



SHIVAJI UNIVERSITY KOLHAPUR

REVISED SYLLABUS AND STRUCTURE

SECOND YEAR (B. Tech) - CBCS

INFORMATION TECHNOLOGY

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 INFORMATION TECHNOLOGY – CBCS PATTERN

SEMESTER - III																								
Sr. No	Course (Subject Title)	TEACHING SCHEME									EXAMINATION SCHEME													
		THEORY				TUTORIAL			PRACTICAL			THEORY					PRACTICAL			TERM WORK				
		Credits	No. of Lecture	Hours		Credits	No. of Lecture	Hours	Credits	No. of Lecture	Hours	Hours	Mode	Marks	Total Marks	Min	Hours	Max	Min	Hours	Max	Min		
1	BSC-IT301	3	3	3		1	1	1		-	-	-			CIE	30	100	40	As per BOS Guidelines	As per BOS Guidelines	25	10		
2	PCC- IT302	4	4	4		-	-	-		1	2	2			ESE	70								
3	PCC- IT303	3	3	3		-	-	-		-	-	-			CIE	30	100	40						
4	PCC- IT 304	3	3	3		-	-	-		-	-	-			ESE	70								
5	PCC - IT 305	3	3	3		-	-	-		-	-	-			CIE	30	100	40						
6	PCC- IT 306	3	3	3		-	-	-		-	-	-			ESE	70								
7	PW- IT 307	-	-	-		-	-	-		1	2	2			CIE	30	100	40						
	TOTAL	19	19	19		2	2	2		4	8	8			ESE	70								
												500			150			150						
SEMESTER –IV																								
1	PCC- IT 401	3	3	3						1	2	2			CIE	30	100	40	As per BOS Guidelines	As per BOS Guidelines	25	10		
2	PCC- IT402	3	3	3						-	-	-			ESE	70								
3	PCC- IT403	3	3	3		-	-	-						CIE	30	100	40							
4	PCC-IT404	3	3	3		1	1	1						ESE	70									
5	PCC- IT405	3	3	3		-	-	-						CIE	30	100	40							
6	PCC- IT406	2	2	2		-	-	-		2	4	4			ESE			70						
7	PW- IT407									1	2	2						50					20	
8	MC- IT408	2	2	2		-	-	-		1	2	2			CIE	30	100							10 25
						-	-	-		-	-	-			ESE	70								
												600			150			150						
	TOTAL	38	38	38		3	3	3		9	18	18				1100			300			300		

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

Note:

- BSC-IT:** Basic Science Course - Information Technology are compulsory.
- ESC-IT:** Engineering Science Course - Information Technology are compulsory.
- PCC-IT:** Professional Core Course – Information Technology are compulsory.
- MC-EV:** Mandatory Course - Environmental Studies which is compulsory for theory 70 marks and project work 30 marks.

Semester-III

Sl. No	Code No.	Subject	Semester	Credits
1.	BSC-IT301	Statistics & Fuzzy Systems	3	4
2.	PCC- IT302	Digital System and Microprocessor	3	5
3.	PCC- IT303	Data Communication	3	3
4.	PCC- IT304	Fundamentals of Economics and Management	3	3
5.	PCC- IT 305	Discrete Mathematical Structures	3	4
6.	PCC- IT306	Problem solving using C	3	5
7.	PW- IT307	Soft Skills	3	1

Semester -IV

Sl. No	Code No.	Subject	Semester	Credits
1.	PCC- IT401	Computer Network	4	4
2.	PCC-IT402	Computer Organization and Architecture	4	3
3.	PCC-IT403	Data Structures	4	3
4.	PCC-IT404	Theory of computation	4	4
5.	PCC-IT405	Software Engineering	4	3
6.	PCC- IT406	Object Oriented Programming	4	4
7.	PW-IT407	Mini Project	4	1
8.	MC-IT408	Environmental Studies	4	3

S. Y. B.Tech (INFORMATION TECHNOLOGY) Sem – III

BSC-IT301 – STATISTICS AND FUZZY SYSTEMS

	TEACHING SCHEME	EXAMINATION SCHEME
	Theory : 3 Hrs/week	Term work: 25 marks
	Tutorial : 1 Hrs/week	Theory : 100marks
	Practical: --	Practical :--
	Credits:- 4	

Prerequisite: Basic probability theory, Statistics

Course Objectives:

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

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 involving the binomial, Poisson and normal distributions
3. Calculate numerical integration
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 arithmetic operations such as addition, multiplication and fuzzy equation
6. Solve assignment problems by using different techniques of operation research

SECTION – I

Unit No.	Unit Name and Contents	No. of Lectures
1.	Correlation, Regression & Curve Fitting: Introduction, Karl Pearson's Coefficient of Correlation, Lines of regression of bivariate data, Fitting of Curves by method of Least-squares, Fitting of Straight lines, Fitting of exponential curves, Fitting of second degree Parabolic curves	06
2.	Probability Distribution: Random variables, Discrete Probability distribution, Continuous probability distribution, Binomial Distribution, Poisson Distribution, Normal Distribution	06
3.	Numerical Integration: Newton Cotes formulae, Trapezoidal Rule, Simpson's 1/3 rd rule, Simpson's 3/8 th rule, Weddle's Rule	06

SECTION – II

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|----|--|----|
| 4. | Introduction to Fuzzy sets:
Crisp set and Fuzzy set, Basic concepts of fuzzy sets, Basic operations on fuzzy sets, Properties of fuzzy sets | 06 |
| 5. | Fuzzy Arithmetic:
Fuzzy numbers, Fuzzy cardinality, Arithmetic Operations on Fuzzy numbers, Solutions of Fuzzy equations of type $A + X = B$ and $A.X = B$ | 06 |
| 6. | Assignment Problem:
Definition, Balanced and Unbalanced assignment problem, Hungarian Method, Balanced assignment problems, Unbalanced assignment problems | 06 |

S. Y. B.Tech (INFORMATION TECHNOLOGY) Sem – III

PCC-IT302 – DIGITAL SYSTEMS AND MICROPROCESSOR

	TEACHING SCHEME	EXAMINATION SCHEME
	Theory : 4 Hrs/week	Term work: 25 marks
	Tutorial : ---	Theory : 100marks
	Practical: 1 Hrs/week	Practical : 50marks
	Credits:- 5	

Prerequisite: Fundamentals of Electronics and Computers, basic number system.

