DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE COVERAGE

For

FOR B.TECH II YEAR - II SEM(R18)

(2019-20)

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

(Affiliated to JNTUH, Hyderabad, Approved by AICTE - Accredited by NBA & NAAC – 'A' Grade - ISO 9001:2015 Certified)

Maisammaguda, Dhulapally (Post Via. Hakimpet), Secunderabad – 500100, Telangana State, INDIA.

(R18A0509) JAVA PROGRAMMING

LSESSION PLAN:

Topics in each unit as per syllabus	Modules/sub modules for each Topic	Text Books/ Reference Books
Unit-I		

History of Java, Java Buzzwords, Data types, Variables, scope and lifetime of variables	Creation of java, Byte code, java is simple, object oriented, robust, multithreaded, distributed , dynamic, primitive types, floating point types , characters , Booleans, Declaring &creation of variables	T1: 6-13,33-38 T1:41-42 R1: 2.1-2.2 R3: pgno:2-8,32-33, 35-39 R5: 4-11,48-52 R1:14.7 R3:pgno:29-31 R5:52-53
Arrays, Operators, Expressions ,control statements	One dimensional, multi dimensional, arrays,Arithmetic, Bitwise, relational, logical, assignment operators, operator precedence, control statements	T1: 48-55,57-74 R1: 6.1-6.2 R3: pgno:40,52-67 R5: 92-98,56-59, 74-84
Automatic type conversion, Casting Incompatible types, simple programs	Automatic type conversion,Casting ,incompatible types,simple programs	T1: 45-47 R3: pgno:35
Concepts of classes, class fundamentals, Declaring objects, assigning object reference values	General form of class &object, A simple Class	T1: 105-111 R1: 2.3-2.4 R3: pgno:110-113 R5:pgno: 109-111
Constructors, Methods, Access Control	Parameterized constructors, adding methods to the class, access controls	T1: 117-120,112-138 R1:4.2.3 R3:pgno:78-80,114,115
this keyword, garbage collection, Overloading methods, overloading constructors Call by value.	this keyword , garbage collection, Overloading methods, overloading constructors Call by value ,	T1: 120,121,125-130 R1:10.4.2,23.5 R1:Pgno:342-344 R3:pgno:83-85,187 R5:141-142,139-140
Passing objects, Recursion, Nested class, inner class, Exploring String	Passing objects, Recursion,	T1:pgno:132-134,134-135,135-137

class	Nested class, inner class, Exploring String class	R3:pgno:81-83,166-172 R5:90-92,60-67
Unit-II		
Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance-specialization, specification,	Hierarchical abstractions, Base class object, Subclass, Subtype, Substitutability, forms of inheritance-specialization, specification	T1: 6,157-170 R1:14.5 R3:pgno:182,183 R5:164-170
Construction, extension, limitation, combination, benefits of inheritance, costs of inheritance	Construction, extension, limitation, combination, benefits of inheritance, costs of inheritance	R3: 7
Member access rules, super uses, using final with inheritance	Member access rules, Super uses, using final to prevent overriding, To prevent Inheritance	T1: pgno:159,163-167,180-181 R1:14.2.3 R3: pgno:184-187, 189-190 R5:165,172-173
Polymorphism-method overriding, abstract classes the object class	Dynamic Method Dispatch, method overriding, abstract classes, object class	T1: pgno:171-177, 177-181 R1:14.2.2,14.3 R3: pgno:189-190 R5:176
Defining a Package, Creating and Accessing the package, understanding CLASSPATH, access protection	Defining a Package, Creating and Accessing the package, understanding CLASSPATH, access protection example	T1: pgno:183-190 R3: pgno:133-138 R5:153-255
How to import a package, Differences between classes and interfaces	How to import a package, Differences between classes and interfaces	T1:pgno:190-192 R1:pgno:174 R5:155-157
Defining an interface, Access implementations and Partial implementations of an interface	Defining an interface, Access implementations and Partial implementations of an interface	T1:pgno:193 T1: pgno:195-196 R1:15.1.2 R3: pgno:210-215 R5:226 R5:229
Applying interfaces, Variables in interfaces and extending interfaces	Applying interfaces, Variables in interfaces and extending interfaces	T1:pgno:197-203
Exploring Java. IO package	Java i/o classes&interfaces, stream classes byte stream, character streams,console class, serialization,stream benefits	T1: pgno:555-598
Unit-III		
Concepts of exception Handling, benefits of exception handling	Way to handle and invoke exceptions and its uses	T1: pgno: 205-206 R1:pgno: 444 R3: pgno:364-366 R5: pgno: 583-585
Termination or resumptive models	Termination or resumptive models	T1: pgno: 207

