D.K.T.E. Society's

TEXTILE & ENGINEERING INSTITUTE

(An Autonomous Institute)

Rajwada, Ichalkaranji – 416115.

Syllabus

of

Second Year B.Tech.Information Technology

(With effect from June 2017)

D.K.T.E.

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Second Year B.Tech.Information Technology

(With effect from Academic Year 2017-18)

Semester – III

Course Code	Course Name	Group	Teaching Scheme Hours/Week				Examination Scheme and Marks						Credits
							Theory			Practical			
			Theory	Tutorial	Practical	Total	SE-I	SE-II	SEE	CIE	SEE	Total	
ITL201	Mathematics for IT Engineers	A	3	-	-	3	25	25	50	-	-	100	3
ITL202	Data Communication	D	3	1	-	4	25	25	50	-	-	100	4
ITL203	Digital System and Microprocessor	D	3	-	-	3	25	25	50	-	-	100	3
ITL204	Discrete Mathematics	A	3	1	-	4	25	25	50	-	-	100	4
ITL205	Fundamentals of Economics and Management	C	3	-	-	3	25	25	50	-	-	100	3
ITP206	Programming Lab-I	D	2	-	4	6	-	-	-	50	50	100	4
ITP207	Digital systems & Microprocessor Lab	D	-	-	2	2	-	-	-	50	50	100	1
ITP208	Soft Skills Lab	C	-	-	2	2	-	-	-	50	50	100	1
		Total	**17**	**2**	**8**	**27**						**800**	**23**
Audit Course ITL209	Environmental Science (MandatoryAudit)*	C	2	-	-	2						Grade	-
		Total	**19**	**2**	**8**	**29**	**125**	**125**	**250**	**150**	**150**	**800**	**23**

Abbreviations:

CIE:	Continuous Internal Evaluation
SEE:	Semester End Examination
SE-I:	Semester Examination-I
SE-II:	Semester Examination-II

Group Details

A	Basic Science	E	Open electives
B	Engineering Science	F	Seminar/Training/Project
C	Humanities, Social Science and Management		
D	Professional Subjects - core and Electives		

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Semester – IV

Course Code	Course Name	Group	Teaching Scheme Hours/Week				Examination Scheme and Marks						Credits
							Theory			Practical			
			Theory	Tutorial	Practical	Total	SE-I	SE-II	SEE	CIE	SEE	Total	
ITL210	Computer Organization	D	3	-	-	3	25	25	50	-	-	100	3
ITL211	Theory of Computation	D	3	1	-	4	25	25	50	-	-	100	4
ITL212	Data Structures	D	3	-	-	3	25	25	50	-	-	100	3
ITL213	Software Engineering	D	3	1	-	4	25	25	50	-	-	100	4
ITL214	Network Protocols	D	3	-	-	3	25	25	50	-	-	100	3
ITP215	Data Structures Lab	D	-	-	4	4	-	-	-	50	50	100	2
ITP216	Programming Lab-II	D	2	-	2	4	-	-	-	50	50	100	3
ITP217	Network Protocols Lab	D	-	-	2	2	-	-	-	50	50	100	1
ITP218	Mini Project-I	F	-	-	2	2	-	-	-	50	-	50	1
		Total	**17**	**2**	**10**	**29**						**850**	**24**
Audit Course ITL209	Environmental Science (Mandatory Audit)*	C			2	2			*70	*30		Grade	-
		Total	**17**	**2**	**12**	**31**	**125**	**125**	**250**	**200**	**150**	**850**	**24**

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ITL201: Mathematics for IT Engineers

Teaching Scheme:	Credits	Examination Scheme
TH : 03 Hours/Week	03	SE-I : 25 SE-II : 25 SEE : 50

Prerequisite: --

Course Objectives:

1. To explain the theory of statistics and concepts of correlation and regression.
2. To discuss the theory of probability and hence explain the concept of probability distribution.
3. To introduce principle of counting, recurrence relation and generating function.

Course Outcomes:

On completion of the course, student will be able to-

1. Remember the theory of statistics, univariate data
2. Analyze the bivariate data using correlation and regression and curve fitting.
3. Analyze the problem for probability and different probability distributions.
4. Apply the knowledge of combinatorics and recurrence relation to solve the problems.

Course Contents

Unit 1	**INTRODUCTION TO STATISTICS, CORRELATION AND REGRESSION**	**09 Hours**

Types of data, univariate, bivariate; univariate data analysis: n-observations, frequency distribution, mean, Mode, median, dispersion; bivariate data analysis: correlation-Karl person's coefficient of correlation, properties of coe of correlation. Regression analysis: lines of regression, regression coefficients, properties of regression coefficient.

Unit 2	**CURVE FITTING**	**04 Hours**

Method of least squares, fitting of straight lines, parabolic curve, and exponential curve.

Unit 3	**PROBABILITY**	**05 Hours**

Definition, laws, conditional probability, Bayes theorem**.**

Unit 4	**PROBABILITY DISTRIBUTIONS**	**09 Hours**

Random variable, expectation of random variable, probability distribution of random variable, types of random variable, discrete probability distribution: moment generating function of binomial and poisson probability distribution, recurrence relation of binomial and poisson probability distribution.

Unit 5	**COMBINATORICS**	**05 Hours**

First counting principle, second counting principle, permutation, combination, Pigeonhole principle.

Unit 6	**RECURRENCE RELATION AND GENERATING FUNCTION**	**08 Hours**

Recurrence relation definition, types, linear recurrence relation –solution to homogeneous and non-homogeneous recurrence relation. Generating function: definition, examples

Books:

Text Books:

1. Discrete Mathematics and its Applications - Kenneth H. Rosen (AT&T Bell Labs)
2. Mathematical Statistics by J.Fruend.
3. Applied Statistics & Probability of Engineers by Montgomeri&Runger

Reference Books:

1. Discrete Mathematics –SemyourLipschutz, MarcLipson (MGH), Schaum's outlines
2. Probability and Statistics- John Schiller, Murray R. Spigel (MGH), Schaum's outlines
3. Probability & Statistics for Engineers by Johnson

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ITL202: Data Communication

Teaching Scheme:	Credits	Examination Scheme
TH : 03 Hours/Week TU : 01 Hour/Week	04	SE-I : 25 SE-II : 25 SEE : 50

Prerequisite: --

Course Objectives:

1. To introduce data, signals and digital transmission.
2. To explain network architecture.
3. To introduce various functions of physical layer.
4. To provide knowledge of different functions and protocols of data link layer.
5. To explain the concept of MAC protocols and Identify various IEEE Standards
6. To discuss different functions and protocols of network layer

Course Outcomes:

On completion of the course, student will be able to-

1. Explain data, signals and digital transmission.
2. Illustrate network architectures.
3. Describe various functions of physical layer.
4. Demonstrate different functions and protocols of data link layer.
5. Describe medium access control protocols and various IEEE standards for LANs
6. Explain network layer protocols and their functions.

