

**COURSE STRUCTURE
AND
DETAILED SYLLABUS**

for

II B.TECH

COMPUTER SCIENCE & ENGINEERING

(Applicable for the batches admitted from 2016-17)

(AUTONOMOUS)
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**COURSE STRUCTURE
II. B. Tech. Computer Science and Engineering**

II YEAR I SEMESTER

S.No	Code	Subject	L	T	P	Credits
1	CS0321	Mathematical Foundations of Computer Science	4	1	0	4
2	EC0343	Digital Logic Design & Microprocessors	3	1	0	3
3	CS0322	Advanced Data Structures	4	1	0	4
4	CS0323	Object Oriented Programming Through Java	4	1	0	4
5	CS0324	Computer Organization & Architecture	4	1	0	4
6	GN0391	Gender Sensitization Lab	-	-	-	-
7	EC0344	Digital Logic Design & Microprocessors Lab	0	0	3	1
8	CS0325	Advanced Data Structures Through C Lab	0	0	3	2
9	CS0326	Object Oriented Programming Through Java Lab	0	0	3	2
Total Credits						24

II YEAR II SEMESTER

S.No	Code	Subject	L	T	P	Credits
1	HM0412	Computer Oriented Statistical Methods	3	1	0	3
2	CS0421	Design and Analysis of Algorithms	4	1	0	4
3	CS0422	Formal Languages and Automata Theory	4	1	0	4
4	CS0423	Software Engineering	4	1	0	3
5	CS0424	Operating Systems	4	1	0	4
6	CS0425	Scripting Languages Lab	0	0	3	1
7	CS0426	Operating Systems Lab	0	0	3	1
8	CS0427	Software Engineering Lab	0	0	3	2
9	GN0492	Human Values and Professional Ethics	2	0	0	2
Total Credits						24

II Year B. Tech. CSE I-Sem

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(CS0321): MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

Syllabus:

UNIT-I: Mathematical logic: Introduction, Statements and Notation, Connectives, Normal Forms, Theory of Inference for the Statement Calculus, The Predicate Calculus, Inference Theory of the Predicate Calculus.

UNIT-II: Set theory: Introduction, Basic Concepts of Set Theory, Representation of Discrete Structures, Relations and Ordering, Functions.

UNIT-III: Algebraic Structures: Introduction, Algebraic Systems, Semi groups and Monoids, Lattices as Partially Ordered Sets, Boolean Algebra.

UNIT-IV: Elementary Combinatorics: Basics of Counting, Combinations and Permutations, Enumeration of Combinations and Permutations, Enumerating Combinations and Permutations with Repetitions, Enumerating Permutation with Constrained Repetitions, Binomial Coefficient, The Binomial and Multinomial Theorems, The Principle of Exclusion.

UNIT-V: Graph Theory: Basic Concepts, Isomorphism and Sub-graphs, Trees and their Properties, Spanning Trees, Directed Trees, Binary Trees, Planar Graphs, Euler's Formula, Multi-graphs and Euler Circuits, Hamiltonian Graphs, Chromatic Numbers, The Four-Color Problem.

TEXT BOOKS:

1. Discrete Mathematical Structures with Applications to Computer Science: J.P. Tremblay, R. Manohar, McGraw-hill, 1st ed.
2. Discrete Mathematics for Computer Scientists & Mathematicians: Joe I. Mott, Abraham Kandel, Theodore P. Baker, Prentis Hall of India, 2nd ed.

REFERENCE:

1. Discrete and Combinatorial Mathematics - an applied introduction: Ralph.P. Grimald, Pearson education, 5th edition.
2. Discrete Mathematical Structures: Thomas Kosy, Tata McGraw Hill publishing co.

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(EC0343):DIGITAL LOGIC DESIGN AND MICRO PROCESSORS

Syllabus:

UNIT 1

Introduction to number systems: Binary codes, code conversion, Basic of Boolean algebra, Basic theorems and properties of Boolean algebra Canonical and standard form of Boolean function, all digital logic gates-map method of minimization of 4 and 5 variable functions, Don't-care map entries

UNIT II

NAND and nor implementation: Design of Binary adders Subtractors, comparator, decoder, encoder, multiplexers and De-multiplexers using gats/CS Introduction to sequential circuits, latches, Flip flops-SR,JK,JK master slave ,D and T type flip flops, Truth tables and excitation tables conversion of flip flops form

UNIT III

Concept of shift register, operation of shift register, its configuration, operation of asynchronous connotes, Design of Synchronous modulo N- connotes, Design and operation of Ring and twisted Ring connotes

UNIT IV

8086 Architecture: functional diagram, Register organization, memory segmentation, programming model, memory addressing, Physical memory organization, signal descriptions of 8086, interrupts of 8086

UNIT V

Instruction set and Assembly language programming of 8086: instruction formats, addressing models, Instruction set, simple programs involving logical, Branch all instructions, Solving, String manipulations

Text Books:

1. Switching theory and logic design –A. Anand Kumar PHI,2013
2. Advanced microprocessor & Pieperar-A. K. Ray and K.M. Bherchandavi, TMH, 2nd edition.

References:

1. Switching and Finite Automatic theory-Zvi Kohavi ,Niraj K.Jha Cambridge ,3rd edition
2. Digital Design –Morris Mano, PHI, 3rd edition
3. Microprocessor and Interfacing –Douglas V. Hall, TMGH 2nd edition.

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(CS0322) : ADVANCED DATA STRUCTURES

Syllabus:

Unit I:

Review of basic data structures: The list, Stack, Queue, Implementation Using C.

