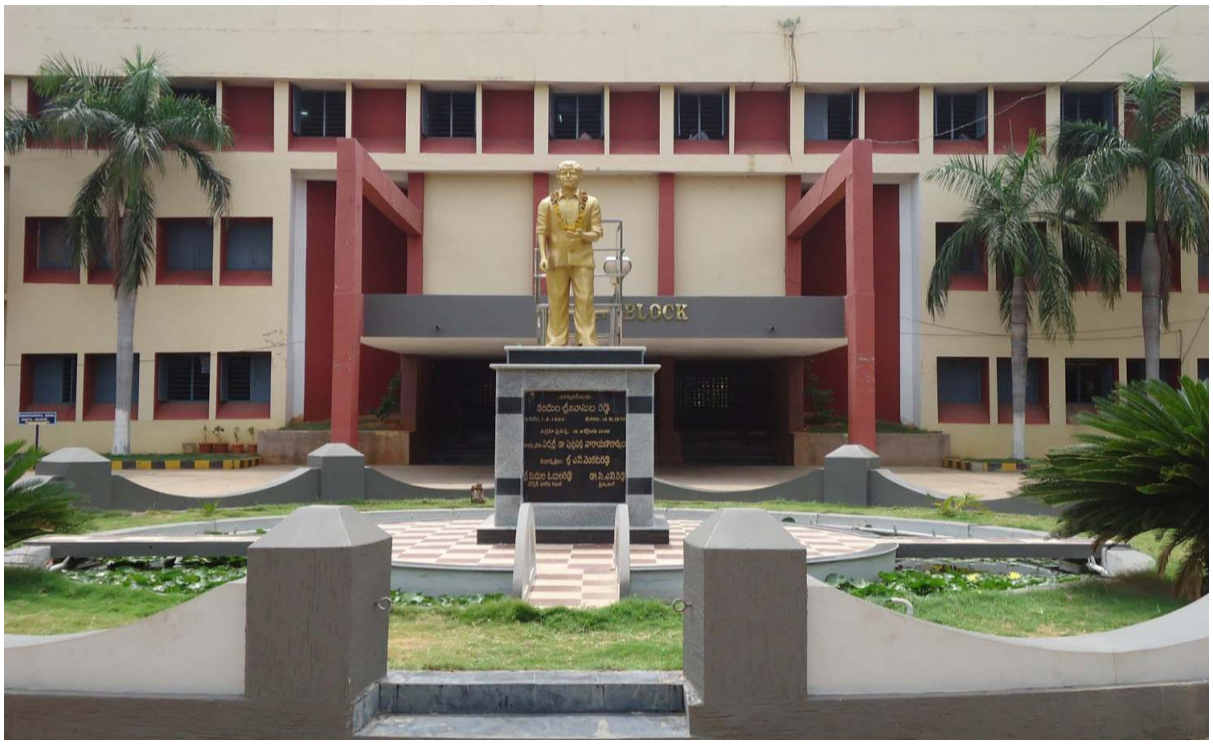
Regulations for
UG Programs in Engineering (R18UG)
Curriculum and Syllabus for

VI Sem B.Tech

Department of Computer Science and Engineering



KandulaSrinivasa Reddy Memorial College of Engineering
(Autonomous)
Kadapa 516003 AP

(Approved by AICTE, Affiliated to JNTUA, Ananthapuramu, Accredited by NAAC)
(An ISO 9001-2008 Certified Institution)

Semester 6

S.No	Subject Code	Subjects	L	T	P	CR
Theory						
1	1805601	Internet of Things	3	0	0	3
2	1805602	Data Mining	3	0	0	3
3	 1805603 1805604 1805605	**Professional Elective-2** 1. Artificial Intelligence 2. Software Testing 3. Mobile Adhoc Networks	3	0	0	3
		Open Elective-1				
4	1825609	Management Science	3	0	0	3
5	1805608	Mobile Application Development	3	0	0	3
Labs						
1	1824609	IOT Lab	0	0	2	1
2	1805610	Mobile Applications Development Lab	0	0	2	1
3	1805611	Internship	0	0	4	2
		Total	**15**	**0**	**8**	**19**

