SHIVAJIUNIVERSITY KOLHAPUR

REVISED SYLLABUS AND STRUCTURE

SECOND YEAR (B. Tech) CBCS

Computer Science and Engineering

To be introduced from the academic year 2019-20

(i.e. from June 2019) onwards

(Subject to the modifications will be made from time to time)

SECOND YEAR COMPUTER SCIENCE AND ENGINEERING - CBCS PATTERN

SEMESTER - III

Sr. No.	Course Subject / Title	TEACHING SCHEME									EXAMINATION SCHEME											
		THEORY			TUTORIAL			PRACTICAL			THEORY					PRACTICAL			TERMWORK		
		Credits	N0. Of Lectures	Hours	Credits	No. of Hours	Hours	Credits	No. of Hours	Hours	Hours	mode	marks	Total Marks	MIN.	Hours	MAX	MIN.	Hours	MAX	MIN.
1	BSC - CS301 Applied Mathematics	3	3	3	1	1	1					CIE	30	100	40	AS PER BOS GUIDELINES			AS PER BOS GUIDELINES	25	10
												ESE	70								
2	PCC-CS302 DiscreteMathematics &Structures	3	3	3	1	1	1					CIE	30	100	40					25	10
												ESE	70								
3	PCC- CS303 Data Structures	3	3	3								CIE	30	100	40						
												ESE	70								
4	PCC- CS304 Computer Networks - I	3	3	3				1	2	2		CIE	30	100	40		50	20		25	10
												ESE	70								
5	PCC- CS305 Microprocessors	3	3	3				1	2	2		CIE	30	100	40					25	10
												ESE	70								
6	PCC- CS306 C programming	3	3	3				2	4	4							50	20		50	20
7	HM- CS307 Soft Skills							1	2	2							25	10		25	10
	Total (SEM –III)	***18***	***18***	***18***	***2***	***2***	***2***	***5***	***10***	***10***				***500***			***125***			***175***	

SECOD YEAR COMPUTER SCIENCE AND ENGINEERING - CBCS PATTERN																						
SEMESTER - IV																						
		TEACHING SCHEME									EXAMINATION SCHEME											
Sr. No.	Course Subject / Title	THEORY			TUTORIAL			PRACTICAL			THEORY					PRACTICAL			TERMWORK		
		Credits	N0. Of Lectures	Hours	Credits	No. of Hours	Hours	Credits	No. of Hours	Hours	Hours	mode	marks	Total Marks	MIN.	Hours	MAX	MIN.	Hours	MAX	MIN.
1	PCC-CS401 Automata Theory	3	3	3								CIE	30	100	40	AS PER BOS GUIDELINES			AS PER BOS GUIDELINES		
												ESE	70								
2	PCC- CS402 Computer Networks - II	3	3	3				1	2	2		CIE	30	100	40		50	20		25	10
												ESE	70								
3	PCC- CS403 Computer Organization and Architecture	3	3	3								CIE	30	100	40						
												ESE	70								
4	PCC- CS404 Operating Systems - I	3	3	3				1	2	2		CIE	30	100	40					25	10
												ESE	70								
5	PCC- CS405 Software Engineering	3	3	3								CIE	30	100	40						
												ESE	70								
6	PCC- CS406 Object Oriented Programming	2	2	2				2	4	4							50	20		50	20
7	PW- CS407 Mini Project							1	2	2							50	20		50	20
8	MC-CS408 Environmental Studies	2	2	2	1	1	1					CIE ESE	30 70	100	40						
	Total (SEM –IV)	***19***	***19***	***19***	***1***	***1***	***1***	***5***	***10***	***10***				***600***			***150***			***150***	
	Total	**37**	**37**	**37**	**3**	**3**	**3**	**10**	**20**	**20**				**1100**			**275**			**325**	

CIE- Continuous Internal Evaluation

ESE – End Semester Examination

• Candidate contact hours per week : 30 Hours(Minimum)	• Total Marks for S.E. Sem III & IV : **800 + 900 =1700**
• Theory and Practical Lectures : 60 MinutesEach	• Total Credits for S.E. Sem III & IV : **50 (SEM-III: 25 + SEM -IV:25)**
• In theory examination there will be a passing based on separate head of passing for examination of CIE andESE.	
• There shall be separate passing for theory and practical (term work)courses.	

Note:

1. **BSC-CS**: Basic Science Course – Computer Science and Engineering arecompulsory.
2. **ESC-CS:** Engineering Science Course - Computer Science and Engineering arecompulsory.
3. **PCC-CS:** Professional Core Course – Computer Science and Engineering arecompulsory.
4. **HM-CS:** Humanities and Management- Computer Science and Engineering arecompulsory.
5. **PW-CS:** Project Work-– Computer Science and Engineering arecompulsory.
6. **MC-CS:** Mandatory Course -Environmental Studies which is compulsory for theory 70 marks and project work 30 marks.

S. Y. B. Tech (Computer Science and Engineering) Sem – III

1. Applied Mathematics(BSC-CS301)

TEACHING SCHEME	EXAMINATION SCHEME
Theory : 3 Hrs/Week	**Theory :** ESE 70Marks CIE 30Marks
Tutorial : 1 Hrs/Week	**Term work:** 25 marks
Practical: ---	**Practical :---**
Credits:- 4	

Prerequisite: Basic probability theory , Statistics

Course Objectives:

1. To develop mathematical skills and enhance thinking power ofstudents.
2. To give the knowledge to the students of fuzzy set theory, numerical methods probability and statistics with an emphasis on the application of solvingengineering problems
3. To prepare students to formulate a mathematical model using engineering skills& interpret the solution in realworld.

Course Outcomes:

Upon successful completion of this course, the student will be able to:

1. Describe the statistical data numerically by using Lines of regression and Curve fittings.
2. Solve basic problems in probability theory, including problems involvingthe binomial, Poisson, and normaldistributions.
3. Calculate numericalIntegration.
4. Define fuzzy sets using linguistic words and represent these sets by membership functions, convexity, Normality, support,etc.
5. Solve examples on the principle in performing fuzzy number arithmeticoperations such as Addition, Multiplication & fuzzyequation.
6. Solve assignment problems by using different techniques of operationresearch.