Course Contents

Unit 1	**Fundamentals of communications**	**06Hours**
Introduction to data communications, data and signals, transmission impairment, data rate limits and performance in channel, Digital communication: Line coding & line coding schemes.		
Unit 2	**Network architectures**	**06 Hours**
Introduction to computer networks, LAN, MAN, WAN, Network topologies: Bus, Star, Ring, Mesh, Hybrid, Layered network model: OSI, TCP/IP, ATM model And Types of Addresses.		
Unit 3	**Physical layer characterization**	**08 Hours**
Introduction to physical layer, transmission media: - Guided and Unguided media, Network Hardware components, and Data Transmission modes: Serial and Parallel transmission, Switching: Circuit switched networks, datagram networks, virtual circuit networks, Multiplexing.		
Unit 4	**Data Link Layer**	**07 Hours**
Error detection & correction: Block coding, cyclic codes, checksum, Data Link Control: - Framing, Flow & error control, stop & wait protocol, sliding window protocol. Types of services: - Connection oriented services, Connectionless services.		

Unit 5	Protocol Concepts - Media Access Control	07 Hours
Protocol basics, Channel allocation Problem , MAC protocols, ALHOA, CSMA, collision free protocols, Limited contention protocols, **IEEE standards For LANS** 802.3 Standard & Ethernet, 802.4 Standard & Token Bus, 802.5 Standard & Token Ring, Comparison of 802.3, 802.4 and 802.5.		
Unit 6	**Network Layer, Internet Protocol**	**06 Hours**
IPv4 Addresses: Introduction, Classful and Classless Addressing, Special Addresses, IPv6 Addresses, IP Datagram format, Fragmentation, Checksum.		
Books:		
Text Books: 1. Data communication and networking - Behrouz A Forouzan, The McGraw Hill, 4th Edition. 2. Computer Networks- A. S. Tenebaum, PHI, 3rd Edition.		
Reference Books: 1. Data and Computer communications - William Stallings, Pearson Education, 8th Edition. 2. Data communication and Computer Networks- Ajit Pal, PHI Learning, Eastern Economy Edition.		

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ITL203: Digital Systems & Microprocessor

Teaching Scheme:	Credits	Examination Scheme
TH : 03 Hours/Week	03	SE-I : 25 SE-II : 25 SEE : 50

Prerequisite:

Fundamentals of Electronics & Computer Programming

Course Objectives:

1. To provide knowledge of arithmetic and logical operations in digital systems.
2. To provide knowledge of principles of Boolean algebra
3. To provide hands on knowledge about different sequential and combinational logic design.
4. To introduce the basic concepts of microprocessor.
5. To provide knowledge about working of different instructions and assembly language programming.

Course Outcomes:

On completion of the course, student will be able to-

1. Solve problems on number systems and apply the principles of Boolean algebra.
2. Design the combinational logic circuits.
3. Design the sequential logic circuits.
4. Illustrate the fundamentals of microprocessor.
5. Explain fundamentals of assembly language.

Course Contents

Unit 1	Introduction and number systems	07 Hours

Analog and digital systems, representation of signed numbers, 2's complement arithmetic, BCD addition & subtraction, octal & Hexadecimal addition and subtraction.

Boolean algebra and logic gates: Derived gates , Boolean function representation, expansion of Boolean expression (standard SOP & POS), simplification of Boolean expressions using K-map (up to 5 variable)

Unit 2	Combinational Logic Design	06 Hours

Adders &Subtractors design using gates, comparator (7485), decoder (74138), Design of Combinational Circuits using Programmable Logic Devices (PLDs): Programmable Read Only Memories (PROMs), Programmable Logic Arrays (PLAs), Programmable Array Logic (PAL) devices

Unit 3	Sequential Logic Design	07 Hours

Flip-Flops (S-R, J-K,T, D)using gates, Race around condition, Master –Slave J-K Flip Flop, Counters(Asynchronous& Synchronous),design examples,
Shiftregisters(SISO,SIPO,PISO,PIPO), State transition diagram, excitation table.

Unit 4	8086 Architecture	06 Hours

Register organization of 8086, Architecture. Memory Segmentation, address formation, signal descriptions of 8086, physical memory organization, interrupts and interrupt service

routines.		
Unit 5	**8086 Instruction Set**	**07 Hours**
Addressing modes, Instruction set of 8086 -data Transfer, arithmetic and logical ,string, flag manipulation, control group of instruction.		
Unit 6	**Operating Modes and Programming**	**06 Hours**
Multifunction pins of 8086, 8284 clock generation, latching 20 bit address of 8086, buffering data bus of 8086, 8288 Bus controller, Minimum & Maximum mode system of 8086. **Programming:** assembler directives and operators, writing programs using assembler directives, Linking and relocation, Stacks, procedures, interrupt and interrupt routines, macros, machine level programs .		
Books:		
Text Books: 1. Fundamental of Digital Circuits –A. Anand Kumar, PHI Learning Private Limited, 2nd Edition. 2. Advanced Microprocessors and Peripherals-K.M. Bhurchandi, A.K. Ray, McGraw-Hill Education, 3rd Edition.		
Reference Books: 1. Microprocessor interfacing and assembly language programming –Douglas V. Hall. McGraw-Hill, Revised 2nd Edition. 2. Microcomputer Systems: 8086/8088 Family Architecture, programming and Design – Yu-cheng Liu, Glenn A. Gibson, PHI, 2nd Edition. 3. Modern Digital Electronics, R. P. Jain, Tata McGraw-Hill 2003, 3rd Edition.		

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ITL204: Discrete Mathematics

Teaching Scheme:	Credits	Examination Scheme
TH : 03 Hours/Week TU: 01 Hours/Week	04	SE-I : 25 SE-II : 25 SEE : 50

Prerequisite: --

Course Objectives:

1. To discuss Mathematical Logic and its applications
2. To introduce Sets, relations and functions
3. To provide knowledge about Graph theory and its applications
4. To Explain Algebraic systems and its applications.

Course Outcomes:

On completion of the course, student will be able to-

1. Apply logical reasoning to solve problems in engineering design.
2. Solve examples on set theory, relations & function.
3. Analyze different problems in Computer Science using graph theory.
4. Make use of properties of algebraic systems.

Course Contents

Unit 1	**Mathematical Logic**	**07 Hours**
Propositions, logical connectives, Conditionals and Bi conditionals, well formed formulas, tautologies, logical equivalences, Theory of Inference		
Unit 2	**Set theory and relations**	**07 Hours**
Set, finite and infinite sets, ,operations on set ,Power set, Principle of Inclusion and exclusion, Relations, Properties of binary relations, closure of relations, Equivalence Relations and partitioning, Partial ordering relations		
Unit 3	**Functions**	**06 Hours**
Functions, composition of functions, invertible functions, recursive functions		
Unit 4	**Graph Theory**	**06 Hours**
Basic Terminology, Multi graph and weighted graphs, Diagraphs and relations, Representation of graphs, Paths and circuits, Eulerian and Hamiltonian Paths and Circuits, Graph coloring		
Unit 5	**Groups**	**06 Hours**
Algebraic Systems, Semi Groups, Groups, Monoid, Abelian Groups, subgroups, Isomorphism and Automorphisms, Homomorphism		
Unit 6	**Lattices**	**07 Hours**
Lattices, Principle of duality, Properties of Algebraic system defined by Lattices, Boolean Lattices and Boolean Algebras, Boolean functions and Boolean Expressions, Normal Forms.		