Course Title	INTERNET OF THINGS					B.Tech CSE VI Sem (R18)		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1805601	PJ	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours					End Exam Duration: 3Hrs			

Course Objectives:

- Basic principles of IOT.
- Various IOT platforms and application development.
- To know about Arduino board.
- To know about Raspberry pi.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Demonstrate knowledge on Protocols, functional blocks and communication models of Internet of Things.
CO 2	Identify domain specific IoT's.
CO 3	Design appropriate solutions for IoT applications.
CO 4	Working with Arduino board.
CO 5	Design and develop applications using Raspberry pi device.

UNIT I

INTRODUCTION TO IoT:

Definition and Characteristics of IoT, Physical Design of IoT, Logical Design of IoT, IoT Enabling Technologies, IoT Levels and Development Templates

UNIT II

DOMAIN SPECIFIC IoTs

Introduction, Home Automation, Cities, Environment, Energy, Retail, Logistics, Agriculture, Industry, Health & Lifestyle.

UNIT III

IOT and M2M:

Introduction, M2M, Difference between IoT and M2M, SDN and NFV for IoT

IoT Platform Design Methodology:

Introduction, IoT Design Methodology, Case Study on IoT System for Weather Monitoring

UNIT IV

Introduction to Arduino:

Introduction, The Arduino Way, The Arduino Platform, Getting started with Arudino, Advanced Input and Output, Sample Programs.

UNIT V

IOT Physical Devices:

What is an IOT device, basic building blocks of an IOT device, Exemplary device: Raspberry Pi, about the board, linux on raspberry Pi, raspberry Pi interfaces, Programming Raspberry Pi with Python, Other IoT Devices

Text books:

1. ArshdeepBahga, Vijay Madisetti " Internet of Things(A hands on approach)" 1ST edition, VPI publications,2014.
2. Getting Started with Arduino, 3rd Edition, Massimo Banzi and Michael Shiloh

Reference Book:

1. Raj Kamal, "Internet of Things", McGraw Hill, 1st Edition, 2016.
2. Adrian McEwen,Hakin Cassimally "Designing the Internet of Things" Wiley India

Course Title	DATA MINING				B.Tech CSE VI Sem (R18)		
Course Code	Category	Hours/Week			Credits	Maximum Marks	
1805602	PJ	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours					End Exam Duration: 3Hrs		

Course Objectives:

- To learn the concepts of database technology evolutionary path which has led to the need for data mining and its applications
- To develop skills of using data mining techniques for solving practical problems.
- To learn Data mining algorithms to build analytical applications.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Understand the fundamentals of Data Mining and its Principles
CO 2	Understand different steps followed in Data mining and pre-processing for Data mining
CO 3	Apply appropriate data mining algorithms to find Frequent patterns , Associations, and Correlations
CO 4	Compare and evaluate data mining techniques classification, prediction
CO 5	Cluster the high dimensional data for better organization of the data and to detect the Outliers in the high dimensional data.

UNIT-I

Introduction: Why Data Mining? What Is Data Mining? What Kinds of Data Can Be Mined? What Kinds of Patterns Can Be Mined? Major issues in Data Mining.

UNIT-II

Data Preprocessing:

Why Pre-process the Data? Descriptive Data Summarization, Data Cleaning, Data Integration and Transformation, Data Reduction, Data Discretization and Concept Hierarchy Generation.

UNIT-III

Mining Frequent Patterns, Associations, and Correlations: Basic Concepts and Methods: Basic Concepts, Frequent Itemset Mining Methods, From Association Analysis to Correlation Analysis, Pattern Mining in Multilevel, Multidimensional Space, Constraint-Based Frequent Pattern Mining.

