DEPARTMENT OF INFORMATION TECHNOLOGY
B.TECH(R-22) COURSE STRUCTURE

II YEAR I- SEMESTER

S.no	Course code	Course title	Category	L	T	P	Credits
1	22EC2117	Digital Electronics	ES	3	0	0	3
2	22CS2111	Data structures	PC	3	0	0	3
3	22BS2114	Computer oriented statistical methods	BS	3	1	0	4
4	22IT2111	Computer organization and microprocessor	PC	3	0	0	3
5	22IT2112	Introduction to IoT	PC	2	0	0	2
6	22EC2155	Digital Electronics lab	ES	0	0	2	1
7	22CS2151	Data Structures Lab	PC	0	0	3	1.5
8	22IT2151	Internet of things of lab	PC	0	0	3	1.5
9	22CS2153	Data visualization- R Programming/ Power BI	PC	0	0	2	1
10	22MC0004	Gender Sensitization	MC	0	0	2	0
			Total	14	1	12	20

II YEAR II SEMESTER

S.no	Course code	Course title	Category	L	T	P	Credits
1	22BS2211	Discrete Mathematics	BS	3	0	0	3
2	22MB2211	Business Economics & Financial Analysis	HS	3	0	0	3
3	22CS2211	Operating Systems	PC	3	0	0	3
4	22CS2212	Database Management Systems	PC	3	0	0	3
5	22IT2211	Java Programming	PC	2	0	0	2
6	22CS2251	Operating Systems Lab	PC	0	0	2	1
7	22CS2252	Database Management Systems Lab	PC	0	0	2	1
8	22IT2251	Java Programming Lab	PC	0	0	2	1
9	22IT2281	Real-time Research Project/ Societal Related Project	PW	0	0	4	2
10	22CS2254	Node JS/ React JS/ Django	PC	0	0	2	1
11	22MC0003	Constitution of India	MC	3	0	0	0
			Total	17	0	12	20

22EC2117: DIGITAL ELECTRONICS

B.Tech II Year I SEM   L T P C
                                                                    3 0 0 3

Course Objectives: The main objectives of the course is to
- Review of various number representations, understand fundamental concepts of code Conversions, Boolean theorems, various logic gates.
- Understand the minimization of switching functions using k-maps.
- Understand the design of combinational circuits.
- Understand various memory elements and their applications in sequential circuits
- Understand and learn the concepts of memories and asynchronous sequential logic circuits.

Course Outcomes: Upon completion of the course, students should be able to:
- Have a thorough knowledge about number representations, logic gates and realization of logic gates using Boolean theorems.
- Understand the k-map simplification with SOP and POS forms.
- Understand the design of Combinational circuits.
- Understand the design of flip-flops, their applications in data transfer, shift registers and counters.
- Analyze the various types of memory, programmable logic device and asynchronous sequential logic.

UNIT - I
Boolean algebra and logic gates: Digital Systems, Binary Numbers, Number base conversions, Octal and Hexadecimal Numbers, complements, Signed binary numbers, Binary codes, Binary Storage and Registers, Binary logic.
Basic Definitions, Axiomatic definition of Boolean Algebra, Basic theorems and properties of Boolean algebra, Boolean functions, canonical and standard forms, other logic operations, Digital logic gates.

UNIT - II
Gate – level minimization: The map method, Four-variable map, Five-Variable map, product of sums simplification Don't-care conditions, NAND and NOR implementation other Two-level implementations, Exclusive – Or function.

UNIT - III:
Combinational logic: Combinational Circuits, Analysis procedure Design procedure, Binary Adder-Subtractor Decimal Adder, Binary multiplier, magnitude comparator, Decoders, Encoders, Multiplexers, HDL for combinational circuits.

UNIT - IV:
Sequential logic: Sequential circuits, latches, Flip-Flops Analysis of clocked sequential circuits, state Reduction and Assignment, Design Procedure. Registers, shift Registers, Ripple counters, synchronous counters, other counters.

UNIT - V
Memories and asynchronous sequential logic: Introduction, Random-Access Memory, Memory Decoding, Error Detection and correction Read-only memory, Programmable logic Array programmable Array logic, Sequential Programmable Devices.
Introduction, Analysis Procedure, Circuits with Latches, Design Procedure, Reduction of state and Flow Tables, Race-Free state Assignment Hazards, Design Example.

TEXT BOOKS:
1. Digital Design – Third Edition, M. Morris Mano, Pearson Education/PHI.

2. Digital Principles and Applications Albert Paul Malvino Donald P. Leach TATA McGraw Hill Edition.

3. Fundamentals of Logic Design, Roth, 5th Edition, Thomson.

REFERENCE BOOKS:

1. Switching and Finite Automata Theory by Zvi. Kohavi, Tata McGraw Hill.
2. Switching and Logic Design, C.V.S. Rao, Pearson Education
3. Digital Principles and Design – Donald D.Givone, Tata McGraw Hill, Edition.
4. Fundamentals of Digital Logic and Microcomputer Design, 5TH Edition, M. Rafiquzzaman John Wiley.

22CS2111: DATA STRUCTURES

B.Tech II Year I SEM   L T P C
                                                                           3 0 0 3

Prerequisites: Programming for Problem Solving

- Introduces about dictionaries and hash table representations.
- Introduces about various search trees such as BST, B trees , B+ trees, AVL trees and Red Black trees.
- To understand the concepts of graphs and sorting techniques.
- Introduces about different pattern matching and tries algorithms.

Course Outcomes

- Select the data structures that efficiently model the information   in a problem and implement stacks, queues using arrays and   linked list.
- Summarize efficiency trade-offs among different data structure   implementations or combinations and implement Dictionaries, Hash tables.
- Identify and design advance data structure using Non linear data structure such as search trees.
- Analyze appropriate sorting technique for given problem and also implement graph traversal methods.
- Implement the concepts of Pattern Matching and Tries

UNIT - I
Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks- Operations, array and linked representations of stacks, stack applications, Queues- operations, array and linked representations.

UNIT - II
Dictionaries: linear list representation, skip list representation, operations - insertion, deletion and searching.
Hash Table Representation: hash functions, collision resolution-separate chaining, open addressing-linear probing, quadratic probing, double hashing, and rehashing, extendible hashing.

UNIT - III
Search Trees: Binary Search Trees, Definition, Implementation, Operations- Searching, Insertion and Deletion, B- Trees, B+ Trees, AVL Trees, Definition, Height of an AVL Tree, Operations – Insertion, Deletion and Searching, Red –Black, Splay Trees.