Course Objectives:

1. To provide knowledge of basic arithmetic and logical operations in digital systems.
2. To design and construction of combinational and sequential circuits.
3. To understand architecture and working of 8 bit & 16 bit microprocessor and peripheral.
4. To learn the assembly language programming.
5. To understand knowledge about working of different instructions using timing diagrams.

Course Outcomes:

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

1. Solve different examples of arithmetic and logical operations on various number systems.
2. Design and demonstrate different sequential and combinational logic design.
3. Summarize the working of 8085 & 8086 microprocessor and peripheral.
4. Design and execute assembly language programs using 8085 instruction set.
5. Distinguish different instructions using timing diagrams.

SECTION – I

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|---|--|----|
| 1 | Fundamental of Digital System:
Analog and digital systems, representation of signed numbers, 2's complement arithmetic, BCD addition & subtraction, octal & Hexadecimal addition and subtraction, Derived gates. | 04 |
| 2 | Boolean algebra & combinational logic design:
Reduction of Boolean expressions, Boolean function representation, expansion of Boolean expression (standard SOP & POS), simplification of Boolean expressions using K-map (up to 5 variable), prime implicants, Adders & Subtractors design using gates, Multiplexer, implementation of expression using MUX, Demultiplexer, decoder (74138), BCD to 7 segment decoder. | 07 |
| 3 | Sequential Logic Design:
Classification, Flip-Flops (S-R, J-K, T, D) using gates, Race around condition Master-Slave J-K Flip Flop, Counters (Asynchronous & Synchronous), Design examples, Shift registers, State transition diagram, excitation table. | 06 |

SECTION – II

4 8085 Microprocessor Architecture & Memory Interfacing:	06
The 8085 MPU, Microprocessor communication and bus timing, De-multiplexing address and Data bus, Generating control signals, The 8085 Architecture , op-code fetch machine cycle, memory read and write machine cycle. Memory interfacing-memory structure, memory interfacing & address decoding.	
5 8085 Programming techniques:	07
8085 instruction groups, addressing modes writing and execution assembly language program, counters & delays, stack, Instruction related to stack execution of CALL and RET, The 8085 interrupt , RST instructions, vectored interrupts, RIM and SIM	
6 Interfacing I/O devices & Introduction 8086:	06
Basic interfacing concepts, peripherals i/o instructions – IN, OUT, I/ O execution, memory mapped I/O, I/O mapped I/O, Architecture of 8086.	

Text Books:

1. Fundamental of Digital Circuits- A. Anand Kumar, 2nd Edition, PHI private Limited. (Chapter 1,2,3)
2. Microprocessor architecture, programming & applications- Ramesh S. Gaonkar, New Age International publication. (Chapter 4,5,6)
3. The Microcomputer systems: The 8086/8088 Family - Yu Cheng Liu , Glenn A. Gibson (PHILtd)

Reference Books:

1. Digital fundamentals -Floyd & Jain, , Pearson education, eighth edition, 2007
2. Digital Design –Morris Mano, Pearson Education
3. Modern Digital Electronics, R.P.Jain, 3rd Edition, Tata McGraw-Hill, 2003
4. Digital systems, principles and applications – Ronald Tocci, Neal S. Widmer, Gregory Moss (Pearson Education) 9 th Edition.
5. Microprocessors and Microcontrollers - N. Senthikumar, M. Saravanan and S.
6. Jeevananthan (Oxford University Press)

Term Work:

Term work should consist of minimum of 10-12 experiments based on following topics.

1. Study of Basic gates.
2. Study of Universal gates.
3. Study of Boolean algebra & De Morgan's theorem using gates.
4. Study of MUX/DEMUX.
5. Study of 74138.
6. Study of R-S and J-K flip-flops
7. Study of counters
8. Interfacing of counters to seven segment display
9. Realization of 4/5 variable K-maps
10. Study of 8085 processor data transfer instructions using timing diagrams.

11. Assembly language programming for 8085 (Arithmetic, Logical and data transfer, interrupts- Minimum 6 programs using kits)
12. Study of 8086.

S. Y. B.Tech (INFORMATION TECHNOLOGY) Sem – III

PCC-IT303 – DATA COMMUNICATION

	TEACHING SCHEME	EXAMINATION SCHEME
	Theory: 3 Hrs/Week	Term work: --
	Tutorial: --	Theory: 100 marks
	Practical: --	Practical :--
	Credits:- 4	

Prerequisite: Basic Knowledge of Computer Fundamentals

Course Objectives:

1. To understand fundamentals of Data communication and Networking.
2. To learn Data Encoding techniques used in during Data Transmission.
3. To study layered architecture of OSI & TCP/IP reference model.
4. To gain knowledge of multiplexing and switching techniques used for bandwidth utilization.
5. To study basic components & devices used in Data communications system

Course Outcomes:

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

1. Explain the basic concepts and components of Data communications system.
2. Understand Data Encoding techniques.
3. Compare various multiplexing & spreading techniques.
4. Understand responsibilities of each layers in OSI model.
5. Study and understand protocols used at each layer in TCP/IP reference model.
6. Get familiar with hardware components required to build network.

