

# 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

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					TEAC	HING SO	CHEMI	E							EXAM	IINAT	TION	SCHE	ME			
C.	se ect	]	THEORY	Y	Г	UTORIA	<b>L</b>	P	RACTIC	AL			1	THEO	RY		PR.	ACTIC	CAL	TEF	RM WO	<b>JRK</b>
Sr. No	Cours (Subje Title	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 ESE	30 70	100	40	s	-	-	ø	25	10
2	PCC- IT302	4	4	4	-	-	-	1	2	2			CIE ESE	30 70	100	40	deline	50	20	deline	25	10
3	PCC- IT303	3	3	3	-	-	-	-	-	-			CIE ESE	30 70	100	40	S Gui	-	-	S Gui	-	-
4	PCC- IT 304	3	3	3	-	-	-	-	-	-			CIE ESE	30 70	100	40	er BO	-	-	er BO	-	-
5	PCC - IT 305	3	3	3	1	1	1	-	-	-			CIE ESE	30 70	100	40	As pe	-	-	As pe	25	10
6	PCC- IT 306	3	3	3	-	-	-	2	4	4			-	-	-	-		50	20		50	20
7	PW- IT 307	-	-	-	-	-	-	1	2	2								50	20		25	10
	TOTAL	19	19	19	2	2	2	4	8	8					500			150			150	
			-					SI	EMESTI	ER –IV	V			-	_							
1	PCC- IT 401	3	3	3				1	2	2			CIE ESE	30 70	100	40		50	20		25	10
2	PCC- IT402	3	3	3				-	-	-			CIE ESE	30 70	100	40		-	-			
3	PCC- IT403	3	3	3	-	-	-						CIE ESE	30 70	100	40	deline			deline		
4	PCC-IT404	3	3	3	1	1	1						CIE ESE	30 70	100	40	S Gui			S Gui	25	10
5	PCC- IT405	3	3	3	-	-	-						CIE ESE	30 70	100	40	er BO			er BO		
6	PCC- IT406	2	2	2	-	-	-	2	4	4			-	-	-	-	As p	50	20	As p	50	20
7	PW- IT407							1	2	2								50	20		50	20
8	MC- IT408	2	2	2	-	-	-	1	2	2			CIE ESE	30 70	100	10 25		-	-		-	-
	TOTAL	19	19	19	1	1	1	5	10	10					600			150			150	
	TOTAL	38	38	38	3	3	3	9	18	18					1100			300			300	

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
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- 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:

- 1. BSC-IT: Basic Science Course Information Technology arecompulsory.
- 2. ESC-IT: Engineering Science Course Information Technology arecompulsory.
- 3. PCC-IT: Professional Core Course Information Technology arecompulsory.
- **4.** MC-EV: Mandatory Course Environmental Studies which is compulsory for theory 70 marks and project work30 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

#### **BSC-IT301 – STATISTICS AND FUZZY SYSTEMS**

TEACHING SCHEME	<b>EXAMINATION SCHEME</b>
Theory: 3 Hrs/week	Term work: 25 marks
Tutorial: 1 Hrs/week	<b>Theory</b> : 100marks
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 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 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 Curvefittings
- 2. Solve basic problems in probability theory, including problems involving the binomial, Poissonand normaldistributions
- 3. Calculate numerical integration
- 4. Define fuzzy sets using linguistic words and represent these sets by membership functions, convexity, normality, supportetc...
- 5. Solve examples on the principle in performing fuzzy number arithmetic operations such as addition, multiplication and fuzzyequation
- 6. Solve assignment problems by using different techniques of operationresearch

#### SECTION – I

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

4.	<b>Introduction toFuzzy sets:</b> Crisp set and Fuzzy set, Basic concepts of fuzzy sets, Basic operations on fuzzy sets, Properties of fuzzy sets	06
5.	<b>FuzzyArithmetic:</b> Fuzzy numbers, Fuzzy cardinality, Arithmetic Operations on Fuzzy numbers, Solutions of Fuzzy equations of type $A + X = B$ and $A.X = B$	06
6.	AssignmentProblem: Definition, Balanced and Unbalanced assignment problem, Hungarian Method, Balanced assignment problems, Unbalanced assignment problems	06

#### PCC-IT302 – DIGITAL SYSTEMS AND MICROPROCESSOR

TEACHING SCHEME	EXAMINATION SCHEME
Theory : 4 Hrs/week	<b>Term work:</b> 25 marks
Tutorial :	Theory : 100marks
Practical: 1 Hrs/week	<b>Practical</b> : 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 languageprogramming.
- 5. To understand knowledge about working of different instructions using timingdiagrams.