Dictionaries: linear list representation, skip list representation, operations - insertion, deletion and searching.

Unit II:

Hash table representation: hash functions, collision resolution-separate chaining, open addressing-linear probing, quadratic probing, double hashing, rehashing, extendible hashing, and comparison of hashing and skip lists.

Priority Queues – Definition, Realizing a Priority Queue using Heaps, Definition, insertion, Deletion.

Unit III:

Search Trees: Binary Search Trees, Definition, Implementation, Operations- Searching, Insertion and Deletion, AVL Trees, Definition, Height of an AVL Tree, Operations – Insertion, Deletion and Searching, Red –Black, Splay Trees, B-Tree of order m, height of a B-Tree, insertion, deletion and searching, Comparison of Search Trees.

UNIT-IV:

Graphs: Graph Implementation Methods. Graph Traversal Methods.

Sorting: Quick sort, Heap Sort, External Sorting- Model for external sorting, Merge Sort, Multiway merge, Polyphase merge.

Unit V:

Pattern matching and Tries: Pattern matching algorithms-Brute force, the Boyer – Moore algorithm, the Knuth-Morris-Pratt algorithm, Standard Tries, Compressed Tries, Suffix tries.

TEXTBOOKS:

1. Fundamentals of data structures in c, 2nd edition, E.Horowitz, S.Sahni and Susan Anderson Freed, University Press
2. Advanced Data Structures and Algorithms, N. Sridhar, R. Siva Ranjini, SMS Education, New Delhi, India.

REFERENCES:

1. The C Programming Language, B.W. Kernighan, Dennis M.Ritchie, PHI/Pearson Education
2. C Programming with problem solving, J.A. Jones & K. Harrow, Dreamtech Press
3. Data structures: A Pseudocode Approach with C, 2nd edition, R.F.Gilberg and B.A.Forouzan, Cengage Learning.
4. Introduction to data structures in c, 1/e Ashok Kamthane
5. Data structures using c – A.S.Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/Pearson Education.

II Year B. Tech. CSE I-Sem

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(CS0323): OBJECT ORIENTED PROGRAMMING THROUGH JAVA

Syllabus:

UNIT I:

Object oriented thinking and Java Basics- Need for oop paradigm, summary of oop concepts, coping with complexity, abstraction mechanisms. A way of viewing world – Agents, responsibility, messages, methods, History of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and casting, simple java program, concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, method binding, inheritance, overriding and exceptions, parameter passing, recursion, nested and inner classes, exploring string class.

UNIT II:

Inheritance, Packages and Interfaces – Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, super uses, using final with inheritance, polymorphism- method overriding, abstract classes, the Object class. Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces, Exploring java.io.

UNIT III:

Exception handling and Multithreading-- Concepts of exception handling, benefits of exception handling, Termination or resumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes. String handling, Exploring java.util. Differences between multi threading and multitasking, thread life cycle, creating threads, thread priorities, synchronizing threads, inter thread communication, thread groups, daemon threads. Enumerations, auto boxing, annotations, generics.

UNIT IV:

Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes. The AWT class hierarchy, user interface components- labels, button, canvas, scrollbars, text components, check box, check box groups, choices, lists panels – scrollpane, dialogs, menubar, graphics, layout manager – layout manager types – border, grid, flow, card and grid bag.

UNIT V:

Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets.

Swing – Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing- JApplet, JFrame and JComponent, Icons and Labels, text fields, buttons – The JButton class, Check boxes, Radio buttons, Combo boxes, Tabbed Panes, Scroll Panes, Trees, and Tables.

TEXT BOOKS:

1. Java the complete reference, 7th editon, Herbert Schildt, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, Pearson Eduction.

REFERENCES:

1. An Introduction to programming and OO design using Java, J.Nino and F.A. Hosch, John Wiley & sons.
2. Introduction to Java programming, Y. Daniel Liang, Pearson Education.
3. An introduction to Java programming and object oriented application development, R.A. Johnson- Thomson.

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(CS0324) : COMPUTER ORGANIZATION AND ARCHITECTURE

Syllabus:

UNIT I

Digital Computers: Introduction, Block diagram of Digital Computer, Definition of Computer Organization, Computer Design and Computer Architecture.

Register Transfer Language and Micro operations: Register Transfer language, Register Transfer, Bus and memory transfers, Arithmetic Micro operations, logic micro operations, shift micro operations, Arithmetic logic shift unit.

Basic Computer Organization and Design: Instruction codes, Computer Registers Computer instructions, Timing and Control, Instruction cycle, Memory Reference Instructions, Input – Output and Interrupt, Complete Computer Description.

UNIT II

Micro Programmed Control: Control memory, Address sequencing, micro program example, design of control unit.

Central Processing Unit: General Register Organization, STACK organization, Instruction Formats, Addressing modes, Data Transfer and Manipulation, Program Control.

UNIT III

Data Representation: Data types, Complements, Fixed Point Representation, Floating Point Representation.

Computer Arithmetic: Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating – point Arithmetic operations. Decimal Arithmetic unit, Decimal Arithmetic operations.

UNIT IV

Input-Output Organization: Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt Direct memory Access, Input –Output Processor (IOP).

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory, Cache Memory.

UNIT V

Reduced Instruction Set Computer: CISC Characteristics, RISC Characteristics.

Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing.

Multi Processors: Characteristics of Multiprocessors, Interconnection Structures, Inter processor arbitration, Inter processor communication and synchronization, Cache Coherence.