SECTION – I

1 Introduction:

1. Data Communications-Definition, Components, Data representation, Data Flow.
2. Networks- Definition, Uses, Physical Structures, Types of Networks.
3. Protocols and Standards.

05

2 Data & Signals:

1. Data and Signals- Analog and Digital, Periodic and Non-periodic signals.
2. Transmission Impairments-Attenuation, Distortion, Noise.
3. Data Rate Limits-Nyquist Bit Rate, Shannon Capacity.
4. Performance-Bandwidth, Throughput, Latency, Jitter.

05

3 Digital & Analog Transmission:

1. Digital-To-Digital Conversion- Line coding (Unipolar, Polar, Bipolar), Block coding, scrambling.
2. Analog-to-Digital conversion – Pulse code modulation, delta modulation.
3. Transmission Modes- Parallel and Serial;

08

4. Digital-to-Analog conversion – ASK, FSK, PSK;
5. Analog-to-Analog conversion – AM, FM, PM.

SECTION – II

4 Bandwidth Utilization:

1. Multiplexing-FDM, WDM, TDM;
2. Spread Spectrum – Frequency Hopping Spread Spectrum (FHSS), Direct Sequence Spread Spectrum (DSSS);
3. Switching – Circuit switched, Packet switched, Message switched. 06

5 Network Models:

1. Layered architecture,
2. The OSI model- Layers in the OSI Model,
3. TCP/IP protocol suite,
4. Network Addressing – Physical, Logical, and Port. 05

6 Network Hardware Components:

1. Transmission Media-Guided (Twisted pair, Coaxial, OFC) and Unguided (Propagation Modes, Radio Waves, Microwave, Infrared)
2. Connecting Devices – NIC, Repeaters, Hub, Switches, Bridges, Routers, Gateways. 07

TEXT BOOKS :

1. Data Communications and Networking – Behrouz A. Forouzan ,4th Edition, TMGH.

REFERENCE BOOKS :

1. Data and Computer Communications – Williams Stallings ,5th Edition, PHI.
2. Computer Networks – A. S. Tanenbaum.,3rd Edition, PHI.
3. TCP/IP Protocol Suite Networking – Behrouz A. Forouzan ,4th Edition, TMGH.

S. Y. B.Tech (INFORMATION TECHNOLOGY) Sem –III

PCC-IT304 – FUNDAMENTALS OF ECONOMICS ANDMANAGEMENT

	TEACHING SCHEME	EXAMINATION SCHEME
	Theory : 3 Hrs/Week	Term work:
	Tutorial :	Theory : 100marks
	Practical:	Practical :
	Credits:- 3	

Prerequisite: --

Course Objectives:

To provide knowledge of following,

1. The fundamentals of economics and its application
2. The basics of cost concepts
3. The importance of market
4. The principles of management
5. The basic financial concepts

Course Outcomes:

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

1. Explain basic economics concepts
2. Describe different management related activities for business enhancement
3. Explain basic costing and marketing policies

Unit 1.Introduction to Economics

(8)

Definitions, Scope of Economics (Macro, Micro, International Industrial, Environmental, Public Finance, Managerial economics etc.) Managerial Economics meaning definition and decision making process. Basic terms in Economics: Economic Resources, firm - type of firms, goods, services, utility, value & wealth.

Unit 2 Demand and Supply Analysis

(6)

Meaning of Demand - types, determinants, demand function, law of Demand, and elasticity of demand supply - determinants, supply function and elasticity of supply.

Unit 3 Basic Cost Concepts

(6)

Production function, Law of variable proportions, Returns to scale, production optimization and uses of production function. Cost Concepts -Types - Short run and long run costs -(total, fixed, variable, marginal Average and opportunity cost)

Unit 4.Markets

(4)

Meaning of market – Types of Market-Perfect competition, Monopoly, oligopoly and monopolistic competition

Unit 5. Principles of management

(8)

Nature and importance of management, levels of management, fundamental managerial skills,

functions of management, Henry Fayol's principles of management, motivation theory: X and Y

Unit 6. Basic Financial concepts (8)

Basic concept of :- Business, Capital, Assets, Liabilities, interest, Profit & Loss, Balance Sheet and related concept Profit & Loss Statement and related concepts.

Text Books:

1. Managerial Economics by Geetika, Payalii Ghosh, Puraba Roy Choudhury Publisher The Tata McGraw-Hill companies, New Delhi 2008 (units 1 to 4)
2. Essential of management by Harold Koontz and Heinz, Weihrich- Tata McGraw Hill for Principles of management (unit-5)
3. "Basic Financial Accounting For Management" by Paresh Shah Publisher- Oxford University Press New Delhi-2007 (unit-6)

Reference Books:

1. Fundamentals of Engineering Economics by Pravin Kumar , Wiley India Ltd.

S. Y. B.Tech (INFORMATION TECHNOLOGY) Sem – III

PCC-IT305 – DISCRETE MATHEMATICAL STRUCTURE

	TEACHING SCHEME	EXAMINATION SCHEME
	Theory: 3 Hrs/Week	Term work: 25 marks
	Tutorial: 1 Hrs/Wek	Theory: 100 marks
	Practical: --	Practical :--
	Credits:- 4	

Prerequisite: Knowledge of basic mathematical concept

Course Objectives:

1. To develop mathematical logic and its applications.
2. To provide knowledge on sets, relations and functions.
3. To provide knowledge on algebraic systems and its applications
4. To provide knowledge on graph theory and its applications

Course Outcomes:

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

1. Understand mathematical logic, truth tables and its applications.
2. Discuss the basic principles of sets and operations in sets.
3. Demonstrate an understanding of relations and functions and be able to determine their properties
4. Determine basic terminologies of groups, graphs and its applications.
5. Implement the knowledge of logical reasoning to solve variety of problems
6. Acquire ability to describe computer programs in a formal mathematical manner and become efficient to face GATE and other competitive exams.