#### **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 numbersystems.
- 2. Design and demonstrate different sequential and combinational-logicdesign.
- 3. Summarize the working of 8085 & 8086 microprocessor and peripheral.
- 4. Design and execute assembly language programs using 8085 instructionset.
- 5. Distinguish different instructions using timingdiagrams.

#### SECTION – I

#### 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.

2 Boolean algebra & combinationallogicdesign:

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.

3 SequentialLogicDesign:

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.

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# 4 8085 Microprocessor Architecture & MemoryInterfacing: 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 8085Programming techniques:

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

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#### 6 Interfacing I/O devices &Introduction 8086:

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. (Chapter4,5,6)
- 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, PearsonEducation
- 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 thEdition.
- 5. Microprocessors and Microcontrollers N. Senthi Kumar, M. Saravanan and S.
- 6. Jeevananthan (Oxford UniversityPress)

#### **Term Work:**

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

- 1. Study of Basicgates.
- 2. Study of Universalgates.
- 3. Study of Boolean algebra & De Morgan's theorem usinggates.
- 4. Study of MUX/DEMUX.
- 5. Study of 74138.
- 6. Study of R-S and J-Kflip-flops
- 7. Study of counters
- 8. Interfacing of counters to seven segmentdisplay
- 9. Realization of 4/5 variableK-maps
- 10. Study of 8085 processor data transfer instructions using timingdiagrams.

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

#### PCC-IT303 – DATA COMMUNICATION

TEACHING SCHEME	<b>EXAMINATION SCHEME</b>
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 andNetworking.
- 2. To learn Data Encoding techniques used in during DataTransmission.
- 3. To study layered architecture of OSI& TCP/IP referencemodel.
- 4. To gain knowledge of multiplexing and switching techniques used for bandwidthutilization.
- 5. To study basic components & devices used in Data communicationsystem

#### **Course Outcomes:**

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

- 1. Explain the basic concepts and components of Data communicationsystem.
- 2. Understand Data Encodingtechniques.
- 3. Compare various multiplexing & spreading techniques.
- 4. Understand responsibilities of each layers in OSImodel.
- 5. Study and understand protocols used at each layer in TCP/IP referencemodel.
- 6. Get familiar with hardware components required to buildnetwork.

#### **SECTION – I**

#### **1** Introduction:

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

#### 2 Data & Signals:

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

#### **3** Digital & AnalogTransmission:

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

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

#### 4 BandwidthUtilization:

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

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#### 5 NetworkModels:

- 1. Layeredarchitecture,
- 2. The OSI model- Layers in the OSIModel,
- 3. TCP/IP protocol suite,
- 4. Network Addressing Physical, Logical, and Port.

#### 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.

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#### TEXT BOOKS :

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

#### **REFERENCE BOOKS**:

- 1. Data and Computer Communications –Williams Stallings ,5thEdition,PHI.
- 2. Computer Networks A. S. Tenebaum., 3rdEdition, PHI.
- 3. TCP/IP Protocol Suite Networking Behrouz A. Forouzan ,4thEdition,TMGH.

#### 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 itsapplication
- 2. The basics of costconcepts
- 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 businessenhancement
- 3. Explain basic costing and marketing policies

#### **Unit 1.Introductionto Economics**

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

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

#### Unit 3 BasicCostConcepts

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

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

#### Unit 5. Principlesofmanagement

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

#### (8)

#### (6)

(6)

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

#### Unit 6. BasicFinancialconcepts

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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 to4)

2. Essential of management by Harold koonez 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.

#### PCC-IT305 – DISCRETE MATHEMATICAL STRUCTURE

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

Prerequisite: Knowledge of basic mathematical concept

#### **Course Objectives:**

- 1. To develop mathematical logic and itsapplications.
- 2. To provide knowledge on sets, relations and functions.
- 3. To provide knowledge on algebraic systems and itsapplications
- 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 itsapplications.
- 2. Discuss the basic principles of sets and operations insets.
- 3. Demonstrate an understanding of relations and functions and be able to determine their properties
- 4. Determine basic terminologies of groups, graphs and itsapplications.
- 5. Implement the knowledge of logical reasoning to solve variety ofproblems
- 6. Acquire ability to describe computer programs in a formal mathematical manner and become efficient to face GATE and other competitive exams.