Exception hierarchy, usage of try, catch, throw, throws and finally	Exception hierarchy, usage of try, catch, throw, throws and finally	T1: pgno: 221, 207-216 R1:446-449 R3:pgno:366-380 R5:586-587,592-597
Built in exceptions, creating own exception sub classes	Run time Exceptions, Checked Exceptions, Unchecked Exceptions, Creating own exceptions by using Exception class	T1: 217-219 R1: 18.2.4
String Handling	String constructors,special string operations,character extraction,modifying string,string buffer	T1:359-384
Exploring java util	String tokenizer,bit set, calendar,formatter, java.util.sub pakages	T1:pgno:503-554
Multi threading	Thread model,ImplementingRunnable, Extending thread,creating Multiple Threads, synchronized methods ,synchronized statement ,Inter Thread Communication, Deadlock	T1:Pgno:224-237 R3:pgno:394-403 T1:pgno:238-253 R3:pgno:407-411
Daemon threads, thread groups	Daemon thread,Thread Group	T1:pgno:424-429 R3:pgno:406-407
Enumerations,Auto boxing,annotations,generics	Enumerations,Auto boxing,annotations,generics	T1:Pgno:255-284
	Tutorial	
Unit-IV		
Introduction to java collections,	Overview of collections,	T1:pgno:437-439
Overview of java collection framework	Overview of java collection	T1:pgno:437-439
Commonly used collection classes	Array List, Vector, Hash table, Stack, Lambda Expressions.	T1:pgno:448-494
Files	Streams- Byte streams, Character streams, Text input/output, Binary input/output, File management using File class.	T1:pgno:555-562-586
Connecting to Database	JDBC Type 1 to 4 drivers, Connecting to a database, querying a database and processing the results, updating data with JDBC,Data Access Object (DAO).	T2:pgno:616
	Tutorial	
Unit-V		
Events, Event Sources, Event Classes, Event listeners	Two event handling mechanisms, Declaring event model, Event sources, Event Classes, Event listeners	T1: pgno: 637-648 R3:pgno:227-230

delegation event model, handling mouse events	delegation event model, handling mouse events	T1: pgno 653-656 R3:pgno:233-235
Handling key board events	Handling key board events	T1: pgno 656-659 R3:pgno:337-339
Adapter classes	Adapter classes	T1: pgno 659 R1:328-330
Inner classes	Anonymous Inner classes	T1: pgno 662 R5:238-255
AWT class hierarchy	Window fundamentals,creating a applet, Handling events,Working with graphics	T1: pgno :666-683 R3:pgno:314-320 R5:pgno:330-332
User interface components-labels, buttons, canvas, scroll bars, text components, check box	User interface components-canvas, scroll bars, text components, check box	T1: pgno: 667,702-708 R3: pgno:246-248, 270-278
Check box groups, choices, list panels	Choice controls,handling choice lists, handling lists	T1: 709-714 R3:pgno:289-292,278-286
Scrollpane, dialogs, menubar, graphics	Scrollpane, dialogs, menubar, graphics	T1: 716-718,737-749 R3:pgno:293-303
Layout manager, layout manager types, boarder and grid layouts	Understanding Layout managers layout manager types, boarder and grid layouts	T1:723,725,728-729 R1: pgno:479-481 R3:pgno:239-242 R5:383,465-468
Flow Layout, Card Layout and Grid bag		Flow Layout, Grid bag, Card Layout	T1: pgno: 724,732,730 R1: pgno:478,580 R3:pgno:238-239 R5: pgno: 474-475
Introduction, limitations of AWT, MVC Architecture		Describing what is the use of Abstract Window Toolkit, Model-view-controller connection	T1: 24 T1: pgno:861 R1: pgno: 20.1-20.2 R5:374-379
Containers, exploring swing Japplet, JComponent, Icons and Labels		Creating a swing Applet, Painting fundamentals, Creating Icons and Labels	T1: pgno:863,871-879 T1: pgno:864-866 R1: 19.5.6 R1:19.5.2 T1: pgno:874-878 R1: 19.5.5 T1: pgno:879-881 R5:pgno:404-407
Text fields, buttons, JButton class, Checkboxes		Text fields, buttons, JButton class, Checkboxes	T1: pgno:881-888 R1: R5:pgno:387-393,408-411
Radio buttons, comboboxes, Tabbed panes, scroll panes, Trees and Tables		Designing Radio buttons, comboboxes, Designing Tabbed panes scroll panes, Designing Trees and Tables	T1:pgno:889,898- 900,900-906 R5:411-415,438-441 T1: pgno:891-895 R5: pgno: 446-455