Unit No.	Contents	No.of Lectures
1.	**Correlation, Regression & CurveFitting:** Introduction, Karl Pearson's Coefficient of Correlation.,Lines of regression of bivariate data., Fitting of Curves by method of Least-squares, FittingofStraight lines. Fitting of exponential curves. Fitting of second degree Parabolic curves.	06
2.	**ProbabilityDistribution:** Random variables,Discrete Probability distribution,Continuousprobability distribution,BinomialDistribution,PoissonDistribution,Normal Distribution.	06

3.	**NumericalIntegration:** Newton Cotes formulae.TrapezoidalRule,Simpson's 1/3rd rule.Simpson's 3/8th rule, Weddle's Rule.	06
4.	**Introduction to Fuzzysets:** Crisp set and Fuzzy set, Basic concepts of fuzzy sets, Basic operationsonfuzzy sets,Properties of fuzzy sets	06
5.	**Fuzzy Arithmetic:** Fuzzy numbers,Fuzzy cardinality, Arithmetic Operationson Fuzzy numbers,Solutions of Fuzzy equations of type A + X = B&A.X	06
6.	**Assignment Problem:** Definition, Balanced and Unbalancedassignment problem, Hungarian Method., Balanced assignmentproblems.,Unbalanced assignment problems. Traveling salesmen problem.	09

TEXTBOOKS:

1. Advance Engineering Mathematics by Erwin Kreyszig (WileyIndia).
2. Mathematical Methods of Science and Engineering, by Kanti B. Datta(Cengage Learning)
3. Advanced Engineering Mathematics, 3e, by Jack Goldberg (OxfordUniversity Press).
4. Engineering Mathematics by V. Sundaram (VikasPublication).
5. Higher Engineering Mathematics, by B. S. Grewal (Khanna PublicationDelhi).
6. Higher Engineering Mathematics, by B. V. Ramana (TataMcGraw-Hill).
7. Advanced Engineering Mathematics, by H. K. Das (S. ChandPublication).
8. Fuzzy Sets and Fuzzy Logic: Theory and Applications, by George J. Klir andBo Yuan (Prentice Hall of India Private Limited).
9. Applied Mathematics by Navneet D. Sangle (CengagePublication)

General Instructions:

1. For the term work of 25 marks, batch wise tutorials are to beconducted.
2. Number of assignments should be at least six (All units should becovered).

S. Y. B. Tech (Computer Science and Engineering) Sem – III

2. Discrete Mathematics & Structures (PCC-CS302)

TEACHING SCHEME	EXAMINATION SCHEME
Theory : 3 Hrs/Week	**Theory :** ESE 70Marks CIE 30Marks
Tutorial : 1 Hrs/Week	**Term work:** 25 marks
Practical: ---	**Practical :---**
Credits:- 4	

Prerequisite: Basic Mathematics

Course Objectives:

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

Course Outcomes:

Upon successful completion of this course, the student will be able to –

1. Apply logic concepts in designing aprogram.
2. Illustrate basic set concepts & apply operations onset.
3. Minimize the BooleanFunction.
4. Apply basic concepts of probability to solve real worldproblem.
5. Represent data structures using graph concepts.
6. Design abstract machine, detectdeadlocks.

Unit No.	Contents	No. of Lectures
1	**Mathematical Logic:** Statements & Notations, Connectives, Statement Formulas & truth table, Well formed formulas, Tautologies , Equivalence of formulas, Duality law, Tautological Implications, Functionally complete set of connectives, Other connectives, Normal Forms, Theory of Inference for statement calculus.	10
2	**Set Theory:** Basic concepts of set theory, Operations on Sets, Ordered pairs & n-tuples, Cartesian product	04
3	**Relations & Functions:** Relations. Properties of binary relations. Matrix & Graph Representation of Relation., Partition & covering of Set, Equivalence Relations. , Composition of Binary Relation., POSET&Hasse Diagram, Functions, Types of Functions, Composition of functions..	06

4	**AlgebraicSystems:** Algebraic Systems: Examples & general Properties, Semi groups & Monoids, Groups: Definitions & Examples, Subgroup & Homomorphism.	06
5	**Lattice andBooleanAlgebra:** Lattice as partially ordered sets, Lattice as Algebraic Systems., Special Lattices., Boolean Algebra: Definitions & examples, Boolean Functions., Representation & Minimization of Boolean Functions.	08
6	**GraphTheory:** Basic concepts of graph theory., Paths, Reachability & Connectedness, Matrix, Representations of Graphs., Storage Representation & Manipulations of Graphs. PERT & Related technologies.	05

Text Books:

1. "DiscreteMathematicalStructureswithApplicationtoComputerScience"byJ.P.Tremblay& R. Manohar (MGH International)

Reference Books:

1. Discrete Mathematics –SemyourLipschutz, Marc Lipson (MGH), Schaum's outlines.
2. Discrete Mathematics and its Applications – Kenneth H. Rosen (AT&T Bell Labs) (mhhe.com/rosen)
3. Discrete Mathematical Structures – Bernard Kolman, Robert Busby, S. C. Ross and Nadeemur-Rehman (PearsonEducation)

TERM WORK :

4. It should consist of minimum 10 to 12 assignments based on topics of syllabus & Exercise problems mentioned in text books out of which 4 to 5 implementations of above assignments must be using 'C' programming language.

S. Y. B. Tech (Computer Science and Engineering) Sem – III

3. Data Structures (PCC-CS303)

TEACHING SCHEME	EXAMINATION SCHEME
Theory :3 Hrs. / Week.	**Theory :** ESE 70Marks CIE 30Marks
Tutorial : ---	**Term work: ---**
Practical : ---	**Practical :---**
Credit:-3	

Prerequisite: C programming

Course Objectives:

1. To make the students familiar with basic datastructures.
2. To provide students with foundation in computer programming/problem.
3. To teach the students to select appropriate data structures in computerapplications.
4. To provide the students with the details of implementation of various datastructures.

Course Outcomes:

Upon successful completion of this course, the student will be able to –

1. Identify the appropriate data structure for specific application.
2. Design and analyze programming problemstatements.
3. Chose appropriate sorting and searchingalgorithms.
4. Outline the solution to the given software problem with appropriate datastructure.

