**TKR COLLEGE OF ENGINEERING AND TECHNOLOGY
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DEPARTMENT OF INFORMATION TECHNOLOGY
B.TECH – Course Structure R-22

SEMESTER III

S.No.	Course Classification	Course Code	Name of the subject	L	T	P	C	I	E	Total
1	BS	D3BSPS1	Probability & Statistics	3	1	0	4	40	60	100
2	HS	D3HSBF	Business Economics & Financial Analysis	3	0	0	3	40	60	100
3	ES	D3ESCOA	Computer Organization and Architecture	3	0	0	3	40	60	100
4	PC	D63PC1	Data Structures	3	0	0	3	40	60	100
5	PC	D63PC2	Object Oriented Programming through Java	3	0	0	3	40	60	100
6	PC	D63PC3	Data Structures Lab	0	0	3	1.5	40	60	100
7	PC	D63PC4	Object Oriented Programming through Java Lab	0	0	3	1.5	40	60	100
8	ES	D3ESITE	IT Essentials Lab	0	0	2	1	40	60	100
9	MC	MCOO4	Gender Sensitization	3	0	0	0	0	0	S
			TOTAL	**15**	**1**	**10**	**20**	**320**	**480**	**800**

SEMESTER IV

S.No.	Course Classification	Course Code	Name of the subject	L	T	P	C	I	E	Total
1	PC	D64PC5	Discrete Mathematics	3	0	0	3	40	60	100
2	PC	D64PC6	Web Technologies	3	0	0	3	40	60	100
3	PC	D64PC7	Operating Systems	3	0	0	3	40	60	100
4	PC	D64PC8	Database Management Systems	3	0	0	3	40	60	100
5	PC	D64PC9	Design and Analysis of Algorithms	3	1	0	4	40	60	100
6	PC	D64PC10	Operating Systems Lab	0	0	2	1	40	60	100
7	PC	D64PC11	Database Management Systems Lab	0	0	3	1.5	40	60	100
8	PC	D64PC12	Web Technologies Lab	0	0	3	1.5	40	60	100
9	MC	MC001	Environmental Science	3	0	0	0	0	0	S
			TOTAL	**18**	**1**	**08**	**20**	**320**	**480**	**800**

L-Lecture hours per week; T-Tutorial hours per week; P-Practical hours per week; I-Internal Marks; E-External Marks; S-Satisfactory

Chairman BoS   **HOD**

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INFORMATION TECHNOLOGY

B.Tech III SEMESTER   **L/T/P/C**
                                                                                            3/1/0/4

PROBABILITY & STATISTICS (D3BSPS1)

Pre-requisites: Mathematics courses of first year of study

COURSE OBJECTIVES

To Learn:
1. Random variables that describe randomness or an uncertainty in certain realistic situation.
2. The study of discrete and continuous distribution predominantly describes important probability distribution.
3. Sampling distribution of mean, variance, point estimation and interval estimation.
4. The testing of Hypothesis of Large samples.
5. The testing of Hypothesis of small samples.
6. The basic ideas of statistics including correlation and regression.

COURSE OUTCOMES

After learning the contents of this the student must be able to learn the concept of

CO1: Random variables and various discrete and continuous probability distribution and their properties.

CO2: Calculate interval estimations of Mean and Proportion of large samples.

CO3: Make important decisions s for few samples which are taken from a large data.

CO4: Calculate Mean and Proportion and to make important decisions from large samples which are taken from normal populations.

CO5: Test the hypothesis and give the inference to the given data.

CO6: The statistical methods of studying data sample.

UNIT I: Random variables

Discrete and continuous Random variables- properties- Expectation of discrete and continuous Random variables and Variance of a sum.

UNIT II: Probability Distributions

Binomial- poison and Normal-evaluation of statistical parameters for these three distributions
and related problems.

UNIT III: Basic statistics

Correlation and regression- Rank correlation- Curve fitting by the method of least squares- fitting of straight lines- second degree parabolas- power and exponential curves

UNIT IV: Sampling distributions, Estimations and Hypothesis-I
Sampling distributions of means (σknown and unknown), Estimation theory, point estimations, Interval estimations, maximum error. Null hypothesis, alternative hypothesis, Type-1, Type-2 errors, critical region, confidence interval for mean, testing of single mean and two means, confidence interval for the proportions ,Test of hypothesis for the single proportions and difference between the proportions.

UNIT V: Testing of hypothesis – II
Small samples Test for single mean- difference of two means- test for ratio of variances- Chi-   square test for goodness of fit and independence of attributes, ANOVA.

TEXT BOOKS
1. S C Gupta and V K Kapoor, Fundamentals of Mathematical statistics, Khanna publications
2. Probability and Statistics by Dr. T.K.V. Iyengar, B. Krishna Gandhi, S.Chand publications
3. Miller and Freunds Probability and Statistics for Engineers, Pearson publications

REFERENCE BOOKS
1. B.S. Grewal- Higher Engineering Mathematics- Khanna Publishers- 40th Edition- 2015
2. S.Ross- A First Course in Probability- 6th Ed.- Pearson publications
3. Sheldon M Ross, Probability and statistics for Engineers and scientists, academic press

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B.Tech III SEMESTER   L/T/P/C
                                                                            3/0/0/3

BUSINESS ECONOMICS AND FINANCIAL ANALYSIS (D3HSBF)

COURSE OBJECTIVES
1. To learn the basic business type of the organization.
2. To acquire the knowledge and impact of the economy on business firms.
3. To analyze the business from the financial perspective.
4. To know the financial position of the company.
5. To predict the future of business

COURSE OUTCOMES
1. Analyze the total structure of the business and able to identify and classify the Different types of business entities.
2. Asses the demand and supply analyses with the help of various measures and types of Elasticity of demand.
3. Infer the knowledge about production and cost analysis for product and services.
4. Interpret the fundamental concepts related to financial accounting.
5. Predict the financial position by analyzing the financial statement of the company Through various ratios.