Referred to by faculty:-

T1. Herbert schildt , "***Java; the complete reference"***, 7th edition, , TMH.
T2. Core Java: An Integrated Approach – Dr R Nageswara Rao
R1. J.Nino and F.A. Hosch ***"An Introduction to programming and OO design using Java"***, John wiley & sons.
R3. Y. Daniel Liang ***"Introduction to Java programming"*** 6th edition, , pearson education.
R5. Cay.S.Horstmann and Gary ***"Core Java 2",*** Vol 1, Fundamentals, Cornell, seventh Edition, Pearson Education.

WEBSITES

1. https://www.javatpoint.com/
2. https://docs.oracle.com/javase/tutorial/
3. https://docs.oracle.com/javase/tutorial/
4. https://www.programiz.com/java-programming
5. https://www.tutorialspoint.com/java/index.htm
6. https://www.w3schools.com/java/

VIDEOS

1. https://www.youtube.com/watch?v=8cm1x4bC610
2. https://www.youtube.com/watch?v=eTXd89t8ngI&list=PLd3UqWTnYXOmx_J1774ukG_rvrpyWczm0
3. https://www.digimat.in/nptel/courses/video/106105191/L01.html

DATA VISUALIZATION

UNIT	TOPICS	Course Learning Outcomes	PAGE REFERENCE
I	• Introduction to Statistics • Difference between inferential statistics and descriptive statistics • Inferential Statistics	1. Define statistics. Write short notes on descriptive and inferential statistics. 2. Explain the different types of descriptive statistics. 3. State the differences between descriptive and inferential statistics. Explain the different types of inferential statistics.	1.T4- pg.1-2 2.T4- pg.2-4 3.T4-pg. 4-7
	• Random Variables, Normal Probability Distribution • Sampling -Sample Statistics and Sampling Distributions	1. What are random variables? Brief on Normal Probability Distribution. 2. Define sampling. Explain sampling types and distributions.	1.T4- pg.8-12
	• Overview and About R, R and R studio Installation • Descriptive Data analysis using R	1. List the features of R. Give an overview of R and R-Studio installation. 2. State the differences between descriptive and inferential statistics. Apply descriptive statistics functions on any given dataset using R.	1.T1 2.T4- pg.12-30
II	• Data manipulation packages- dplyr, data.table, reshape2, tidyr, Lubridate	1. Explain data manipulation functions using dplyr and data.table packages with suitable examples. 2.Explain data manipulation functions using Lubridate package with suitable examples. 3.Explain data manipulation functions using reshape and tidyr packages with suitable	1.T4- pg.31-41 2.T4- pg.47-48, T1 3.T4-pg.41-46