Books:
Text Books: 1. Elements of Discrete Mathematics- C. L. Liu and D. P. Mohapatra, McGraw-Hill, 4th Edition
Reference Books: 1. Discrete Mathematical Structures with Application to Computer Science - J. P. Tremblay & R. Manohar , MGH, International Edition. 2. Discrete Mathematics –SemyourLipschutz, Marc Lipson (MGH), Schaum's outline Series, 3rd Edition

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ITL205: Fundamentals of Economics and Management

Teaching Scheme:	Credits	Examination Scheme
TH : 03 Hours/Week	03	SE-I : 25 SE-II : 25 SEE : 50

Prerequisite: --

Course Objectives:

1. To introduce fundamentals of economics and its application.
2. To explain basics of cost concepts.
3. To provide importance of Market and types of Markets.
4. To discuss principles of Management.
5. To explain basic Financial Concepts.

Course Outcomes:

On completion of the course, student will be able to-

1. Demonstrate the understanding of economics and its applications in IT sector.
2. Explain basics of cost concepts.
3. Illustrate the importance of Market.
4. Explain different Management Principles.
5. Apply Financial Concepts such as Balance Sheet, Profit and Loss Statement etc.

Course Contents

Unit 1	Introduction to Economics	09 Hours

Definition, Basic terms in Economics: Economic Resources, firms, goods, services, utility, value & wealth. Scope of Economics (Macro, Micro, International, Industrial, Environmental, Public Finance, Managerial Economics etc.)Managerial Economics: Meaning, Features and Scope.

Unit 2	Demand and Supply Analysis	07 Hours

Demand: Types of Demand, Determinants of Demand, Law of Demand, Exceptions to Law of Demand. Elasticity of Demand (Types)

Supply: Determinants of supply, Law of Supply, Elasticity of supply.

Unit 3	Basic Cost Concepts	07 Hours

Production function, Law of Variable Proportions, Returns to scale, Uses of production function.

Cost Concepts: Real Cost, Money cost and Opportunity cost.

Classification of cost: Variable, Fixed, Total, Marginal, Average.

Unit 4	Markets	05 Hours

Meaning of Market, Economic Types of Market (Perfect competition, Monopoly, oligopoly and monopolistic competition)

Unit 5	Principles of Management	09 Hours
Definition of Management, Functions of Management, Levels of Management, Fundamental managerial skills, Henry Fayol's principles of Management. Motivation: Definition, Maslow's Need Hierarchy Theory and McGregor's Theory X and Theory Y of Motivation.		
Unit 6	**Basic Financial Concepts**	**05 Hours**
Basic concepts such as, Business, Capital, Assets, Liabilities, interest, Profit & Loss, Balance Sheet and related concepts, Profit & Loss Statement and related concepts.		
Books:		
Text Books:--		
Reference Books: 1. Managerial Economics- G Geetika, Payali Ghosh, Purba Roy Choudhury, The Tata McGraw-Hill companies New Delhi 2008, 1st Edition (units 1 to 4) 2. Essentials of Management- Harold Koontz and Heinz Weihrich, Tata McGraw Hill, 7th Edition (unit-5) 3. Basic Financial Accounting for Management- Paresh Shah, Oxford University Press New Delhi-2007, 3rd Edition (unit-6)		

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ITP206: Programming Lab-I

Teaching Scheme:	Credits	Examination Scheme
TH : 02 Hours/Week PR : 04 Hours/Week	04	CIE : 50 SEE : 50

Prerequisite:

Fundamentals of Electronics & Computer Programming

Course Objectives:

1. To introduce fundamentals of economics and its application.
2. To explain algorithm and flowchart for solving computational Problems.
3. To introduce C programming constructs like data types, input-output, control statements, arrays, structures, functions, pointers and file management.

Course Outcomes:

On completion of the course, student will be able to-

1. Demonstrate syntax and working of control statements, function, arrays, structures, pointers and files in C programming language.
2. Analyze the problem for different problem statements.
3. Design the algorithmic solution for different problem statements.
4. Develop fully functional C program for a given problem statement.

Course Contents

Unit 1	Introduction to Computational Problem Solving	04 Hours

Introduction to problem solving, Types of problems, Steps in problem solving, use of Logic in problem solving, Introduction to Computational Problems, Algorithms, Flowcharts, Pseudo codes, Writing algorithms and drawing flowcharts for simple exercises, Memory concepts, Program development steps, C Program development environment(editor, compiler, linker, loader, library files, operating system, debugger)

Unit 2	Introduction to 'C' Language	04 Hours

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

Unit 3	Functions	04 Hours

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, storage classes of variables

Unit 4	Arrays and Strings	06 Hours

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, various string handling functions.

Unit 5	**Structures and Pointers**	**06 Hours**

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, declaring and initialization pointer variables, accessing a variable through its pointer, pointer expressions, pointer to array, array of pointers, pointer to strings, constant pointer, pointer to constant, function pointer, Dynamic Memory allocation

Unit 6	**File Management in C**	**04 Hours**

Defining and opening a file, closing a file, input/output operations on files, error handling during I/O operations, random access files, command line arguments, variable number of arguments

Books:

Text Books:

1. Programming with C- Byron S. Gottfried, SCHAUM'S OUTLINE Series, McGRAW HILL, 2nd Edition
2. How to Solve it by Computer-R G Dromey, PHI. (E-Book)
3. Understanding Pointers in C- YashavantKanetkar, BPB Publications,4thEdition

Reference Books:

1. Engineering Problem Solving with C - Delores M. EtterPearson Publication, 4th Edition
2. Problem Solving and Program Design in C-Jeri R. Hanly, Elliot B. Koffman, Pearson Publication, 7th Edition
3. **http://www.spoken-tutorial.org/**NMEICT Project of Govt. Of India.

Sample List for Experiments

Lab Work will consist of minimum 15 experiments to be completed by students in a batch on following topics and based on programming contest problems.

For programming students should use following IDE gcc/code blocks/C-Free.

Experiment List should consist of following type of programs

1. Programs demonstrating use of basic datatypes, scanf, printf, format specifiers
2. Programs demonstrating use of operators and expressions
3. Programs demonstrating use of conditional control statements if-else, Switch-case
4. Programs demonstrating use of looping constructs while, do-while, for
5. Programs demonstrating use of single and multidimensional array
6. Programs demonstrating use of structure and union
7. Programs demonstrating use of string handling functions
8. Programs demonstrating use of user defined functions
9. Programs demonstrating use of storage classes of variable

10. Programs demonstrating use of user defined function
11. Programs demonstrating use of pointers
12. Programs demonstrating sequential and random access operations on Text and Binary Files
13. Programs demonstrating use of command line arguments, variable number of arguments

Sample problem statements

1. Finding biggest of three numbers
2. To find roots of given quadratic equation
3. To find the biggest and smallest of given set of numbers
4. Exchanging values of two variables
5. Counting, summation of set of numbers
6. Factorial computation
7. Sine function computation
8. Fibonacci series
9. Reverse of digit
10. BCD conversion
11. Char to number conversion
12. Factoring methods - Square root of number
13. Smallest divisor
14. GCD of two number
15. Prime number
16. Prime factors of integer
17. Pseudo random number generation
18. Raising the number to a large power
19. Matrix operations (addition, multiplication, transpose etc.)
20. String operations and manipulation (finding length, reverse, change case etc.)