SECTION – I

- | | | |
|----------|---|-----------|
| 1 | Mathematical Logic:
Statement and Notation, logical connectives, truth tables, tautologies, principle of duality, well formed formulas, logical equivalences, Inference of Theory for statement Calculus. | 06 |
| 2 | Sets:
Set, Different of types of sets, Operations on sets, Venn Diagrams, Ordered Pairs, Cartesian product of two sets, Principle of Inclusion and exclusion. | 06 |
| 3 | Relations:
Definition, types of relation, composition of relations, domain and range of a relation, Equivalence Relations and partitioning, Partial ordering relations, Hasse Diagrams, Introduction to Lattices. | 06 |

SECTION – II

4	Function: Definition and types of function, composition of functions, recursively defined functions.	06
5	Groups: Algebraic Systems, Semi Groups, Groups, Monoid, Abelian Groups, subgroups, Isomorphism and Automorphisms, Homomorphism and Normal Subgroups.	06
6	Graph Theory: Basic Terminology, Multi graph and weighted graphs, Diagraphs and relations, Representation of graphs, Paths and circuits, Eulerian and Hamiltonian Paths and Circuits, Graph Coloring.	06

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|--|-----------|
| 1. consist of minimum 06-08 assignments based on above subjects and GATE Papers. | It should |
|--|-----------|

TEXTBOOKS:

- | | |
|---|-------------|
| 1. Mathematical Structures with Application to Computer Science - J. P. Tremblay & R. Manohar, MGH International Edition. | Discrete |
| 2. Discrete Mathematics- C. L. Liu and D. P. Mohapatra, 4th Edition McGraw-Hill. | Elements of |

REFERENCE BOOKS:

- | | |
|---|----------|
| 1. Mathematics – Seymour Lipschutz, Marc Lipson (MGH), Schaum's Outline Series. | Discrete |
| 2. mathematics and its applications - Kenneth H. Rosen (AT&T Bell Labs). | Discrete |
| 3. Mathematics With Proof, 2nd Ed, ERIC GOSSETT, Wiley India Ltd. | Discrete |

S. Y. B.Tech (INFORMATION TECHNOLOGY) Sem – III

PCC-IT306 – PROBLEM SOLVING USING C

	TEACHING SCHEME	EXAMINATION SCHEME
	Theory : 3 Hrs/Week	Term work: 50 marks
	Tutorial :	Theory :
	Practical: 2 Hrs/Week	Practical : 50marks
	Credits:- 5	

Prerequisite: Basic knowledge of Electronics and Computers

Course Objectives:

1. To understand C programming environment
2. To develop problem solving skills amongst the students.
3. To write, compile and debug programs in C language.
4. Implement C programs for various problem statements.

Course Outcomes:

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

1. Illustrate flowchart and algorithm to the given problem
2. Understand basic Structure of the C-PROGRAMMING, declaration and usage of variables
3. Write C programs using operators
4. Exercise conditional and iterative statements to Write C programs
5. Write C programs using Pointers to access arrays, strings and functions.

SECTION – I

1	Unit 1. Introduction to Programming and Problem Solving The meaning of algorithms, Flowcharts, Pseudo codes, Writing algorithms and drawing flowcharts for simple exercises, Memory concepts, C Program development environment, Types of problems, problems solving with computers, difficulties with problem solving, Problem Solving Aspects, Problem Solving Concepts for computer, Programming Concepts – communicating with computers, organizing the problem, using the tools, Top down design	6
2	Unit 2. Introduction to ‘C’ Language Importance of ‘C’ Language, Sample ‘C’ Program, Structure of ‘C’ Program, Constants, variables and data types. Operators and expressions, Managing input / output operations, Control statements.	6
3	Unit 3. Functions: Need for user defined functions, elements of User defined functions, defining functions, return values and their types, function calls, function declaration, methods of parameter passing, user defined and library functions.	6

SECTION – II

4	Unit 4. Arrays and Strings The meaning of an array, one dimensional and two dimensional arrays, declaration and initialization of arrays, reading , writing and manipulation of above types of arrays, multidimensional arrays. Declaring and initialing string variables, reading string from terminal, writing string to screen, arithmetic operations on characters, putting strings together, comparison of two strings, string handling functions	8
5	Unit 5. Structures and Pointers Defining a structure, declaring structure variables, accessing structure members, structure initialization, copying and comparing structure variables, operations on individual members, array of structures, structures and functions, Unions. Understanding pointers, accessing the address space of a variable, declaring and initialization pointer variables, accessing a variable through its pointer, pointer expressions, pointers and arrays, pointer and characterstrings	8
6	Unit 5. Structures and Pointers Defining a structure, declaring structure variables, accessing structure members, structure initialization, copying and comparing structure variables, operations on individual members, array of structures, structures and functions, Unions. Understanding pointers, accessing the address space of a variable, declaring and initialization pointer variables, accessing a variable through its pointer, pointer expressions, pointers and arrays, pointer and characterstrings	6

Text Books :

1. Programming And Problem Solving Using C Language, ISRD Group, McGraw-Hill Publications
2. How to Solve it by Computer, R G Dromey ISBN978-81-317-0562-9, Pearson.
3. C How to Program, Harvey M. Deitel , Paul J. Deitel, Abbey Deitel, Pearson Publication.