UNIT - IV
Graphs: Graph Implementation Methods. Graph Traversal Methods.
Sorting: Quick Sort, Heap Sort, External Sorting- Model for external sorting, Merge Sort.

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

TEXT BOOKS:
1. Fundamentals of Data Structures in C, 2 nd Edition, E. Horowitz, S. Sahni and Susan Anderson Freed, Universities Press.
2. Data Structures using C – A. S.Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/Pearson Education.

REFERENCE BOOKS:
1. Data Structures: A Pseudocode Approach with C, 2 nd Edition, R. F. Gilberg and B.A.Forouzan, Cengage Learning.

22BS2114: COMPUTER ORIENTED STATISTICAL METHODS

B.Tech II Year I Sem   **L T P C**
          3 1 0 4

Pre-requisites: Mathematics courses of first year of study.

Course Objectives: To learn

- The theory of Probability, Probability distributions of single and multiple random variables
- The Expectation and Discrete Probability Distributions.
- The Continuous and Sampling Distributions.
- The sampling theory, testing of hypothesis and making statistical inferences
- Stochastic process and Markov chains.

Course outcomes: After learning the contents of this paper the student must be able to
- Apply the concepts of probability and distributions to case studies.
- Formulate and solve problems involving random variables and apply statistical methods for analyzing experimental data.
- Understand the different types of discrete and continuous distributions.
- Apply concept of estimation and testing of hypothesis to case studies.
- Apply the concept of Stochastic Processes and Markov Chains in real time problems.

UNIT – I   **10L**
Probability: Sample Space, Events, Counting Sample Points, Probability of an Event, Additive Rules, Conditional Probability, Independence, and the Product Rule, Baye's Rule,
Random Variables and Probability Distributions: Concept of a Random Variable, Discrete Probability Distributions, Continuous Probability Distributions.

UNIT – II   **10L**
Expectation and discrete distributions: Mean of a Random Variable, Variance and Covariance of Random Variables, Means and Variances of Linear Combinations of Random Variables, Chebyshev's Theorem.
Discrete Probability Distributions: Binomial Distribution, Poisson distribution.

UNIT – III   **10L**
Continuous and Sampling Distributions: Uniform Distribution, Normal Distribution, Areas under the Normal Curve, Applications of the Normal Distribution, Normal Approximation to the Binomial Distributions.
Fundamental Sampling Distributions: Random Sampling, Some Important Statistics, Sampling Distributions, Sampling Distribution of Means and the Central Limit Theorem, t - Distribution, F-Distribution.

UNIT – IV   **10L**
Sample Estimation & Tests of Hypotheses: Introduction, Statistical Inference, Classical Methods of Estimation, Single Sample: Estimating the mean, standard error of a point estimate, prediction interval. Two sample: Estimating the difference between two means, Single sample: Estimating a proportion, Two samples: Estimating the difference between two proportions, Two samples: Estimating the ratio of two variances.
Statistical Hypotheses: General Concepts, Testing a Statistical Hypothesis, Single sample: Tests concerning a single mean, Two samples: tests on two means, One sample: test on a single proportion. Two samples: tests on two proportions, Two- sample tests concerning variances.

UNIT-V   **8L**

B.TECH (IT)-R22
Stochastic Processes and Markov Chains: Introduction to Stochastic processes- Markov process. Transition Probability, Transition Probability Matrix, First order and Higher order Markov process, n-step transition probabilities, Markov chain, Steady state condition, Markov analysis.

TEXT BOOKS:
1.Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye, Probability & Statistics For Engineers & Scientists, 9th Ed. Pearson Publishers.
2. S C Gupta and V K Kapoor, Fundamentals of Mathematical statistics, Khanna publications.
3. S.D.Sharma, Operations Research, Kedarnath and Ramnath Publishers, Meerut, Delhi.

REFERENCE BOOKS:
1.T.T. Soong, Fundamentals of Probability and Statistics For Engineers, John Wiley & Sons, Ltd, 2004.
2.Sheldon M Ross, Probability and statistics for Engineers and scientists, academic press.
3.Miller and Freund's, Probability and Statistics for Engineers, 8th Edition, Pearson Educations.

22IT2111: COMPUTER ORGANIZATION AND MICROPROCESSOR

B.Tech II Year I Sem   **L T P C**
                                                                            3 0 0 3

Course Objectives

- To understand basic components of computers and instruction sets, instruction formats and various addressing modes.
- To understand the architecture of the 8086 processor.
- To understand the representation of data at the machine level and how computations are performed at machine level.
- To understand the memory organization and I/O organization.
- To understand the parallelism both in terms of single and multiple processors

Course Outcomes

- Recall and summarize the principles of computer organization and the basic architectural concepts.
- Discuss the design concepts of the architecture of the 8086 processor.
- Develop assembly language programs with 8086.
- Make use of the computer arithmetic set of operations and I/O organization.
- Explain the concepts of various types pipelining, vector processing and memory organization.

UNIT - I
Digital Computers: Introduction, Block diagram of Digital Computer, Definition of Computer Organization, Computer Design and Computer Architecture.
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
Central Processing Unit: The 8086 Processor Architecture, Register organization, Physical memory organization, General Bus Operation, I/O Addressing Capability, Special Processor Activities, Minimum and Maximum mode system and timings.

UNIT - III
Assembly Language Programming with 8086- Machine level programs, Machine coding the programs, Programming with an assembler, Assembly Language example programs. Stack structure of 8086, Interrupts and Interrupt service routines, Interrupt cycle of 8086, Interrupt programming, Passing parameters to procedures, Macros, Timings and Delays.

UNIT - IV
Computer Arithmetic: Introduction, Addition and Subtraction, Multiplication Algorithms, Division Algorithms, Floating - point Arithmetic operations. Input-Output Organization: Peripheral Devices, Input- Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt, Direct memory Access, Input –Output Processor (IOP), Intel 8089 IOP.

UNIT - V
Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory, Cache Memory.
Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.

B.TECH (IT)-R22

TEXT BOOKS:
1. Computer System Architecture, M. Morris Mano, Third Edition, Pearson. (UNITS – I, IV, V)
2. Advanced Microprocessors and Peripherals, K M Bhurchandi, A. K Ray ,3rd edition, McGraw Hill India Education Private Ltd. (UNITS - II, III).