		examples.	
	• Data visualization with R	1.What is the necessity of data visualization? Explain the different graphical plots (scatter, bar, boxplot, histogram, line, ggplot) in R used for visualization with suitable diagrams.	1.T4- pg.48-54
	• Adding data to data refinery • Visualization of Data on WatsonStudio	1. Explain the methods to add data to data refinery.	1.T4- pg.54-60 2. T5
III	• Introduction to Python, • How to Install, Introduction to Jupyter Notebook	1. List the features of Python and list the steps to install Jupyter notebook.	1.T4- pg.61-84 2. T2
	• Python scripting basics • Accessing Numpy Arrays • Introduction to pandas- read and write csv • Descriptive statistics using pandas	1,Explain the different data types and control statements in Python. 2. Explain the different types of arrays using Numpy. Brief on indexing and selecting array elements with examples. 3.Explain how to read data from CSV file in Pandas and apply descriptive statistics functions.	1.T4- pg.61-84 2.T4- pg.84-87 3.T4- pg.87-91 4.T2
	• Working with text data and date time columns • Indexing and selecting data, groupby, Merge / Join datasets	1. Explain the different types of Pandas data structures. Brief on indexing and selecting elements with examples. 2. Explain groupby, merge and join functions on a dataset using Pandas with suitable examples.	1.T4- pg.91-92 2.T4- pg.92-105
IV	• Basic plots using matplotlib • Specialized Visualization Tools using Matplotlib, • Advanced Visualization Tools using Matplotlib- WaffleCharts • WordClouds	1. Brief on the benefits of Matplotlib. With neat diagrams explain the basic visualisation plots(plot,line, bar plot, plot,histogram) 2.Explain the installation of Matplotlib. Apply specialised visualisation tools (box,scatter,pie,bubble). Creating subplots and layouts 3. Describe installation of waffle chart and with suitable diagrams explain the advanced visualisation tool-Waffle chart 4. Describe installation of Word clouds and with suitable diagrams explain the advanced visualisation tool-Word clouds	1.T4- pg.106-122 2.T4- pg.-123- 132 3.T4- pg.-132- 139

V	• Seaborn functionalities and usage • Spatial Visualizations and Analysis in Python with Folium	1.Describe distribution plots with suitable diagrams using seaborn 2.Describe categorical and matrix plots with suitable diagrams using seaborn 3.Describe regression plot with suitable diagrams using seaborn 4. Explain Spatial Visualizations and Analysis in Python with Folium 5.Apply Folium for data analysis for an organization as sample case study.	1.T4- pg.-139- 150 2.T4- pg.-150- 158 3.T3

Text/Reference Books/Materials

T1. The Comprehensive R Archive Network- https://cran.r-project.org

T2. Python for Data Analysis by William McKinney, Second Edition, O'Reilly Media Inc

T3. https://seaborn.pydata.org/

T4. Departmental notes for DV based on IBM Syllabus (Units 1 to 5)

T5. **https://www.ibm.com/in-en/ products/watson-studio-desktop**

(R18A0510) DATABASE MANAGEMENT SYSTEMS

Topics in Each Unit as per syllabus	Status	Sub modules	Text Books/Reference Books
Unit-I			
Database System Applications, Purpose of Database Systems, View of Data – Data Abstraction — Transaction Management – Database Architecture	Completed	Instances and Schemas – Database Languages – database Access for applications Programs – Database Users and Administrator, Storage Manager – the Query Processor –	T1:1-7 T1:11-28
Data Models ER diagrams – ER Model Relational Query Languages, Relational Operations	Completed	Introduction to the Relational Model – Structure – Database Schema, Keys – Schema Diagrams. Database design– Other Models, - Entities, Attributes and Entity sets – Relationships and Relationship sets – ER Design Issues – Concept Design – Conceptual Design with relevant Examples.	T1:17-20 T1:27-71
Unit-II			
Relational Algebra –	Completed	Selection and projection set operations – renaming – Joins – Division – Examples of Algebra overviews	T1-97-132 T2:92-114
– Relational calculus –	Completed	Tuple Relational Calculus (TRC) – Domain relational calculus (DRC).	
Overview of the SQL Query Language	Completed	– Basic Structure of SQL Queries, Set Operations, Aggregate Functions – GROUPBY – HAVING, Nested Sub queries, Views, Triggers, Procedures	T2:121-143
Unit-III			
Normalization – Introduction, Non loss decomposition and functional dependencies, First, Second, and third normal forms – dependency preservation, Boyce/Codd normal form	Completed	Apply normalization	T1:260-288 T2:418-436
Higher Normal Forms - Introduction,Multi-valued dependencies and Fourth normal form, Join dependencies and Fifth normal form	Completed	Apply normalization	T1:292-293 T2:444-449
Unit-IV			
TransactionConcept Serializability- Recoverability – Implementation of Isolation – Testing for serializability- Lock –Based Protocols	Completed	Transaction State- Implementation of atomicity and Durability – Concurrent Executions – Timestamp Based Protocols- Validation- Based Protocols – Multiple Granularity	T1:564-586 T2:591-612
Unit-V			
Recovery and Atomicity – Log – Based Recovery –- Buffer Management		Recovery with Concurrent Transaction– Check Points Failure with loss of nonvolatile storage	T1:642-662