Unit No.	Contents	No.of Lectures
1	**Basic of DataStructures** Data structure- Definition, Types of data structures, DataStructureOperations, Algorithms: Complexity, Time and Space complexity.	03
2	**Searching and SortingTechniques** Linear search, Binary search, Hashing – Definition, hash functions, Collision, Bubble sort, Selection sort, Insertion sort, Merge sort, Quick sort, Radix sort, Complexity and analysis.	07
3	**Stacks andQueues** Stack: Definition, operations, Array representation of stack, applications Queue: Definition, operations, Array representation of queue,applications,Circular queue, Priority queue, Deque.	07

4	**LinkedLists** Definition, representation, operations, implementation and applications ofsingly, doubly and circular linked lists. Linked representation of stack and Queue.	06
5	**Trees** Terminology, representation, binary tree, traversal methods, binary search tree, AVL search tree, B tree, B+ tree, Heaps- Operations and their applications, Heap sort.	06
6	**Graphs:** Basic concept of graph theory, storage representation, graph traversal techniques- BFS and DFS, Graph representation using sparse matrix.	06

TEXT BOOKS:

1. Schaum's Outlines Data Structures – Seymour Lipschutz (MGH)

REFERENCE BOOKS:

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

S. Y. B. Tech (Computer Science and Engineering) Sem – III

4. Computer Networks – I (PCC-CS304)

TEACHING SCHEME	EXAMINATION SCHEME
Theory : 3 Hrs. / Week	**Theory :** ESE 70Marks CIE 30Marks
Tutorial : ---	**Term work:** 25
Practical: 2 Hrs. /Week	**Practical :**50
Credit:- 4	

Course Objectives: To perceive fundamental concepts of Computer Networks

1. To understand layered architecture and basic networkingprotocols
2. To illustrate the TCP/IP protocol internal details

Course Outcomes:

Upon successful completion of this course, the student will be able to –

1. Demonstrate concepts of ComputerNetworks.
2. Explain OSI and TCP/IP layeredarchitecture
3. Implement network and data linklayer.
4. Demonstrate TCP protocol indetail.
5. To analyze the protocol structure using network analyzingtools.
6. apply the principals of socket programming in thenetworks.

Unit No.	Contents	No. of Lectures
1	**Introduction to Computer Network:** Overview of OSI layer Model and TCP/IP protocol model, Addressing, Underlying technologies for LANs, WANs, and Switched WANs.	05
2	**Data Link Layer** Design issues for Data Link Layers, Framing methods, Error control: detection and correction, Flow control, Elementary Data Link protocols, Sliding window Protocols, Go back n, Selective repeat.	06
3	**Medium Access Control Sub layer:** Static and Dynamic channel allocation, Multiple Access protocols ALHOA, CSMA, Collision Free Protocols, Ethernet: IEEE 802.3, IEEE 802.4, IEEE 802.5 standards, Wireless LANS 802.11 standards	06
4	**Network Layer:** IPv4 Addresses: Classful Addressing Other Issues, Sub-netting and Super netting, Class less Addressing, Delivery, Forwarding and routing; Routing methods: Shortest path, Link state, Distance vector routing and broadcast routing,	06

Congestion control algorithms: Principles, Congestion prevention policies, congestion control in datagram subnet, Load Shedding, Jitter Control.

5	**Internet Protocol:** IPDatagramformat,Fragmentationandreassemblymodels,ARP,RARP,ICMP, IGMP	08
6	**TransportLayer:** The Transport service primitives, UDP:ProcesstoProcesscommunication,UserDatagramFormat,Operationand uses of UDP. TCP: TCP Services and Features, TCP segment format, TCP Connections, Flow and error control in TCP, TCP Timers; Berkeley Sockets: Socket Addresses, Elementary Socket system calls byte ordering and address conversion routines, connectionless iterative server, connection oriented concurrent server, TCP and UDP Client serverPrograms.	08

TEXT BOOKS:

1. TCP/IP protocol suit 4th Ed. – Behrouz A. Forouzen (Tata Mag.Hill)
2. Computer Networks – Andrew S. Tanenbaum(PHI)
3. Unix Network Programming – W. Richard Stevens (PHI)

REFERENCEBOOKS*:*

1. TCP/IP Illustrated, The Protocols, Vol. I – W. Richard Stevens, G. Gabrani (PearsonEducation.)
2. Internetworking with TCP/IP, Vol. I Principles, Protocols, and Architectures – D. E. Comer (PearsonEd.)
3. Internetworking with TCP/IP, Vol. III, Client-Server Programming and Application (2nd Ed.) –D. E. Comer, David L. Stevens (Pearson Ed.)

TERM WORK

1. Study and demo of LAN, WAN and various connecting devices andcomponents
   - List out component and devices required for a std. LAN,WAN
2. Study, design and configuration of IEEE 802.3 Ethernet and IEEE 802.11Wireless
   - LANs (ReferringRFCs)
3. Study of following connectivity test tools with all its options–
4. ifconfig, arp, route,traceroute
5. nmap, netstat,finger
6. Implementing Framingmethods
7. Implementing Elementary data link protocol (Stop & waitprotocol)
8. Implementation of Error detection (CRC)code
9. Implementation of Error detection codes (Hamming)
10. Programs to understand IP addressing, classful & classlessaddressing
11. Implementation of sliding windowprotocol.

12. Implement shortest path routingalgorithm.

13. Programs for connection oriented (TCP) client-server using socketprogramming
14. Programs for connection less (UDP) client-server using socketprogramming
15. Study of network protocol analyzer (Ethereal or Wire-Shark) and understanding packet formats for UDP, TCP, ARP, ICMPprotocols.

INTRUCTIONS FOR PRACTICAL EXAMINATIONS AND TERMWORK:

Term Work: It should consist of 10-12 experiments based on the syllabus and should be implemented by using Socket Programming. The study experiments should consist of some practical work and observations.

S. Y. B. Tech (Computer Science and Engineering) Sem – III

5. Microprocessors (PCC-CS305)

TEACHING SCHEME	EXAMINATION SCHEME
Theory : 03 Hrs / Week	**Theory :** ESE 70Marks CIE 30Marks
Tutorial : ---	**Term work :** 25 marks
Practical :02 Hrs / Week	**Practical :---**
Credits:- 4	

Prerequisite: Fundamental of Electronics and Basic Computer

Course Objectives:

1. To learn the Architecture and Basic Programmingmodel.
2. To give the hands onexperienceof Assembly language programming for 8085 and 8086 Microprocessors
3. Differentiate between Microprocessors and Microcontrollers
4. To differentiate the microprocessorfamily.