UNIT I: Introduction to Business and Economics
Business: Define Business, characteristics of business, Types of Business Entities, Limited Liability Companies, Sources of Capital for a Company..
Economics: Significance of Economics, Micro and Macro Economic Concepts, and Importance of National Income, Business Cycle, Features and Phases of Business Cycle. Nature and Scope of Business Economics, Role of Business Economist,

UNIT II: Demand 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: Steps in Demand Forecasting, Methods of Demand Forecasting.

UNIT III: Production, Cost, Market Structures & Pricing
Production Analysis: production function, Law of returns to scale, Internal and External Economies of Scale. **Cost analysis**: Cost concepts, Types of Costs. Break-even Analysis (BEA).**Pricing:** Types of Pricing, product life cycle, **GST** (**Goods & service Tax**). **Market Structures**- Types of competition, Features of Perfect competition, Monopoly and Monopolistic Competition, oligopoly.

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, and Preparation of Final Accounts.

UNIT V:Financial Analysis through Ratios
Concept of Ratio Analysis, Liquidity Ratios, Turnover Ratios, Profitability Ratios, Proprietary Ratios, Solvency, Leverage Ratios (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 McGraw Hill, 2011.
3. Geethika Ghosh, Piyali Gosh, Purba Roy Choudhury, Managerial Economics, 2e, Tata McGraw Hill Education Pvt. Ltd. 2012.
4. Rakesh garg,sandeepgarg,Hand book of GST in India
5. A.R. Aryasri (2011), Managerial Economics and Financial Analysis, TMH, India.

REFERENCES
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.

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INFORMATION TECHNOLOGY

B.Tech III SEMESTER   **L/T/P/C**
                                                                                                              3/0/0/3
COMPUTER ORGANIZATION AND ARCHITECTURE (D3ESCOA)

COURSE OBJECTIVES
   To impart knowledge on
   1. To understand the basic structure and operation of a digital computer.
   2. To learn the design of arithmetic unit.
   3. To understand the basics of processing unit and control signals.
   4. To study the pipelining architecture and its issues.
   5. To study the hierarchical memory system.
   6. To study the interfaces for I/O devices.

COURSE OUTCOMES
   At the end of this course, students will be able to:

   CO1: Work with the instruction set of given architecture
   CO2: Design the processing unit and trace the execution sequence of an instruction.
   CO3: Design a pipeline for consistent execution of instructions with minimum hazards
   CO4: Analyze memory hierarchy and its impact on computer cost/performance
   CO5: Design I/O circuits with suitable interfaces.

UNIT I:
BASIC STRUCTURE OF COMPUTERS
Functional units - Basic operational concepts - Performance - Instructions and instruction sequencing – Addressing modes - Arithmetic: Design of fast adders - Multiplication of unsigned and signed numbers - Fast Multiplication - Integer division - Floating point numbers and operations.

UNIT II:
BASIC PROCESSING UNIT
Fundamental concepts - Instruction Execution - Hardware Components - Instruction Fetch and Execution Steps - Control Signals - Hardwired control - CISC Styles Processors.

UNIT III:
PIPELINING
Basic concepts - Pipeline organization and issues - Data dependencies - Memory and branch delays – Performance evaluation - Pipelining in CISC processors.

UNIT IV:
MEMORY SYSTEM
Basic concepts - Semiconductor RAM - Read-only Memories - Direct Memory Access - Memory hierarchy –Cache memories - Performance considerations - Virtual memory - Secondary storage.

UNIT V:
I/O ORGANIZATION
Bus structure - Bus operation - Arbitration - Interface circuits - Interconnection standards: PCI, SCSI, SATA, USB, Firewire-SAS - Accessing I/O Devices: I/O Device Interface - Program-Controlled I/O - Interrupts.

TEXT BOOK:
1. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, and Naraig Manjikian, "Computer Organization and Embedded Systems", McGraw Hill Higher Education, Sixth Edition, 2012.

REFERENCE BOOKS
2. David A. Patterson and John L. Hennessy, "Computer Organization and Design: The Hardware / Software interface", Elsevier, Third Edition, 2005.
3. "Computer Organization", ISRD Group, Tata McGraw Hill, 2006.
4. William Stallings, "Computer Organization and Architecture - Designing for Performance", Pearson Education, Sixth Edition, 2008.

Web References:
- http://www.ics.p.lodz.pl/~dpuchala/CompArch/Lecture_6.pdf
- http://www.dauniv.ac.in/downloads/CArch_PPTs/
- http://cse.iitk.ac.in/users/karkare/courses/2011/cs220/html/notes.html
- http://nptel.ac.in/courses/106102062/
- http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-823-computer-systemarchitecture-fall-2005/

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INFORMATION TECHNOLOGY

B.Tech III SEMESTER   **L/T/P/C**
                                                                                           3/0/0/3

DATA STRUCTURES (D63PC1)

COURSE OBJECTIVES
To impart knowledge on
1. To study the design and applications of linear ADTs such as List, Stack and Queue.
2. To understand the various non-linear data structures like binary tree, binary search tree, AVL, Splay and B-tree.
3. To study the design and applications of various Heap Structures
4. To learn the various indexing techniques to avoid collision.
5. To understand the graph ADT and its applications.

