

Government College (A) Rajahmundry
DEPARTMENT OF COMPUTER SCIENCE



Estd: 1853

PG BOS

2024

M.Sc Computer Science

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY



(Accredited by NAAC “A+” Grade)

DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

COURSE STRUCTURE

2-Year Master of Science (M.Sc.) with coursework in first 3 semesters and project work in 4th semester of II year								
Semester	Courses		Title	Level of Course	Theory		Practical	
					H	Cr	H	Cr
Sem 1	Core Course 1		Mathematical Foundations of Computer Science	500 – 599	5	4	-	-
	Core Course 2		Advanced Data Structures and Algorithm Analysis	500 – 599	5	4	-	-
	Core Course 3		Computer Organization	500 – 599	5	4	-	-
	Skill Oriented Course 1 (Electives)	A	Advanced Java	400 – 499	3	3	2	1
			Advanced Java Lab					
		B	Mobile Application Development					
			Mobile Application Development Lab					
	Skill Oriented Course 2		Advanced DBMS	400 – 499	3	3	2	1
			Advanced DBMS Lab					
Open Online Transdisciplinary Course 1			300 – 399		2			
Indian Knowledge Systems 1			200 – 299	2	0	AUDIT COURSE		
<i>End of Sem 1</i>					23	20	4	2
Sem 2	Core Course 4		Theory of Computation	500 – 599	5	4	-	-
	Core Course 5		Data Communication and Computer Networks	500 - 599	5	4	-	-
	Core Course 6		Computer Graphics	500 - 599	5	4	-	-
	Skill Oriented Course 3	A	Data Science using R	500 - 599	3	3	2	1
			Data Science using R Lab					
B		Python Programming						

	(Elective)		Python Programming Lab									
	Skill Oriented Course 4	A	MERN stack development	500 - 599	3	3	2	1				
			MERN stack development Lab									
		B	IoT development									
			IoT development Lab									
		Open Online Transdisciplinary Course 2								300 - 399		2
	Indian Knowledge Systems 2			200 - 299	2	0	AUDIT COURSE					
	<i>End of Sem 2</i>				23	20	14	2				
Sem 3	Core Course 7		Compiler Design	500 - 599	5	4	-	-				
	Core Course 8		Information Security and Cryptography	500 - 599	5	4	-	-				
	Core Course 9		Foundations of Machine Learning	500 - 599	5	4	-	-				
	Skill Oriented Course 5 (Elective)	A	Computer Vision with OpenCV	500 - 599	3	3	2	1				
			Computer Vision with OpenCV Lab									
		B	Cloud Computing									
			Cloud Computing Lab									
		C	DevOps Development									
			DevOps Development Lab									
	Skill Oriented Course 6 (Elective)	A	Digital Forensics	500 - 599	3	3	2	1				
			Digital Forensics Lab									
		B	Big Data Analytics									
			Big Data Analytics Lab									
		C	Deep Learning									
Deep Learning Lab												
	<i>End of Sem 3</i>				21	18	4	2				
Sem 4	Open Online Skill Development Course/s			300 - 399	-	8	-	-				
	Project Work			400 - 499				12				
	<i>End of Sem 4</i>				-	8	-	12				
Total Hours/Credits					67	66	16	18				



**Government College (Autonomous)
Rajahmundry**

Course Code MSC101	TITLE OF THE COURSE Mathematical Foundations of Computer Science	Program & Semester I M.Sc. (I Sem)			
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
Pre-requisites:	Basic Mathematics	5		-	4

Course Objectives:

1. To introduce the concepts of mathematical logic
2. To introduce the concepts of sets, relations, and functions
3. To perform the operations associated with sets, functions, and relations.
4. To relate practical examples to the appropriate set, function, or relation model, and interpret the associated operations and terminology in context.
5. To introduce generating functions and recurrence relations.
6. To use Graph Theory for solving problems.