Reference Books:

1. The ‘C’ Programming Language, By B.W. Kernighan and D. M. Ritchie, Pearson Education.
2. C Programming Laboratory : Handbook for Beginners by Sidnal, Wiley India Limited.
3. <http://www.spoken-tutorial.org/NMEICT> Project of Govt. Of India.

Term Work:

It should consist of minimum of 15-18 experiments based on the following topics:

1. Simple Programs using basic datatypes, scanf, printf, format specifiers
2. Programs using conditional control statements if-else, Switch-case
3. Programs using looping constructs while, do-while, for

4. Programs on Finding biggest of threenumbers
5. Programs to find roots of given quadratic equation
6. Programs to find the biggest and smallest of given set of numbers
7. Programs Exchanging values of two variables
8. Programs Counting, summation of set of numbers
9. Programs factorial computation
10. Programs sine function computation
11. Programs Fibonacci series
12. Programs reverse of digit
13. Programs BCD conversion
14. Programs Char to number conversion
15. Programs Factoring methods - Square root of number, smallest divisor, GCD of two number
16. Programs prime number, prime factors of integer
17. Programs pseudo random number generation, raising the number to a large power
18. Programs Matrix operations (addition, multiplication, transpose etc.)
19. Programs String operations and manipulation (finding length, reverse, change case etc.)
20. Programs Demonstrate structures

S. Y. B.Tech (INFORMATION TECHNOLOGY) Sem – III

PCC-IT307 – SOFT SKILLS

	TEACHING SCHEME	EXAMINATION SCHEME
	Lecture : --	Term work: 25
	Tutorial :--	Theory :--
	Practical: 1 Hrs/Week	Practical :50
	Credits:- 1	

Prerequisite: English Communication

Course Objectives:

1. Introduce students to professional verbal and written communication
2. Introduce students to team work and self enhancement.

Course Outcomes:

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

1. Enhance the communications skills of the students.
2. Expose the students to basic skills of teamwork
3. Inculcate the writing skills necessary for business communications.

Unit 1.	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 2.	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 3.	Writing Introduction to writing, Hallmark of good writing, Writing conventions, business writing, writing a notice, writing styles, e-mail writing, report writing, practice.

Books:

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

S. Y. B.Tech (INFORMATION TECHNOLOGY) Sem – IV

PCC-IT401 – COMPUTER NETWORK

	TEACHING SCHEME	EXAMINATION SCHEME
	Theory: 3 Hrs/Week	Term work: 25 marks
	Tutorial: --	Theory: 100 marks
	Practical: 1 Hrs/Week	Practical : 50marks
	Credits:- 4	

Prerequisite: Data Communication

Course Objectives:

To provide knowledge about local area networks, types of computer networks.

2. To understand computer network protocols and wireless protocols.
3. To understand functionalities of different layers
4. To provide knowledge about internet layer protocol.
5. To provide knowledge about routing protocol and functionality of application layer

Course Outcomes:

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

1. Explain functions of data link layer
2. Describe network layer of OSI model
3. Explain transport layer with its functionality
4. Explain application layer of OSI model.

SECTION – I

1	Introduction Data Link Layer: Introduction; Goal of Data Link Layer: Design issues of Data Link Layer; Services provided to the Network layer, Framing, Error control, Flow control, Error Detection and correction	06
2	Data Link Layer: Elementary data link protocols- Simplex, Stop & Wait, and Simplex for noisy channel. Sliding window protocols – 1-bit, go back n, selective repeat, Channel allocation- static, dynamic	06
3	Data Link Layer protocols: Network Layer Design Issues, Routing Algorithms: Shortest Path, Flooding, Distance Vector and Link State	05

SECTION – II

4	Network Layer IPv4 Addresses: Introduction, Classful and Classless Addressing, Special	06
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	Addresses, Network, transaction from IPv4 to IPv6, IPv6 Addresses, packet format, ICMPv6	
5	Transport Layer The Transport service primitives, UDP: Process to Process communication, User Datagram Format, Operation and uses of UDP, TCP: TCP Services and Features, TCP segment format, TCP Connections, Flow and error control in TCP, Berkeley Sockets: Socket Addresses, Elementary Socket system calls byte ordering	07
6	Routing Protocols and Application Layer: Application Layer : DNS, Electronic Mail, Telnet, FTP, HTTP.	06

TERM WORK:

1. It should consist of minimum 06-08 assignments based on above subjects.

TEXT BOOKS:

1. Computer Networks , A. S. Tenebaum., 3rd Edition, PHI.
2. TCP/IP protocol suite , B A Forouzan, TMGH.
3. Computer Networks: Principles , Technologies and Protocols for Network Design by olifer, Wiley India Ltd.

REFERENCE BOOKS:

1. Unix Network Programming , W Richard Stevens, PHI

S. Y. B.Tech (INFORMATION TECHNOLOGY) Sem – III

PCC-IT402 – COMPUTER ORGANIZATION AND ARCHITECTURE

	TEACHING SCHEME	EXAMINATION SCHEME
	Theory : 3 Hrs/Week	Term work: --
	Tutorial : --	Theory : 100marks
	Practical: --	Practical :--
	Credits:-3	

Prerequisite: Concepts of digital system and Microprocessors

Course Objectives:

- To introduce student the different component of CPU and their interactions.
- To design digital circuit for arithmetic operation.
- To explain CPU design and memory organization

Course Outcomes:

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

- To understand the structure, function and characteristics of components of computer.
- To examine the design at gate, register and processor level.
- To understand various processor architectures and data representation.
- To apply algorithm to perform operation like multiplication and division.
- To illustrate control unit.
- To study memory organization.