Text Books:

1. Computer System Architecture – M. Moris Mano, Third Edition, Pearson/PHI.

Reference:

1. Computer Organization – Car Hamacher, Zvonks Vranesic, SafeaZaky, Vth Edition, McGraw Hill.
2. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI.
3. Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition PHI/Pearson.

II Year B. Tech. CSE I-Sem

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(GN0391): GENDER SENSITIZATION LAB

(An Activity-based Course)

Unit-I: UNDERSTANDING GENDER

Gender: Why Should We Study It? (*Towards a World of Equals: Unit -1*)

Socialization: Making Women, Making Men (*Towards a World of Equals: Unit -2*)

Introduction. Preparing for Womanhood. Growing up Male. First lessons in Caste. Different Masculinities.

Unit – II: GENDER AND BIOLOGY

Missing Women: Sex Selection and Its Consequences (*Towards a World of Equals: Unit -4*)

Declining Sex Ratio. Demographic Consequences.

Gender Spectrum: Beyond the Binary (*Towards a World of Equals: Unit -10*)

Two or Many? Struggles with Discrimination.

Unit – III: GENDER AND LABOUR

Housework: the Invisible Labour (*Towards a World of Equals: Unit -3*)

“My Mother doesn’t Work.” “Share the Load.”

Women’s Work: Its Politics and Economics (*Towards a World of Equals: Unit -7*)

Fact and Fiction. Unrecognized and Unaccounted work. Additional Reading: Wages and Conditions of Work.

Unit – IV: ISSUES OF VIOLENCE

Sexual Harassment: Say No! (*Towards a World of Equals: Unit -6*)

Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading: “*Chupulu*”.

Domestic Violence: Speaking Out (*Towards a World of Equals: Unit -8*)

Is Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives. Additional Reading: New Forums for Justice.

Thinking about Sexual Violence (*Towards a World of Equals: Unit -11*)

Blaming the Victim-“I Fought for my Life....” - Additional Reading: The Caste Face of Violence.

Unit – V: GENDER : CO-EXISTENCE

Just Relationships: Being Together as Equals (*Towards a World of Equals: Unit - 12*)

Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers. Additional Reading: Rosa Parks-The Brave Heart.

Essential Reading: All the Units in the Textbook, “*Towards a World of Equals: A Bilingual Textbook on Gender*” written by A.Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu.

Note: Since it is Interdisciplinary Course, Resource Persons can be drawn from the fields of English Literature or Sociology or Political Science or any other qualified faculty who has expertise in this field from engineering departments.

Reference Books:

1. Sen, Amartya. “More than One Million Women are Missing.” *New York Review of Books* 37.20 (20 December 1990). Print. ‘*We Were Making History...*’ *Life Stories of Women in the Telangana People’s Struggle*. New Delhi: Kali for Women, 1989.
2. Tripti Lahiri. “By the Numbers: Where Indian Women Work.” *Women’s Studies Journal* (14 November 2012) Available online at: <http://blogs.wsj.com/India/real-time/2012/11/14/by-the-numbers-where-Indian-women-work/>
3. K. Satyanarayana and Susie Tharu (Ed.) *Steel Nibs Are Sprouting: New Dalit Writing From South India, Dossier 2: Telugu And Kannada* http://harpercollins.co.in/BookDetail.asp?Book_Code=3732
4. Vimala. “Vantillu (The Kitchen)”. *Women Writing in India: 600 BC to the Present. Volume II: The 20th Century*. Ed. Susie Tharu and K. Lalita. Delhi: Oxford University Press, 1995. 599-601.

5. Shatrughna, Veena et al. *Women's Work and its Impact on Child Health and Nutrition*, Hyderabad, National Institute of Nutrition, Indian Council of Medical Research. 1993.
6. Stree Shakti Sanghatana. *"We Were Making History ...' Life Stories of Women in the Telangana People's Struggle*. New Delhi: Kali for Women, 1989.
7. Menon, Nivedita. *Seeing like a Feminist*. New Delhi: Zubaan-Penguin Books, 2012
8. Jayaprabha, A. "Chupulu (Stares)". *Women Writing in India: 600BC to the Present. Volume II: The 20th Century* Ed. Susie Tharu and K. Lalita. Delhi: Oxford University Press, 1995. 596-597.
9. Javeed, Shayan and Anupam Manuhaar. "Women and Wage Discrimination in India: A Critical Analysis." *International Journal of Humanities and Social Science Invention* 2.4(2013)
10. Gautam, Liela and Gita Ramaswamy. "A 'conversation' between a Daughter and a Mother." *Broadsheet on Contemporary Politics. Special Issue on Sexuality and Harassment: Gender Politics on Campus Today*. Ed. Madhumeeta Sinha and Asma Rasheed. Hyderabad: Anveshi Research Center for Women's Studies, 2014.
11. Abdulali Sohaila. *"I Fought For My Life...and Won."* Available online at: <http://www.thealternative.in/lifestyle/i-fought-for-my-lifeand-won-sohaila-abdul/>
12. Jeganathan Pradeep, Partha Chatterjee (Ed). *"Community, Gender and Violence Subaltern Studies XI"*. Permanent Black and Ravi Dayal Publishers, New Delhi, 2000
13. K. Kapadia. *The Violence of Development: The Politics of Identity, Gender and Social Inequalities in India*. London: Zed Books, 2002
14. S. Benhabib. *Situating the Self: Gender, Community, and Postmodernism in Contemporary Ethics*, London: Routledge, 1992
15. Virginia Woolf. *A Room of One's Own*. Oxford: Black Swan. 1992.