Course Outcomes:

Upon successful completion of this course, the student will be able to –

1. Describe the Architecture of 8085 microprocessors andmicrocontroller
2. Classify the 8086 Assembly Instructions set and use in Assembly languagePrograms
3. Explain Programming model's of 8086 microprocessors
4. Classify the 8086 Assembly Instructions set and use in Assembly languagePrograms
5. Understand the higher processor architecture
6. Understand the need for otherMicroprocessors

Unit No.	Contents	No. of Lectures
1	Architecture of 8085 Classification of Instructions, Instruction set of 8085 Introduction to 8051 Micro controllers	06
2	The Microprocessor and its Architecture: a) Internal Microprocessor Architecture b) Real Mode Addressing Addressing Mode: a) data Addressing Mode b) Program Memory Addressing Mode c) Stack memory Addressing mode..	06
3	Data movement Instruction , PUSH and POP , Load Effective Address String Data Transfer Arithmetic Instruction:	06

	a) Addition b) Subtraction c)Comparison d) Multiplication e) Division BCD & ASCII Arithmetic, AssemblerDetails.	
4	Logic & Program ControlInstruction: a) Basic LogicInstruction Shift & Rotate, Jump Group and Procedures Machine Control & Miscellaneous Instructions Basic Interrupt Processing, HardwareInterrupts	06
5	80386Microprocessor: Introduction to 80386 Microprocessor, The Memory System Special 80386 Registers80386 Memory Management , Virtual 8086 Mode Introduction to Protected Mode memory Addressing,Memory Paging Mechanism	09
6	PentiumProMicroprocessor Introduction to Pentium Pro Microprocessor, Internal Structure of the Pentium Pro, The Memory System Multiple Core technology.	06

TEXT BOOKS:

1. The INTEL Microprocessors; Architecture, Programming and Interfacing By Barry B Brey (8th Edition)
2. Microprocessors and Microcontrollers- N.Senthi Kumar, M, Saravanam and SJeevananthan (Oxford UniversityPress)

REFERENCE BOOKS:

7. Microprocessors Architecture, Programming and Application with 8085 by Ramesh Gaonkar 2 The Microcomputer Systems: the 8086.8088 Family By Yu Chenn A. Gibson (PHI Ltd)

List of Laboratory Experiments:

1. To convert different number from decimal to binary, octal to hexadecimal & vice versa &alsostudy of logic gates.
2. Perform hands on experiment using 8085kit.
3. Storing and displaying the content stored at different registers and memorylocation
4. Implementation of 8085 programs involving data transfer and arithmetic instructionset.
5. Implementation of 8085 programs involving logical and bit manipulation instructionset.
6. Implementation of 8086 programs involving branch instruction and machine control instructionset.
7. Implementation of DOS debugsutility.
8. Use of assembler directive and find the count and the sum of even, odd numbers from the givenarray.
9. Implementation of string data transfer instructions and use of Db directive for declaration of 2-Darray
10. Implementation of Dos interrupts to read char from keyboard and display on thescreen.
11. Implementation of basic logic instruction, shift and rotate instruction and BCD and ACSII arithmetic instructions.
12. To study memory management unit of 80386 processor which include address calculation, descriptor and pagingmechanisms.

S. Y. B. Tech (Computer Science and Engineering) Sem – III

6. C Programming (PCC-CS306)

TEACHING SCHEME	EXAMINATION SCHEME
Theory : 3 Hrs / Week	**Theory :**---
Tutorial : ---	**Term work:** 50 marks
Practical: 4 Hrs. / Week	**Practical :** 50marks
Credits:- 5	

Prerequisite: Digital Electronics ,Computer Fundamentals

Course Objectives:

1. To learn concepts of arrays and pointers inC
2. To learn file handling in C
3. To learn memory management inC
4. To learn structures inC

Course Outcomes:

Upon successful completion of this course, the student will be able to –

1. Articulate the principles of procedure oriented problem solving andprogramming.
2. Explain programming fundamentals including statements, control flow andrecursion
3. Able to formulate problems and implement algorithmsinC . .
4. Analyze and use data structures to solve the complexproblemstatements. .
5. Demonstrate file operations using file handling concepts through developingapplications.

Unit No.	Contents	No.of Lectures
1	**Introduction toC:** The Form of a C Program, The Library and Linking, Separate Compilation,Compilinga 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, BlockStatements.	6
2	**Console I/O & Basics of ArrayandStrings.** Console I/O: Reading and Writing Characters, Reading and Writing Strings, Formatted Console I/O, printf(), scanf(), Suppressing Input. Arrays and Strings- Two-Dimensional Arrays, Arrays of Strings, Multidimensional Arrays, Array Initialization, Variable-Length Arrays.	6
3	**Functions:** 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?,	6

Recursion, Function Prototypes, Declaring Variable Length Parameter Lists, The inline Keyword.

4	**Pointers:** 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 withPointers.	6
5	**Structures, Unions, Enumerations, andtypedef :** 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 .	6
6	**File I/O :** FileI/O,StandardCvs.UnixFileI/O,StreamsandFiles,FileSystemBasics,fread() and fwrite(), fseek() and Random-Access I/O, fprintf( ) and fscanf(), The Standard Streams.	6

Instructions for Practical Examinations:

It should consist of minimum 10-12 experiments based on the syllabus and concepts mention below. Students of different batches should implement different programs. Student should perform all experiments using GCC under Linux environment.

TEXT BOOKS:

1. C the Complete Reference by Herbert Schild (Tata McGraw Hill) 4thEdition.
2. The C Programming Language- Brian W. Kernighan, Dennis Ritchie 2ndEdition.

REFERENCE BOOKS:

1. Programming in ANSI C by E.Balaguruswamy.(TataMcGraw Hill)4thEdition.
2. Let Us C By Yashavant P. Kanetkar, 5thEdition.

List of Experiments

1. BranchingStatements
2. Looping
3. Arrays
4. Functions
5. StorageClass.
6. Structures.
7. Implementation ofSTACK.
8. Implementation ofQUEUE.
9. Implementation of LINKEDLIST.
10. Copy Contents of one file to anotherfile.
11. Implementation ofGRAPH.
12. Implementation ofTREE.