COURSE OUTCOMES
At the end of this course, students will be able to:

CO1: Implement the various linear data structures using arrays and pointers
CO2: Implement the different non-linear data structures
CO3: Develop the various heap structures.
CO4: Work with searching and hashing techniques.
CO5: Apply traversal algorithms in graph.

UNIT I:
LINEAR DATA STRUCTURES
Abstract Data Type (ADT) – List – Array and linked List Implementation – Doubly Linked List- Circularly Linked List – Applications– Stack: Model – Array and linked List Implementation – Applications- Queue: Model – Array and linked List Implementation – Applications.

UNIT II:
NON-LINEAR DATA STRUCTURES – TREES I
Trees – Implementation- Tree traversal with application- Binary trees – Implementation- Expression tree – Threaded binary trees – Binary Search Tree – Applications of trees – AVL trees- Generic Programming.

UNIT III:
NON-LINEAR DATA STRUCTURES – TREES II
Splay trees –Red Black Trees- B-tree – Priority queue –Model – Implementation- Binary heap – Min heap – d-heap-Leftist heap –Skew heap- Applications of Priority Queues.

UNIT IV:
HASHING AND SET
Linear search – Binary search – Hashing- Model- Implementation – Hash Function– Separate chaining – Open addressing – Rehashing - Extendible Hashing - Disjoint Set ADT – Equivalence Relations- Dynamic Equivalence Problem – Smart union algorithms – Path compression – Applications of set.

UNIT V:
GRAPHS
Graph – Definitions – Topological sort – Breadth first traversal – Shortest path algorithms – Minimum spanning tree – Prim's and Kruskal's algorithms – Network Flow Problems- Applications of Depth first traversal – Undirected Graphs- Biconnectivity- Euler Circuits- Directed graphs.

TEXT BOOK
1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Pearson Education Asia, Second edition, 2012.

REFERENCE BOOKS
1. Jean-Paul Tremblay and Paul G. Sorenson, "An Introduction to Data Structures with Applications", TataMcGraw-Hill, New Delhi, Second Edition, 2007.
2. Thomas H. Cormen, Charles E. Leiserson, Ronald L.Rivest, Clifford Stein, "Introduction to Algorithms", Mcgraw Hill, Third Edition, 2009.
3. Reema Thareja, "Data Structures Using C", Oxford University Press, Second Edition, 2014.
4. Alfred V. Aho, John E. Hopcroft and Jeffry D. Ullman, "Data Structures and Algorithms", Pearson Education, New Delhi, 2006.
5. Seymour Lipschutz, "Data structures with C (Schaum's Outline series)", Tata McGraw Hill Education,First edition, 2010.

Web References
- http://172.16.16.210/index.php/nptel-video-courses/video-cse/video-cse-data-structures-algorithms
- http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-851-advanced-data-structuresspring-2012/
- http://courses.cs.vt.edu/~csonline/DataStructures
- http://cslibrary.stanford.edu/103/LinkedListBasics.pdf
- www.cs.cornell.edu/courses/cs312/2005sp/lectures/rec19.html

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B.Tech III SEMESTER   **L/T/P/C**
                                                                           3/0/0/3

OBJECT ORIENTED PROGRAMMING THROUGH JAVA (D63PC2)

COURSE OBJECTIVES
To impart knowledge on
- To comprehend the art of programming and in particular the structure and meaning of basic Java programs
- To study exception handling and generic classes and methods in Java
- To enable the students to understand the concepts of Stream and Files
- To enable the students to create GUI applications and perform event handling functionalities

COURSE OUTCOME
At the end of the course, the students will be able to
- Develop new classes that inculcates pure object oriented concepts
- Create classes that can handle any generic data type and handles exceptions
- Create application program using Streams and File concept
- Build application programs with Graphical User Interface (GUI)
- Design multithreaded programs in java.

UNIT I:
OBJECT ORIENTED PROGRAMMING CONCEPTS
Class Fundamentals - Using predefined classes - Defining own class - Object reference - Constructors - Access control –Modifiers – Methods - Dealing with Static Members and Methods - Method Overloading - Abstract Class - Interfaces - Importing Packages - Understanding Class Path - Implementing Packages - Java Doc Comments – Inheritance – Polymorphism - Object – Cosmic Super Class – Reflection - Object Cloning - Nested Class - Inner Class - Anonymous Classes

UNIT II:
EXCEPTION/ERROR HANDLING AND GENERICS
Garbage Collection - Finalize () Method - Exceptions & Errors - Types of Exception - Control Flow In Exceptions – Use of try - catch - finally - throw - throws in Exception Handling - In-built and User Defined Exceptions - Checked and Un Checked Exceptions - Defining Generic Class - Generic Methods - Restrictions and Limitations - Inheritance Rules for Generic Types - Wild Card Types - Reflection and Generics - Collection Framework - Collection Types - Map/List/Set Implementations - Array List / Linked List / Hash Set Collection Classes-Lambda Expressions – Method references functional interfaces- Optional class.