T. Banuri and M. Mahmood, *Just Development: Beyond Adjustment with a Human Face*, Karachi: Oxford University Press, 1997

(EC0344): DIGITAL LOGIC DESIGN AND MICRO PROCESSOR LAB

Digital Logic Design Lab:

1. Implement of Logic gates using NAND and NOR gates
2. Design Full adder using gates
3. Design and implement of 4:1 MUX,8:1 MUX using gates /lcs.
4. Design and Implement of 3 to 8 decoder using gates
5. Design of 4 bit comparator using gates/IC
6. Design of Implement of 4 bit shift register using Flip flops
7. Design and Implement of Decode counter
8. Design and Implement of Asynchronous counter.

Micro Processor Lab

Write assembly language programs for the following using MASAM.

1. Write assembly language programs to evaluate the expressions:

i) $a = b + c - d * e$

ii) $z = x * y + w - v + u / k$

a. Considering 8-bit, 16 bit and 32 bit binary numbers as b, c, d, e.

b. Considering 2 digit, 4digit and 8 digit BCD numbers.

Take the input in consecutive memory locations and results also Display the results by using “int xx” of 8086. Validate program for the boundary conditions.

2. Write an ALP of 8086 to take N numbers as input. And do the following operations on them.

a. Arrange in ascending and descending order.

3. Find max and minimum Find average
 - a. Considering 8-bit, 16 bit binary numbers and 2 digit, 4digit and 8 digit BCD numbers. Display the results by using “int xx” of 8086. Validate program for the boundary conditions.
4. Write an ALP of 8086 to take a string of as input (in ‘C’ format)and do the following Operations on it.
 - a. Find the length
 - b. Find it is Palindrome or n
5. Find whether given string substring or not.
 - a. Reverse a string
 - b. Concatenate by taking another string
Display the results by using “int xx” of 8086.
6. Write the ALP to implement the above operations as procedures and call from the main procedure.
7. Write an ALP of 8086 to find the factorial of a given number as a Procedure and call from the main program which display the result.

Text Books:

1. Switching theory and logic design –A. Anand Kumar PHI,2013
2. Advanced microprocessor & Pieperar-A. K. Ray and K. M. Bherchandavi, TMH, 2nd edition.

References:

1. Switching and Finite Automatic theory-Zvi Kohavi, Niraj K.Jha Cambridge ,3rd edition
2. Digital Design –Morris Mano, PHI, 3rd edition
3. Microprocessor and Interfacing –Douglas V. Hall, TMGH 2nd edition.

(CS0325): ADVANCED DATA STRUCTURES THROUGH C LAB

1. Write C programs to implement the following using an array.
 - a) Stack
 - b) Queue
2. Write C programs to implement the following using a singly linked list.
 - a) Stack
 - b) Queue
3. Write C programs to implement the deque (double ended queue) using a doubly linked list and an array.
4. Write a C program to perform the following operations:
 - a) Insert an element into a binary search tree.
 - b) Delete an element from a binary search tree.
 - c) Search for a key element in a binary search tree.
5. Write C programs that use non-recursive functions to traverse the given binary tree in
 - a) Preorder
 - b) Inorder and
 - c) Postorder.
6. Write C programs for the implementation of BFS and DFS algorithms.
7. Write C programs for implementing the following sorting methods:
 - a) Merge sort
 - b) Heap sort
8. Write a C program to perform the following operations
 - a) Insertion into a B-tree
 - b) Deletion from a B-tree
9. Write a C program to perform the following operations
 - a) Insertion into an AVL-tree
 - b) Deletion from an AVL-tree
10. Write a C program to implement all the functions of a dictionary using hashing.

11. Write a C program for implementing Knuth-Morris- Pratt pattern matching algorithm.
12. Write a C program for implementing Boyer – Moore Patten matching algorithm

TEXTBOOKS:

1. Data structures: A Pseudocode Approach with C, 2nd edition, R.F.Gilberg and B.A.Forouzan, Cengage Learning
2. Advanced Data Structures and Algorithms, N. Sridhar, R. Siva Ranjini, SMS Education, New Delhi, India.

REFERENCES:

1. The C Programming Language, B.W. Kernighan, Dennis M.Ritchie, PHI/Pearson Education
2. C Programming with problem solving, J.A. Jones & K. Harrow, Dreamtech Press
3. Data Structures Using C – A. S. Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/Pearson education.
4. Introduction to Data Structures in C, 1/e Ashok Kamthane
5. Fundamentals of Data structures in C, 2nd Edition, E.Horowitz, S.Sahni and Susan Anderson Freed, Universities Press

(CS0326): OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB

Use Eclipse or Netbean platform and get acquainted with the various menus. Create a test project, add a test class and run it. See how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods and classes. Try debug step by step with a small program of about 10 to 15 lines which contains at least one if else condition and a for loop.