S. Y. B. Tech (Computer Science and Engineering) Sem – III

7. SOFT SKILLS (HM-CS307)

TEACHING SCHEME	EXAMINATION SCHEME
Theory : ---	**Theory :---**
Tutorial : ---	**Term work:** 25 Marks
Practical: 2 Hrs. / Week	**Practical :** 25Marks
Credits:- 1	

Prerequisite: English language

Course Objectives:

1. To make the engineering students aware of the importance, the role and the content of soft skills through instruction, knowledge acquisition, demonstration andpractice.
2. To develop and nurture the soft skills of the students through individual andgroup activities.
3. To expose students to right attitudinal and behavioral aspects and to build the same throughactivities
4. To encourage the all round development of students by focusing on softskills.

Course Outcomes:

Upon successful completion of this course, the student will be able to –

1. Effectively communicate through verbal/oral communication and improve thelistening skills
2. Actively participate in group discussion / meetings / interviews and prepare &deliver presentations.
3. Function effectively in multi-disciplinary and heterogeneous teams through the knowledge ofteam work, Inter-personal relationships, conflict management and leadershipquality.

Contents

Unit No	
1	**Understanding Communication Skills:** Verbal Communication - Effective Communication - Active listening – Articulation Paraphrasing – Feedback Non- Verbal Communication- Body Language of self and others
2	**Behavioral Skills /Self Development:** SWOT Analysis, Confidence improvement, values, positive attitude, positive thinking and self esteem.
3	**Leadership and Team Building** Culture and Leadership- Salient Features of Corporate Culture, Leadership Styles,Leadership Trends,Team Building- Team Development Stages, Types of Teams, Attributes of a successful team – Barriers involved
4	**Developing Writing skills** E-mail writing, report writing, resumes writing, practice.

Stress and Time Management

5 Stress in Today's Time- Identify the Stress Source, Signs of Stress, Ways to Cope with Stress.Healthier Ways to Combat Stress, Steps to be taken in the Organizations: Open communication, Time Management, Working towards Your Goals, Smart Work, Prioritize yourTasks

Professional Skill

6 Ethics, Etiquette and Mannerism-All types of Etiquette (at Meetings, Etiquette at Dining. Involuntary Awkward Actions, Public Relations Office(PRO)'s Etiquettes) Technology Etiquette: Phone Etiquette, Email Etiquette, Social Media Etiquette, Video Conferencing Etiquette, InterviewEtiquette.
Dressing Etiquettes: for Interview, offices and social functions.
Ethical Values: Importance of Work Ethics, Problems in the Absence of Work Ethics.

TERM WORK:

1. The instructor shows videos to enhance skills supporting career aspects and discussion about same videos. Multiple set of observations based on videos can be prepared by students.
2. Multiple set of activity based assignments can be prepared to allow multiple skills exposurefor example a group task encouraging discussions, team building,value sharing, leadership and role play all at the same time. Every student must be given adequate opportunity to participate actively in each activity.
3. Each student will write one report based on visit / project / business proposaletc.
4. Faculty may arrange one or more sessions from following: Yoga and Meditation. Stress management, relaxation exercises, and fitness exercises. Time management and personal planningsessions.
5. The student must prepare the journal in the form of report elaborating the activities performed in the lab. Continuous assessment of laboratory work is to be done based on overall performance and lab assignments performance of student. Each lab assignment assessment will assign grade/marks based on parameters with appropriate weightage. Suggested parameters for overall assessment as well as each lab assignment assessment include- timely completion, performance, punctuality, neatness, enthusiasm, participation and contribution in various activities-SWOT analysis, presentations, team activity, event management, group discussion, Group exercises and interpersonal skills and similar otheractivities/assignments.

TEXT BOOKS:

1. Developing Communication Skills by Krishna Mohan and MeeraBanerji;MacMillan India Ltd., Delhi
2. Gajendra Singh Chauhan, Sangeeta Sharma: Soft Skills – An Integrated Approach to Maximize Personality, WILEY INDIA, ISBN:13:9788126556397
3. Essentials of Effective Communication, Ludlow and Panthon; Prentice Hall ofIndia.

REFERENCE BOOKS:

1. Indrajit Bhattacharya, ―An Approach to Communication Skills‖, Delhi, Dhanpat Rai,2008.
2. Seven Spiritual Laws of Success - DeepakChopra
3.Simon Sweeney, ―English for Business Communication‖, Cambridge University Press, ISBN13:978-0521754507.

S. Y. B. Tech (Computer Science and Engineering) Sem – IV

1. Automata Theory(PCC-CS-401)

TEACHING SCHEME	EXAMINATION SCHEME
Theory : 3 Hrs/Week	**Theory :** ESE 70Marks CIE 30Marks
Tutorial : ---	**Term work:** ---
Practical: ---	**Practical :---**
Credits:- 3	

Prerequisite: Basic Mathematical Concepts, Sets, graphs. **Course Objectives:**

1. To introduce students to the mathematical foundations of computation, the theory offormal languages andgrammars
2. To strengthen the students' ability to understand and conduct mathematical proofsfor computations
3. To make the students understand the use of automata theory in Compliers & SystemProgramming.
4. To analyze and design finite automata, pushdown automata, grammars & Turingmachines

Course Outcomes:

Upon successful completion of this course, the student will be able to –

1. Understand basic concepts of Regular Language and Regular Expressions
2. Select appropriate abstract machine to recognize a given formallanguage.
3. Generate complex languages by applying Union, Intersection, Complement, Concatenationand Kleene * operations on simplelanguages.
4. Apply parsing concepts for syntaxanalysis.
5. Be familiar with thinking analytically and intuitively for problem solving situations in relatedareas of theory in computerscience.