Unit III:
STREAMS AND FILES
Streams – Reading and Writing Bytes – Stream Hierarchy – Combining Stream Filters - Text Input and Output – Saving Objects in Text format – Character Sets - Reading and Writing Binary Data – Zip Archives – Object Streams and Serialization – Object Serialization File format – Serialization mechanism – Serializing singletons – Typesafe Enumeration –Versioning – Working with Files – Memory Mapped files

UNIT IV:
APPLICATION PROGRAMMING WITH GUI
Event - Driven Programming - The Event Delegation Model - Event Classes - Event Sources - Event Listeners - Adapter Classes - Anonymous Inner classes - Actions - Keyboard and Mouse Event Handling - AWT Event Hierarchy - Introduction to Swings - Frame - Components - Text Input - Choice Components - Menus - Dialog Box – Layout Management - Working with 2D shapes - Shapes - Using Colors and Fonts - Displaying Images - Accessing Databases with JDBC - Deploying Applications and Applets - Applet Life - Cycle - Applet Architecture - Parameters to Applet – 48 Adding Controls - Embedding Applets in Web Page

UNIT V:
MULTI THREADING
Multi-Threaded Programming - Thread States - Thread Life - Cycle - Thread Properties - Thread Priorities - Synchronizing Threads - Mutex – Semaphores - Inter-Thread Communication - Dead Lock Handling - Executors.

TEXT BOOK
1. Cay S. Horstmann, Gary Cornell, "Core Java: Volume I – Fundamentals", Prentice Hall, Tenth Edition, 2015.
2. Cay S. Horstmann, Gary Cornell, "Core Java: Volume II – Fundamentals", Prentice Hall, Tenth Edition, 2016

REFERENCE BOOK
1. P.J.Deitel&H.M.Deitel, "Java: How to Program Java 2", Prentice Hall, Seventh Edition, 2011.
2. Herbert Schildt, "Java The Complete Reference",TataMcgrawHill, Ninth Edition, 2014.
3. E.BalaGurusamy, "Programming with java A Primer", Tata McGraw Hill Education, Fourth Edition, 2009
4. Paul Deitel ,Harvey Deitel " Java SE8 for Programmers", Pearson Education, Third Edition,2014

Extensive Reading:
- http://www.kodejava.org/
- http://docs.oracle.com/javase/tutorial/
- http://www.devx.com/
- http://horstmann.com/corejava
- http://www.oracle.com/technetwork/java/index.html
- http://www.tutorialspoint.com

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INFORMATION TECHNOLOGY

B.Tech III SEMESTER   L/T/P/C
                                                                                       0/0/2/1

DATA STRUCTURES LAB (D63PC3)

COURSE OBJECTIVES
To impart knowledge on
1. To study the design and applications of linear ADTs such as List, Stack and Queue.
2. To understand the various non-linear data structures like binary tree, binary search tree, AVL, Splay and B-tree.
3. To study the design and applications of various Heap Structures
4. To learn the various indexing techniques to avoid collision.
5. To understand the graph ADT and its applications.

COURSE OUTCOMES
At the end of this course, students will be able to:

CO1: Implement the various linear data structures using arrays and pointers

CO2: Implement the different non-linear data structures

CO3: Develop the various heap structures.

CO4: Work with searching and hashing techniques.

CO5: Apply traversal algorithms in graph.

LIST OF EXERCISES
1 Lists and its applications
2 Stacks and its applications
3 Queues and its applications
4 Binary Search tree
5 Set ADT
6 AVL tree
7 Splay tree
8 Red black tree
9 Binary Heap
10 Leftist heap
11 Graph traversal and spanning tree
12 Hashing

TEXT BOOK
1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Pearson Education Asia, Second edition, 2012.

REFERENCE BOOKS
1. Jean-Paul Tremblay and Paul G. Sorenson, "An Introduction to Data Structures with Applications", TataMcGraw-Hill, New Delhi, Second Edition, 2007.
2. Thomas H. Cormen, Charles E. Leiserson, Ronald L.Rivest, Clifford Stein, "Introduction to Algorithms", Mcgraw Hill, Third Edition, 2009.
3. Reema Thareja, "Data Structures Using C", Oxford University Press, Second Edition, 2014.
4. Alfred V. Aho, John E. Hopcroft and Jeffry D. Ullman, "Data Structures and Algorithms", Pearson Education, New Delhi, 2006.
5. Seymour Lipschutz, "Data structures with C (Schaum's Outline series)", Tata McGraw Hill Education,First edition, 2010.

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INFORMATION TECHNOLOGY

B.Tech III SEMESTER   **L/T/P/C**
                                                                                                    0/0/3/1.5

OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB (D63PC4)

COURSE OBJECTIVES
To impart knowledge on
- To Effectively use the Java SDK environment to create, debug and run simple Java programs
- To understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc
- Understand how to create graphical interfaces
- Use Multithreading and Generics in java programs

COURSE OUTCOME
At the end of the course, the students will be able to
- Construct Java Programs using Fundamental Programming Structures
- Create classes that conform to the Interface
- Build Java Programs that use Graphical User Interface (GUI) with IO Streams
- Plan novel ways of using Generics and Multithreaded programming in Java

PRACTICAL EXPERIMENTS
1. Basic Java programs.
2. Programs using Interfaces.
3. Programs using Packages.
4. Programs using Function overloading.
5. Programs using Inheritance.
6. Programs using Files and IO streams.
7. Programs using Exception handling mechanism.
8. Programs using Generics.
9. Programs using AWT.
10. Programs using Swing.
11. Programs using JDBC.
12. Programs using Multi threading

TEXT BOOK
1. Cay S. Horstmann, Gary Cornell, "Core Java: Volume I – Fundamentals", Prentice Hall, Tenth Edition, 2015.
2. Cay S. Horstmann, Gary Cornell, "Core Java: Volume II – Fundamentals", Prentice Hall, Tenth Edition, 2016

REFERENCE BOOK

1. P.J.Deitel&H.M.Deitel, "Java: How to Program Java 2", Prentice Hall, Seventh Edition, 2011.
2. Herbert Schildt, "Java The Complete Reference",TataMcgrawHill, Ninth Edition, 2014.
3. E.BalaGurusamy, "Programming with java A Primer", Tata McGraw Hill Education, Fourth Edition, 2009
4. Paul Deitel ,Harvey Deitel " Java SE8 for Programmers", Pearson Education, Third Edition,2014