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ITP207: Digital Systems & Microprocessor Lab

Teaching Scheme:	Credits	Examination Scheme
TH : -	01	CIE : 50
PR : 02 Hour/Week		SEE : 50

Prerequisite:

Fundamentals of Electronics & Computer Programming Lab

Course Objectives:--

Course Outcomes:

On completion of the course, student will be able to-

1. Explain the basic concepts of logic gates.
2. Simplify expressions using K-map.
3. Implement various combinational and sequential circuit designs.
4. Develop assembly language programs.

Guidelines for experiment list:

The experiment list should consist of minimum 10 practical assignments on the above topics. It includes 5 experiments from digital system and remaining are the assembly language programs (using data transfer, Arithmetic, Logical, DOS and BIOS interrupts.). The sample list of experiments is given below—

Sample List of Experiments

1. To verify truth tables of Basic gates and universal gates.
2. To verify truth tables for De Morgan's theorem.
3. Simplify the given expression using K-map and design using gates and verify it.
4. Implement full adder.
5. Study of 4 bit magnitude comparator (7485).
6. Study of 74138 decoder.
7. Study of D and JK flip-flops.
8. Study of counter (7490 decade counter)
9. Implement shift register.
10. Program for addition & subtraction of two 16 bit /32 bit numbers.
11. Program for multiplication two 8 bit numbers & two 16 bit numbers. Program for division –1) word by byte, 2) Double word by word.
12. Program for arranging elements in Descending order.
13. Study of DOS & BIOS services.
14. Program to Concatenate two strings
15. Study of 8086 minimum and maximum mode
16. Program to convert BCD to seven segment code

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ITP208: Soft Skills Lab

Teaching Scheme:	Credits	Examination Scheme
PR : 02 Hours/Week	01	CIE : 50 SEE : 50

Prerequisite:

1. Professional Communications –I
2. Professional Communications – I Lab
3. Professional Communications – II
4. Professional Communication – II Lab

Course Objectives:

This course aims at giving students a practical exposure to enhance their soft skills and improve their employability skills.

1. To enhance communication skills
2. To encourage participation in activities which contribute to soft skill improvement
3. To improve stage daring and confidence
4. To improve interview skills

Course Outcomes:

On completion of the course, student will be able to-

1. Demonstrate effective communication
2. Take active participation in all activities
3. Demonstrate lack of fear in performance of all the activities
4. Develop interview skills

Guidelines for conducting activities

The students shall be divided into groups depending on the activity to be carried out. Some activities are individual and shall be performed by every student in the batch. The performance of a student in a batch shall be periodically evaluated for assessment

List of Experiments

1. Group discussions
2. Role play
3. Debate
4. Elocution (Extempore and prepared)
5. Letter writing (Formal and informal)
6. Interactive games to encourage participation from students
7. Mime
8. Interview

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ITL209: Environmental Studies

Teaching Scheme:	Credits	Examination Scheme
TH : 02 Hours/Week	Grade	--

Prerequisite: --

Course Objectives:

1. Introduce Students to multidisciplinary nature of environmental sciences
2. To create awareness about present Environmental Problems and their root causes.
3. Understand action needed for environment conservation for present and future.
4. Introduce to sustainability and resource conservation.

Course Outcomes:

On completion of the course, student will be able to-

1. Explain various concepts in Environmental Sciences.
2. Describe about collective responsibility towards conservatory approach.
3. Explain importance of mass awareness and individual role in pollution prevention.
4. Analyze social issues and local environment problems and suggest solutions.

Course Contents

Unit 1	Nature of Environmental Studies	06 Hours

Definition, scope and importance. Multidisciplinary nature of environmental studies. Need for public awareness.

Unit 2	Natural Resources and Associated Problems	10 Hours

Forest resources: Use and over-exploitation, deforestation. Timber extraction, mining, dams and their effects on forests and tribal people.

Mineral resources: Usage and exploitation, environmental effects of extracting and using mineral resources.

Food resources: World food problem, changes caused by agriculture effects of modern agriculture, fertilizer-pesticide problems.

Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources.

Land resources: Land as a resource, land degradation, man induced landslides soil erosion and desertification. Role of an individual in conservation of natural resources.

Water resources: Global distribution, Use and over utilization of source and ground water, drought and flood, Dam benefits and problems.

Unit 3	Ecosystems	10 Hours

Concept of an ecosystem, Structure and function of an ecosystem. Producers, consumers and decomposers. Energy flow in the ecosystem, Ecological succession. Food chains, food webs and ecological pyramids. Introduction, types, characteristics features, structure and function of the following ecosystem - Forest ecosystem. Grassland ecosystem.

Desert ecosystem. Aquatic ecosystems (Ponds, Lakes). Aquatic ecosystems (Lakes, Rivers). Aquatic ecosystems (Streams, Oceans, Estuaries).

Books:

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Text Books:

1. Environmental studies for Undergraduates publisher shivaji university Kolhapur
2. Environmental studies by ErachBharucha, publisher University press
3. Environmental Studies by Tiwari and khulbe publisher IKInternationa Kanpur

Reference Books:

1. Agarwal, K.C.2001, Environmental Biology, Nidi Pub. Ltd., Bikaner.
2. BharuchaErach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad 380013, India, Email:mapin@icenet.net (R)
3. Brunner R.C.,1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
4. Clank R.S. Marine Pollution, Clanderson Press Oxford (TB)
5. Cunningham, W.P. Cooper, T.H.Gorhani, E. & Hepworth, M.T.2001, Environmental Encyclopedia, Jaico Pub. Mumbai, 1196p
6. De A.K., Environmental Chemistry, Wiley Wastern Ltd.
7. Down to Earth , Centre for Science and Environment , New Delhi.(R)
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Second Year B. Tech. of Information Technology

ITL210: Computer Organization

Teaching Scheme:	Credits	Examination Scheme
TH : 03 Hours/Week	03	SE-I : 25 SE-II : 25 SEE : 50

Prerequisite:

Digital Systems & Microprocessor

Course Objectives:

1. To introduce the different components of CPU and their interaction.
2. To explain use of different components and their application in design.
3. To provide knowledge about internal organization of the computer systems with different processor architectures.
4. To explain CPU design and its memory organization.

Course Outcomes:

On completion of the course, student will be able to-

1. Show organization of computer system in terms of its different components.
2. Explain the nature of design process and examines the design at gate and register level.
3. Compare and contrast various processor architectures and data representation formats.
4. Apply various algorithms to perform operations like multiplication & division.
5. Illustrate control unit, data path unit and memory organization of a computer system.

Course Contents

Unit 1	Computing and Computers	05 Hours

Elements of computers: The brain versus the computer, Limitations of computers: unsolvable problems, Intractable problems speed limitations.