#### **SECTION – I**

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I	MathematicalLogic:	06
	Statement and Notation, logical connectives, truth tables, tautologies,	
	Theory for statement Calculus.	
2	Sets:	06
	Set, Different of types of sets, Operations on sets, Venn Diagrams, Ordered	
	Pairs, Cartesian product of two sets, Principle of Inclusion and exclusion.	
3	Relations:	06
	Definition types of relation composition of relations domain and range of a	

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.

	4	<b>Function:</b> Definition and types of function, composition of functions, recursively	06
	5	defined functions. <b>Groups:</b> Algebraic Systems, Semi Groups, Groups, Monoid, Abelian Groups, subgroups, Isomorphism and Automorphisms, Homomorphism and Normal Subgroups	06
	6	GraphTheory: 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
1.	consist and GA	of minimum 06-08 assignments based on above subjects ATE Papers.	Itshould
1	TEXTBO	POKS:	
1.	Mather	natical Structures with Application to Computer Science - J. P. Tremblay & R. M International Edition.	Discrete anohar
2.	Discret McGra	e Mathematics- C. L. Liu and D. P. Mohapatra,,4Edition w-Hill.	Elementsof
	REFER	PENCEBOOKS:	
1.	Mather	natics – SemyourLipschutz, Marc Lipson (MGH), Schaum'	Discrete
2.	mathen	natics and its applications - Kenneth H. Rosen (AT&T Bell Labs).	Discrete
3.	Mather	natics With Proof, 2nd Ed, ERIC GOSSETT, Wiley India Ltd.	Discrete

#### PCC-IT306 – PROBLEM SOLVING USING C

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

Prerequisite: Basic knowledge of Electronics and Computers

#### **Course Objectives:**

- 1. To understand C programmingenvironment
- 2. To develop problem solving skills amongst thestudents.
- 3. To write, compile and debug programs in Clanguage.
- 4. Implement C programs for various problemstatements.

#### **Course Outcomes:**

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

- 1. Illustrate flowchart and algorithm to the givenproblem
- 2. Understand basic Structure of the C-PROGRAMMING, declaration and usage ofvariables
- 3. Write C programs using operators
- 4. Exercise conditional and iterative statements to Write Cprograms
- 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 downdesign	6
2	<b>Unit 2. Introduction to 'C' Language</b> 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	<b>Unit 3. Functions:</b> 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

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,	8
	putting strings together, comparison of two strings, string handling functions	
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,	8
	declaring and initialization pointer variables, accessing a variable through its	
	pointer, pointer expressions, pointers and arrays, pointer and characterstrings	
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-HillPublications
- 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, AbbeyDeitel, Pearson Publication.

#### **Reference Books:**

- 1. The 'C' Programming Language, By B.W. Kernigghan and D. M.Ritchie, Pearson Education.
- 2. C Programming Laboratory : Handbook for Beginners by Sidnal, Wiley IndiaLimited.
- 3. http://www.spoken-tutorial.org/NMEICT Project of Govt. OfIndia.

#### Term Work:

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

- 1. Simple Programs using basic datatypes, scanf, printf, formatspecifiers
- 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 ofnumbers
- 7. Programs Exchanging values of two variables
- 8. Programs Counting, summation of set ofnumbers
- 9. Programs factorial computation
- 10. Programs sine function computation
- 11. Programs Fibonacciseries
- 12. Programs reverse ofdigit
- 13. Programs BCD conversion
- 14. Programs Char to numberconversion
- 15. Programs Factoring methods Square root of number, smallest divisor, GCD of twonumber
- 16. Programs prime number, prime factors of integer
- 17. Programs pseudo random number generation, raising the number to a largepower
- 18. Programs Matrix operations (addition, multiplication, transposeetc.)
- 19. Programs String operations and manipulation (finding length, reverse, change caseetc.)
- 20. Programs Demonstrate structures

#### 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 writtencommunication
- 2. Introduce students to team work and selfenhancement.

#### **Course Outcomes:**

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

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

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 teamformation		
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.
- Seven Spiritual Laws of Success Deepak Chopra.
   Good To Great JimCollins.