Unit No	Contents	No. of Lectures
1	**Regular Languages and Finite Automata** Proofs,RecursiveDefinitions,Regularexpressionsandregularlanguages,Finite Automata,unions,intersection&complementsofregularlanguages,Applications of FA	7
2	**Nondeterminism and Kleene's Theorem** Nondeterministic finite automata, NFA with null transition, Equivalence of FA's, Kleene's Theorem (Part I & Part II), Minimal Finite Automata	6
3	**Context free Grammars** Definition, Union, Concatenation and Kleene *'s of CFLs, Derivation trees and ambiguity, Simplified forms and normal forms	5

4	**Parsing andPushdownAutomata** Definition of Pushdown Automata, Deterministic PDA, Equivalence of CFG's& PDA's, Top down parsing, bottom up parsing.	6
5	**Context free languages** CFL's and non CFL's**,** Pumping Lemma, intersections and complementsof CFLs	5
6	**Turing Machines** Definition,TMaslanguageacceptors,combiningTuringMachines**,**Computing partial function with a TM, Multi-tape TMs, and Universal TM	7

Text Books:

1. Introduction to Languages & the Theory of Computations – John C. Martin (Tata MGHEdition)
2. Discrete Mathematical Structures with applications to Computer Science – J .P. Trembley & R. Manohar (MGH)

Reference Books:

1. Introduction to Automata Theory, Languages and computation – John E. Hopcraft,Raje
2. Motwani, Jeffrey D. Ullman (PearsonEdition)
3. Introduction to theory of Computations – Michael Sipser (ThomsonBooks/Cole)
4. Theory of Computation –VivekKulkarni

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2. Computer Networks-II (PCC-CS-402)

TEACHING SCHEME	EXAMINATION SCHEME
Theory : 3 Hrs/Week	**Theory :** ESE 70Marks CIE 30Marks
Tutorial : ---	**Term work:** 25 marks
Practical: 2 Hrs/Week	**Practical :** 50Marks
Credits:- 4	

Prerequisite: Computer Network-I.

Course Objectives:

1. To understand the Client server model & socketinterface
2. To perceive IPv6 addressing and protocol
3. To explain and learn basic internet technologyprotocols
4. Simulate protocols using softwaretools.

Course Outcomes:

Upon successful completion of this course, the student will be able to –

1. program the client server model usingsockets
2. understand and apply next generation protocol and addressingmodel
3. elaborate the fundamentals of Domain NameSystems
4. apply the concepts of Remote login and FTP in networkapplications
5. learn fundamentals of web, HTTP and e-mail communication protocols.
6. understand multimedia streaming and relevant protocols.

Unit No	Contents	No. of Lectures
1	**Client server model & socket interface:** The Socket Interface, The Client Server model andSoftwaredesign, Concurrent processinginclient-serversoftware,AlgorithmsandissuesinClient-Serverdesign, Multiprotocol Servers, Multiservice Servers, Concurrency in clients, Unix Internet Super server (inetd).	6
2	**Next Generation IPv6 and ICMPv6:** IPV6 addresses, packet format, ICMPV6, Transaction from IPV4 to IPV6	5
3	**BOOTP, DHCP and Domain name system:** Name Space, Domain Name Space, Distribution of name space, and DNS in internet, Resolution, DNS massages, Types of records, Compression examples, and encapsulation. BOOTP, DHCP	6

4	**Remote Login: TELNET and File TransferFTP,TFTP:** Concept, NVT, Embedding, Options & options/sub-option negotiation, controlling the server, Out-of-band signaling, Escape charter, Mode of operation, user interface. **FTP:** Connections, Communication, Command processing, File transfer, User interface, Anonymous FTP, TFTP.	6
5	**Web Applications Service Protocols:** HTTP: Architecture, Web Documents, HTTP Transaction, RequestandResponse, HTTP Headers and Examples, Persistent Vs Non- Persistent HTTP, Proxy servers. **Electronic Mail:** Architecture, User agent, addresses, Delayed delivery, SMTP commands and responses, Mail transfer phases, MIME, POP3	7
6	**Multimedia In Internet:** Streaming stored audio/video, Streaming live audio/video, Realtimeinteractive audio/video, Real Time Transport Protocol (RTP), Real Time Transport Control Protocol (RTCP), Voice Over IP (VoIP), Session Initiation Protocol (SIP)	6

Text Books:

1. TCP/IP Protocol Suite by Behrouz A. Forouzan McGraw-Hill Publication, 4thEdition.
2. Computer Networks by Andrew STanenbaum.

Reference Books:

1. Data Communications and Networking by Behrouz AForouzan
2. Internetworking with TCP/IP by Douglas Comer
3. Computer Networking: A Top-Down Approach by Jim Kurose

Term work:

It should consist of minimum 8 - 10 experiments based on the following guidelines

1. Client program using UDP to connect to well known services (echo, time of the day serviceetc.).
2. Implementing concurrent TCP multiserviceclient/server.
3. Implementing Iterative UDP client/server.
4. Study of following DNS Tools with all its options. nslookup, dig, host,whois.
5. Implement trivial file transfer protocol (TFTP).
6. Configuration of basic services for FTP, HTTP, Telnet etc. on LinuxPlatform
7. Write program to send a mail using SMTP commands and receive a mail using POP3commands.
8. Capturing & Analyzing operation of various application layer protocols using network protocol analyzer. (Wireshark andtcpdump)
9. Study of various streaming multimedia protocols in Internet (Using various audio/video streaming services on theInternet)

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3. Computer Organization and Architecture (PCC-CS-403)

TEACHING SCHEME	EXAMINATION SCHEME
Theory : 3 Hrs/Week	**Theory :** ESE 70Marks CIE 30Marks
Tutorial : ---	**Term work:** ---
Practical: ---	**Practical :---**
Credits:- 3	

Prerequisite: Basic Computer and Microprocessor

Course Objectives:

1. To provide a high-level overview of Computerorganization.
2. To discuss the basic of I/O addressing andaccess.
3. To make the students aware of overall design and architecture of computer and itsorganization.
4. To analyze performance issues in processor and memory design of a digitalcomputer.

Course Outcomes:

Upon successful completion of this course, the student will be able to –

1. recapitulate the history of computer system and the basic concepts of computer architectureand organization.
2. understand the concept of I/Oorganization.
3. apply the different algorithms to perform arithmeticoperations.
4. articulate the design issues in the development ofprocessor.
5. conceptualize instruction levelparallelism.
6. understand the concept of memorytechniques.