The Evolution of computers: The first generation computer, IAS Computer, Stack Computers, IBM/360 computers, A typical personal computer system.

Unit 2	Design Methodology	07 Hours

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, Decoders, Encoders Arithmetic Elements: Design of 4-bit magnitude comparator, Registers **Programmable Logic Devices:** PLA implementation of adder, **Processor level design:** prototype structure, performance measurement, Queuing models.

Unit 3	Processor Basics	07 Hours

CPU Organization: Fundamentals, Study of design and architecture of a small accumulator based CPU, Architecture extensions, A typical CPU with general register organization, pipelining, RISC Machines: Organization of ARM6, CISC Machines: Organization of 68020.

Data representation: Storage order, Fixed- Point Numbers, Floating Point Number- The IEEE 754floating pointing numbers, Instruction Set: Instruction Formats, Addressing Modes, instruction Types.

Unit 4	**Data path Design**	**07 Hours**

Addition-subtraction-serial binary adder, 2's compliment adder-subtractor, High speed adders, Multiplication: twos-complement multiplier, Robertson's multiplication algorithm for twos –complement fractions, Booths multiplication algorithm, Division: Non-restoring division algorithm for unsigned integers.

Unit 5	**Control Design**	**06 Hours**

Hardwired Control: Design of GCD processor, Design Examples: Multiplier Control, **CPU control unit:** Hardwired control unit for accumulator based CPU

Micro programmed Control: Basic concepts, control unit organization.

Unit 6	**Memory Organization**	**07 Hours**

Memory Technology: Memory device Characteristics, Random access memories (1-D and 2-D RAM), Serial-Access Memories, Multilevel memories-general characteristics, dynamic memory allocation **Caches:** Cache organization, Cache read and write operation.

Books:

Text Books:

1. Computer Architecture and Organization-John. P. Hayes. Tata McGrawHill,3rd Edition.

Reference Books:

1. Computer Organization- Carl Hamacher,ZvonkoVranesic, SafwatZaky, McGrawHill, 5th edition.
2. Computer Organization and Architecture-William Stallings, Prentice Hall, 5th Edition.

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Second Year B. Tech. of Information Technology

ITL211: Theory of Computation

Teaching Scheme:	Credits	Examination Scheme
TH : 03 Hours/Week TU: 01 Hours/Week	04	SE-I : 25 SE-II : 25 SEE : 50

Prerequisite:

Discrete Mathematics

Course Objectives:

1. To introduce Formal languages like Regular Language and Context free Language
2. To explain representation of Regular language as Regular Expression and Context free languages as context free grammar
3. To discuss Model of Language acceptors like Finite Automata for Regular Language and Push Down Automata for Context free Language
4. To provide knowledge of Turing Machines and its types

Course Outcomes:

On completion of the course, student will be able to-

1. Describe different types of formal languages and their properties.
2. Formulate Regular Expressions (RE) for given language.
3. Design finite automata for given RE.
4. Design Push Down Automata.
5. Construct Context Free Grammar (CFG) for given Context Free Language and translate the CFG to Standard Forms.
6. Design Turing machine to solve given problem.

Course Contents

Unit 1	**Mathematical Induction and Recursive definition**	**04 Hours**

Proofs, The Principals of mathematical Inductions, Strong Principal of Mathematical induction, Recursive definitions, structural inductions

Unit 2	**Regular Expressions and Finite Automata**	**09 Hours**

Languages, Definition & types of grammars & languages, Regular expressions and corresponding regular languages, examples and applications, unions, intersection & complements of regular languages, Pumping Lemma for regular languages. Finite automata-definition and representation, union, intersection and complement of Regular Languages and their corresponding FA. Mealy and Moor machines.

Unit 3	**Nondeterminism**	**06 Hours**

Nondeterministic Finite Automata, Nondeterministic Finite Automata with Λ –transitions, Conversion of NFA-Λ to NFA and DFA. Kleen'stheorem. Minimization of FA

Unit 4	**Context Free Languages and Grammar**	**06 Hours**

Examples and definition, Regular Grammar, Derivation and ambiguity, An Unambiguous CFG, Union, concatenation kleen * of CFL, Simplified forms and Normal Forms, Pumping Lemma for context free languages, Intersection and complements of context Free Languages

Unit 5	Push Down Automata	07 Hours
Definition, The Language of PDA, Deterministic PDA and Non Deterministic PDA, Acceptance by Final state and empty stack, PDA to CFG, Parsing		
Unit 6	**Turing Machine**	**07 Hours**
Turing Machines-models of computation, definition of TM as Language acceptors, Combining Turing machines, computing a function with a TM, Variations in TM, Universal TM.		
Books:		
Text Books: 1. Introduction to languages & Theory of computations – John C. Martin , MGH, 3rd edition.		
Reference Books: 1. Introduction to Automata Theory , Languages and computation – John E. Hopcraft , Rajeev Motwani , Jeffrey D. Ullman, Pearson Education, 3rd edition		

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ITL212: Data Structures

Teaching Scheme:	Credits	Examination Scheme
TH : 03 Hours/Week	03	SE-I : 25 SE-II : 25 SEE : 50

Prerequisite:

Programming Lab -I

Course Objectives:

1. To introduce Data Structures and different types of Data Structures.
2. To Explain Algorithms, its Pseudo code representation and its Analysis.
3. To discuss working of searching and sorting operations on Data Structures.
4. To introduce application of Linear and Non Linear Data structures.

Course Outcomes:

On completion of the course, student will be able to-

1. Demonstrate working of Linear and Non Linear Data Structures and searching and sorting operations on it
2. Analyze a given problem and identify use of appropriate data structures for the given problem
3. Analyze a given problem and identify use of appropriate searching and/ or sorting algorithms for the given problem
4. Design a solution for given problem using Linear and Non Linear Data structures
5. Design and analyze solution for given problem using searching and sorting algorithms

Course Contents

Unit 1	**Data Structures, Algorithm Basics and Recursion**	**05 Hours**

Algorithms, Its Pseudocode Representation , Abstract Datatype, Data Structures, Algorithm Efficiency, Recursion, Designing Recursive Algorithms, Recursive Examples

Unit 2	**Searching and Sorting Techniques**	**08 Hours**

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).