REFERENCES BOOKS:
1. Microprocessors and Interfacing, D V Hall, SSSP Rao, 3 rd edition, McGraw Hill India Education Private Ltd.
2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky: Computer Organization, 5th Edition, Tata McGraw Hill, 2002
3. Computer Organization and Architecture, William Stallings, 9th Edition, Pearson.
4. David A. Patterson, John L. Hennessy: Computer Organization and Design – The Hardware / Software Interface ARM Edition, 4th Edition, Elsevier, 2009.

22IT2112: INTRODUCTION TO IoT

B.Tech II Year I Sem   **L T P C**
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Course Objectives: The objectives of the course are to
● Understand the concepts of Internet of Things and able to build IoT applications
● Learn the programming and use of Arduino and Raspberry Pi boards.
● Known about data handling and analytics in SDN.
●Learn about sensors and Actuators with Arduino.
●Design of IoT applications in various environment.

Course Outcomes: Upon completing this course, the student will be able to
● Known basic protocols in sensor networks.
● Program and configure Arduino boards for various designs.
● Python programming and interfacing for Raspberry Pi.
● Explore IoT applications in different domains.
●To understand SDN for IOT.

UNIT – I
Introduction to Internet of Things, Characteristics of IoT, Physical design of IoT, Functional blocks of IoT, Sensing, Actuation, Basics of Networking, Communication Protocols, Sensor Networks.

UNIT - II
Machine-to-Machine Communications, Difference between IoT and M2M, Interoperability in IoT, Introduction to Arduino Programming, Integration of Sensors and Actuators with Arduino.

UNIT – III
Introduction to Python programming, Introduction to Raspberry Pi, Interfacing Raspberry Pi with basic peripherals, Implementation of IoT with Raspberry Pi, Case studies.

UNIT - IV
Implementation of IoT with Raspberry Pi, Introduction to Software defined Network (SDN), SDN for IoT, Data Handling and Analytics.

UNIT - V
Cloud Computing, Sensor-Cloud, Smart Cities and Smart Homes, Connected Vehicles, Smart Grid, Industrial IoT.
Case Study: Agriculture, Healthcare, Activity Monitoring

TEXT BOOKS:
1. Pethuru Raj and Anupama C. Raman "The Internet 'of Things: Enabling Technologies, Platforms, and Use Cases", (CRC Press)
2. Terokarvinen, kemo, karvinen and villey valtokari, "Make sensors": 1st edition, maker media, 2014

REFERENCE BOOKS:
1. Vijay Madisetti, Arshdeep Bahga, "Internet of Things: A Hands-On Approach"
2. Waltenegus Dargie,Christian Poellabauer, "Fundamentals of Wireless Sensor Networks: Theory and Practice"
3. Beginning Sensor networks with Arduino and Raspberry Pi – Charles Bell, Apress, 2013

22EC2155: DIGITAL ELECTRONICS LAB

B.Tech II Year I Sem   **L T P C**
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Course Objectives:

1. Provide practical experience with the implementation of basic and universal gates using ICs.
2. Design the code converters using digital ICs.
3. Design the combinational circuits using ICs.
4. Design the sequential circuits using ICs.
5. Realize the design of sequence detector using FSM.

Course Outcomes: Upon completing this course, the students will be able to

1. Simplify the Boolean expressions and design digital circuits using gates in various logic families.
2. Understand the use of universal gates for various digital circuits design.
3. Implement combinational circuits using ICs.
4. Use flip-flops for designing shift registers and counters.
5. Understand FSM and design sequence detector.

List of Experiments

1. Realization of Logic gates using IC's.

2. Realization of given Boolean function using universal gates .

3. Design and realize Full Adder circuit using gates/universal gates. Implement Full Subtractor using full adder.

4. Designing a 2 – bit Comparator using AND, OR and NOT gates.

5. Realize 2:1 MUX using the given gates and Design 8:1 using 2:1 MUX.

6. Implement the given Boolean function using the given MUX(ex: code converters).

7. Realize a 2x4 Decoder using logic gates and implement 3x8 Decoder using 2x4 Decoder.

8. Implement the given Boolean function using given Decoders.

9. Convert Demultiplexer to Decoder and vice versa.

10. Verification of truth tables of flipflops and also converts the given flipflop from one type to other.

11. Designing of Universal 4-bit shift register using IC.

12. Design a Synchronous binary counter using D-flipflop/given flipflop.

13. Design a asynchronous counter using given flipflops.

14. Designing of MOD 8 Counter using JK flipflops.

15. Designing of sequence detecting State Machine with minimal states using the given flipflops.

16. Design of Parity Bit(even/odd) generator using IC

17. Realize all logic gates with TTL logic.

18. Realize all logic gates with DTL logic.

   *Design a sequence detector to detect a given sequence and verify practically
   *Design a serial subtractor for 4 bit binary numbers

Major Equipment required for Laboratories:
   1. 5 V Fixed Regulated Power Supply/ 0-5V or more Regulated Power Supply.
   2. 20 MHz Oscilloscope with Dual Channel.
   3. Bread board and components/ Trainer Kit.
   4. Multimeter.

22CS2151: DATA STRUCTURES LAB

B.Tech II Year I Sem   **L T P C**
                                                                            0 0 3 1.5

Prerequisites: A Course on "Programming for problem solving".
   Course Objectives:
   - It covers various concepts of C programming language
   - It introduces searching and sorting algorithms
   - It provides an understanding of data structures such as stacks and queues.
   - To develop programming skills with a systematic approach in organizing and debugging programs in C
   - To implement data structures for problem solving

Course Outcomes:
   - Ability to develop C programs for computing and real-life applications using basic elements like control statements, arrays, functions, pointers and strings, and data structures like stacks, queues and linked lists.
   - Ability to understand a systematic approach to organizing, writing and debugging C programs
   - Ability to implement linear and non-linear data structure operations using C programs
   - Ability to solve problems implementing appropriate data structures
   - Ability to implement sorting and searching algorithms using relevant data structures

List of Experiments:

1. Write a program that uses functions to perform the following operations on singly linked list.:

i)   Creation   ii) Insertion   iii) Deletion   iv) Traversal

2.   Write a program that uses functions to perform the following operations on doubly linked list.:

i)   Creation   ii) Insertion   iii) Deletion   iv) Traversal

3.   Write a program that uses functions to perform the following operations on circular linked list.:

i)   Creation   ii) Insertion   iii) Deletion   iv) Traversal

4.   Write a program that implement stack (its operations) using

i)   Arrays ii) Pointers

5.   Write a program that implement Queue (its operations) using

i)   Arrays ii) Pointers

6.   Write a program that implements the following sorting methods to sort a given list of integers in ascending order

i)   Quick sort   ii) Heap sort   iii) Merge sort

7.   Write a program to implement the tree traversal methods(Recursive and Non Recursive).

8.   Write a program to implement

i)   Binary Search tree   ii) B Trees   iii) B+ Trees   iv)   AVL trees   v) Red - Black trees

9.   Write a program to implement the graph traversal methods.

10.   Implement a Pattern matching algorithms using Boyer- Moore, Knuth-Morris-Pratt

TEXT BOOKS:

1. Fundamentals of Data Structures in C, 2nd Edition, E. Horowitz, S. Sahni and Susan Anderson Freed, Universities Press.