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INFORMATION TECHNOLOGY

B.Tech III SEMESTER   **L/T/P/C**
                                                                                                  0/0/2/1

IT ESSENTIALS LAB (D3ESITE)

COURSE OBJECTIVES

To impart knowledge on

- To learn Markup languages and style sheets for web design
- To get familiarized with JavaScript
- To demonstrate the usage of blogs
- To understand the working of databases

COURSE OUTCOME

At the end of the course, the students will be able to

- Design web page using Markup languages and cascading style sheets
- Design a web page using JavaScript
- Develop a blog using word press
- Create a database and visualize it

PRACTICAL EXPERIMENTS

1. Implement basic tags in HTML5
2. Implement form validation using HTML5
3. Create a webpage with image, audio and video in HTML5
4. Implement form validation using CSS
5. Develop a web page using CSS
6. Implement basic JavaScript programs
7. Implement functions and event handling in JavaScript
8. Implement form validation using JavaScript
9. Create a blog using word press
10. Develop a database application using MS Access and visualize using QLIK

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B.Tech III SEMESTER   **L/T/P/C**
                                                                           3/0/0/0

GENDER SENSITIZATION (MCOO4)

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.

COURSE OBJECTIVESs
- 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.

Course Outcome
- 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

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.

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.**

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INFORMATION TECHNOLOGY

B.Tech IV SEMESTER   L/T/P/C
                                                                                          3/0/0/3

DISCRETE MATHEMATICS (D64PC5)

COURSE OBJECTIVES
- Introduces elementary discrete mathematics for computer science and engineering.
- Topics include formal logic notation, methods of proof, induction, sets, relations, algebraic structures, elementary graph theory, permutations and combinations, counting principles; recurrence relations and generating functions.

COURSE OUTCOMES
- Understand and construct precise mathematical proofs
- Apply logic and set theory to formulate precise statements
- Analyze and solve counting problems on finite and discrete structures
- Describe and manipulate sequences
- Apply graph theory in solving computing problems

UNIT I: LOGIC AND PROOFS
Basic connectives and truth tables - Logical equivalences and implications - Propositional logic - First order logic - Laws of logic - Rules of inference - Inference theory - Statement calculus - Quantifiers - Predicate calculus – Proof methods and strategy.

UNIT II: INDUCTION AND COMBINATORICS
Mathematical induction –The basics of counting –Permutations and combinations – Recurrence relations – Solving linear recurrence relations – Generating functions – Inclusion and exclusion and its applications

UNIT III: BASIC GRAPH THEORY
Introduction to graphs – Terminology – Directed and undirected graphs – Adjacency and incidence matrices – Paths – Euler and Hamiltonian paths – Tree – Properties – Spanning tree – Matching and coloring (Definitions and examples).

UNIT IV: ALGEBRAIC STRUCTURE
Semi groups and monoids – Groups – Subgroups and homomorphism's – Cosets and Lagrange's theorem.

UNIT V: RELATIONS AND FUNCTIONS
Relations Properties of Binary relations, equivalence, transitive closure, compatibility and partial ordering Relations, Hasse diagram Functions: Inverse function, composition of functions, recursive functions.

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.

REFERENCE BOOKS
1. Koshy,"Discrete Mathematics with Applications", Elsevier Publications, 2006.
3. Veerarajan T., "Discrete Mathematics with Graph Theory" , Tata McGraw-Hill Education,   2017.

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INFORMATION TECHNOLOGY

B.Tech IV SEMESTER   **L/T/P/C**
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WEB TECHNOLOGIES (D64PC6)

COURSE OBJECTIVES
To impart knowledge on
- To understand and practice HTML,CSS and Javascript
- To understand and practice Server-side JS Framework
- To work with Express, a Node.js web application framework
- To understand the concepts of TypeScript and practice Client-side JS Framework.
- To work with built-in services and to create our own customized Services

COURSE OUTCOME
At the end of the course, the students will be able to
- Create an interactive Website
- Acquire knowledge about Server-side JS framework
- Implement Express middleware.
- Familiarize with Typescript
- Explore Angular features and create component based web pages using them

UNIT I:
HTML5, CSS AND JAVASCRIPT
Learning HTML –Make it Prettier with CSS-Loading background images into HTML elements-Organizing your files- Learning JavaScript-Variables-Controlling HTML and CSS-Organizing your JavaScript code.

UNIT II:
INTRODUCTION TO NODE.JS
Understanding Node.js - Installing Node.js - Working with Node Packages - Creating a Node.js Application – Writing Data to the Console - Understanding the Node.js Event Model - Working with JSON - Processing URLs – Processing Query Strings and Form Parameters - Understanding Request, Response, and Server Objects – Implementing HTTP Clients and Servers in Node.js - Implementing HTTPS Servers and Clients

UNIT III:
EXPRESS IN NODE.JS
Getting Started with Express - Configuring Routes - Using Requests Objects - Using Response Objects – Setting Headers Setting the Status Sending Response Implementing a Template Engine - Understanding Middleware – Using the query Middleware - Serving Static Files - Handling POST Body Data Sending and Receiving Cookies - Implementing Sessions - Applying Basic HTTP Authentication - Implementing Session Authentication – Creating Custom Middleware