Unit 3	**Sequential Representation of Linear Data Structures**	**06 Hours**

Stack, Operations on Stack, Applications of Stack, Queue, Operations on Queue, Applications of Queue, Priority Queues

Unit 4	**Linked Representation of Linear Data Structures**	**07 Hours**

Limitations of static memory allocation. Dynamic memory allocation, Singly, doubly and circular linked list, stack using linked list, Linear and circular queue using linked list, Operations like insertion, deletion, traversal & other operations on these data structures

Unit 5	Nonlinear Data Structures : (TREES)	08 Hours
Basic Concept and Terminology, Data structure for binary trees. Algorithms for tree traversals, Heaps, Binary search trees (BST), algorithms on BST and applications, AVL tree. B and B++ trees		
Unit 6	**Non Linear Data Structures (Graphs)**	**06 Hours**
Concepts and terminology of graph, Representation of graph using adjacency matrix and adjacency list, Graph traversal Techniques (Depth first and Breath first search)		
Books:		
Text Books: 1. Data structures A Pseudocode Approach with C-Richard F. Gilberg&Behrouz A. Forouzan, Cengage Learning, 2nd Edition (For Unit:1,3,4,5,6)		
Reference Books: 1. Data structures -Seymour Lipschutz, Schaum Series, TMH, 1st Edition (For Unit:2) 2. Data Structures through C-YashavantKanetkar, BPB Publication, 2nd Edition		

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ITL213: Software Engineering

Teaching Scheme:	Credits	Examination Scheme
TH : 03 Hours/Week TU: 01 Hours/Week	04	SE-I : 25 SE-II : 25 SEE : 50

Prerequisite:

Programming Lab I

Course Objectives:

This course aims at giving students a knowledge of basic software engineering methods and practices and their application

1. To provide knowledge of software process models such as the waterfall and evolutionary models.
2. To introduce software requirements and the Software Requirement Specification (SRS) document.
3. To discuss design and implementation issues such as modularity and coding standards.
4. To make aware of approaches to verification and validation including static analysis, and reviews.
5. To explain software testing approaches such as unit testing and integration testing

Course Outcomes:

On completion of the course, student will be able to-

1. Select, with justification, the software development models most appropriate for the development and maintenance of diverse software products.
2. Use a common, non-formal method to model and specify (in the form of a requirements specification document) the requirements for a sample project (e.g., structured analysis or object-oriented-analysis).
3. Use a software requirement specification and a common program design methodology and notation, create and specify the software design for a sample project. (e.g., using structured design or object-oriented design).
4. Demonstrate the application of the different types and levels of testing (unit, integration, systems, and acceptance) to a sample project.
5. Make oral presentations as a part of a team during tutorials.

Course Contents

Unit 1	Introduction and Software Process	07 Hours

The Problem Domain, SE Challenges, SE Approaches, Software Process, Desired Characteristics of a Software Process, Software Development Process Models, Other Software Processes

Unit 2	**Software Requirement Analysis and Specifications**	**06 Hours**
Software Requirements, Problem Analysis, Requirements Specification, Functional Specifications with use cases, Validation, Metrics		
Unit 3	**Function Oriented Design**	**07 Hours**
Design Principles, Module-Level Concepts, Design Notation and Specification, Structured Design Methodology, Verification, Metrics		
Unit 4	**Object Oriented Design and Detailed Design**	**07 Hours**
OO Analysis and OO Design, OO Concepts, Design Concepts, UML, A design Methodology, Metrics, Detailed Design and PDL, Verification, Metrics		
Unit 5	**Coding**	**06 Hours**
Programming Principles and Guidelines, Coding Process, Refactoring, Verification, Metrics.		
Unit 6	**Testing**	**07 Hours**
Testing Fundamentals, Black-Box Testing, White-Box Testing, Testing Process, Defect Analysis and Prevention, Metrics—Reliability Estimation		

Books:

Text Books:

1. An Integrated Approach to Software Engineering-PankajJalote, Narosa Publishing, India, Third Edition

Reference Books:

1. Software Engineering- A Practitioner's Approach-Roger Pressman, McGraw Hill, India, Eight edition
2. Software Engineering-Ian Sommerville, Pearson, 8th edition

Guidelines for conducting Tutorials

Students in a batch shall be divided in a group of 3-4 students for the purpose of tutorial. Case studies shall be based on the text books and reference book given in the syllabus. For tutorials brain storming sessions, group discussions and presentations shall be used as assessment tools.The focus will on creating the software engineering documents for a sample project for the whole SDLC. Templates for the case studies are currently available at the linkhttp://www.iiitd.edu.in/~jalote/jalotesebook/JaloteSEbook/. Please use the same templates The performance of a student in a batch shall be periodically assessed by the concerned batch teacher. The assessment will be considered for determining term work marks

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ITL214: Network Protocols

Teaching Scheme:	Credits	Examination Scheme
TH : 03 Hours/Week	03	SE-I : 25 SE-II : 25 SEE : 50

Prerequisite:

Data communication

Course Objectives:

1. To provide knowledge of design issues of network layer.
2. To introduce connection oriented and connectionless protocol services.
3. To discuss client server concept.
4. To explain procedure of remote login using TELNET and SSH.
5. To explain working of Application layer protocols.

Course Outcomes:

On completion of the course, student will be able to-

1. To describe design issues of network layer.
2. To classify connection oriented and connectionless protocol services.
3. To explain client server concept.
4. To illustrate procedure of remote login using TELNET and SSH.
5. To explain concept of Application layer protocols and their functionalities.

Course Contents

Unit 1	Internet Protocol, Routing Protocols	07 Hours

IPv6 addressing, IPv6 Packet format, Transition from IPv4 to IPv6,

ARP and RARP, ICMP and IGMP

Routing Protocols: Introduction and background, RIP, OSPF, BGPRouting Congestion control algorithms: Principles, Congestion prevention policies, Traffic Shaping, congestion control in datagram subnet: Choke Packet, Load Shedding, and Jitter Control.

Unit 2	Transport Layer	07 Hours

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, TCP Timers.

Client Server Concept, Berkeley Sockets: Socket Addresses, Elementary Socket system calls

byte ordering and address conversion routines, connectionless iterative server, Connection Oriented concurrent server.		
Unit 3	**DHCP, DNS**	**07 Hours**
DHCP: Introduction, Previous Protocols, DHCP operation, Packet Format. DNS: Need, Name Space, Domain Name Space, Distribution of name space, and DNS in internet, Resolution, DNS massages, Types of records, Compression examples, encapsulation.		
Unit 4	**TELNET and SSH**	**06 Hours**
Concept, NVT, Embedding, Options & options/sub-option negotiation, controlling the server, Out-of-band signaling, Escape charter, Mode of operation, user interface, security issue in telnet, SSH, format of SSH packets.		
Unit 5	**FTP, TFTP and HTTP**	**06 Hours**
FTP: Connections, Communication, Command processing, File Transfer Anonymous FTP, TFTP. HTTP: Architecture, Web Documents, HTTP Transaction, Request & Response messages: header & examples, Persistent vs. non persistent HTTP, Proxy Servers.		
Unit 6	**Electronic Mail and SNMP**	**06 Hours**
Architecture, User agents, addresses, delayed delivery, Aliases, Mail transfer agent SMTP commands & responses, mail transfer phases, MIME, Mail Delivery, mail access protocols:- POP3,IMAP4,**SNMP:- Management Components: SMI, MIB, SNMP.**		
Books:		
Text Books: 1. TCP/IP Protocol Suite-BehrouzForouzan. McGraw Hill, 4thEdition.		
Reference Books: 1. Internetworking with TCP/IP: principles, protocols, and architectures Volume one - Douglas E. Comer, Prentice Hall, 4thEdition.		

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ITP215: Data Structures Lab

Teaching Scheme:	Credits	Examination Scheme
PR : 04 Hours/Week	02	CIE : 50 SEE : 50

Prerequisite:

Programming Lab-I

Course Objectives:

1. To introduce Data Structures and different types of Data Structures.
2. To explain Algorithms, its Pseudo code representation and its Analysis
3. To discuss working of searching and sorting operations on Data Structures.