2. Data Structures using C – A. S. Tanenbaum, Y. Langsam, and M. J. Augenstein, PHI/Pearson Education.

REFERENCE BOOK:

1. Data Structures: A Pseudocode Approach with C, 2nd Edition, R. F. Gilberg and B. A. Forouzan, Cengage Learning.

22IT2151: INTERNET OF THINGS LAB

B.Tech II Year I Sem   **L T P C**
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Assess the vision and introduction of IoT and understanding how M2M is connected to IOT.
●Identify the appropriate Hardware and software components of IoT for communication.
● Gain knowledge on raspberry PI platform that is widely used in IoT applications.
● Learn the implementation of distance sensor on IoT devices.
●Learn about Arduino Boards.
Course Outcomes:
● Interpret the vision of IoT from a global context, compare and contrast M2M and IOT
  Technology.
● Relate the appropriate Hardware and software components of IoT for providing the
  communication among the devices.
● Gain Awareness about Raspberry Pi devices.
● Get awareness in implementation of distance sensor
● Get the skill to program using python scripting language which is used in many IoT devices

List of Experiments
1. Using raspberry pi
a. Calculate the distance using a distance sensor.
b. Basic LED functionality.

2. Using Arduino
a. Calculate the distance using a distance sensor.
b. Basic LED functionality.
c. Calculate temperature using a temperature sensor.

3. Using Node MCU
a. Calculate the distance using a distance sensor.
b. Basic LED functionality
c. Calculate temperature using a temperature sensor.

4. Installing OS on Raspberry Pi
a) Installation using PiImager
b) Installation using image file
● Downloading an Image
● Writing the image to an SD card
● using Linux
● using Windows
● Booting up Follow the instructions given in the URL
https://www.raspberrypi.com/documentation/computers/getting-started.html
5. Accessing GPIO pins using Python
a) Installing GPIO Zero library.
First, update your repositories list:
sudo apt update
Then install the package for Python 3:
sudo apt install python3-gpiozero
b) Blinking an LED connected to one of the GPIO pin
c) Adjusting the brightness of an LED Adjust the brightness of an LED (0 to 100, where 100 means
maximum brightness) using the in-built PWM wavelength.
6. Collecting Sensor Data
a) DHT Sensor interface
● Connect the terminals of DHT GPIO pins of Raspberry Pi.

● Import the DHT library using import Adafruit_DHT
● Read sensor data and display it on screen.

TEXT BOOKS:

1. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547
2. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759

REFERENCE BOOKS:

1. Bernd Scholz-Reiter, Florian Michahelles, "Architecting the Internet of Things", ISBN 978-3- 642-19156-5 e-ISBN 978-3-642-19157-2, Springer, 2016
2. N. Ida, Sensors, Actuators and Their Interfaces, Scitech Publishers, 2014.

B.TECH (IT)-R22
22CS2153: DATA VISUALIZATION - R PROGRAMMING/ POWER BI

B.Tech II Year I Sem   **L T P C**
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Course Objectives:
- Effective use of Business Intelligence (BI) technology (Tableau) to apply data visualization
- To discern patterns and relationships in the data.
- To build Dashboard applications.
- To communicate the results clearly and concisely.
- To be able to work with different formats of data sets.

Course Outcomes: At the end of the course a student should be able to
- Understand How to import data into Tableau.
- Understand Tableau concepts of Dimensions and Measures.
- Develop Programs and understand how to map Visual Layouts and Graphical Properties.
- Create a Dashboard that links multiple visualizations.
- Use graphical user interfaces to create Frames for providing solutions to real world problems.

Lab Problems:
1. Understanding Data, What is data, where to find data, Foundations for building Data Visualizations, Creating Your First visualization?

2. Getting started with Tableau Software using Data file formats, connecting your Data to Tableau, creating basic charts(line, bar charts, Tree maps),Using the Show me panel.

3. Tableau Calculations, Overview of SUM, AVR, and Aggregate features, Creating custom calculations and fields.

4. Applying new data calculations to your visualizations, Formatting Visualizations, Formatting Tools and Menus, Formatting specific parts of the view.

5. Editing and Formatting Axes, Manipulating Data in Tableau data, Pivoting Tableau data.

6. Structuring your data, Sorting and filtering Tableau data, Pivoting Tableau data.

7. Advanced Visualization Tools: Using Filters, Using the Detail panel, using the Size panels, customizing filters, Using and Customizing tooltips, Formatting your data with colors.

8. Creating Dashboards & Storytelling, creating your first dashboard and Story, Design for different displays, adding interactivity to your Dashboard, Distributing & Publishing your Visualization.

9. Tableau file types, publishing to Tableau Online, Sharing your visualizations, printing, and Exporting.

10. Creating custom charts, cyclical data and circular area charts, Dual Axis charts.

TEXT BOOKS:
1. Microsoft Power BI cookbook, Brett Powell, 2nd edition.
2. R Programming for Data Science by Roger D. Peng.

REFERENCE BOOKS:
1. The Art of R Programming by Norman Matloff Cengage Learning India.

22MC0004: GENDER SENSITIZATION

B.Tech II Year I Sem   **L T P C**
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COURSE DESCRIPTION

This course offers an introduction to Gender Studies, an interdisciplinary field that asks critical questions about the meanings of sex and gender in society. The primary goal of this course is to familiarize students with key issues, questions and debates in Gender Studies, both historical and contemporary. It draws on multiple disciplines – such as literature, history, economics, psychology, sociology, philosophy, political science, anthropology and media studies – to examine cultural assumptions about sex, gender, and sexuality.