#### PCC-IT401 – COMPUTER NETWORK

TEACHING SCHEME	<b>EXAMINATION SCHEME</b>
Theory: 3 Hrs/Week	Term work: 25 marks
Tutorial:	Theory: 100 marks
Practical: 1 Hrs/Week	<b>Practical</b> : 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 wirelessprotocols.
- 3. To understand functionalities of different layers
- 4. To provide knowledge about internet layerprotocol.
- 5. To provide knowledge about routing protocol and functionality of applicationlayer

#### **Course Outcomes:**

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

- 1. Explain functions of data linklayer
- 2. Describe network layer of OSImodel
- 3. Explain transport layer with its functionality
- 4. Explain application layer of OSImodel.

#### **SECTION – I**

1	Introduction Data Link Layer:	06
	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	
2	Data Link Layer:	06
	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	
3	Data Link Layer protocols:	05
	Network Layer Design Issues, Routing Algorithms: Shortest Path, Flooding,	
	Distance Vector and Link State	

#### **SECTION – II**

4	Network Layer	06
	IPv4 Addresses: Introduction, Classful and Classless Addressing, Special	

Addres format,	ses, Network, transaction from IPv4 to IPv6, IPv6 Addresses, packet ICMPv6
5 Transp The Tra User D Feature TCP, B byte or	oort Layer07ansport service primitives, UDP: Process to Process communication, atagram Format, Operation and uses of UDP, TCP: TCP Services and s, TCP segment format, TCP Connections, Flow and error control in erkeley Sockets: Socket Addresses, Elementary Socket system calls dering

6	<b>Routing Protocols and Application Layer:</b>	
	Application Layer : DNS, Electronic Mail, Telnet, FTP, HTTP.	

#### TERM WORK:

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

#### TEXT BOOKS:

1. Computer Networks , A. S. Tenebaum., 3rdEdition, PHI.

2. TCP/IP protocol suite , B A Forouzan, TMGH.

3.Computer Networks: Principles ,Technologies and Protocols for Network Design by olifer, WileyIndia Ltd.

#### **REFERENCE BOOKS:**

1. Unix Network Programming, W Richard Stevens, PHI

#### PCC-IT402 – COMPUTER ORGANIZATION AND ARCHITECTURE

TEACHING SCHEME	<b>EXAMINATION SCHEME</b>
Theory: 3 Hrs/Week	Term work:
Tutorial :	<b>Theory</b> : 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 arithmeticoperation.
- To explain CPU design and memoryorganization

#### **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 processorlevel.
- To understand various processor architectures and datarepresentation.
- To apply algorithm to perform operation like multiplication and division.
- To illustrate control unit.
- To study memoryorganization.

#### **SECTION –I**

**1** Unit 1.Computing andComputers:

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

7

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2 Unit 2.DesignMethodology 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. ProcessorBasics:

**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.

6

4	<b>Unit 4. Datapath Design</b> 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	<b>Memory Technology</b> : Memory device Characteristics, Random access memories, Serial-Access Memories, Multilevel memories- General characteristic, Memory allocation, <b>Caches:</b> Cache organization, Cache read and write operation.	6

#### Text books:

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

#### **Reference books:**

- a. Computer Organization- HamacherZaky.McGraw-Hill.
- b. Computer Architecture & Organization An Integrated Approach , Miles Murdocca, Vincent Heuring Wiley IndiaEdition
- c. Computer Architecture and organization: An integrated Approach by Murdacca, WileyIndia Limited.
- d. NPTEL Video Lectureshttp://nptel.ac.in

#### 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 Clanguage.
- 2. To become familiar with advanced data structures such as Stacks, Queues, Treesetc.
- **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, Treesetc.