Course Outcomes:

On completion of the course, student will be able to-

1. Select and apply appropriate Linear and Non Linear Data structures for implementing the solution of given problem
2. Select and apply appropriate searching and sorting algorithms for implementing the solution of given problem
3. Develop programs to implement Linear and Non Linear Data structures
4. Develop programs to implement searching and sorting algorithms

Sample List of Experiments

Lab Work should consist of minimum 15 experiments to be completed by students in a batch on following topics. For programming student should use software's such as C-Free, Code Block, GCC on Linux/Ubuntu platform and for debugging GDB tool can be used.

1. Implement Sorting Methods using functions- Bubble Sort, Selection Sort, and Insertion Sort.
2. Implement Sorting Methods using recursion- Quick Sort and Merge Sort.
3. Implement Searching Methods-Sequential Search, Binary Search
4. Implement Stack as an ADT using Array. Use this ADT to perform expression Conversion and evaluation (infix to postfix, infix to prefix, prefix to infix, prefix to Postfix, postfix to infix and postfix to prefix).
5. Represent Circular Queue using Linked List and write a program to perform Operations like Insert, Delete, Finding front and rear element, Display.
6. Write a menu driven program to perform following operations on singly linked list/Circular linked list/ Doubly linked list: Create, Insert – Start, end, In Between, Search & delete, Display etc.
7. Create two Singly Linked lists, sort them and Merge these two lists into one list without creating a new node or swapping of the data.
8. Represent a polynomial using Circular Linked List and write a menu driven program to perform Addition.
9. Creation of binary search tree and perform recursive and non recursive in order, preorder and post order Traversals.

10. Write a program to represent a given graph using adjacency list and perform DFS and BFS.
11. Implementation of Heap sort
12. Implementation of Hashing

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ITP216: Programming Lab II

Teaching Scheme:	Credits	Examination Scheme
TH: 02 Hours/Week PR : 02 Hours/Week	03	CIE : 50 SEE : 50

Prerequisite:

1) Programming Lab-I

Course Objectives:

This course aims at giving students a knowledge of Object Oriented programming and a hands on implementation of Object Oriented Programming (OOP) concepts using C++

1. To provide knowledge about the fundamental concepts of OOP and UML
2. To discuss concepts of C++ to design, implement, test and debug programs
3. To make aware of how to use classes, constructor, destructors, inheritance and operator overloading in C++
4. To explain polymorphism using virtual functions in C++
5. To impart knowledge about file handling in C++
6. To explain concept of templates and STL in C++

Course Outcomes:

On completion of the course, a team of students will be able to-

1. Demonstrate understanding about the fundamental concepts of OOP and UML
2. Develop, test and debug programs in C++
3. Make use of classes, constructor, destructors, inheritance and operator overloading in C++
4. Implement polymorphism using virtual functions in C++
5. Build file handling programs in C++
6. Construct programs using concept of templates and use STL in C++

Course Contents

Unit 1	Introduction	04 Hours

C++ Program Structure, variables, operators, control structure – if, if- else, switch, looping-while, do-while, for, C++ keywords.

Input/output – I/O streams and standard I/O devices, cin and associated functions, cout and formatted output.

User Defined function- declaration, definition &calling function, function call stack and activation records, storage classes, scope rules, function -default arguments.

Reference and reference arguments to the function. Pointer variables, new and delete operator, dynamic arrays

Unit 2	Object Oriented Programming - Class	05 Hours

Object Oriented fundamentals , Class and object- concept and need, Class declaration, Class members- member variables and functions, access specifiers, UML notations for class, implementation of member functions,

Object Declaration, Accessing class members, class scope, accessor and mutator functions, order of public and private members of the class.

Constructors, invoking a constructor, constructors and default parameters, array of objects and constructor, destructor.

this pointer, static members, constant objects and member function, Data abstraction , structure and class, information hiding

Unit 3	Object Oriented Programming – Inheritance and composition	05 Hours

Inheritance – concept, implementation, base classes and derived classes, members in base classes and derived classes, overriding base class members, UML notations for inheritance, constructors of derived and base classes, destructor in derived class, Inheritance as public, protected and private

Composition (Aggregation) and association – concept, implementation and UML Notation

Unit 4	Polymorphism	05 Hours

Polymorphism – need, concept, implementation using function overloading, Multiple Inheritance, function overriding, virtual function, pure virtual function, abstract classes, Friend function and friend classes, accessing base class functions from derived class objects, accessing derived class functions from base class objects.

Operator overloading: -fundamentals of operator overloading, overloading binary operators, overloading unary operator

Unit 5.	Exceptions Handling and File Processing	05 Hours

Exception handling:-Introduction, Handling exceptions within program, C++ mechanism of exception handling, Throwing an exception, order of catch blocks, creating exception classes, rethrowing exceptions, exception handling techniques,Standard Library Exception Hierarchy.

File Processing: Introduction, Files and streams, creating and opening a file, file opening modes, Reading data from file, updating file, Random access file – creating and opening a random access file, reading and writing to a random access file, object serialization.

Unit 6	Template and Standard Template Library (STL)	05 Hours

Template: Introduction, function template, class template,

STL – Introduction, STL containers, Common member functions in STL container, container headers, typedefs, iterators, iterator operations, STL Algorithms.

Books:

Text Books:

1. C++ programming: From Problem Analysis to Program Design -D.S. Malik ,CengageLearning, Fifth Edition

Reference Books:

1. C++ How to Program – Paul Dietel and Harvey Dietel,Prentice Hall, Eight Edition
2. C++: The Complete Reference-Herbert Schildt, McGraw-Hill**,** Fourth Edition
3. C++ Programming with language –BjarneStroustrup, AT & T
4. Object oriented Programming in C++ -R.Lafore, Galgotia Publications, 3rd Edition

Guidelines for term work distribution

The distribution of the term work marks is as follows

25 marks for performance in practical's and experiments

25 marks to be given based on continuous evaluation using quizzes, additional assignments.

Guidelines for experiment list

The experiment list should consist of minimum 10 practical assignments on the above topics. Each experiment should be a problem statement which can be solved using some features of C++. The sample list of experiment is given below

Sample List of Experiments

1. Write a program to implement complex numbers and provide basic arithmetic operations for them using structure (basic c++ program)
2. Write a program to implement complex numbers and provide basic arithmetic operations for them (basic c++ program and class)
3. Write a program to calculate mode for a given set of number. Numbers can be integers, floating point numbers and double precision numbers (function overloading)
4. Write a program to overload the basic arithmetic operators for the class complex numbers, also modify the show method to include I/O manipulators (Operator overloading)
5. Write a program to overload insertion and extraction operators for the complex class using friend function (friend function)
6. Write a program to implement hierarchy given in the figure. (simple inheritance)
7. Write a program to implement linear search using template function. Input can be a set of integers, a set of double precision numbers, and a set of strings (Function template)
8. Write a program to implement the given hierarchy (Multiple inheritance)
9. Write a program to implement a class mySet as a template class and implement the following set operation union, intersection, difference and symmetric difference (Class template)
10. Write a program to read a C++ program and check for error, if any in the parenthesis. The program should report the line numbers where error found (file handling)
11. Write a program to implement a graph class and provide a method for DFS
12. Study of various containers available in Standard Template Library (STL)
13. Write a program to demonstrate various features of list container in STL

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ITP217: Network Protocols Lab

Teaching Scheme:	Credits	Examination Scheme
PR : 02 Hours/Week	01	CIE : 50 SEE : 50

Prerequisite:

Data Communication

Course Objectives:

1. To introduce fundamental of client-server concept.
2. To provide basics of socket programming.
3. To discuss working of network layer protocols.
4. To explain configuration of different types of servers.
5. To provide details of working of application layer protocol.