UNIT IV:
ANGULAR
Jumping into TypeScript - Learning the Different Types Understanding Interfaces - Implementing Classes - Implementing Modules - Understanding Functions - Why Angular? Understanding Angular - Adding Angular to Your Environment-Using the Angular CLI - Creating a Basic Angular Application Angular Components – Component Configuration - Building a Template-Injecting Directives – Expressions - Using Expressions - Using Pipes - Building a Custom Pipe

UNIT V:
MODELING CONCEPTS AND TECHNIQUES
Data Binding - Built-in Directives - Understanding Directives Using Built-in Directives - Events and Change Detection - Using Browser Events - Emitting Custom Events - Using Observables - Understanding Angular Services - Using the Built-in Services - Implementing a Simple Mock Server Using the http Service

TEXT BOOKS
1. Brad Dayley, Brendan Dayley ,Caleb "Node.js, MongoDB and Angular Web Development" Second Edition,Addison-Wesley,2018
2. BRex van der Spuy "Foundation Game Design with HTML5 and JavaScript" Apress / friends of ED,2012

REFERENCE BOOKS
1. Nathan Rozentals, "Mastering TypeScript", April 2015
2. Nate Murray, Felipe Coury, Ari Lerner and Carlos Taborda, "ng-book, The Complete Book on Angular 4"September 2016
3. AmolNayak, "MongoDB Cookbook Paperback" , November 2014
4. KrasimirTsonev, "Node.js by Example Paperback", May 2015

Extensive Reading
- https://www.typescriptlang.org/
- https://angular.io/
- https://nodejs.org/en/
- https://www.mongodb.com/

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INFORMATION TECHNOLOGY

B.Tech IV SEMESTER   **L/T/P/C**
                                                                          3/0/0/3

OPERATING SYSTEMS (D64PC7)

COURSE OBJECTIVES

- To gain insight knowledge on performance and working of an operating system.

COURSE OUTCOMES
The student will be able to
- Able to understand the basic overview of operating systems and system calls
- Ability to solve synchronization problem with Two-Process solution, Petersons solutions and apply the concepts of minimization of turnaround time, waiting time and response time to find CPU scheduling Problems
- Apply the page replacement algorithms to identify the page fault in the given string.
- Able to distinguish between file access methods and allocation methods.
- Ability to apply Bankers Algorithm to avoid deadlocks and change access controls to protect files.

UNIT I
OVERVIEW
Introduction-Operating system objectives, User view, System view, Operating system definition, Computer System Architecture, OS Structure, OS Operations, Process Management, Memory Management, Storage Management, Computing Environments. Operating System services, User and OS Interface, System Calls, Types of System Calls, System Programs, Operating System Design and Implementation.

UNIT II
CPU SCHEDULING
Concepts-The Process, Process State, Process Control Block, Threads, Process Scheduling-Scheduling Queues, Schedulers, Context Switch, Operations on Processes, Inter-process communication-ordinary pipes and named pipes, message queues.
Process Scheduling: Basic concepts, Scheduling Criteria, Scheduling algorithms, Multiple-Processor Scheduling, Real-Time Scheduling, Thread scheduling. Process Synchronization, Background, The Critical Section Problem, Peterson"s solution, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors.

UNIT III
MEMORY MANAGEMENT
Memory Management Strategies- Background, Swapping, ContiguousMemory Allocation,Segmentation, Paging, Structure of Page Table. **Virtual Memory**

Management: Background, Demand Paging, Copy-on-Write, Page Replacement, PageReplacement Algorithms, Allocation of Frames, Thrashing, Virtual memory in Windows.

UNIT IV
STORAGE MANAGEMENT
File System- Concept of a File, System calls for file operations - open (), read (), write (), close (), seek (), unlink (), Access methods, Directory and Disk Structure, File System Mounting, File Sharing. **File System Implementation:** File System Structure, File System Implementation, Directory Implementation, Allocation methods, Free-space Management, Efficiency, and Performance.

UNIT V
DEADLOCKS
System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, and Recovery from Deadlock.
Protection: System Protection, Goals of Protection, Principles of Protection, Domain of Protection, Access Matrix, Implementation of Access Matrix, Access Control, Revocation of Access Rights, Capability-Based Systems, Language-Based Protection.

TEXT BOOKS
1. Operating System Concepts , Abraham Silberschatz, Peter B. Galvin, Greg Gagne, 8th Edition,Wiley, 2016 India Edition
2. Operating Systems – Internals and Design Principles, W. Stallings, 7th Edition, Pearson.

REFERENCE BOOKS
1. Modern Operating Systems, Andrew S Tanenbaum, 3rd Edition, PHI
2. Operating Systems: A concept-based Approach, 2nd Edition, D.M. Dhamdhere, TMH.
3. Principles of Operating Systems, B. L. Stuart, Cengage learning, India Edition.
4. An Introduction to Operating Systems, P.C.P. Bhatt, PHI.
5. Principles of Operating systems, Naresh Chauhan, Oxford University Press.

UNIT III
LOGICAL DATABASE DESIGN
Need for good database design – Functional Dependencies and Keys – Closure of Functional Dependencies Set – Closure of attributes - Dependency Preservation - Decomposition using functional dependencies – Atomic domains and First Normal Form – Second Normal Form – Third Normal Form – Boyce Codd Normal Form – Multivalued Dependencies - Decomposition using Multivalued dependencies – Fourth Normal Form – Join Dependencies – Fifth Normal Form – Introduction to Domain Key Normal Form – Case Studies

UNIT IV
DATABASE TRANSACTIONS AND CONCURRENCY CONTROL
Transaction Model– ACID properties – Transaction States – Serializability - Conflict serializability – View Serializability – Testing Serializability - Concurrency Control – Lock Based Protocols – Deadlocks – Multiple Granularity – Time Stamp Based Protocols – Validation Based Protocols – Multi Version Schemes – Recovery System – Failure Classification – Storage – Recovery and Atomicity – Recovery Algorithm.