Referred to by faculty:-

TEXT BOOKS:

1. Database System Concepts, Silberschatz, Korth, McGraw hill, Sixth Edition.(All UNITS except III th)
2. Database Management Systems, Raghu Ramakrishnan, Johannes Gehrke, TATA McGrawHill 3rd Edition

WEBSITES

1. https://www.guru99.com/what-is-dbms.html
2. https://www.javatpoint.com/dbms-tutorial
3. https://www.techopedia.com/definition/24361/database-management-systems-dbms
4. https://www.codecademy.com/articles/what-is-rdbms-sql
5. https://www.tutorialspoint.com/dbms/index.htm

VIDEOS

6. https://www.youtube.com/watch?v=EuqQeJfJbgA
7. https://www.youtube.com/watch?v=ABwD8IYByfk
8. https://www.youtube.com/watch?v=eYQwKi7P8MM
9. https://www.youtube.com/watch?v=6u2zsJOJ_GE
10. https://www.youtube.com/watch?v=gbVev8RuZLg

Managerial Economics & Financial Analysis

COURSE COVERAGE SUMMARY

UNIT NO	Title of the unit	Topics of the unit	NAME OF THE TEXT BOOK	Page no.
I	Introduction to Managerial Economics	Definition, Nature and Scope of Managerial Economics, Micro and Macroeconomic Concepts. Demand Analysis: Demand Determinants, Law of Demand and exceptions. Elasticity of Demand: Definition, Types, Measurement and Significance of elasticity of Demand. Demand Forecasting: Factors governing Demand Forecasting, Methods of Demand Forecasting (Survey Methods, Expert Opinion, Test Marketing, Controlled Experience, Judgemental Approach, and Time Series Analysis).	Managerial Economics & Financial Analysis, Special Edition- MRCET. McGraw Hill Publications, 2017	7-21
II	Production & Cost Analysis	Production Function- Isocost and Isoquants, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production Function, Laws of Returns, Internal and External Economies of Scale. Cost Analysis: Cost Concepts. Break-Even Analysis (BEA) - Determination of Break-Even Point (Simple Problems)	Managerial Economics & Financial Analysis, Special Edition- MRCET. McGraw Hill Publications, 2017	22-37
III	Markets,pricing	Types of Competition and Markets, Features of Perfect Competition, Monopoly and Monopolistic Competition; Pricing: Objectives, Methods of Pricing; Business: Features of different forms of Business Organisation (Sole Trader, Partnership, Joint Stock Company, Cooperative Society, and Public Enterprises).	Managerial Economics & Financial Analysis, Special Edition- MRCET. McGraw Hill Publications, 2017	38-61
IV	Introduction to Capital and Financial Accounting	Need for Capital, Types of Capital, Working Capital Analysis, Methods and Sources of raising Finance. Accounting: Definition, Concepts and Conventions (GAAP); Accounting Cycle; Formats for preparation of Trial Balance and Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet).	Managerial Economics & Financial Analysis, Special Edition- MRCET. McGraw Hill Publications, 2017	62-82
V	Investment Decision	Capital Budgeting - Features, Objectives, and Methods (Payback Method, Accounting Rate of Return and Net Present Value) - advantages & disadvantages. (Simple Problems) Financial Analysis: Analysis and Interpretation of Liquidity Ratios, Activity Ratios, Capital Structure Ratios and Profitability Ratios. (Simple Problems)	Managerial Economics & Financial Analysis, Special Edition- MRCET. McGraw Hill Publications, 2017	83-93

(R 18A0507) DESIGN AND ANALYSIS OF ALGORITHMS

TEXT BOOKS:

1. Fundamentals of Computer Algorithms, 2nd Edition, Ellis Horowitz, Sartaj Sahni and S. Rajasekharan, UniversitiesPress.
2. Design and Analysis of Algorithms, P. H. Dave, H.B.Dave,2nd edition, Pearson Education.