UNIT-IV

Classification:

Basic Concepts, Decision Tree Induction, Baye's Classification Method, Rule-Based Classification.

Prediction: Basic concepts, Accuracy and Error measures, Evaluating the accuracy of a classifier or apredictor.

UNIT-V

Cluster Analysis: Cluster Analysis basic concepts, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid-Based Methods.

Outlier Detection - Outliers and Outlier Analysis, Outlier Detection Methods

TEXT BOOK:

1. Data Mining : Concepts and Techniques, Jiawei Han , MichelineKamber and Jian Pei, Morgan Kaufmann Publishers, Elsevier, Third Edition,2012.

REFERENCE BOOKS:

1. Data Mining Techniques, Arun K Pujari, Second Edition, UniversitiesPress**.**
2. Data Warehousing in the Real world, Sam Aanhory& Dennis Murray , Pearson Education, Asia.
3. Insight into Data Mining, K.P.Soman, S.Diwakar , V.Ajay, PHI2008

Course Title	ARTIFICIAL INTELLIGENCE (Professional Elective-2)				B.Tech CSE VI Sem (R18)		
Course Code	**Category**	**Hours/Week**		**Credits**	**Maximum Marks**		
1805603	**PJ**	**L**	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exams**	**Total**
		3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours					**End Exam Duration: 3Hrs**		

Course Objectives:

- To understand how a computer making intelligent decisions.
- To understand the notions of state space representation, heuristic search methods.
- To learn different knowledge representation techniques
- To understand the applications of AI.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Possess the ability to formulate an efficient problem space for a problem.
CO 2	Possess the ability to select a search algorithm for a problem
CO 3	Possess the skill for representing knowledge using the appropriate technique
CO 4	Enable Artificial Intelligence role in different domains

UNIT-I

Introduction to AI: AI Problems History what is an AI Technique.Problem, Problem Space and Search,Heuristic Search techniques.

UNIT-II

Knowledge Representation Issues, Predicate Logic, Knowledge Representation using rules.

UNIT –III

Symbolic reasoning under Uncertainty, Bayesian Networks.

UNIT-IV

Weak Slot Filler Structures, Strong Slot and Filler Structures, Knowledge Representation summary.

UNIT –V

Game Playing, Planning, Natural Language processing.

Text Books:

1.Rich, Knight, Nair: Artificial intelligence, Tata McGraw Hill, Third Edition 2009.

Reference Books:

1. SarojKaushik. Artificial Intelligence. Cengage Learning, 2011.
2. Russell, Norvig: Artificial intelligence, A Modern Approach, Pearson Education, Second Edition. 2004.

Course Title	SOFTWARE TESTING (Professional Elective-2)				B.Tech CSE VI Sem (R18)			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1805604	PJ	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		4	0	0	3	30	70	100
Mid Exam Duration: 1Hr 30 Min					End Exam Duration: 3Hrs			

Course Objectives:

- Study the concepts of Software Testing objectives, Complications of bugs and Types of bugs.
- Learn various testing methodologies.
- Indentify the techniques and skills on how to use modern software testing tools to support software testing projects.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Recall Software Testing
CO 2	Compare various Terminologies used in Software Testing.
CO 3	Understand various testing methodologies like Path Testing, Domain Testing, Logic based Testing and Tools (Winrunner testing Tool)
CO 4	Construct various graphs useful in Software Testing like Flow Graph, State Graph.
CO 5	Examine various testing strategies and categorize them.

UNIT-I

Introduction: Purpose of testing, Dichotomies, Model for testing, Consequences of Bugs, Taxonomy of bugs.

Flow graphs and Path testing: Path testing basics, Predicates, Path Predicates and Achievable Paths, Path Sensitizing, Path Instrumentation, Application of path testing.

UNIT-II

Transaction Flow Testing: Transaction Flows, Transaction Flow Testing Techniques.