This course integrates analysis of current events through student presentations, aiming to increase awareness of contemporary and historical experiences of women, and of the multiple ways that sex and gender interact with race, class, caste, nationality and other social identities. This course also seeks to build an understanding and initiate and strengthen programmes combating gender-based violence and discrimination. The course also features several exercises and reflective activities designed to examine the concepts of gender, gender-based violence, sexuality, and rights. It will further explore the impact of gender-based violence on education, health and development.

Objectives of the Course
• To develop students' sensibility with regard to issues of gender in contemporary India.
• To provide a critical perspective on the socialization of men and women.
• To introduce students to information about some key biological aspects of genders.
• To expose the students to debates on the politics and economics of work.
• To help students reflect critically on gender violence.
• To expose students to more egalitarian interactions between men and women.

Learning Outcomes
☐ Students will have developed a better understanding of important issues related to gender in contemporary India.
☐ Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
☐ Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
☐ Students will acquire insight into the gendered division of labor and its relation to politics and economics.
☐ Men and women students and professionals will be better equipped to work and live together as equals.
☐ Students will develop a sense of appreciation of women in all walks of life.
☐ Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

Unit-I: UNDERSTANDING GENDER
Introduction: Definition of Gender-Basic Gender Concepts and Terminology-Exploring Attitudes towards Gender-Construction of Gender-Socialization: Making Women, Making Men
- Preparing for Womanhood. Growing up Male. First lessons in Caste.

Unit – II: GENDER ROLES AND RELATIONS
 Two or Many? -Struggles with Discrimination-Gender Roles and Relations-Types of Gender Roles-Gender Roles and Relationships Matrix-Missing Women-Sex Selection and Its Consequences-Declining Sex Ratio. Demographic Consequences-Gender Spectrum: Beyond the Binary

B.TECH (IT)-R22

Unit – III: GENDER AND LABOUR

Division and Valuation of Labour-Housework: The Invisible Labor- "My Mother doesn't Work."
"Share the Load."-Work: Its Politics and Economics -Fact and Fiction. Unrecognized and Unaccounted
work.

-Gender Development Issues-Gender, Governance and Sustainable Development-Gender and Human
Rights-Gender and Mainstreaming

Unit – IV: GENDER - BASED VIOLENCE

The Concept of Violence- Types of Gender-based Violence-Gender-based Violence from a Human
Rights Perspective-Sexual Harassment: Say No!-Sexual Harassment, not Eve-teasing- Coping with
Everyday Harassment- Further Reading: "Chupulu".

Domestic Violence: Speaking OutIs Home a Safe Place? -When Women Unite [Film]. Rebuilding
Lives. Thinking about Sexual Violence Blaming the Victim-"I Fought for my Life…."

Unit – V: GENDER AND CULTURE

Gender and Film-Gender and Electronic Media-Gender and Advertisement-Gender and Popular
Literature- Gender Development Issues-Gender Issues-Gender Sensitive Language-Gender and Popular
Literature - Just Relationships: Being Together as Equals

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

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.

☐ Classes will consist of a combination of activities: dialogue-based lectures, discussions, collaborative
learning activities, group work and in-class assignments. Apart from the above prescribed book,
Teachers can make use of any authentic materials related to the topics given in the syllabus on
"Gender".

☞ ESSENTIAL READING: The Textbook, "Towards a World of Equals: A Bilingual Textbook on
Gender" written by A.Suneetha, Uma Bhrugubanda, DuggiralaVasanta, Rama Melkote, Vasudha
Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu published by Telugu
Akademi, Telangana Government in 2015.

ASSESSMENT AND GRADING:
• Discussion & Classroom Participation: 20%
• Project/Assignment: 30%
• End Term Exam: 50%

22BS2211: DISCRETE MATHEMATICS

B.Tech II Year II Sem
L T P C
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Course Objectives:

Course Objectives: To learn
- Propositional Calculus, Predicate Logic and various proof techniques for validation of arguments.
- Set theory, functions, Relations, ordering relations.
- Algebraic Systems, Semi groups and Monoids, Lattices as Partially Ordered Sets, Boolean Algebra.
- Discrete mathematics problems that involve Permutations, combinations, Binomial, Multinomial and Inclusion-Exclusion.
- Fundamental notions and applicability of graph theory.

Course Outcomes: Students will be able to
- Understand and construct precise mathematical proofs.
- Apply Set Theory, relations, and functions in Real-world scenarios.
- Apply ordering relations in algebraic structures.
- Demonstrate the concept of permutations and combinations to problem solving.
- Apply graph theory in solving computing problems

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 Subgraphs, 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 l. Mott, Abraham Kandel, Teodore P. Baker, Prentis Hall of India, 2nd ed.

B.TECH (IT)-R22

REFERENCE BOOKS:
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.

22MB2211: BUSINESS ECONOMICS AND FINANCIAL ANALYSIS

B.Tech II Year II Sem   **L T P C**
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Course Objectives:

- To understand the concepts of business economics, objectives, scope, role & responsibilities of a manager of a business undertaking
- To analyze the market dynamics namely demand, elasticity of demand, demand forecasting and supply
- To gain the knowledge on the production theories and cost analysis while dealing with the production
- To explain the process & principles of accounting and to maintain Journal, Ledger, TrialBalance.
- To acquire the basics of how to analyze and interpret the financial statements throughratio analysis.

Course Outcomes: At the end of this course, students will demonstrates the ability to

- Determine the objectives, role & responsibilities of a manager of a business undertaking.
- Understand the demand for a product of a company, to analyze various factors influencing demand elasticity and forecast & compute the future sales level of a product.
- Examine optimum production & cost functions with the help of mathematical equations, Assess the cost behaviour, costs useful for managerial decision making.
- Apply the principle of double entry to the maintenance of books of records and explain the significance and objectives of trial balance and final accounts.
- Analyze, interpret & comment on the financial statements of a business enterprise by using ratios analysis.

Unit – I: Introduction to Business and Economics
Business: Structure of Business Firm, Theory of Firm, Types of Business Entities, Limited Liability Companies, Sources of Capital for a Company, Non-Conventional Sources of Finance. Economics: Significance of Economics, Micro and Macro Economic Concepts, Concepts and Importance of National Income, Inflation, Money Supply and Inflation, Business Cycle, Features and Phases of Business Cycle. Nature and Scope of Business Economics, Role of Business Economist, Multidisciplinary nature of Business Economics.