REFERENCE BOOKS

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

SYLLABUS COVERAGE

UNIT-1				
Sno	**Topic as per the syllabus**	**Pages**	Video Tutorial	**Textbook & Author**
1	**Introduction-**Algorithm definition	**1-10**		Fundamentals of Computer Algorithms, 2nd Edition, Ellis Horowitz, Sartaj Sahni and S. Rajasekharan, Universities Press.
2	Algorithm Specification, Performance Analysis- Space complexity, Time complexity	**14-40**		
3	Randomized Algorithms.	**53-68**	**https://tinyurl.com/u5jx9p6**	
4	**Divide and conquer**- General method,	**127-130**	**https://tinyurl.com/r34uakw**	
5	Binary search	**131-139**	**https://tinyurl.com/u5w5ajp**	
6	Merge sort	**145-154**	**https://tinyurl.com/vkfr7ag**	
7	Quick sort	**154-164**	**https://tinyurl.com/tqhxfhm**	
8	Strassen's MatrixMultiplication.	**179-183**	**https://tinyurl.com/u3vdc5w**	

Assignment Questions:

1. Explain the process of designing an algorithm. Give characteristics of an algorithm.
2. Define time and space complexity. Explain with examples.
3. Explain , Randomized Algorithms.
4. Explain asymptotic notations.
5. Explain General method of Divide and conquer.
6. What is binary search? How it can be implemented by Divide and Conquer strategy? Explain with example.
7. Apply merge sort and show the file after each spitting and then merging for the following input: 30, 12, 75, 35, 85, 70, 35, and 59.

8. Derive the time complexity of the Merge sort and Quick sort in average case and worst case.
9.Explain Strassen's matrix multiplication and its time complexity
10.Write Pseudo code for binary search and derive its complexity
11 .Solve the following recurrence relation

$T(n)=4T(n/3)+n^2$

12

(a) Solve the recurrence relation of formula $T(n) = \begin{cases} g(n) & n \text{ is small} \\ 2T(n/2)+F(n) & \text{otherwise} \end{cases}$

When (i) g(n) = O(1) and f(n)= O(n)
(ii) g(n)= O(n) and f(n)=O(1)

(b) Write and explain Divide and conquer algorithm for computing the no of levels in a binary tree.

UNIT-2				
Sno	**Topic as per the syllabus**	**Pages**	Video Tutorial	**Textbook & Author**
1	Disjoint set operations, union and find algorithms		**https://tinyurl.com/sds4zq9**	
2	AND/OR graphs		**https://tinyurl.com/vpu335t**	
3	Connected Components		**https://tinyurl.com/vpldpud**	
4	Bi-connected components		**https://tinyurl.com/u5wwm9s**	
5	Spanning trees		**https://tinyurl.com/ukftfpo**	
6	Backtracking-General method, The 8-queen problem	**339-357**	**https://tinyurl.com/wm9woy6**	Fundamentals of Computer Algorithms, 2nd Edition, Ellis Horowitz, Sartaj Sahni and S. Rajasekharan, UniversitiesPress.
7	sum of subsets problem	**357-360**	**https://tinyurl.com/tgkfkxq**	
8	graph coloring	**360-364**	**https://tinyurl.com/qtk7m5h**	
9	Hamiltonian cycles	**364-368**	**https://tinyurl.com/ut452rt**	

Assignment Questions:

1. How Eight Queen's problem can be solved using back tracking and explain with an example.
2. Explain AND/OR graphs and Bi-connected components.
3. Write an algorithm for Sum of Subsets problem and Consider a set S= {5, 10, 12, 13, 15, 18} and d= 30. Solve it for obtaining Sum of Subset problem.
4. What is Hamiltonian Cycle? Describe with an example
5. Describe Backtracking technique to m-coloring graph
6. Explain Bi-connected components and Articulation point

UNIT-3				
Sno	**Topic as per the syllabus**	**Pages**	Video Tutorial	**Textbook & Author**
1	Greedy method- General method	**197-198**	**https://tinyurl.com/u5452ks**	Fundamentals of Computer Algorithms, 2nd Edition, Ellis Horowitz, Sartaj Sahni and S. Rajasekharan, UniversitiesPress.
2	Knapsack problem	**198-202**	**https://tinyurl.com/vzjbyyd**	
3	Job sequencing with deadlines	**208-215**	**https://youtu.be/zPtI8q9gvX8**	
4	Minimum cost spanning trees	**216-224**	**https://tinyurl.com/vvaaltq**	
5	Single source shortest path problem.	**241-248**	**https://tinyurl.com/r6mc24l**	