Dataflow testing: Basics of dataflow testing, Strategies in dataflow testing, Application of dataflow testing.

UNIT-III

Domain Testing: Domains and Paths, Nice & Ugly Domains, Domain Testing, Domains and Interfaces Testing, Domains and Testability.

Paths, Path products and Regular expressions: Path products & Path expression, Reduction Procedure, Regular Expressions & Flow Anomaly Detection.

UNIT- IV

Logic Based Testing: Overview, Decision Tables, and Path Expressions, KV charts, and specifications

State, State Graphs and Transition Testing: State Graphs, Good & Bad State Graphs, State Testing, Testability Tips.

UNIT-V

Graph Matrices and Application: Matrix of Graph, Power of a Matrix, Node Reduction Algorithm, Building Tool.

Text Books:

1. Software Testing techniques, Boris Beizer, Dreamtech, Second Edition.
2. Software Testing Tools, Dr.K.V.K.K.Prasad, Dreamtech.

Reference Books:

1. The craft of software testing - Brian Marick, Pearson Education.
2. Software Testing, Third Edition, P.C.Jorgensen, Aurbach Publications (Dist.by SPD).
3. Software Testing, N.Chauhan, Oxford University Press.
4. Introduction to Software Testing, P.Ammann and J.Offutt, Cambridge Univ. Press.
5. Effective methods of Software Testing, Perry, John Wiley, Second Edition, 1999.
6. Software Testing Concepts and Tools, P.Nageswara Rao, Dreamtech Press.
7. Software Testing, M.G.Limaye, TMH.
8. Software Testing, Desikan, G.Ramesh, Pearson.
9. Foundations of Software Testing, D.Graham and Others, Cengage Learning.
10. Foundations of Software Testing, A.P.Mathur, Pearson.

Course Title	MOBILE ADHOC NETWORKS				B.Tech CSE VI Sem (R18)		
Course Code	Category	Hours/Week			Credits	Maximum Marks	
1805605	PJ	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours					End Exam Duration: 3Hrs		

Course Objectives:

- To understand the concept of Adhoc Networks
- To understand the routing mechanism in Adhoc networks
- To understand the role of security at different layers

To understand the quality issues in Adhoc networks

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Compare the differences between cellular and ad hoc networks and the analyse the challenges at various layers and applications
CO 2	Summarize the protocols used at different layers and scheduling mechanisms
CO 3	Compare and analyze types of routing protocols used for unicast and multicast routing
CO 4	Examine the network security solution and routing mechanism

UNIT -I

INTRODUCTION TO MOBILE ADHOCNETWORKS

Network Deployment, Structured Versus Randomized Deployment, Network Topology, Topology Control, Connectivity in Geometric Random Graphs, Connectivity using Power Control and Mobility Models.

UNIT -II

LOCALIZATION AND TIMESYNCHRONIZATIONPROTOCOLS .

Localization: protocols Approaches, Coarse-GrainedNodeLocalizationusingMinimalInformation,Fine-Grained Node Localization using Detailed Information-Network-Wide Localization-Theoretical Analysis of Localization Techniques

Time Synchronization Protocols: TraditionalApproaches, Coarse-Grained Clock Synchronization, Fine-Grained Clock Synchronization.

UNIT -III

ROUTINGPROTOCOLS

Challenges and Issues, DSDV, DSR, AODV Protocols, Link Reversal Routing, Properties, Unicast and Multicast Route Establishment, Comparison of Multicast Routing Protocols, Scheduling Techniques, Transmission Scheduling, Medium Access and Sleep Scheduling.

UNIT -IV

TRANSPORT LAYER ANDSECURITYPROTOCOLS

Transport Layer Protocols: Design Goals, Issue in Designing a Transport Layer Protocol, Classification of Transport Layer Solutions, TCP over MANET.
Security Protocols: Security over MANET, Security Requirements, Issue and Challenges in Security Provisioning, Network Security Attacks, Security Routing in MANET.

