theory papers of Sem-VI of 100 marks will be divided into two parts.

- **Part-A**: 50 marks theory paper similar to the existing theory paper exam. The nature of the questions will be descriptive, analytical and problem solving.
- **Part-B:** 50 marks computer based exam with multiple choice questions (MCQs) .

b. The marks obtained in the individual heads should be added and considered as marks of the respective theory paper out of 100 marks.

c. The questions of part-A and part-B will be based on the entire syllabus of the respective subjects.

d. The theory paper for part-A will consist of two sections carrying 25 marks each.

e. The questions in part-B will be of 1 or 2 marks only.

f. Duration of part-A exam will of 2 hours and that of part-B will be of 1 hour.

g. No separate passing head for part-A and part-B.

h. The scheme of moderation / revaluation is not applicable for part-B, however is applicable for part-A

- 5.2 : For theory exam of 100 marks the scheme to be followed is as under :

a. The theory paper of 100 marks will consist of two sections carrying 50 marks each.

b. The scheme of moderation / revaluation is applicable.

6. Passing scheme is as under -

a. The passing scheme for the subjects will be similar to existing scheme.

b. All the existing ordinances will be applicable for passing criteria.

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Equivalences of T.E. (CSE) for repeater students

TE (CSE) Sem.-V

Sr.no.	TE (CSE) –I (Pre-Revised)	Equivalent / Replacement subject (Revised)
1	Computer Graphics	Computer Graphics of TE (CSE) Sem - V
2	System Programming	System Programming of TE (CSE) Sem - V
3	Operating Systems - I	Operating Systems – I of SE (CSE) Sem - IV
4	Computer Algorithm	Computer Algorithm of TE (CSE) Sem - V
5	Programming Lab-III	Programming Lab-III of TE (CSE) Sem - V
6	Mini-Project-II	Domain Specific Mini-Project of TE(CSE) Sem-VI

T.E. (CSE) Sem.-VI

Sr.no.	TE (CSE) II (Pre-Revised)	Equivalent / Replacement subject (Revised)
1	Compiler Construction	Compiler Construction of TE (CSE) Sem - VI
2	Operating Systems - II	Operating Systems – II of TE (CSE) Sem - VI
3	Database Engineering	Database Engineering of TE (CSE) Sem - VI
4	Object Oriented Modeling & Design	Object Oriented Modeling & Design of TE (CSE) Sem - V
5	Programming Lab-IV	Programming Lab-IV of TE (CSE) Sem - VI
6	Soft Skills	Soft Skills of SE (CSE) Sem - IV

SHIVAJI UNIVERSITY, KOLHAPUR

REVISED STRUCTURE & SYLLABUS OF B.E. COMPUTER SCIENCE & ENGINEERING

With effect from 2016-17 (Semester – VII & VIII)

SEMESTER VII

Sr. No.	Subject Name	L	T	P	Theory Marks	T/W	Oral	POE	Total Marks
1	Advanced Computer Architecture	4	-	-	100	-	-	-	100
2	Distributed Systems	3	-	2	100	50	-	-	150
3	Advanced Database Systems	3	-	2	100	25	50	-	175
4	Elective – I	3	-	-	100	-	-	-	100
5	Web Technology	3	-	4	-	50	-	50	100
6	Community Services-1	-	-	2	-	50	-	-	50
7	Project – I	-	-	4	-	50	75	-	125
	Total	**16**	**-**	**14**	**400**	**225**	**125**	**50**	**800**

SEMESTER VIII

Sr. No.	Subject Name	L	T	P	Theory Marks	T/W	Oral	POE	Total Marks
1	Cloud Computing	4	-	2	100	25	50	-	175
2	Advanced Technologies	3	-	2	100	50	-	-	150
3	Real Time Operating System	4	1	-	100	25	-	-	125
4	Elective – II	3	-	-	100	-	-	-	100
5	Network Engineering	2	-	2	-	50	-	50	100
6	Project – II	-	-	4	-	50	75	-	125
7	Community Services -2	-	2	-	-	25	-	-	25
	Total	**16**	**2**	**10**	**400**	**225**	**125**	**50**	**800**

Elective – I

1. Soft Computing
2. Project Management
3. Ad hoc Networks

Elective – II

1. Data Mining
2. Business Intelligence System
3. Introduction to Mainframes

Note:

1. The term work as prescribed in the syllabus is to be periodically and jointly assessed by a team of teachers from the concerned department.

2. In case of tutorials, students of different batches be assigned problems of different types and be guided for the solution of the problem during tutorial session. Problems thus solved be translated into computer programs wherever applicable and executed by respective batches during practical session.

3. The assignments of tutorials and practicals need to be submitted in the form of soft copy and / or written journal.

4. Breakup of term work marks shall be as follows:

    a. For subjects having term work marks 25 -
        - Mid-semester test – 5 marks.
        - End-semester test – 5 marks.
        - Tutorial assignments and / or practical performance – 15 marks.

    b. For subjects having term work marks 50 –
        - Mid-semester test – 10 marks.
        - End-semester test – 10 marks.
        - Tutorial assignments and / or practical performance – 30 marks.

5. Project work should be continually evaluated based on
    a. The contributions of the group members, originality of the work, innovations brought in, research and developmental efforts, depth and applicability, etc.
    b. Two mid-term evaluations should be done, which includes presentations and demos of the work done.
    c. **Care should be taken to avoid copying and outsourcing of the project work.**

Special Note: Considering the pace of development in the technology the above proposed structure is likely to be revised as and when required

EQUIVALENCES OF B.E. (CSE) FOR REPEATER STUDENTS

BE (CSE) Sem.-VII

Sr. No.	BE (CSE) –I (Pre-Revised)	Equivalent / Replacement subject (Revised)
1.	Advanced Computer Architecture	Advanced Computer Architecture of B.E. (CSE) Sem - VII
2.	Distributed Systems	Distributed Systems of B.E. (CSE) Sem-VII
3.	Advanced Database Systems	Advanced Database Systems of B.E. (CSE) Sem-VII
3.	Network Engineering	Network Engineering of B.E. (CSE) Sem- VIII
5.	Elective-I	
	a. Soft Computing b. Project Management c. Cyber Laws	Soft Computing Project Management Cyber Security

BE (CSE) Sem.-VIII

Sr. No.	BE (CSE) –I (Pre-Revised)	Equivalent / Replacement subject (Revised)
1.	Grid Technology	Cloud Computing of B.E. (CSE) Sem - VII
2.	Storage Networks	Storage Networks of TE(CSE) Sem-VI
3.	Real Time Operating System	Real Time Operating System
4.	Web Technology	Web Technology of B.E.(CSE) Sem - VII
5.	Elective –II	
	a. Data Mining b. Ad-hoc Networks c. Business Intelligence System	Data Mining Ad-hoc Networks of BE (CSE) Sem-VII (El-I) Business Intelligence System