• SECTION –I

- 1 Unit 1.Computing and Computers:** 5
Elements of computers: The brain versus the computer, Limitations of computers: unsolvable problems, speed limitations, The Evolution of computers: IAS Computers, IBM/360 computers, A typical personal computer system
- 2 Unit 2.Design Methodology** 7
System Design: System Representation, Design Process: **The Gate level:** Combinational logic: Full Adder, Four bit ripple carry adder, Sequential logic: serial adder, 4- bit stream serial adder, **The Register level:** Register level components- Word Gates, Multiplexers to implement a full adder, Arithmetic Elements: Design of 4-bit magnitude comparator , **Processor level design:** prototype structure, performance measurement
- 3 Unit 3. Processor Basics:** 6
CPU Organization: Fundamentals, design and architecture of a small accumulator based CPU, A typical CPU with general register organization, pipelining, RISC & CISC Machines
Data representation: Fixed- Point Numbers, Floating Point Number, Instruction Set: Instruction Formats, Addressing Modes, Instruction Types.

SECTION – II

4	Unit 4. Datapath Design Addition-subtraction-High speed adders A 4-bit carry-lookahead adder, Design of a complete twos-complement adder-subtractor, Multiplication: twos-complement multiplier, Booths multiplication algorithm, Division: Non-restoring division algorithm for unsigned integers.	7
5	.Unit 5. Control Design Hardwired Control-Design of GCD processor, Design Examples: Multiplier Control, CPU control unit: Hardwired control unit for accumulator based CPU	5
6	Memory Technology: Memory device Characteristics, Random access memories, Serial-Access Memories, Multilevel memories- General characteristic, Memory allocation, Caches: Cache organization, Cache read and write operation.	6

Text books:

Computer Architecture & Organization, J. P. Hayes. McGraw-Hill.

Reference books:

- Computer Organization- HamacherZaky.McGraw-Hill.
- Computer Architecture & Organization An Integrated Approach , Miles Murdocca,Vincent Heuring Wiley IndiaEdition
- Computer Architecture and organization: An integrated Approach by Murdacca,WileyIndia Limited.
- NPTEL Video Lectures<http://nptel.ac.in>

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PCC-IT403 – DATA STRUCTURE

	TEACHING SCHEME	EXAMINATION SCHEME
	Theory: 3 Hrs/Week	Term work: --
	Tutorial: --	Theory: 100 marks
	Practical: --	Practical :--
	Credits:- 3	

Prerequisite: Computer Programming

Course Objectives:

1. To learn basic concepts of C language.
2. To become familiar with advanced data structures such as Stacks, Queues, Trees etc.
3. To analyze and solve problems using advanced data structures such as Lists, Linked Lists, Queues, Stacks, Trees, and Graphs.
4. To write programs on Linked Lists, Doubly Linked Lists, Trees etc.

Course Outcomes:

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

1. Define the basic terms of Linear Lists, Linked List, Doubly Linked List, Non Linear Data Structures (Binary Trees, AVL Trees, Graphs)
2. Choose the appropriate and optimal data structure for a specified Application
3. Analyze Time Complexity and Memory Complexity of different Algorithms
4. Write programs and applications with Static and Dynamic data structures

SECTION – I

Unit no.	Chapter Name	
1.	Algorithm Basics and Recursion Algorithms, Its Pseudo code Representation , Abstract Data type, Data Structures, Algorithm Efficiency, Recursion, Towers of Hanoi and Ackermann's function, etc.	05
2.	Sequential Representation of Linear Data Structures Stack, Operations on Stack, Applications of Stack, Queue, Operations on Queue, Applications of Queue, Circular queue, Priority Queues	06
3.	Linked Lists Limitations of static memory allocation, Dynamic memory allocation Definition, representation, implementation and operations on singly, doubly and circular linked lists, stack and queue implementation using linked list	07

SECTION – II

4.	Nonlinear Data Structures : (TREES) Basic terminology, representation, binary tree, traversal methods, binary search tree, AVL search tree, B tree, B+ tree ,Heaps and its operations	05
5.	Non Linear Data Structures (Graphs) Concepts and terminology of graph, Representation of graph using adjacency matrix, storage representation ,Graph traversal Techniques- Depth first and Breath first search	05
6.	Searching and Sorting Techniques Need of sorting and searching, Sequential Search, Binary Search, Analysis of Searching Techniques (Best, Average and worst case)., Hashing Techniques, Types of Hash Functions, Collision resolution techniques, open and closed hashing, Bubble sort, insertion sort, selection sort, heap sort, Merge sort, quick sort, Analysis of Sorting Techniques (Best, Average and worst case).	08

TEXT BOOKS :

- 1.Data Structure using C- A. M. Tanenbaum, Y. Langsam, M. J. Augenstein(PHI)
2. Data Structures- A Pseudo code Approach with C – Richard F. Gilberg and Behrouz A. Forouzon, Cengage Learning, SecondEdition.
3. Schaum’s Outlines Data Structures – Seymour Lipschutz (MGH), TataMcGraw-Hill.