UNIT -V

QoSENERGYMANAGEMENT

Issues and Challenges in Providing QoS in MANET, Classification of QoS Solutions, MAC Layer and Network Layer Solutions, QoS Frameworks, Need for Energy Management, Classification, Battery Management Scheme, Transmission Power and System Power Management Scheme.

Text books

1. Toh.C.K, "Ad Hoc Mobile Wireless Networks: Protocols and Systems", Prentice Hall PTR,2001
2. SivaramMurthy.Cand B S Manoj, "Ad Hoc Wireless Networks: Architecture and Protocols", Prentice Hall PTR,2004
3. Charles E Perkins, Ad Hoc Networking", Addison Wesley,2001

Reference books:

1. XiuzhenCheng, Xiao Huang, Ding Zhu Du, "Ad Hoc Wireless Networking", Springer Netherlands,2004
2. Tavli, Bulent, Heinzelman, Wendi, "Mobile Ad Hoc Networks: Energy-Efficient Real-Time Data Communications", Springer,2006
3. Aggelou, George, "Mobile Ad Hoc Networks: From Wireless LANs to 4g Networks", McGraw-Hill Professional Engineering,2004

Course Title	MOBILE APPLICATION DEVELOPMENT				B.Tech CSE VI Sem (R18)		
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**	
1805608	**PJ**	**L**	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exams**	**Total**
		3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours					**End Exam Duration: 3Hrs**		

Course Objectives:

- To Understand fundamentals of android operating systems.
- To learn the internals of the Android OS
- To learn the Mobile application development using the Android SDK

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Identify various concepts of mobile programming that make it unique from programming for other platforms
CO 2	Critique mobile applications on their design pros and cons
CO 3	Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces
CO 4	Program mobile applications for the Android operating system that use basic and advanced phone features
CO 5	Deploy applications to the Android marketplace for distribution

UNIT – I

Introduction to Android: The Android Platform, Android SDK, Eclipse Installation, Android Installation, Building you First Android application, Understanding Anatomy of Android Application, Android Manifest file. Using the Text view Control, Using the Android Emulator, The Android Debug Bridge(ADB), Launching Android Applications on a Handset.

UNIT -II

Basic Widgets: Understanding the Role of Android Application Components, Understanding the Utility of Android API, Overview of the Android Project Files, Understanding Activities, Role of the Android Manifest File,

Android User Interface Design Essentials: User Interface Screen elements, Designing User Interfaces with Layouts, Drawing and Working with Animation, Event Handling, Displaying Messages Through Toast, Creating and Starting an Activity, Using the Edit Text Control, Choosing Options with Checkbox, Choosing Mutually Exclusive Items Using Radio Buttons

UNIT -III

Building Blocks for Android Application Design: Introduction to Layouts, Adapting to Screen orientation. Utilizing Resources and Media: Resources, Creating Values Resources, Using Drawable Resources, Switching States with Toggle Buttons, Creating an Images Switcher Application, Scrolling Through Scroll View, playing Audio, Playing Video, Displaying Progress with Progress Bar.

UNIT -IV

Selection widgets and Debugging: Introduction to Views, Using the Spinner control, Creating an Image Gallery Using the ViewPager Control, Using the Debugging Tool: Dalvik Debug Monitor Service(DDMS), Debugging Application, Using the Debug Perspective. Displaying And Fetching Information Using Dialogs and Fragments: Selecting the Date and Time in One Application, Fragments, Creating Fragments with java Code, Creating Special Fragments.