#### **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 DataStructures (Binary Trees, AVL Trees, Graphs)
- 2. Choose the appropriate and optimal data structure for a specifiedApplication
- 3. Analyze Time Complexity and Memory Complexity of differentAlgorithms
- 4. Write programs and applications with Static and Dynamic datastructures

#### **SECTION – I**

Uni t no.	Chapter Name	
1.	Algorithm Basics and Recursion	05
	Algorithms, Its Pseudo code Representation , Abstract Data type, Data Structures, Algorithm Efficiency, Recursion, Towers of Hanoi and Ackermann's function, etc.	
2.	Sequential Representation of Linear Data Structures	06
	Stack, Operations on Stack, Applications of Stack, Queue, Operations on Queue, Applications	
	of Queue, Circular queue, Priority Queues	
3.	Linked Lists	07
	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	

4.	Nonlinear Data Structures : (TREES)	05
	Basic terminology, representation, binary tree, traversal methods, binary search tree,	
	AVL search tree, B tree, B+ tree, Heaps and its operations	
5.	Non Linear Data Structures (Graphs)	05
	Concepts and terminology of graph, Representation of graph using adjacency matrix, storage	
	representation ,Graph traversal Techniques- Depth first and Breath first search	
6.	Searching and Sorting Techniques	08
	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	
1	case).	

#### 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.

#### 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 and recognizers

#### **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 Compliers & 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 information processing.

#### **SECTION – I**

#### Unit No.1 : RegularLanguages:

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:**

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

#### Unit No.3: GrammarsandLanguages:

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.

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#### Unit No.4: PushDownAutomata:

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:

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: TuringMachines:

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. REFERENCEBOOKS:

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

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#### PCC-IT405 – SOFTWARE ENGINEERING

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

	4.6 Metrics	
5	Coding and testing	07
	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	
6	Software reliability and quality assurance	06
	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	

#### Text book:

1)Software Engineering : A precise Approach - Pankaj Jalote (Wiley India) (Unit 1,4).

2) Fundamentals of Software Engineering - Rapit Mall (3rd Edition)( PHI) (Unit 2, 5,6).

3) Software Engineering by Jan Sommerville (9th Edition) Pearson (Unit 6, 7 &6.8).

4) Software Engineering Principles & Practices by RohitKhuranaITLESL (2<sub>nd</sub>Edition) 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)

#### PCC-IT406 – OBJECT ORIENTED PROGRAMMING

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

**Prerequisite:** Problem solving using C

#### **Course Objectives:**

- 1. Limitations of Procedural programming and Benefits of Object OrientedProgramming
- 2. OOPs concepts like Class, Objects, Data hiding, Data Encapsulation, DataAbstraction, Inheritance and polymorphism and their implementation usingC++
- 3. File handing using object oriented concepts
- 4. Advanced features like Generic programming using Templates, STL and ExceptionHandling

#### **Course Outcomes:**

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

- 1. To understand the basic object orientedconcepts.
- 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:	5
	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.	
2	<b>Unit 2.Basics of C++ programming:</b> 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:	6
	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.	

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	. <b>Unit 5. Files and Streams:</b> 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.eseekg, 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 Virtual function
- 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 ExceptionHandling
- 12 Implementation of File Handling using OOPconcepts
- 13 Demonstration of STL inC++

#### **TEXT BOOKS :**

- 1. C++: The Complete ReferenceFourth Edition -Herbert Schildt(McGraw-Hill)
- C++ programming: From Problem Analysis to Program Design Fifth Edition -D.S. Malik(Cengage Learning)
- 3. C++ Programming with language –BjarneStroustrup (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 (GalgotiaPublications)
- 3. C++ programming –John Thomas Berry(PHI)

4. Object –Oriented Analysis & Design: Understanding System Development with UML 2.0 ,Docherty, Wiley IndiaLtd.

5. http://www.spoken-tutorial.org/NMEICT Project of Govt. Of India. Computer Architecture and organization: An integrated Approach by Murdacca, Wiley India Limited.

#### PCC-IT407 - MINI PROJECT

TEACHING SCHEME	EXAMINATION SCHEME
Theory :	Term work: 50 marks
Tutorial :	Theory :
Practical: 2 Hrs/Week	<b>Practical</b> : 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.

<b>Platforms:</b>	Free and Open source software's.		
<b>Description:</b>	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 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
<ol> <li>Mid Term assessment - 5 marks.</li> <li>End term assessment - 5 marks.</li> <li>Final Performance evaluation is to be done by guide - 15marks</li> </ol>
<b>External Oral Exam:</b> The external oral examination will be conducted by the examiners appointed by the University

#### PCC-IT408 – ENVIRONMENTAL STUDIES

TEACHING SCHEME	<b>EXAMINATION SCHEME</b>
Theory : 2 credits	Term work:
Tutorial :	Theory 100
Practical: 1 credit	Practical :