UNIT V
QUERY PROCESSING AND OPTIMIZATION
Query Processing - Measures of Query Cost - Selection– Sorting - Join Operation – Other Operations - Evaluation of Expressions – Query Tuning - Query Optimization - Transformation of Relational Expressions - Estimating Statistics of Expression Results - Choice of Evaluation Plans – Materialized Views.

TEXT BOOK
1. Henry F Korth, Abraham Silberschatz, S. Sudharshan, "Database System Concepts", McGraw Hill, Sixth Edition, 2011.

REFERENCE BOOKS
1. R. Elmasri, S.B. Navathe, "Fundamentals of Database Systems", Pearson Education/Addison Wesley, Sixth Edition, 2010.
2. Thomas Cannolly and Carolyn Begg, "Database Systems, A Practical Approach to Design, Implementation and Management", Pearson Education, Fifth Edition, 2009.
3. C.J.Date, A.Kannan and S.Swamynathan, "An Introduction to Database Systems", Pearson Education, Eighth Edition, 2006.
4. Raghu Ramakrishnan, Johannes Gehrke, "Database Management Systems", McGraw Hill, Third Edition, 2004.

Extensive Reading:
- http://www.1keydata.com/datawarehousing/data-modeling-levels.html
- http://www.cs.uwaterloo.ca/~gweddell/cs448/Arch.pdf
- http://www.sql-tutorial.net/SQL-tutorial.asp
- http://sqlzoo.net/
- http://www.service-architecture.com/database/articles/ acid_properties. Html
- http://www.orafaq.com/wiki/Oracle_database_Performance_Tuning_FAQ

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INFORMATION TECHNOLOGY

B.Tech IV SEMESTER   **L/T/P/C**
                                                                            3/1/0/4

DESIGN AND ANALYSIS OF ALGORITHMS (D64PC9)

COURSE OBJECTIVES
- To analyze performance of algorithms.
- To choose the appropriate data structure and algorithm design method for a specified application.
- To understand how the choice of data structures and algorithm design methods impacts theperformance of programs.
- To solve problems using algorithm design methods such as the greedy method, divide and conquer, dynamic programming, backtracking and branch and bound.
- To understand the differences between tractable and intractable problems.
- To introduce P and NP classes.

COURSE OUTCOMES
- Able to analyze the performance of the algorithm in terms of time and space & apply the concept ofdivide & conquer method on various examples.
- Able to find out the solution for the given example problems by using Backtracking & apply theconcept of graph problems on various examples.
- Able to solve the problems with Greedy method for the given example problems.
- Able to solve optimization problems using Dynamic Programming.
- Able to solve the given example problems using Branch & Bound and design the deterministic & non deterministic algorithms and categorize them as a Np-hard and Np-complete problems accordingly.

UNIT I
INTRODUCTION
Introduction: Algorithm definition, Algorithm specification, Performance analysis.
Divide and conquer- General method, applications - Binary search, Merge sort, Quick sort, Strassen's Matrix Multiplication.

UNIT II
DISJOINT SET OPERATIONS
Disjoint set operations, union and find algorithms, AND/OR graphs, Graph Traversals, Connected Components and Spanning trees, Bi-connected components Backtracking-General method, applications- The 4-queen problem, The 8-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles.

UNIT III
GREEDY METHOD

General method, applications- Knapsack problem, Job sequencing with deadlines, Minimum cost spanning trees, Single source shortest path problem.

UNIT IV
DYNAMIC PROGRAMMING

General Method, applications- Chained matrix multiplication, All pairs shortest path problem, Optimal binary search trees, 0/1 knapsack problem, Reliability design, Traveling sales person problem.

UNIT V
BRANCH AND BOUND

General Method, applications-0/1 Knapsack problem, LC Branch and Bound solution, FIFO Branch and Bound solution, Traveling sales person problem. 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, 2nd Edition, Ellis Horowitz, Sartaj Sahni and S. Rajasekharan, Universities Press.
2. Design and Analysis of Algorithms, P. H. Dave, H. B. Dave, 2nd edition, Pearson Education.

REFERENCE BOOKS
1. Algorithm Design: Foundations, Analysis and Internet examples, M. T. Goodrich and R. Tomassia, John Wiley and sons.
2. Design and Analysis of Algorithms, S. Sridhar, Oxford Univ. Press
3. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson Education.
4. Foundations of Algorithms,, R. Neapolitan and K. Naimipour, 4th edition, Jones and Bartlett Student edition.
5. Introduction to Algorithms, 3rd Edition, T. H. Cormen, C. E. Leiserson, R. L. Rivest, and C. Stein, PHI.

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INFORMATION TECHNOLOGY

B.Tech IV SEMESTER   **L/T/P/C**
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OPERATING SYSTEMS LAB (D64PC10)

COURSE OBJECTIVES
- To write shell scripts to solve problems.
- To implement some standard Linux utilities such as ls,cp etc using system calls.
- To understand the operating System functionalities

COURSE OUTCOMES
- Ability to understand the Linux environment
- Ability to perform the file management and multiple tasks using shell scripts in Linux Environment.
- Able to implement various Scheduling algorithms.
- Able to detect and solve deadlocks.