UNIT-V

Building Menus and Storing Data: Creating Interface Menus and Action Bars, Menus and Their Types, Creating Menus Through XML, Creating Menus Through Coding, Applying a Context Menu to a List View, Using the Action Bar, Replacing a Menu with the Action Bar, Creating a Tabbed Action Bar, Creating a Drop-Down List Action Bar. Using Databases: Accessing Databases with the ADB, Creating a Data Entry Form

Text Books

1. Android Programming by B.M Harwani, Pearson Education, 2013.
2. T1. Lauren Darcey and Shane Conder, "Android Wireless Application Development", Pearson Education, 2nd ed. (2011)

Reference Text Books:

1. Android application Development for Java Programmers, James C Sheusi, Cengage Learning

2. Android In Action by w.Frank Ableson, Robi Sen, Chris King, C. Enrique Ortiz., Dreamtech.

3. Beginning Android 4 Application Development, by Wei-Meng Lee , Wiley India.

Course Title	INTERNET OF THINGS LAB					B.Tech CSE VI Sem (R18)		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1805609	PJ	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		0	0	2	1	50	50	100
					End Exam Duration: 3Hrs			

Course Objectives:

- Student should get the knowledge of Python and Eclipse background.
- Student should get the knowledge of Control statements in python
- Student should get the knowledge of Arduino.
- Student should get the knowledge of Raspberry Pi

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Student will be aware of Python and Eclipse background.
CO 2	Student will develop basic programs in python
CO 3	Student will get knowledge on Arduino IDE and Arduino Board
CO 4	Student will get knowledge on Raspberry Pi

IoT Experiments:-

1. Study and Install IDE of Arduino and different types of Arduino
2. Digital Output (Blinking of LED)
3. Digital Input (Push Button)
4. Analog Output (Fading)
5. Communication between Computer and Arduino.
6. Displaying messages on LCD
7. Traffic Controller
8. Night Light Simulation using LDR and PVR
9. Fire Alert.
10. Color Recognition.

11. Study and Configure Raspberry Pi
12. Write a Program for LED blink using Raspberry Pi

Books:

1. Getting Started with Arduino, 3rd Edition, Massimo Banzi and Michael Shiloh – Maker Media.
2. Getting Started with Raspberry pi, Matt Richardson & Shawn Wallace, O'Reilly – 2014.

<table>
<tr><td colspan="2">Course Title</td><td colspan="4">MOBILE APPLICATION DEVELOPMENT LAB</td><td colspan="3">B.Tech CSE VI Sem (R18)</td></tr>
<tr><td>Course Code</td><td>Category</td><td colspan="3">Hours/Week</td><td>Credits</td><td colspan="3">Maximum Marks</td></tr>
<tr><td rowspan="2">1805610</td><td rowspan="2">PJ</td><td>L</td><td>T</td><td>P</td><td>C</td><td>Continuous Internal Assessment</td><td>End Exams</td><td>Total</td></tr>
<tr><td>0</td><td>0</td><td>2</td><td>1</td><td>50</td><td>50</td><td>100</td></tr>
<tr><td colspan="5"></td><td colspan="4">End Exam Duration: 3Hrs</td></tr>
<tr><td colspan="9">Course Objectives:
• To understand fundamentals of android operating systems.
• Illustrate the various components, layouts and views in creating android applications.
• To understand fundamentals of android programming.</td></tr>
<tr><td colspan="9">Course Outcomes: On successful completion of this course, the students will be able to</td></tr>
<tr><td>CO 1</td><td colspan="8">Develop applications using services and publishing android applications.</td></tr>
<tr><td>CO 2</td><td colspan="8">To demonstrate their skills of using Android software development tools</td></tr>
</table>

1. Setting up the Development Environment

1.1 Installation of JDK and Setting path

1.2 Downloading and Installing Android Studio

2. Creating "Hello World" Application and viewing the output through emulator.

3. Creating the Application by using Activity class

i) onCreate()

ii) onStart()

iii) onResume()

iv) onPause()

v) onStop()

vi) onDestroy()

vii) onRestart()