Course Outcomes:

On completion of the course, student will be able to-

1. To develop client server model using Socket programming.
2. To build a client programs to get well known services.
3. To analyse working of Network layer protocols.
4. To build and utilise different types of servers.
5. To demonstrate working of application layer protocol.

Sample List of Experiments

1. Implementation of connection oriented (TCP) client-server socket program.
2. Implementation of connectionless (UDP) client-server socket program.
3. Client program using UDP to connect to well-known services echo, daytime, finger.
4. Implementation of Address Resolution Protocol.
5. Implement Trivial file transfer protocol (TFTP) using TFTP messages
6. Implementation of the Math server using UDP protocol.
7. Implement simple web server. Use browser as a client for your server.
8. Implementation of forward lookup method using Socket Programming
9. Implementation of Reverse lookup method using Socket Programming
10. Configuration of DHCP server.
11. Configuration of DNS server.
12. Configuration of FTP server.

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ITP218: Mini Project I

Teaching Scheme:	Credits	Examination Scheme
PR : 02 Hours/Week	01	CIE : 50

Prerequisite:

1) Programming Lab –I
2) Software Engineering
3) Programming Lab-II

Course Objectives:

This course aims at giving students a practical exposure to apply software engineering knowledge to a real life problem

1. To expose the students to software engineering practice techniques and encourage its use in real life project
2. To develop group behavior and team dynamics
3. To develop documentation and presentation skill

Course Outcomes:

On completion of the course, student will be able to-

1. Carry out requirement analysis of the project.
2. Design solution to the problem
3. Carry out coding using appropriate programming language.
4. Carry out testing.
5. Write a report covering details of the project and give presentation on a project

Guidelines

The students should form group of 3-4 students each and every group is supposed to identify a specific problem. Further the group shall apply software engineering practices. The focus should be on following the software engineering practices. The group will then implement the project in a suitable programming language. The mini-project work should be evaluated by a team of faculty appointed by the department. The evaluation should be done in a continuous manner during which the group should give presentation and demonstration of their work done. Students also have to maintain a Project progress sheet of project work. Care should be taken to avoid out-sourcing of the work.

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ITL209:Environmental Studies

Teaching Scheme:	Credits	Examination Scheme
PR : 02 Hours/Week	Grade	SEE : 70 CIE : 30

Prerequisite: Environmental Studies Part-I

Course Objectives:

1. Introduce Students to multidisciplinary nature of environmental sciences
2. To create awareness about present Environmental Problems and their root causes.
3. Understand action needed for environment conservation for present and future.
4. Introduce to sustainability and resource conservation.

Course Outcomes:

On completion of the course, student will be able to-

1. Explain various concepts in Environmental Sciences.
2. Describe about collective responsibility towards conservatory approach.
3. Explain importance of mass awareness and individual role in pollution prevention.
4. Analyze social issues and local environment problems and suggest solutions.

Course Contents

Unit 1	**Biodiversity and its Conservation**	**06 Hours**

Introduction - Definition: genetic, species and ecosystem diversity, Bio-geographical classification of India. Value of biodiversity: Consumptive use, productive use, social, ethical, aesthetic and option values. India as a mega-diversity nation. Western Ghats as a bio-diversity region.

Hot-spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, mad-wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

Unit 2	**Environmental Pollution**	**10 Hours**

Definition: Causes, effects and control measures of Air pollution. Water pollution. Soil pollution, Marine pollution. Noise pollution. Thermal pollution & Nuclear hazards.

Solid Waste Management: Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution.

Unit 3	**Social Issues and Environmental protection**	**10 Hours**

Disaster Management: Floods, earthquake, cyclone and landslides. Tsunami. Urban problems related to energy. Water conservation, rain water harvesting, watershed management. Resettlement and rehabilitation of people; its problems and concerns. Environmental Ethics: Issue and possible solutions. Global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Wasteland reclamation. Consumerism and waste products. Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and Control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act.

Books:

Reference Books:

1. Agarwal, K.C.2001, Environmental Biology, Nidi Pub. Ltd., Bikaner.
2. BharuchaErach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad 380013, India, Email:mapin@icenet.net (R)
3. Brunner R.C.,1989, Hazardous Waste Incineration, McGraw Hill Inc.480p
4. Clank R.S. Marine Pollution, Clanderson Press Oxford (TB)
5. Cunningham, W.P. Cooper, T.H.Gorhani, E. & Hepworth, M.T.2001, Environmental Encyclopedia, Jaico Pub. Mumbai, 1196p
6. De A.K., Environmental Chemistry, Wiley Wastern Ltd.
7. Down to Earth , Centre for Science and Environment , New Delhi.(R)
8. Gleick, H.,1993, Water in crisis, Pacific Institute for studies in Dev., Environment &Security.StockholmEnv.Institute. Oxford Univ. Press 473p
9. Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R)
10. Heywood, V.H.& Watson, R.T.1995, Global Biodiversity Assessment,Cmbridge Univ. Press 1140p.
11. Jadhav, H.andBhosale, V.M.1995, Environmental Protection and Laws, Himalaya Pub. House, Delhi 284p.
12. Mickinney, M.L.and School. R.M.1196, Environmental Science Systems and Solutions, Web enhanced edition, 639p.
13. Miller T.G. Jr., Environmental Science. Wadsworth Publications Co. (TB).
14. Odum, E.P.1971, Fundamentals of Ecology, W.B.Saunders Co. USA, 574p.
15. RaoM.N.andDatta, A.K.1987, Waste Water Treatment, Oxford & IBH Publ. Co. Pvt. Ltd., 345p
16. Sharma B.K., 2001, Environmental Chemistry, Gokel Publ. Hkouse, Meerut
17. Survey of the Environment, The Hindu (M)
18. Townsend C., Harper, J. and Michael Begon, Essentials of Ecology, Blackwell Science (TB)
19. Trivedi R.K. Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, vol. I and II, Environmental Media (R)
20. Trivedi R.K. and P.K. Goel, Introduction to air pollution, Techno- Science Publications (TB)
21. Wagner K.D.,1998, Environmental management, W.B. Saunders Co. Philadelphia, USA 499p.
22. Paryavaranshastra – Gholap T.N.
23. ParyavaranSahastra - Gharapure

Note:

Student has to carry out field work (project) based on Environmental syllabus considering local environmental issues. Field work (project) will be evaluated at the end of semester.