- 1) Write a Java program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception. Display the exception in a message dialog box. [Use JOption Pane –Input dialog, Message dialog]
- 2) Write a Java program to create an abstract class named Shape that contains two integers and an empty method named print Area(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method print Area () that prints the area of the given shape.
- 3) Write a Java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number.
- 4) Write a Java program that connects to a database using JDBC and does add, delete, modify and retrieve operations.
- 5) Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with “Stop” or “Ready” or “Go” should appear above the buttons in selected color. Initially, there is no message shown.
- 6) Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -, *, % operations. Add a text field to display the result. Handle any possible exceptions like divide by zero

- 7)
 - a) Develop an applet in Java that displays a simple message.
 - b) Develop an applet in Java that receives an integer in one text field, and computes its factorial value and returns it in another text field, when the button named "Compute" is clicked.
- 8) Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas. Write a Java program to display the table using Labels in Grid Layout.
- 9) Write a Java program that loads names and phone numbers from a text file where the data is organized as one line per record and each field in a record are separated by a tab (\t). It takes a name or phone number as input and prints the corresponding other value from the hash table (hint: use hash tables).
- 10) Implement the above program with the database instead of a text file.
- 11) Write a Java program that prints the meta-data of a given table

Text Books:

1. Java Fundamentals – A comprehensive Introduction, Herbert Schildt and Dale Skrien, TMH.

References:

1. Java for Programmers, P.J.Deitel and H.M.Deitel, Pearson education (OR) Java: How to Program P.J.Deitel and H.M.Deitel, PHI.
2. Object Oriented Programming through Java, P. Radha Krishna, University Press.

(HM0412): COMPUTER ORIENTED STATISTICAL METHODS

UNIT-I: Introduction to Statistics and Data Analysis: Overview: Statistical Inference, Samples, Populations, and the Role of Probability, Sampling Procedures; Collection of Data, Measures of Location: The Sample Mean and Median, Measures of Variability, Discrete and Continuous Data, Statistical Modeling, Scientific Inspection, and Graphical Diagnostics, General Types of Statistical Studies: Designed Experiment, Observational Study, and Retrospective Study.

Probability: Sample Space, Events, Counting Sample Points, Probability of an Event, Additive Rules, Conditional Probability, Independence, and the Product Rule, Bayes' Rule, Potential Misconceptions and Hazards; Relationship to Material in Other Chapters.

UNIT-II: Random Variables and Probability Distributions: Concept of a Random Variable, Discrete Probability Distributions, Continuous Probability Distributions, Joint Probability Distributions, Potential Misconceptions and Hazards; Relationship to Material in Other Chapters.

Mathematical Expectation: Mean of a Random Variable, Variance and Covariance of Random Variables, Means and Variances of Linear Combinations of Random Variables, Chebyshev's Theorem, Potential Misconceptions and Hazards; Relationship to Material in Other Chapters.

UNIT-III: Some Continuous Probability Distributions: Continuous Uniform Distribution, Normal Distribution, Areas under the Normal Curve, Applications of the Normal Distribution, Normal Approximation to the Binomial, Gamma and Exponential Distributions, Chi-Squared Distribution, Beta Distribution, Lognormal Distribution, Weibull Distribution (Optional), Potential Misconceptions and Hazards; Relationship to Material in Other Chapters.

UNIT-IV: Fundamental Sampling Distributions and Data Descriptions: Random Sampling, Some Important Statistics, Sampling Distributions, Sampling Distribution of Means and the Central Limit Theorem, Sampling Distribution of S^2 , t –Distribution, F-Distribution, Quantile and Probability Plots, Potential Misconceptions and Hazards; Relationship to Material in Other Chapters.

One and Two-Sample Estimation Problems: Introduction, Statistical Inference, Classical Methods of Estimation, Single Sample: Estimating the Mean, Standard Error of a Point Estimate, Prediction Intervals, Tolerance Limits, Two Samples: Estimating the Difference between Two Means, Paired Observations, Single Sample: Estimating a Proportion, Two Samples: Estimating the Difference between Two Proportions, Single Sample: Estimating the Variance, Two Samples: Estimating the Ratio of Two Variances, Maximum Likelihood Estimation (Optional) Potential Misconceptions and Hazards; Relationship to Material in Other Chapters.

UNIT-V: Multiple Linear Regression and Certain Nonlinear Regression Models: Introduction, Estimating the Coefficients, Linear Regression Model Using Matrices, Properties of the Least Squares Estimators, Inferences in Multiple Linear Regression, Choice of a Fitted Model through Hypothesis Testing, Special Case of Orthogonality (Optional), Categorical or Indicator Variables, Sequential Methods for Model Selection, Cross Validation, C_p , and Other Criteria for Model Selection, Special Nonlinear Models for Non ideal Conditions, Potential Misconceptions and Hazards; Relationship to Material in Other Chapters.

TEXT BOOK:

1. Probability & statistics for engineers & scientists: **Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye**, 9th ed. Pearson pub.

REFERENCE:

1. Fundamentals of probability and statistics for engineers: **T. T. Soong**, *john wiley & sons, ltd, 2004.*

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(CS0421): DESIGN AND ANALYSIS OF ALGORITHMS

UNIT I:

Introduction: Algorithm, Pseudo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, Probabilistic analysis, Amortized analysis. **Divide and conquer:** General method, applications-Binary search, Quick sort, Merge sort, Strassen's matrix multiplication.

UNIT II:

Disjoint Sets: Disjoint set operations, union and find algorithms, spanning trees. **Backtracking:** General method , applications – n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles, connected components and bi connected components.

UNIT III:

Dynamic Programming: General method, applications-Matrix chain multiplication, Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Traveling sales person problem, Reliability design.

UNIT IV:

Greedy method: General method, applications-Job sequencing with deadlines, 0/1 knapsack problem, Minimum cost spanning trees, Single source shortest path problem.

UNIT V:

Branch and Bound: General method, applications - Travelling sales person problem, 0/1 knapsack problem - LC Branch and Bound solution, FIFO Branch and Bound solution.

NP-Hard and NP-Complete problems: Basic concepts, non deterministic algorithms, NP - Hard and NP-Complete classes, Cook's theorem.

Text Books:

1. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharan, University Press.