Unit No	Contents	No.of Lectures
1	**Computer Evolution andPerformance** Evolution of computer – Mechanical Era: Babbage's Difference Engine, Electronic Era: First generation, IAS Computers, Instruction Set and Instruction Execution, Second generation, Input-Output Operation, Programming Language, Third generationand VLSI Era – IC Circuits, Performance Consideration and Measures, Speed up Techniques, Difference between RICS and CISC.	5
2	**Input and OutputOrganization** Accessing I/O devices, Direct Memory Access (DMA), Buses: SynchronousBusand Asynchronous Bus, Interface Circuits, Standard IO Interface.	6
3	**Arithmetic** Addition and Subtraction of Signed Numbers, Design of fast Adders,Multiplication of Positive numbers , Signed Operand Multiplication, Fast Multiplication, Integer Division, Floating Point Number Operations: IEEE 754 Floating Point Format, Arithmetic Operations	8
4	**The Processing Unit** Some fundamental Concepts, Execution of complete Instruction,Multiplebus	6

	organization, Hardwired control, Micro programmed Control **Pipelining**	
5	Basic Concepts: Role of Cache Memory, Pipeline Performance. DataHazards:Operand Forwarding, Handling Data Hazards in Software and Side Effects and Instruction Hazards: Unconditional Branches and Conditional Branches and Branch Prediction	5
	Computer Memory System	
6	Some Basic Concepts, Types of Memories :ROM and RAM, SemiconductorRAMmemory, Cache Memories: Mapping functions, Replacement Algorithms, Example of Mapping Techniques	6

Text Books:

1. Computer Architecture and Organization-John P Hayes (MGH) 3rd Edition
2. Computer Organization – Carl Hamacher, ZvonkoVranesic and SafwatZaky . Publisher: Tata McGraw Hill. 5th Edition.

Reference Books:

4. Computer Systems Organization & Architecture – John D. Carpinelli (PearsonEducation)
5. http://cse.stanford.edu/class/sophomore-college/projects-00/risc/risccisc/(RISC vs.CISC)
6. http://www.cpu-world.com/sspec/

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4. Operating System I (PCC-CS-404)

TEACHING SCHEME	EXAMINATION SCHEME
Theory : 3 Hrs/Week	**Theory :** ESE 70Marks CIE 30Marks
Tutorial : ---	**Term work:** 25 marks
Practical: 2 Hrs/Week	**Practical :---**
Credits:- 4	

Prerequisite: Computer Network-I.

Course Objectives:

1. To make the students understand basic concepts of operatingsystem
2. To expose the students to various functions of the Operating system and theirusage
3. To give hands on exposure to Linux commands and systemcalls.

Unit No.	Contents	No.of Lectures
1	**Overview of OS** Abstract view of an operating system,Fundamental principles of OS operations, OS interaction with the computer and user programs, Efficiency ,system performance and user service,Batch Processing System, Multiprogramming System, The Time Sharing System, The Real Time Operating System, Distributed operating system, Operation of OS, Operating system with monolithic structure,Virtual machine operating system, Kernel based operating system, Microkernel based operatingsystem	6
2	**Processes, Threads and Synchronization** Processes andprograms,Implementing processes, Threads, Process synchronization, Race condition, Critical Section, Synchronization approaches, Classic process synchronization problems, Semaphores, Monitors	6
3	**Process Scheduling** Scheduling terminology and concepts,Nonpreemptive scheduling policies, Preemptive scheduling policies, Long, Medium and short term scheduling	6
4	**Deadlock** What is deadlock, Deadlock in resourceallocation,Handling Deadlocks : Deadlock Detection and Resolution, Deadlock prevention, Deadlock avoidance	6
5	**Memory Management** Managing the memory hierarchy, Static and Dynamic Memory Allocation, Heap Management, Contiguous Memory Allocation and Non Contiguous Allocation, Segmentation and Segmentation with paging, Virtual memory basics, Demand paging, Page replacementpolicies	6

6	**File systems and I/O systems** Overview of file processing, Filesandfile operations, Fundamental file organizations and access methods, Layers of the Input Output control system, Overview of I/O system	6

Text Books:

1. Operating Systems –A Concept Based approach –Dhananjay M Dhamdhere (TMGH).3rd edition.
2. Operating System Concepts –Abraham Silberschatz, Peter B. Galvin &Grege Gagne(Wiley)

Reference Books:

1. UNIX Concepts and Applications –Sumitabha 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 thesyllabus.
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.
3. Installation of any two operating system usingVmware.

These assignments should be practically conducted during the tutorial sessions.

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5. Software Engineering (PCC-CS-405)

TEACHING SCHEME	EXAMINATION SCHEME
Theory : 3 Hrs/Week	**Theory :** ESE 70Marks CIE 30Marks
Tutorial : ---	**Term work: ---**
Practical: ---	**Practical :---**
Credits:- 3	

Course Objectives:

1. To expose the students to basic concepts & principles of softwareengineering.
2. To make the student aware of the importance of SDLC in their project developmentwork.
3. To expose the students to software testing techniques and software qualitymanagement.

Course Outcomes:

1. Comprehend systematic methodologies of SDLC(Software Development LifeCycle)
2. Discriminate competing and feasible system requirements indicating correct real world problem scope and prepare stepwise system conceptual model using stakeholder analysis and requirementvalidation.
3. Prepare SRS document for aproject
4. Apply software design and developmenttechniques
5. Develop a quality software project through effective team-building, planning, scheduling and risk
6. Understand testing methods at each phase ofSDLC

Unit No.	Contents	No.of Lectures
1	**The software Problem** Cost, Schedule & Quality, Scale and Change, Software Processes: Process & Project, Component Software Processes, Software Development process Models, Project Management Process.	6
2	**Software Requirements Analysis & specification** Value of Good SRS, Requirement Process, Requirements Specification, Other Approaches for Analysis ,Validation	5
3	**Software Planning & Scheduling** Responsibilities of Software Project Manager, Project Planning, Project Scheduling, Project Staffing, People CMM, Risk Management	6
4	**Design** Design Concepts, Function Oriented Design, Object Oriented Design, Detail Design,Verification,Metrics	6

5	**Coding & Testing** Coding & Code Review,Testing, UnitTesting,Black Box ,Testing,White Box Testing, Program Analysis Tools,Integration Testing, System Testing	7
6	**Software Reliability &Quality Management** Reliability,SoftwareQuality,Software Quality Management System, ISO 9000, SEI capability Maturity Model, Six Sigma, Agile Software Development & Extreme Programming, Agile Project Management	6

Text Books:

1. Software Engineering: A precise Approach – Pankaj Jalote (Wiley India) (Unit1,2,4).
2. Fundamentals of Software Engineering – Rajib Mall (3rd Edition)(PHI) (Unit 5,6).
3. Software Engineering by Jan Sommerville (9th Edition) Pearson (Unit 6, 7 &6.8).
4. Software Engineering Principles & Practices by RohitKhuranaITLESL (2nd Edition) Vikas Publishing House Pvt. Ltd. (Unit3).