4. Create the Application using the Edit Text control.

5. Create the Application Choosing options.

i) CheckBox

ii) RadioButton

iii) Spinner

6. Create the applications using different layouts.

i) Linear Layout

ii) Relative Layout

iii) Absolute Layout

iv)Table Layout

7. Create the application for doing arithmetic operations. (Calculator)

8. Create the application to play the audio and video clips.

9. Create the application by using menus and action bar.

Semester 6:

(Open Elective-1)

S.No	Subject Code	Subjects	L	T	P	CR
1	 1805606 1805607	**<u>Open Elective-1:</u>** 1. Data Structures 2. Database Management Systems	3	0	0	3
		Total	**3**	**0**	**0**	**3**

Course Title	DATA STRUCTURES (Open Elective-1)				B.Tech CSE VI Sem (R18)		
Course Code	**Category**	**Hours/Week**		**Credits**	**Maximum Marks**		
1805606	**PJ**	**L**	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exams**	**Total**
		3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours					**End Exam Duration: 3Hrs**		

Course Objectives:

- To develop skills and analyze linear and nonlinear data structures.
- To understand basic concepts about linked lists, stacks, queues.
- To study algorithms as they apply to trees and graphs.
- To study in detail about sorting.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Understand the variety of abstract data types and data structures
CO 2	Analyze data structures such as linked list, Stacks and Queues
CO 3	Apply and analyze tree traversal algorithms and graph traversal algorithms
CO 4	Organize data in order using various sorting algorithms

UNIT-I

Introduction: Data structures, Primitive & Non Primitive data structures, Linear & Non Linear data structures,**Linear Lists:**Definition,**Arrays:**Definition, **Linked Lists:** Single Linked List-Definition, Insertion and Deletion operations**,** Doubly Linked List- Definition, Insertion and Deletion operations.

UNIT-II

Stacks: Definition, Array & Linked representations, Operations, Applications, **Queues:** Definition, Array & Linked representations, Operations, Circular Queues & Dequeues.

UNIT-III

Trees: Basic terminology, Binary Trees- Definition, Properties, Representation, Complete and Full Binary Tree, **Tree Traversal Algorithm:** Inorder, Preorder andPostorder, **Priority Queues:** Definition,Heaps, Leftist Trees, **Binary Search Tree(BST):** Definition, Operations & Implementations, Indexed BST.

UNIT-IV

Balanced Search Trees: AVL, Red-Black & Splay Trees, Graphs: Terminology, Representations, **Graph Traversal:** Depth First Search (DFS), Breadth First Search(BFS),

UNIT-V

Sorting: Selection, Insertion, Bubble, Heap, Quick Sort, Merge Sort, **Searching:** Linear and Binary search

TEXT BOOKS:

1. An Introduction to Data Structures with applications, Jean Paul Trembley and Paul G.Sorenson, McGraw Hill.
2. Fundamentals of Data Structures in C, Horowitz, Sahni, Anderson Freed, Universities press.
3. Data Structures using C++, VarshaH.Patil, Oxford University Press.

REFERENCE BOOKS:

1. Data Structures, Algorithms and Applications in C++, AnandaRaoAkepogu and Radhika RajuPalagiri, Pearson Education.
2. Data Structures and Algorithms in C++, S.Sahni, University Press (India) Private Limited, Second Edition.
3. Data Structures, Seymour Lipschutz, Schaum's Outlines, McGraw Hill.
4. Data Structures and Algorithms, G.A.V.Pai, Tata McGraw Hill.
5. Data Structures using C and C++, Langsam, Augenstein and Tanenbaum, PHI.