UNIT - II: Demand and Supply Analysis
Elasticity of Demand: Elasticity, Types of Elasticity, Law of Demand, Measurement and Significance of Elasticity of Demand, Factors affecting Elasticity of Demand, Elasticity of Demand in decision making, Demand Forecasting: Characteristics of Good Demand Forecasting, Steps in Demand Forecasting, Methods of Demand Forecasting.
Supply Analysis: Determinants of Supply, Supply Function and Law of Supply.

UNIT - III: Production, Cost, Market Structures & Pricing
Production Analysis: Factors of Production, Production Function, Production Function with one variable input, two variable inputs, Returns to Scale, Different Types of Production Functions. Cost analysis: Types of Costs, Short run and Long run Cost Functions.
Market Structures: Nature of Competition, Features of Perfect competition, Monopoly, Oligopoly, Monopolistic Competition. Pricing: Types of Pricing, Product Life Cycle based Pricing, Break Even Analysis, Cost Volume Profit Analysis.

UNIT - IV: Financial Accounting:
Accounting concepts and Conventions, Accounting Equation, Double-Entry system of Accounting, Rules for maintaining Books of Accounts, Journal, Posting to Ledger, Preparation of Trial Balance, Elements of Financial Statements, Preparation of Final Accounts (Simple Problems).

UNIT - V: Financial Ratios Analysis: Concept of Ratio Analysis, Importance and Types of Ratios, Liquidity Ratios, Turnover Ratios, Profitability Ratios, Proprietary Ratios, Solvency, Leverage Ratios – Analysis and Interpretation (simple problems).

TEXT BOOKS:
1. D. D. Chaturvedi, S. L. Gupta, Business Economics - Theory and Applications, International Book House Pvt. Ltd. 2013.
2. Dhanesh K Khatri, Financial Accounting, Tata Mc –Graw Hill, 2011.
3. Geethika Ghosh, Piyali Gosh, Purba Roy Choudhury, Managerial Economics, 2e, Tata Mc Graw Hill Education Pvt. Ltd. 2012.

REFERENCE BOOKS:
1. Paresh Shah, Financial Accounting for Management 2e, Oxford Press, 2015.
2. S. N. Maheshwari, Sunil K Maheshwari, Sharad K Maheshwari, Financial Accounting, 5e, Vikas Publications, 2013.

22CS2211: OPERATING SYSTEMS

B.Tech II Year II Sem   **L T P C**
3 0 0 3

Prerequisites:
- A course on "Computer Programming and Data Structures".
- A course on "Computer Organization and Architecture".

Course Objectives:

- Introduce operating system concepts (i.e., processes, threads, scheduling, synchronization, deadlocks, memory management, file and I/O subsystems and protection)
- Introduce the issues to be considered in the design and development of operating system
- Introduce basic Unix commands, system call interface for process management, inter process communication and I/O in Unix
- To understand I/O management and File systems.
- To be familiar with the basics of Linux system and Mobile OS like iOS and Android.

Course Outcomes:
- Will be able to control access to a computer and the files that may be shared
- Demonstrate the knowledge of the components of computers and their respective roles in computing.
- Ability to recognize and resolve user problems with standard operating environments.
- Gain practical knowledge of how programming languages, operating systems, and architectures interact and how to use each effectively.
- Understand the functionality of file systems.

UNIT - I
Operating System - Introduction, Structures - Simple Batch, Multiprogrammed, Time-shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, System components, Operating System services, System Calls
Process - Process concepts and scheduling, Operations on processes, Cooperating Processes, Threads

UNIT - II
CPU Scheduling - Scheduling Criteria, Scheduling Algorithms, Multiple -Processor 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 Interprocess Communication Mechanisms: IPC between processes on a single computer system, IPC between processes on different systems, using pipes, FIFOs, message queues, shared memory.

UNIT - IV
Memory Management and Virtual Memory - Logical versus Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation, Segmentation with Paging, Demand Paging, Page Replacement, Page Replacement Algorithms.

B.TECH (IT)-R22
UNIT - V
File System Interface and Operations -Access methods, Directory Structure, Protection, File System Structure, Allocation methods, Free-space Management. Usage of open, create, read, write, close, lseek, stat, ioctl system calls.

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, William 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.

22CS2212: DATABASE MANAGEMENT SYSTEMS

B.Tech II Year II Sem
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Prerequisites: A course on "Data Structures".

Course Objectives:
- To understand the basic database concepts, applications, data models, schemas and instances.
- To demonstrate the use of constraints and relational algebra operations.
- To become proficient in the basics of SQL and construct queries using SQL and normalization techniques.
- To demonstrate the basic concepts of transaction processing and concurrency control.
- To familiarize the concepts of database storage structures and the access techniques

Course Outcomes:
- Demonstrate the basic elements of a relational database management system.
- Ability to design entity relationship model and convert in to relational model.
- Formulate SQL queries on the data and apply normalization for the development of application software.
- Analyze transaction processing, concurrency control and recovery management techniques.
- Analyze the storage structures and indexing

UNIT - I
Database System Applications: A Historical Perspective, File Systems versus a DBMS, the Data Model, Levels of Abstraction in a DBMS, Data Independence, Structure of a DBMS
Introduction to Database Design: Database Design and ER Diagrams, Entities, Attributes, and Entity Sets, Relationships and Relationship Sets, Additional Features of the ER Model, Conceptual Design With the ER Model

UNIT - II
Introduction to the Relational Model: Integrity constraint over relations, enforcing integrity constraints, querying relational data, logical database design, introduction to views, destroying/altering tables and views. Relational Algebra, Tuple relational Calculus, Domain relational calculus.

UNIT - III
SQL: QUERIES, CONSTRAINTS, TRIGGERS: form of basic SQL query, UNION, INTERSECT, and EXCEPT, Nested Queries, aggregation operators, NULL values, complex integrity constraints in SQL, triggers and active databases.
Schema Refinement: Problems caused by redundancy, decompositions, problems related to decomposition, reasoning about functional dependencies, First, Second, Third normal forms, BCNF, lossless join decomposition, multivalued dependencies, Fourth normal form, Fifth normal form.

UNIT - IV
Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for serializability, Lock Based Protocols, Timestamp Based Protocols, Validation- Based Protocols, Multiple Granularity, Recovery and Atomicity, Log–Based Recovery, Recovery with Concurrent Transactions.