Reference Books:

1. Software Engineering – Concepts & Practices –Ugrasen Suman (CenageLearning)
2. Software Engineering Fundamentals –Behforooz& Hudson (Oxford: Indian Edition1st)

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6. Object Oriented Programming (PCC-CS406)

TEACHING SCHEME	EXAMINATION SCHEME
Theory : 2 Hrs/Week	**Theory :**---
Tutorial : ---	**Term work:** 50 marks
Practical: 4 Hrs/Week	**Practical :** 50marks
Credits:- 4	

Pre- requisites: Basics Of C Programming Language

Course Objectives:

1. To learn advanced features of the C++ programming language as a continuation of the previouscourse.
2. To learn the characteristics of an object-oriented programming language: data abstractionand information hiding, inheritance, and dynamic binding of the messages to themethods.
3. To learn the basic principles of object-oriented design and software engineering in terms of software reuse and managingcomplexity.
4. To enhance problem solving and programming skills in C++ with extensive programming projects.
5. To become familiar with the LINUX software developmentenvironment.

Course Outcomes:

After the completion of this course, a successful student will be able to do the following:

1) Use the characteristics of an object-oriented programming language in aprogram.
2) Use the basic object-oriented design principles in computer problemsolving.
3) Use the basic principles of software engineering in managing complex softwareproject.
4) Program with advanced features of the C++ programming language.
5) Develop programs in the LINUX programming environment.

Unit No.	Contents	No. of Lectures
1	**Basics of Object Oriented Programming** The Origins of C++,Features of Object Oriented Programming, relations of Classes & Structures, Classes & Objects, Encapsulation, Data Abstraction, Inheritance, Inline Function, Constructor &Destructor ,function overloading & Operator overloading, Static class member, Static Member Function, Scope resolution Operator, Access members Data member & member Function, Defining member functions, Passing Object to Functions, Nested classes, local classes, Friend functions, Friend class	5
2	**Pointers , Arrays, Dynamic allocation Operator** Arrays Of Object, Pointers to Object, THIS pointer, type checking C++ Pointers, Pointers to Derived types, Pointers to Class members Dynamic Allocation Pointers :-New & Delete Operator	3
3	**Functions & Operator Overloading** Functions Overloading, Operator Overloading, Types Of Constructors, Destructors, Operator Overloading Using Friend Function, Unary & Binary Operator Overloading(Arithmetic, Comparison Operator Overloading),Assignment Operator Overloading(=,+=)	4
4	**Inheritance & Virtual Function** Inheritance, Single Inheritance, Types of Derivations, Passing parameters to base ,Multiple Inheritance, Multilevel Inheritance, Hybrid Inheritance ,Hierarchical Inheritance , Virtual function, Calling a Virtual function through a base class reference, Virtual functions are hierarchical, Pure virtual functions, Abstract classes, Early and late binding.	5
5	**Templates & Exception handling** Function Template ,Class Template, Generic Classes ,Generic Functions, Applying Generic Functions Type Name, export keyword Power of Templates Standard Template Library (STL):-STL Container, STL Algorithm, STL iterator. Exception handling :-Exception handling fundamentals, Catching, Throwing ,& Handling Exception, Exception handling options,	5

6	**I/O System Basics,FileI/0** Streams ,File Pointers & Redirections Streams, C++ stream, C++ Predefined stream classes, Formatted I/O, C++ file I/O, manipulators, fstream and the File classes, File operations, namespaces, std namespaces	4

TERM WORK:

- It should consist of minimum 10-12 experiments based on the syllabusand concepts mention below. Students of different batches should implement different programs based on thefollowing guidelines
- Student should perform the Practicals on Linuxplatform

List of Experiments

1. Classes &objects
2. Constructors &destructors
3. Friend function and Friendclass
4. Inline Function, Static data members & memberfunctions,
5. Array, Array of Objects, Pointer to Object, THIS pointer, Dynamic allocation operators (New & Delete)
6. Function overloading, Operator overloading (unary/binary/arithmetic/comparison)
7. Inheritance (multilevel, multiple, hybrid, Hierarchical)
8. Virtual function and Virtual class, early and latebinding
9. Generic function &classes
10. STL
11. ExceptionHandling
12. Filehandling

TEXT BOOKS:

1. The Complete Reference C++ by Herbert Schild(Tata McGraw Hill) 4th Edition andonwards.
2. Object oriented Programming in C++ by Rajesh K.Shukla(Wiley) IndiaEdition

REFERENCE BOOKS:

1 Object-Oriented Programming with C++ by E. Balaguruswamy. (Tata McGraw-Hill) 6th Edition and onwards
2. Object oriented Programming with C++- by SouravSahay (Oxford) 2nd edition

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7. Mini Project (PW-CS407)

TEACHING SCHEME	EXAMINATION SCHEME
Theory : ---	**Theory :**---
Tutorial : ---	**Term work:** 50 marks
Practical: 2 Hrs/Week	**Practical :** 50marks
Credits:- 3	

Pre-requisites: Knowledge of software engineering and C/C++

Course Objectives:

1. To expose the students to solve the real worldproblems.
2. To utilize the techniques. Skills and modern Engineering tools for building theproject.
3. To follow the methods and tasks as per SDOLCApproach

Course Outcomes:

1. Define the problemstatement.
2. Organize, Plan and prepare the detailed projectactivities.
3. Construct Flowchart, System Architecture based on the projectdescription
4. Implement the solution for theirproblem.

Platform: - C, C++

Course Contents/Description:-

The Mini Project should be undertaken preferably by a group of 3-4 students who will jointly work together and implement the project. The Mini Project topic should be based on the any one subject concepts that students have studied for their Academic Year. The group will select the project with the approval of the guide and submit the name of the project with a synopsis of the proposed work not more than 02 to 03 pages. In the Synopsis they have to state Flowchart, Usage of the logic, algorithm, functions and suitable data structure for implementing the solution. They have to implement project using C, C++languages.

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8. ENVIRONMENTAL STUDIES(PCC-CS408)

	TEACHING SCHEME	EXAMINATION SCHEME
	Theory : 2 Hrs/Week	**Term work:**
	Tutorial : 1 Hr/week	**Theory** 100
	Practical:	**Practical :**
	Credits:- 3	