PRACTICAL EXPERIMENTS
LINUX
1. Write a shell script that accepts a file name, starting and ending line numbers as arguments and displaysall the lines between the given line numbers.
2. Write a shell script that deletes all lines containing a specified word in one or more files supplied asarguments to it.
3. Write a shell script that displays a list of all the files in the current directory to which the user has read,write and execute permissions.
4. Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file or a directory and reports accordingly. Whenever the argument is a file, the number oflines on it is also reported.
5. Write a shell script that accepts a list of file names as its arguments, counts and reports the occurrence of each word that is present in the first argument file on other argument files.
6. Write a shell script to list all of the directory files in a directory.
7. Write a shell script to find factorial of a given integer.
8. Write an awk script to count the number of lines in a file that do not contain vowels.
9. Write an awk script to find the number of characters, words and lines in a file.
10. Implement in C the following Linux commands using System calls a) cat b) mv

OPERATING SYSTEMS

1. Simulate the following CPU scheduling algorithms
    a) Round Robin b) SJF c) FCFS d) Priority
2. Simulate all file allocation strategies
    a) Sequential b) Indexed
3. Simulate MVT and MFT
4. Simulate all File Organization Techniques
    a) Single level directory b) Two level c) Hierarchical
5. Simulate Bankers Algorithm for Dead Lock Avoidance
6. Simulate Bankers Algorithm for Dead Lock Prevention
7. Simulate all page replacement algorithms
    a) FIFO b) LRU

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INFORMATION TECHNOLOGY

B.Tech IV SEMESTER   **L/T/P/C**
                                                                        0/0/3/1.5

DATABASE MANAGEMENT SYSTEMS LAB (D64PC11)

COURSE OBJECTIVES
To impart knowledge on
- To persuade different issues involved in the design and implementation of a database system for real time applications
- To speculate sophisticated queries to extract information from the large datasets available
- To schematize several database projects related to an information technology problem based on given requirements

COURSE OUTCOME
At the end of the course, the students will be able to
- Populate and query a database using SQL DML/DDL commands
- Declare and enforce integrity constraints on a database using a state-of-the-art RDBMS
- Programming PL/SQL including stored procedures, stored functions, cursors, packages
- Design and build a GUI application using any programming language as front end

PRACTICAL EXPERIMENTS
1. Database Design using ER Diagram and Apply Normalization
2. Data Definition Language Commands
3. Data Manipulation Language Commands
4. Data Control Language, Nested Queries
5. Set operators and Join Queries
6. Views and Indexes
7. PL/SQL – Triggers
8. PL/SQL – Functions
9. PL/SQL – Procedures
10. OORDBMS
11. Front end Tools
12. Form / Menu Design / Report
13. OLTP concepts

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INFORMATION TECHNOLOGY

B.Tech. IV SEMESTER   **L/T/P/C**
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WEB TECHNOLOGIES LAB (D64PC12)

COURSE OBJECTIVES
To impart knowledge on
- To understand and work with HTML,CSS and Javascript
- To understand and practice Server-side JS Framework
- To work with Express, a Node.js web application framework
- To understand the concepts of TypeScript and practice Client-side JS Framework.
- To work with built-in services and to create our own customized Services

COURSE OUTCOME
At the end of the course, the students will be able to
- Create an interactive Webpage
- Build a Webpage and use Node.js as Server Side JS framework.
- Create component based web pages using Angular

PRACTICAL EXPERIMENTS
1. Create an interactive Personal Webpage
2. Build a simple command line tool using Node.js which allows us to make a request to an API and store the data in a text file
3. Perform CRUD operations with security mechanisms
4. Write custom middleware to handle errors
5. Move routing logic into a separate file using the express router
6. Serving JSON with Express.js.
7. Use built-in Angular directives to show and hide elements and display lists of data.
8. Create Angular components and use one-way data binding for read-only data.
9. Add editable fields to update a model with two-way data binding.
10. Bind component methods to user events, like keystrokes and clicks and Format data with pipes.
11. Create a shared service and Use routing to navigate among different views and their components.

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INFORMATION TECHNOLOGY

B.Tech. IV SEMESTER   **L/T/P/C**
                                                                          3/0/0/0

ENVIRONMENTAL SCIENCE (MCOO1)

COURSE OBJECTIVES
- Understanding the importance of ecological balance for sustainable development.
- Understanding the impacts of developmental activities and mitigation measures.
- Understanding the environmental policies and regulations

COURSE OUTCOMES
- Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development

UNIT - I
Ecosystems: Definition, Scope, and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.

UNIT - II
Natural Resources: Classification of Resources: Living and Non-Living resources, water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources, Land resources: Forest resources, Energy resources: growing energy needs, renewable and non-renewable energy sources, use of alternate energy source, case studies.

UNIT - III
Biodiversity and Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: InSitu and Ex-situ conservation. National Biodiversity act.

UNIT - IV

Environmental Pollution and Control Technologies: Environmental Pollution: Classification of pollution, Air Pollution: Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. Water pollution: Sources and types of pollution, drinking water quality standards. Soil Pollution: Sources and types, Impacts of modern agriculture, degradation of soil. Noise Pollution: Sources and Health hazards, standards, Solid waste: Municipal Solid Waste management, composition and characteristics of e-Waste and its management. Pollution control technologies: Wastewater Treatment methods: Primary, secondary and Tertiary. Overview of air pollution control technologies, Concepts of bioremediation. Global Environmental Issues and Global Efforts: Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol, and Montréal Protocol. NAPCC-GoI Initiatives.

UNIT - V

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP). Towards Sustainable Future: Concept of Sustainable Development Goals, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style.

TEXT BOOKS:
1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
2. Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE BOOKS:
1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.
6. Introduction to Environmental Science by Y. Anjaneyulu, BS. Publications.