REFERENCE BOOKS :

1. Fundamentals of Data Structures – Horowitz, Sahni CBSIndia
- 2.An introduction to data structures with Applications- Jean-Paul Tremblay,Paul.G. Soresan, Tata Mc-Graw Hill International Editions, SecondEdition.

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PCC-IT404 – THEORY OF COMPUTATION

	TEACHING SCHEME	EXAMINATION SCHEME
	Theory :3 Hrs/Week	Term work: 25
	Tutorial : 1 Hrs/Week	Theory 100
	Practical: --	Practical :
	Credits:- 4	

Prerequisite: Knowledge of discrete mathematical structures

Course Objectives:

1. To introduce fundamentals of computermathematics.
2. To strengthen the students' ability to carry out formal and higher studies in computerscience.
3. To explain Grammar, Languages and their relationships.
4. To develop Automata design ability as language descriptors andrecognizers

Course Outcomes:

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

1. To expose the students to the mathematical foundations and principles of computerscience.
2. To make the students understand the use of automata theory in Compilers & Systemprogramming.
3. To make the student aware of mathematical tools, formal methods & automata techniques tocomputing.
4. Face the successfully to the GATE as well as competitive exams.
5. Understand the fundamental mathematical, logical, statistical and scientific principles underlying computing and informationprocessing.

SECTION – I

Unit No.1 : RegularLanguages:

(6)

Recursive Definitions, Definition & types of grammars & languages, Regular expressions and corresponding regular languages, examples and applications, unions, intersection & complements of regular languages.

Unit No.2: FiniteState Machines:

(6)

Deterministic finite automata (DFA) definition and representation, Nondeterministic finite automata (NFA), NFA with ϵ transitions, Equivalence of DFAs, NFAs and NFA- ϵ s, minimum state FA for a regular language, minimizing number of states in an FA.

Unit No.3: GrammarsandLanguages:

(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.

SECTION – II

Unit No.4: PushDownAutomata:

(6)

Definition, The Language of PDA, Deterministic PDA and Non Deterministic PDA, Acceptance by Final state and empty stack, Equivalence of PDA's and CFG- CFG to PDA, PDA to CFG

Unit No.5: Parsing And Properties of CFL's:

(6)

Parsing – Top-Down, Recursive Descent and Bottom-Up Parsing,
Pumping lemma for Context free language, intersection and complement of Context free language

Unit No.6: Turing Machines:

(6)

Models of computation, definition of Turing Machine as Language acceptors, combining Turing Machines, Computing a function with a TM, Turing machines with doubly-infinite tapes, more than one tape, Non-deterministic TM and Universal TM.

1. **TERM WORK:**

1. It should consist of minimum 06 to 08 tutorials based on the topics of the syllabus and exercise problems mentioned in the textbooks.

2. **TEXT BOOKS:**

1. Introduction to languages & Theory of computations – John C. Martin (MGH)
2. Discrete Mathematical Structures with applications to Computer Science J.P. Trembley & R. Manohar (MGH)

3. **REFERENCE BOOKS:**

1. Introduction to Automata Theory, Languages and computation—John E. Hopcraft, Rajeev Motwani, Jeffrey D. Ullman (Pearson Edition).
2. Introduction to theory of Computations—Michael Sipser (Thomson Books/Cole)
3. Theory Of Computation- Vivek Kulkarni, 1st edition OXFORD university Press

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PCC-IT405 – SOFTWARE ENGINEERING

	TEACHING SCHEME	EXAMINATION SCHEME
	Theory : 3 Hrs/Week	Term work: --
	Tutorial : --	Theory : 100marks
	Practical: --	Practical :--
	Credits:- 3	

Prerequisite: Computer Programming

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:

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

1. Describe basic concepts of softwareengineering
2. Explain phases of software development life cycle indetail
3. Explain software reliability and quality management.

1	The software problems 1.1 cost, schedule &Quality 1.2 Scale and change 1.3 Software Processes: Process & Project, Component SoftwareProcesses, Software Development process Modules, Project ManagementProcess.	06
2	Requirement analysis and specification: 2.1 Requirements gathering &Analysis 2.2 Software Requirements Specifications 2.3 Formal System DevelopmentTechniques	05
3	Software planning and scheduling: 3.1 Responsibilities of Software ProjectManager 3.2 ProjectPlanning 3.3 ProjectScheduling 3.4 ProjectStaffing 3.5 PeopleCMM 3.6 RiskManagement	06
4	Design 4.1 DesignConcepts 4.2 Function OrientedDesign 4.3 Object OrientedDesign 4.4 DetailDesign 4.5 Verification	06

	4.6 Metrics	
5	Coding and testing 5.1 Coding & CodeReview 5.2 Testing 5.3 UnitTesting 5.4 Black BoxTesting 5.5 White BoxTesting 5.6 Program AnalysisTools 5.7 IntegrationTesting 5.8 SystemTesting	07
6	Software reliability and quality assurance 6.1 Reliability 6.2 Software Quality 6.3 Software Quality Management System 6.4 ISO 9000 6.5 SEI capability MaturityModel 6.6 SixSigma 6.7 Agile software Development & Extreme Programming 6.8 Agile ProjectManagement	06

Text book:

- 1) Software Engineering : A precise Approach - Pankaj Jalote (Wiley India) (Unit 1,4).
- 2) Fundamentals of Software Engineering - Rapti 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 RohitKhuranaITLESL (2ndEdition) Vikas Publishing House Pvt. Ltd. (Unit3).