B.TECH (IT)-R22

UNIT - V
Data on External Storage, File Organization and Indexing, Cluster Indexes, Primary and Secondary Indexes, Index data Structures, Hash Based Indexing, Tree based Indexing, Comparison of File Organizations, Indexes- Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM), B+ Trees: A Dynamic Index Structure.

TEXT BOOKS:
1. Database System Concepts, Silberschatz, Korth, McGraw hill, V edition.3rd Edition
2. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata Mc Graw Hill

REFERENCE BOOKS:
1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
2. Fundamentals of Database Systems, Elmasri Navrate, Pearson Education
3. Introduction to Database Systems, C. J. Date, Pearson Education
4. Oracle for Professionals, The X Team, S.Shah and V. Shah, SPD.
5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah, PHI.
6.Fundamentals of Database Management Systems, M. L. Gillenson, Wiley Student Edition.

22IT2211: JAVA PROGRAMMING

B.Tech II Year II Sem   **L T P C**
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Course Objectives:

- To introduce object-oriented programming principles and apply them in solving problems.
- To understand interfaces, abstract classes and illustrate inheritance concepts for reusing the program.
- To introduce the concepts of exception handling and file I/O classes.
- To demonstrate multitasking by using multiple threads and event handling
- To understand the basics of java console and GUI based programming

Course Outcomes:

- Utilize the OOP techniques to solve real world problems and recognize the use of abstract classes.
- Gain knowledge on Exception handling and I/O classes.
- Understand packages and solve problems using java collection framework.
- Develop multithreaded applications with synchronization and understand JDBC.
- Design GUI based applications

UNIT - I

Foundations of Java: History of Java, Java Features, Variables, Data Types, Operators, Expressions,Control Statements. Elements of Java - Class, Object, Methods, Constructors and Access Modifiers, Generics, Inner classes, String class and Annotations.

OOP Principles: Encapsulation – concept, setter and getter method usage, this keyword. Inheritance - concept, Inheritance Types, super keyword. Polymorphism – concept, Method Overriding usage andType Casting. Abstraction – concept, abstract keyword and Interface.

UNIT – II

Exception Handling: Exception and Error, Exception Types, Exception Handler, Exception Handling Clauses – try, catch, finally, throws and the throw statement, Built-in-Exceptions and Custom Exceptions.

Files and I/O Streams: The file class, Streams, The Byte Streams, Filtered Byte Streams, The RandomAccess File class.

UNIT – III

Packages- Defining a Package, CLASSPATH, Access Specifiers, importing packages. Few Utility Classes - String Tokenizer, BitSet, Date, Calendar, Random, Formatter, Scanner.

Collections: Collections overview, Collection Interfaces, Collections Implementation Classes, Sorting in Collections, Comparable and Comparator Interfaces.

UNIT – IV

Multithreading: Process and Thread, Differences between thread-based multitasking and process- based multitasking, Java thread life cycle, creating threads, thread priorities, synchronizing threads, and inter thread communication.

Java Database Connectivity: Types of Drivers, JDBC architecture, JDBC Classes and Interfaces, Basic steps in Developing JDBC Application, Creating a New Database and Table with JDBC.

UNIT - V

GUI Programming with Swing – Introduction, limitations of AWT, MVC architecture, components, containers, Layout Manager Classes, Simple Applications using AWT and Swing.

Event Handling- The Delegation event model- Events, Event sources, Event Listeners, Event classes,Handling mouse and keyboard events, Adapter classes.

TEXT BOOKS:
1. Java The complete reference, 9th edition, Herbert Schildt, McGraw Hill Education (India) Pvt.Ltd.
2. Understanding Object-Oriented Programming with Java, updated edition, T. Budd, Pearson Education.

REFERENCE BOOKS:
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. Object Oriented Programming through Java, P. Radha Krishna, University Press.
4. Programming in Java, S. Malhotra, S. Chaudhary, 2nd edition, Oxford Univ. Press.
5. Java Programming and Object-oriented Application Development, R. A. Johnson, Cengage Learning.

22CS2251: OPERATING SYSTEMS LAB

B.Tech II Year II Sem   **L T P C**
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Prerequisites:
 A course on "Programming for Problem Solving", A course on "Computer Organization and Architecture".
Co-requisite: A course on "Operating Systems".

Course Objectives:
• To provide an understanding of the design aspects of operating system concepts through simulation
• Introduce basic Unix commands, system call interface for process management, interprocess communication and I/O in Unix

Course Outcomes:
● Simulate and implement operating system concepts such as scheduling, deadlock management, file management and memory management.
● Able to implement C programs using Unix system calls

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

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

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

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

5. Write C programs to illustrate the following IPC mechanisms a) Pipes b) FIFOs c) Message Queues d)Shared Memory

6. Write C programs to simulate the following memory management techniques a) Paging b) Segmentation

7. Write C programs to simulate Page replacement policies a) FCFS 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, William 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

22CS2252: DATABASE MANAGEMENT SYSTEMS LAB

B.Tech II Year II Sem   **L T P C**
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Co-requisites: "Database Management Systems"

Course Objectives:
• Introduce ER data model, database design and normalization
• Learn SQL basics for data definition and data manipulation

Course Outcomes:
● Design database schema for a given application and apply normalization
● Acquire skills in using SQL commands for data definition and data manipulation.
● Develop solutions for database applications using procedures, cursors and triggers

List of Experiments:
1. Concept design with E-R Model
2. Relational Model
3. Normalization
4. Practicing DDL commands
5. Practicing DML commands
6. A. Querying (using ANY, ALL, UNION, INTERSECT, JOIN, Constraints etc.)
    B. Nested, Correlated subqueries
7. Queries using Aggregate functions, GROUP BY, HAVING and Creation and dropping of Views.
8. Triggers (Creation of insert trigger, delete trigger, update trigger)
9. Procedures
10. Usage of Cursors

TEXT BOOKS:
1. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata Mc Graw Hill, 3rd Edition
2. Database System Concepts, Silberschatz, Korth, McGraw Hill, V edition.

REFERENCE BOOKS:
1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
2. Fundamentals of Database Systems, Elmasri Navrate, Pearson Education
3. Introduction to Database Systems, C.J. Date, Pearson Education
4. Oracle for Professionals, The X Team, S. Shah and V. Shah, SPD.
5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah, PHI.
6. Fundamentals of Database Management Systems, M. L. Gillenson, Wiley Student Edition.