Assignment Questions:

1. Explain General method of Greedy method
2. Define Greedy knapsack. Find the optimal solution of the Knapsack instance n= 7, M=15, (p1, p2, ……p7) = (10,5,15,7,6,18,3) and (w1,w2, ... w7)=(2,3,5,7,1,4,1).
3. Explain Job sequencing with deadline problem.Find the greedy solution for followingjob sequencing with deadlines problem n = 7, (p1,p2,p3,p4,p5,p6,p7) = (3,5,20,18,1,6,30), (d1,d2,d3,d4,…,d7) = (1,3,4,3,2,1,2)
4. Explain Prim's algorithm for minimal spanning tree with an example.
5. Explain Kruskals Algorithm for minimal spanning tree with an example.
6. Discuss about all pairs shortest path problem with suitable example.

UNIT-4				
Sno	**Topic as per the syllabus**	**Pages**	Video Tutorial	**Textbook & Author**
1	Dynamic Programming- General Method	**253-256**	**https://tinyurl.com/ujh2ddx**	Fundamentals of Computer Algorithms, 2nd Edition, Ellis Horowitz, Sartaj Sahni and S. Rajasekharan, UniversitiesPress.
2	Chained matrix multiplication		**https://tinyurl.com/yx3a6vml**	
3	All pairs shortest path problem	**265-270**	**https://tinyurl.com/whncxes**	
4	Optimal binary search trees	**275-284**	**https://tinyurl.com/t32vwys**	
5	0/1 knapsack problem	**287-295**	**https://tinyurl.com/t5s6q6q**	
6	Reliability design	**295-298**	**https://tinyurl.com/qmqr7zx**	
7	Traveling sales person problem	**298-301**	**https://tinyurl.com/wogm4ws**	

Assignment Questions:

1. Explain matrix chain multiplication problem and Find the minimum no of operating required for the following chain matrix multiplication using dynamic programming. A(20,30)*B(30,10)*C(10,5)*D(5,15).
2. Explain General method of Dynamic Programming
3. Deign a three stage reliable system for the following instance of the problem (c1,c2,c3)=(30,15,20), (r1,r2,r3)=(0.9,0.8,0.5) and C=105.
4. Obtain all pairs shortest paths for the following graph.

5. Give the optimal solution for 0/1 knapsack problem using dynamic programming (p1,p2,p3, p4) = (11, 21, 31, 33), (w1, w2, w3, w4) = (2, 11, 22, 15), M=40, n=4.
6. Construct optimal binary search for (a1, a2, a3, a4) = (do, if, int, while), p(1 : 4) = (3,3,1,1) q(0 : 4)= (2,3,1,1,1)

UNIT-5				
Sno	**Topic as per the syllabus**	**Pages**	Video Tutorial	**Textbook & Author**
1	Branch and Bound- General Method	**379-380**	**https://tinyurl.com/rof9tnv**	Fundamentals of Computer Algorithms, 2nd Edition, Ellis Horowitz, Sartaj Sahni and S. Rajasekharan, UniversitiesPress.
2	LC Branch and Bound solution, FIFO Branch and Bound solution, **LIFO** Branch and Bound solution	**388-393**	**https://tinyurl.com/rqaopsz**	
3	0/1 Knapsack problem	**393-397**	**https://tinyurl.com/rebh4lx**	
4	Traveling sales person problem	**403-411**	**https://tinyurl.com/tes2c27**	
5	NP-Hard and NP-Complete problems- Basic concepts, Non-deterministic algorithms, NP – Hard and NP- Complete classes,	**495-504**	**https://tinyurl.com/uczmg9j**	
6	Cook's theorem.	**508-516**	**https://tinyurl.com/rrf76tf**	

Assignment Questions:

1. Discus about P, NP, NP-Complete and NP hard with examples and provide relationship between them.
2. Explain non-deterministic algorithm with an example.
3. State Cook's theorem and explain its importance.
4. Describe Travelling Salesperson Problem (TSP) using Branch and Bound.

Draw the portion of state space tree generated by LCBB& FIFOBB for the following instance of 0/1 knapsack n= 5, M=12, (p1, ……p5) = (10,15,6,8,4) (w1, w5)=(4,6,3,