References:

1. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson education.
2. Introduction to Algorithms, Second Edition, T. H. Cormen, C. E. Leiserson, R. L. Rivest, and C. Stein, PHI Pvt. Ltd./ Pearson Education.
3. Algorithm Design: Foundations, Analysis and Internet Examples, M.T. Goodrich and R. Tamassia, John Wiley and Sons.

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(CS0422): FORMAL LANGUAGES AND AUTOMATA THEORY

Unit I

Introduction to Finite Automata. Structural Representations. Automata and Complexity. The Central Concepts of Automata Theory Alphabets. Strings. Languages. Problems.

Deterministic Finite Automata. Definition of a Deterministic Finite Automaton. How a DFA Processes Strings. Simpler Notations for DFA's. Extending the Transition Function to Strings. The Language of a DFA

Nondeterministic Finite Automata .Definition of Nondeterministic Finite Automata. The Extended Transition Function. The Language of an NFA. Equivalence of Deterministic and Nondeterministic Finite Automata. An Application: Text Search. Finding Strings in Text. Nondeterministic Finite Automata for Text Search. A DFA to Recognize a Set of Keywords. Finite Automata with Epsilon-Transitions. Uses of e-Transitions. The Formal Notation for an e-NFA. Epsilon-Closures .Extended Transitions and Languages for e-NFA's. Eliminating e-Transitions.

UNIT II

Regular Expressions: The Operators of Regular Expressions. Building Regular Expressions. Precedence of Regular-Expression Operators. Finite Automata and Regular Expressions. From DFA's to Regular Expressions. Converting DFA's to Regular Expressions by Eliminating States. Converting Regular Expressions to Automata. Applications of Regular Expressions. Regular Expressions in UNIX. Lexical Analysis. Finding Patterns in Text. Algebraic Laws for Regular Expressions. Associativity and Commutativity. Identities and Annihilators. Distributive Laws. The Idempotent Law. Laws Involving Closures. Discovering Laws for Regular Expressions.

UNIT III

Context-Free Grammars: Definition of Context-Free Grammars, Derivations Using a Grammar. Leftmost and Rightmost Derivations. The Language of a Grammar. Sentential Forms. Parse Trees. Constructing Parse Trees. The Yield of a Parse Tree. Inference, Derivations, and Parse Trees. From Inferences to Trees. From Trees to Derivations. From Derivations to Recursive Inferences. Applications of Context-Free Grammars. Parsers. The YACC Parser-Generator. Mark-up Languages. XML and Document-Type Definitions.

Ambiguity in Grammars and Languages. Ambiguous Grammars. Removing Ambiguity From Grammars. Leftmost Derivations as a Way to Express Ambiguity.

UNIT IV

Normal Forms for Context-Free Grammars. Eliminating Useless Symbols. Computing the Generating and Reachable Symbols. Eliminating ϵ -Productions. Eliminating Unit Productions. Chomsky Normal Form.

The Pumping Lemma for Context-Free Languages. The Size of Parse Trees. Statement of the Pumping Lemma. Applications of the Pumping Lemma for CFL's.

Closure Properties of Context-Free Languages. Substitutions. Applications of the Substitution Theorem. Reversal. Intersection with a Regular Language, Inverse Homomorphism, Decision Properties of CFL's. Complexity of Converting among CFG's and PDA's. Running

Introduction to Turing Machines.

Problems That Computers Cannot Solve. Programs The Turing Machine. Notation for the Turing Machine. Instantaneous Descriptions for the Turing Machines. Transition Diagrams for Turing Machines. The Language of a Turing Machine. Turing Machines and Halting. Programming Techniques for Turing Machines. Storage in the State. Multiple Tracks. Shifting Over. Multiple Turing Machines. Equivalence of One-Tape and Multi-tape Nondeterministic Turing Machines. Restricted Turing Machine Turing Machines With Semi-infinite Tapes. Multi-stack Machines. Counter Machines. The Power of Counter Machines. Turing Machines and Computers. Simulating a Turing Machine by Computer. Simulating a Computer by a Turing Machine.

UNIT V

Undecidability: A Language that is Not Recursively Enumerable. Enumerating the Binary Strings. Codes for Turing Machines .The Diagonalization Language. An Undecidable Problem That is RE. Recursive Languages. Complements of Recursive and RE Languages. The Universal Language. Undecidability of the Universal Language. Undecidable Problems about Turing Machines. Reductions. Turing Machines that Accept the Empty Language. Rice's Theorem and Properties of the RE Languages. Problems about Turing-Machine Specifications. Post's Correspondence Problem. Definition of Post's Correspondence Problem. The "Modified" PCP.Completion of the Proof of PCP Undecidability. Other Undecidable Problems. Problems about Programs.

Text Book:

1. Introduction to Automata Theory, Languages, and Computation, 2nd Edition, John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman, Pearson Education

References:

1. Introduction to Computer Theory, Daniel I.A. Cohen, John Wiley.
2. Introduction to Languages and The Theory of Computation, John C Martic, TMH

(CS0423): SOFTWARE ENGINEERING

UNIT-I:

Introduction to Software Engineering: The evolving role of software, changing nature of software, software myths.

A Generic view of process: Software engineering- a layered technology, a process framework, the capability maturity model integration (CMMI), process patterns, process assessment, personal and team process models.

Process models: The waterfall model, incremental process models, evolutionary process models, the unified process.

UNIT-II:

Software Requirements: Functional and non-functional requirements, user requirements, system requirements, interface specification, the software requirements document.