<table>
<tr><td>Course Title</td><td colspan="5">DATABASE MANAGEMENT SYSTEMS
(Open Elective-1)</td><td colspan="3">B.Tech CSE VI Sem (R18)</td></tr>
<tr><td>Course Code</td><td>Category</td><td colspan="3">Hours/Week</td><td>Credits</td><td colspan="3">Maximum Marks</td></tr>
<tr><td rowspan="2">1805607</td><td rowspan="2">PJ</td><td>L</td><td>T</td><td>P</td><td>C</td><td>Continuous Internal Assessment</td><td>End Exams</td><td>Total</td></tr>
<tr><td>3</td><td>0</td><td>0</td><td>3</td><td>30</td><td>70</td><td>100</td></tr>
<tr><td colspan="5">Mid Exam Duration: 2 Hours</td><td colspan="4">End Exam Duration: 3Hrs</td></tr>
<tr><td colspan="9">Course Objectives:
To Understand and successfully apply logical database design principles, including E-R diagrams and database normalization.
To Understand the role of a database management system in anorganization.
To Understand basic database concepts, including the structure andoperation of the relational data model.
Construct simple and moderately advanced database queries usingStructured Query Language (SQL).</td></tr>
<tr><td colspan="9">Course Outcomes: On successful completion of this course, the students will be able to</td></tr>
<tr><td>CO 1</td><td colspan="8">To Use Structured Query Language (SQL) for database manipulation.</td></tr>
<tr><td>CO 2</td><td colspan="8">To Identify, analyze and define database objects, enforce integrity constraints on a database using RDBMS.</td></tr>
<tr><td>CO 3</td><td colspan="8">To Design and build simple database systems.</td></tr>
<tr><td>CO 4</td><td colspan="8">To Develop application to interact with databases.</td></tr>
</table>

UNIT-I

Introduction - Database-System Applications, Purpose of Database Systems, View of Data,Database languages, Data base architecture,Database Users and Administrators.

Introduction to the Relational Model - Structure of Relational Databases, Database Schema, Keys, Schema Diagrams, Relational Query Languages, Relational Operations.

Database Design and the E-R Model - Overview of the Design Process, The EntityRelationship Model, Constraints, Removing Redundant Attributes in Entity Sets, EntityRelationship Diagrams.

UNIT-II

Introduction to SQL - Overview of the SQL Query Language, SQL Data Definition, BasicStructure of SQL Queries, Additional Basic Operations, Set Operations, Null Values,Aggregate Functions, Nested Sub queries, Modification of the Database.

Advanced SQL - Integrity Constraints, SQL Data Types and Schemas,and Procedures, Triggers.

UNIT-III

Schema Refinement and Normal Forms - Schema Refinement – Problems Caused byRedundancy, Decompositions, Problems related to decomposition. Reasoning aboutFunctional Dependencies, First, Second, Third Normal forms, BCNF. Lossless joinDecomposition, Dependency- preserving Decomposition. Schema refinement in Data base Design, Multi valued Dependencies, Fourth Normal Form, Join Dependencies,FifthNormalForm,Inclusiondependencies.

UNIT-IV

Query Processing and Optimization- Overview, Measures of Query Cost, Transformation of Relational Expressions.

Transactions - Transaction Concept, A Simple Transaction Model, Storage Structure,Transaction Atomicity and Durability, Transaction Isolation, Serializability, TransactionIsolation and Atomicity, Transaction Isolation Levels, Implementation of Isolation Levels,Transactions as SQLStatements.

UNIT-V

Concurrency Control - Lock-Based Protocols, Deadlock Handling, Multiple Granularity,Timestamp-Based Protocols, Validation-Based Protocols, Multi version Schemes, SnapshotIsolation, Insert Operations, Delete Operations, and Predicate Reads.

TEXTBOOKS:

1.Silberschatz,Korth,DatabasesystemConcepts.5thEdition,McGrawhill.

2.Raghurama Krishnan, Johannes Gehrke, Data base Management Systems. 3rd Edition, Tata McGrawHill.

REFERENCEBOOKS:

1. Elmasri, Navathe, Fundamentals of Database Systems, Pearson Education.

2. Peter Rob, Ananda Rao and Carlos Corone, Database Management Systems, Cengage Learning.

3. C.J.Date, Introduction to Database Systems.