References:-

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

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PCC-IT406 – OBJECT ORIENTED PROGRAMMING

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

Prerequisite: Problem solving using C

Course Objectives:

1. Limitations of Procedural programming and Benefits of Object Oriented Programming
2. OOPs concepts like Class, Objects, Data hiding, Data Encapsulation, Data Abstraction, Inheritance and polymorphism and their implementation using C++
3. File handling using object oriented concepts
4. Advanced features like Generic programming using Templates, STL and Exception Handling

Course Outcomes:

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

1. To understand the basic object oriented concepts.
2. To understand variables, pointer in CPP.
3. To implement types of inheritance
4. To understand file handling.

SECTION – I

1	Unit1.Introduction to Object Oriented Programming: Introduction to procedural, object-oriented programming, Limitations of procedural programming, Need of object-oriented programming, fundamentals of object-oriented programming: objects, classes, data members, methods, messages, data encapsulation, data abstraction and information hiding, inheritance, polymorphism.	5
2	Unit 2.Basics of C++ programming: Variable declarations, global scope, const variables, reference variables, function prototypes, functions with default arguments, call by value, call by reference, returning by reference, call by pointer, inline functions, constant arguments, 'cin', 'cout', formatting and I/O manipulators, Classes and Objects defining Class, data members, member functions, Access specifiers – public, private, protected, constructor, destructor, array of objects, passing objects to functions, returning object.	7
3	Unit 3. Inheritance: Need of Inheritance, Concept, public, private, protected inheritance, Single inheritance, Multiple and multilevel inheritance, Hybrid Inheritance, Virtual base class, overriding of member functions, static variable, static function, friend function, friend class.	6

SECTION – II

4	Unit 4. Polymorphism: Pointers basics of memory management, New and delete operators, Pointer to object, Pointer to data members, this pointer. Need of Polymorphism, concept, Compile time polymorphism or early binding: function over loading and operator overloading, operator overloading using member function and friend function, overloading - unary, binary, arithmetic operators, relational operators, Overloading new and delete operators, insertion and extraction operators, Run time polymorphism or late binding using Virtual function, pure virtual function, Abstract class, Type conversion	7
5	.Unit 5. Files and Streams: Concept of Streams, concept of File, opening and closing a file, detecting end-of-file, file modes, file pointer, reading and writing characters, strings and objects to the file, operations to move file pointers i.e.seekg, seekp, tellg, tellp.	5
6	Unit 6. Advanced C++ features: Introduction to Generic Programming using Templates: Function template and class template, Introduction to Standard Template Library (STL), containers, iterators and algorithms, study of container template classes for vectors and stacks and related algorithms Exception handling: Introduction, syntax for exception handling code: try-catch-throw, Multiple Exceptions, Exceptions with arguments.	6

TERM WORK :

It should comprise detailed documentation on the below 10-12 experiments. Students in batches should implement programs based on the following topics preferably on Linux platform.

INTRUCTIONS FOR PRACTICAL EXAMINATIONS :

- 1 Implementation of Inline functions, functions with default arguments, referenceparameters
- 2 Implementation of Class Objects, Constructor, destructor, constructoroverloading
- 3 Implementation of Functions overloading
- 4 Implementation of Operatoroverloading
- 5 Implementation of Multiple and multilevel inheritance using virtual baseclass
- 6 Implementation of Virtualfunction
- 7 Implementation of Static variable, Staticfunctions
- 8 Demonstration of Pointers- new, delete operators
- 9 Implementation of Friend function, friend class
- 10 Implementation of class and functionTemplates

- 11 Implementation of Exception Handling
- 12 Implementation of File Handling using OOP concepts
- 13 Demonstration of STL in C++

TEXT BOOKS :

- 1. C++: The Complete Reference Fourth Edition -Herbert Schildt(McGraw-Hill)
- 2. C++ programming: From Problem Analysis to Program Design Fifth Edition -D.S. Malik(Cengage Learning)
- 3. C++ Programming with language –Bjarne Stroustrup (AT &T)

REFERENCE BOOKS:

- 1. Object Oriented Programming with C++ Fourth Edition-E Balguruswamy(McGraw-Hill)
- 2. Object oriented Programming in C++ 3rd Edition-R.Lafore (Galgotia Publications)
- 3. C++ programming –John Thomas Berry(PHI)
- 4. Object –Oriented Analysis & Design: Understanding System Development with UML 2.0 ,Docherty, Wiley India Ltd.
- 5. <http://www.spoken-tutorial.org/NMEICT> Project of Govt. Of India. Computer Architecture and organization: An integrated Approach by Murdacca, Wiley India Limited.

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PCC-IT407 – MINI PROJECT

	TEACHING SCHEME	EXAMINATION SCHEME
	Theory : --	Term work: 50 marks
	Tutorial : --	Theory :--
	Practical: 2 Hrs/Week	Practical : 50marks
	Credits:- 1	

Prerequisite: Basic Knowledge of C & C++

Course Objectives:

1. To expose the students to use the engineering approach to solve thereal time problems.
2. To learn the skills of team building & teamwork.
3. To develop the logical skills and use of appropriate data structures for solving the engineering problems andpuzzles.
4. Structure for Solving the Engineering Problems &Puzzles.

Course Outcomes:

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

1. Solve the real time Problems with Logicalskills.
2. Simplify the problem structure with good team Management
3. Learn the skills of team building to achieve the finaloutput.
4. Develop the logical skill with appropriate datastructure.

Platforms:	Free and Open source software's.
Description:	Guidelines For Mini Project
	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 - 15marks

External Oral Exam:

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

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PCC-IT408 – ENVIRONMENTAL STUDIES

	TEACHING SCHEME	EXAMINATION SCHEME
	Theory : 2 credits	Term work:
	Tutorial :	Theory 100
	Practical: 1 credit	Practical :