Requirements engineering process: Feasibility studies, requirements elicitation and analysis, requirements validation, requirements management.

System models: Context models, behavioral models, data models, object models, structured methods.

UNIT-III:

Design Engineering: Design process and design quality, design concepts, the design model.

Creating an architectural design: software architecture, data design, architectural styles and patterns, architectural design, conceptual model of UML, basic structural modeling, class diagrams, sequence diagrams, collaboration diagrams, use case diagrams, component diagrams.

UNIT-IV:

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, black-box and white-box testing, validation testing, system testing, the art of debugging.

Product metrics: Software quality, metrics for analysis model, metrics for design model, metrics for source code, metrics for testing, metrics for maintenance.

UNIT-V:

Metrics for Process and Products: Software measurement, metrics for software quality.

Risk management: Reactive Vs proactive risk strategies, software risks, risk identification, risk projection, risk refinement, RMMM, RMMM plan.

Quality Management: Quality concepts, software quality assurance, software reviews, formal technical reviews, statistical software quality assurance, software reliability, the ISO 9000 quality standards.

Text Books:

1. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition, Mc Graw Hill International Edition.
2. Software Engineering- Sommerville, 7th edition, Pearson Education.
3. The unified modeling language user guide Grady Booch, James Rumbaugh, Ivar Jacobson, Pearson Education.

References:

1. Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, John Wiely.
2. Software Engineering principles and practice- Waman S Jawadekar, The Mc Graw-Hill Companies.
3. Fundamentals of object oriented design using UML Meiler page-Jones: Pearson Education.

(CS0424): OPERATING SYSTEMS

UNIT I:

Operating System Introduction, Structures - Simple Batch, Multi programmed, Time-shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, System components, Operating System services, System Calls, Virtual Machines, System Design and Implementation.

UNIX/LINUX Utilities - Introduction to Unix file system, vi editor, file handling utilities, security by file permissions, process utilities, disk utilities, networking commands, text processing utilities and backup utilities.

UNIT II:

Process and CPU Scheduling - Process concepts and scheduling, Operations on processes, Cooperating Processes, Threads, and Interprocess Communication, Scheduling Criteria, Scheduling Algorithms, Multiple -Processor Scheduling, Real-Time Scheduling.

System call interface for process management-fork, exit, wait, waitpid, exec.

Deadlocks - System Model, Deadlocks Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, and Recovery from Deadlock.

UNIT – III:

Process Management and Synchronization - The Critical Section Problem, Synchronization Hardware, Semaphores, and Classical Problems of Synchronization, Critical Regions, Monitors.

Inter process Communication Mechanisms: IPC between processes on a single computer system, IPC between processes on different systems, using pipes, FIFOs, message queues, shared memory, semaphores.

UNIT IV:

Memory Management and Virtual Memory - Logical versus Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation, Segmentation with Paging, Demand Paging, Performance of Demanding Paging, Page Replacement, Page Replacement Algorithms, Allocation of Frames, Thrashing.

UNIT V:

File System Interface and Implementation -Access methods, Directory Structure, Protection, File System Structure, Allocation methods, Free-space Management, Directory Management, Directory Implementation, Efficiency and Performance.

Unix/LINUX Files: File structure, directories, files and devices, System calls, library functions, low level file access, usage of open, create, read, write, close, lseek, stat, ioctl.

TEXT BOOKS:

1. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley
2. Advanced programming in the Unix environment, W.R.Stevens, Pearson education.

REFERENCE BOOKS:

1. Operating Systems – Internals and Design Principles Stallings, Fifth Edition– 2005, Pearson Education/PHI
2. Operating System A Design Approach-Crowley, TMH.
3. Modern Operating Systems, Andrew S Tanenbaum 2nd edition, Pearson/PHI
4. Unix programming environment, Kernighan and Pike, PHI. / Pearson Education
5. Unix Internals The New Frontiers, U.Vahalia, Pearson Education.

(CS0425): SCRIPTING LANGUAGES LAB

Practical Extraction Reporting Language (PERL)

1. a) Write a Perl script to find the largest number among three numbers.
b) Write a Perl script to print the multiplication tables from 1-10 using subroutines.
2. Write a Perl program to implement the following list of manipulating functions
 - a) Shift
 - b) Unshift
 - c) Push
3. Write a Perl script to substitute a word, with another word in a string.
4. Write a Perl script to validate IP address and email address.
5. Write a Perl script to print the file in reverse order using command line arguments

Personal Home Page (PHP).

1. Write a PHP script to print prime numbers between 1-50.
2. PHP script to
 - a. Find the length of a string.
 - b. Count no of words in a string.
 - c. Reverse a string.
 - d. Search for a specific string.
3. Write a PHP script to merge two arrays and sort them as numbers, in descending order.
4. Write a PHP script that reads data from one file and write into another file.

Python.

1. Write a python program to solve a quadratic equation.
2. a) Write a python program to find the factorial of a number.
b) Write a python program to generate Fibonacci series.
3. Write a python program to make a simple calculator.
4. Write a python program to sort words in alphabetical order.
5. Write a python program to add two matrices.

Text Books:

1. Programming Perl, 4th edition. Larry Wall, Tom Christiansen, and Jon Orwant. O'Reilly, 2012.
2. Programming PHP, 3rd edition. Rasmus Lerdorf, Kevin Tatroe, and Peter MacIntyre. O'Reilly, 2013.
3. Programming Python, 4th edition. Powerful Object-Oriented Programming. Mark Lutz. O'Reilly, 2010.