22IT2251: JAVA PROGRAMMING LAB

B.Tech II Year II Sem   **L T P C**
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Course Objectives:
● To understand OOP principles.
● To understand the Exception Handling mechanism.
● To understand Java collection framework.
● To understand multithreaded programming.
● To understand swing controls in Java.

Course Outcomes:
   ● Able to understand object oriented way of solving problems using java.
   • Able to understand the use of inheritance, Polymorphism, abstract classes, interfaces.
   • Able to create packages and develop multithreaded applications with synchronization.
   • Able to solve problems using java collection framework and demonstrate Java Database connectivity.
   • Able to develop GUI based applications using Swing Controls in Java.

List of Experiments:
1. Use Eclipse or Net bean platform and acquaint yourself 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.

2. Write a Java program to demonstrate the OOP principles. [i.e., Encapsulation, Inheritance, Polymorphism and Abstraction]

3. Write a Java program to handle checked and unchecked exceptions. Also, demonstrate the usage of custom exceptions in real time scenario.

4. Write a Java program on Random Access File class to perform different read and write operations.

5. Write a Java program to demonstrate the working of different collection classes. [Use package structure to store multiple classes].

6. Write a program to synchronize the threads acting on the same object. [Consider the example of any reservations like railway, bus, movie ticket booking, etc.]

7. Write a program to perform CRUD operations on the student table in a database using JDBC.

8. 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 divided by zero.

9. Write a Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired. [Use Adapter classes]

REFERENCE BOOKS:
1. Java for Programmers, P. J. Deitel and H. M. Deitel, 10th Edition Pearson education.
2. Thinking in Java, Bruce Eckel, Pearson Education.
3. Java Programming, D. S. Malik and P. S. Nair, Cengage Learning.
4. Core Java, Volume 1, 9th edition, Cay S. Horstmann and G Cornell, Pearson.

22CS2254: NODE JS/REACT JS/DJANGO

B.Tech II Year II Sem   **L T P C**
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Prerequisites: Object Oriented Programming through Java, HTML Basics

Course Objectives:

● To implement the static web pages using HTML and do client side validation using JavaScript.

● To design and work with databases using Java

● To develop an end to end application using java full stack.

● To introduce Node JS implementation for server side programming.

● To experiment with single page application development using React.

Course Outcomes: At the end of the course, the student will be able to,

● Build a custom website with HTML, CSS, and Bootstrap and little JavaScript.

● Demonstrate Advanced features of JavaScript and learn about JDBC

● Develop Server – side implementation using Java technologies like

● Develop the server – side implementation using Node JS.

● Design a Single Page Application using React.

Exercises:

1. Build a responsive web application for shopping cart with registration, login, catalog and cart pages using CSS3 features, flex and grid.

2. Make the above web application responsive web application using Bootstrap framework.

3. Use JavaScript for doing client – side validation of the pages implemented in experiment 1 and experiment 2.

4. Explore the features of ES6 like arrow functions, callbacks, promises, async/await. Implement an application for reading the weather information from openweathermap.org and display the information in the form of a graph on the web page.

5. Develop a java stand alone application that connects with the database (Oracle / mySql) and perform the CRUD operation on the database tables.

6. Create an xml for the bookstore. Validate the same using both DTD and XSD.

7. Design a controller with servlet that provides the interaction with application developed in experiment 1 and the database created in experiment 5.

8. Maintaining the transactional history of any user is very important. Explore the various session tracking mechanism (Cookies, HTTP Session)

9. Create a custom server using http module and explore the other modules of Node JS like OS, path, event.

10. Develop an express web application that can interact with REST API to perform CRUD operations on student data. (Use Postman)

11. For the above application create authorized end points using JWT (JSON Web Token).

12. Create a react application for the student management system having registration, login, contact, about pages and implement routing to navigate through these pages.

13. Create a service in react that fetches the weather information from openweathermap.org and the display the current and historical weather information using graphical representation using chart.js

14. Create a TODO application in react with necessary components and deploy it into github.

REFERENCE BOOKS:

1. Jon Duckett, Beginning HTML, XHTML, CSS, and JavaScript, Wrox Publications, 2010

2. Bryan Basham, Kathy Sierra and Bert Bates, Head First Servlets and JSP, O'Reilly Media, 2nd Edition, 2008.

3. Vasan Subramanian, Pro MERN Stack, Full Stack Web App Development with Mongo, Express, React, and Node, 2nd Edition, A Press.

22MC0003: CONSTITUTION OF INDIA

B.Tech II Year II Sem   **L T P C**
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Course Objectives: Students will be able to:

• Understand the premises informing the twin themes of liberty and freedom from a civil rights perspective.

• To address the growth of Indian opinion regarding modern Indian intellectuals' constitutional role and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism.

• To address the role of socialism in India after the commencement of the Bolshevik Revolution in 1917 and its impact on the initial drafting of the Indian Constitution.

Course Outcomes: Students will be able to:

• Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.

• Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.

• Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution

• Discuss the passage of the Hindu Code Bill of 1956.

Unit – I

 History of Making of the Indian Constitution- History of Drafting Committee.

Unit – II

 Philosophy of the Indian Constitution- Preamble Salient Features

Unit –III

 Contours of Constitutional Rights & Duties - Fundamental Rights
•   Right to Equality
•   Right to Freedom
•   Right against Exploitation
•   Right to Freedom of Religion
•   Cultural and Educational Rights
•   Right to Constitutional Remedies
•   Directive Principles of State Policy
•   Fundamental Duties.

Unit – IV

Organs of Governance: Parliament, Composition, Qualifications and Disqualifications, Powers and Functions, Executive, President, Governor, Council of Ministers, Judiciary, Appointment and Transfer of Judges, Qualifications, Powers and Functions

Unit – V

Local Administration: District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation. Panchayat raj: Introduction, PRI: Zila Panchayat. Elected officials and their roles, CEO ZilaPanchayat: Position and role. Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy

Unit – VI

Election Commission: Election Commission: Role and Functioning. Chief Election Commissioner and Election Commissioners. State Election Commission: Role and Functioning. Institute and Bodies for the welfare of SC/ST/OBC and women.

Suggested Reading:

1. The Constitution of India, 1950 (Bare Act), Government Publication.

2. Dr. S. N. Busi, Dr. B. R. Ambedkar framing of Indian Constitution, 1st Edition, 2015.

3. M. P. Jain, Indian Constitution Law, 7th Edn., Lexis Nexis, 2014.

4. D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015.