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**(CS0426): OPERATING SYSTEMS LAB
(Using UNIX/LINUX)**

Week 1

1. Write C programs to simulate the following CPU Scheduling algorithms:
a. FCFS b. SJF c. Round Robin d. priority

Week 2

1. Write C programs to illustrate the following system calls of UNIX/LINUX operating system:
(fork, exec, getpid, exit, wait)

Week 3

1. Write a C program to simulate Bankers Algorithm for Deadlock Avoidance and Prevention.

Week 4

1. Write a C program to implement the Producer – Consumer problem using semaphores using UNIX/LINUX system calls.

Weeks 5 &6

1. Write C programs to illustrate the following IPC mechanisms:
a. Pipes b. FIFOs c. Message queues d. Shared memory

Weeks 7 & 8

1. Write C programs to simulate the following memory management techniques:
a. Variable Memory technique b. Fixed Memory Technique
c. Paging d. Segmentation

Week 9

1. Write programs using the I/O system calls of UNIX/LINUX operating system:
(open, read, write, close, fcntl, seek, stat, opendir, readdir)

Weeks 10 & 11

1. Write C programs to simulate the following file organization Techniques:
 - a. Single level
 - b. Two level
 - c. Hierarchical
 - d. DAG

Week 12

1. Write C programs to simulate the following file allocation strategies:
 - a. Sequential
 - b. Linked
 - c. Indexed

Week 13

1. Write C programs to simulate the following Page Replacement Techniques:
 - a. FIFO
 - b. LRU
 - c. Optimal

TEXT BOOKS:

1. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley
2. Advanced programming in the Unix environment, W. R. Stevens, Pearson education.

REFERENCE BOOKS:

1. Operating Systems – Internals and Design Principles Stallings, Fifth Edition– 2005, Pearson Education/PHI
2. Operating System A Design Approach-Crowley, TMH.
3. Modern Operating Systems, Andrew S Tanenbaum 2nd edition, Pearson/PHI
4. Unix programming environment, Kernighan and Pike, PHI. / Pearson Education
5. Unix Internals The New Frontiers, U. Vahalia, Pearson Education.

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(CS0427): SOFTWARE ENGINEERING LAB

LIST OF EXPERIMENTS

Do the following 7 exercises for any two projects given in the list of sample projects or any other projects:

- 1) Development of problem statement.
- 2) Preparation of Software Requirement Specification Document, Design Documents and Testing Phase related documents.
- 3) Preparation of Software Configuration Management and Risk Management related documents.
- 4) Study and usage of any Design phase CASE tool
- 5) Performing the Design by using any Design phase CASE tools.
- 6) Develop test cases for unit testing and integration testing
- 7) Develop test cases for various white box and black box testing techniques.

Sample Projects:

1. Passport automation System
2. Book Bank
3. Online Exam Registration
4. Stock Maintenance System
5. Online course reservation system
6. E-ticketing
7. Software Personnel Management System
8. Credit Card Processing
9. E-book management System.
10. Recruitment system

Text Books:

1. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition, Mc Graw Hill International Edition.
2. Software Engineering- Sommerville, 7th edition, Pearson Education.
3. The unified modeling language user guide Grady Booch, James Rumbaugh, Ivar Jacobson, Pearson Education.

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(GN0492): HUMAN VALUES AND PROFESSIONAL ETHICS

Unit I Human Values: Morals, values, ethics – integrity – work ethics –service learning –civic virtue – respect for others- living peacefully - Caring –sharing –honesty – courage –valuing time – cooperation – commitment –empathy – self-confidence –spirituality – character- Mini-Cases

Unit II Professional Ethics: Profession- and professionalism - Two models of professionalism –Professional etiquette -Three types of Ethics or morality Responsibility in Engineering – Engineering standards –Engineering Ethics – Positive and Negative Faces. Professional Codes and Code of conduct of Institute of Engineers. Mini-cases.

Unit III Professional Responsibilities: Ethical standards Vs Professional Conduct – Zero Tolerance for Culpable Mistakes – Hazards and Risks- Risk benefit analysis– congeniality, collegiality and loyalty. Respect for authority – conflicts of interest –Mini-Cases.

Unit IV Professional Rights: professional rights and employee rights communicating risk and public policy – Whistle blowing - Professionals /engineers as managers, advisors, experts, witnesses and consultants – moral leadership- Regulatory compliances, Monitoring and control- Mini-Cases

Unit V Ethics in global context: Global issues in MNCs- Problems of bribery, extortion, and grease payments – Problem of nepotism, excessive gifts – paternalism – different business practices – negotiating taxes. Mini-Cases.

Mini-projects

Project 1: The student of this course should invariably attend (or watch on internet/any TV channel/ Youtube/ social media) two speeches of 30 minutes duration each dealing with spiritual discourse and submit a report on the contents of the lecture proceedings.

Project 2: Visit any organization (including shops/ hotels or shopping malls in your region) of your choice and observe how the professionals perform the given job with a focus on professional ethics and human values.

References

1. Aryasri, *Human Values and Professional Ethics*, Maruthi Publications.
2. S B George, *Human Values and Professional Ethics*, Vikas Publishing.
3. KR Govindan & Saenthil Kumar: *Professional Ethics and Human Values*, Anuradha Publications.
4. S K Chakraborty & D.Chakraborty: *Human Values and Ethics*, Himalaya.
5. M. Govindarajan, S. Natarajan, & V.S. Senthilkumar: *Engineering Ethics(Includes Human Values)*, HI Learning Pvt. Ltd., New Delhi – 110001