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Ability to apply mathematical logic to solve problems.
CO2	Understand sets, relations, functions, and discrete structures.
CO3	Able to use logical notation to define and reason about fundamental mathematical concepts such as sets, relations, and functions.
CO4	Able to formulate problems and solve recurrence relations.
CO5	Able to model and solve real-world problems using graphs and trees.
CO6	Ability to apply mathematical logic to solve problems.

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	
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Syllabus:

UNIT –I

Mathematical logic: Introduction, Statements and Notation, Connectives, Theory of Inference for the Statement Calculus, The Predicate Calculus, Inference Theory of the Predicate Calculus.

Set theory: Introduction, Basic Concepts of Set Theory, Types of Sets, Relations and Ordering, Functions.

UNIT –II

Algebraic Structures: Introduction, Algebraic Systems, Semi groups and Monoids, Groups, Lattices as Partially Ordered Sets, Boolean algebra.

Elementary Combinatorics: Basics of Counting, Combinations and Permutations, Enumeration of Combinations and Permutations, Enumerating Combinations and Permutations with Repetitions, Enumerating Permutations with Constrained Repetitions, Binomial Coefficients, The Binomial and Multinomial Theorems, The Principle of Inclusion-Exclusion.

UNIT –III

Recurrence Relations: Generating Functions of Sequences, Calculating Coefficients of generating functions, Recurrence relations, Solving recurrence relations by substitution and Generating functions, The method of Characteristic roots, Solutions of Inhomogeneous Recurrence Relations.

UNIT –IV

Graphs: Graph Terminology and Types, isomorphism and Sub-graphs, Trees and their Properties, Spanning Trees, Directed Trees, Binary Trees, Planar Graphs, Euler's Formula, Multi-graphs and Euler Circuits, Hamiltonian Graphs, Chromatic Numbers, The Four-color Problem.

Text books:

1. Discrete Mathematical Structures with Applications to Computer Science, J.P. Tremblay, R. Manohar, McGraw Hill education (India) Private Limited. (UNITS - I , II)

MODEL PAPER

BLUE PRINT			
S.NO	QUESTIONS	UNITS OF THE SYLLABUS	MARKS
1	Question1 and Question2	UNIT-I	10
2	Question1 and Question2	UNIT-II	10
3	Question1 and Question2	UNIT-III	10
4	Question1 and Question2	UNIT-IV	10
5	Question 9 Short answers from (a) to (h) (Five out of Eight should be answered, each question is of 4 Marks)	Covers All Four Units of the Syllabus	5x4=20
Total			60M

GOVERNMENT AUTONOMOUS COLLEGE, RAJAMAHENDRAVARAM

M.Sc. Computer Science Semester End Examinations

Semester: I

Mathematical Foundations of Computer Science

Model Paper

Time: 3 Hours

Max. Marks: 60 M

SECTION- A (4 X 10 = 40 M)

Answer ALL Questions

UNIT-I

1. What is a proposition? Explain about theory of inference for propositional calculus.

(OR)

2. Define function? Explain different types of functions.

UNIT-II

3. Write Binomial statement and find the expansion of $(x+y)^8$.using binomial theorem

(OR)

4. Define Abelian group, Show that the set of all positive rational numbers forms an abelian group under the composition * defined by $a*b=(ab)/2$

UNIT-III

5. Solve the recurrence relation $a_n-7a_{n-1}+10a_{n-2}=0$ for $n \geq 2$ by the use of generating functions.

(OR)

6. Solve the recurrence relation $a_n=a_{n-1}+n$ with initial condition $a_0=2$ by substitution method.

UNIT-IV

7. Define graph and explain different types of graphs.

(OR)

8. What is a planar graph with examples and write properties of planar graphs?

SECTION- B

Answer any FIVE Questions

(5×4=20M)

9. Construct the truth table for $p \wedge (\sim q \vee q)$
10. Compute $20!$ $18!$
11. Write a Short note on Predicate Calculus.
12. What are the Properties of Algebraic Structure?
13. Prove $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$
14. State and prove Hand shaking theorem.
15. Define Hamilton circuit Hamiltonian graph give examples to each
16. Explain about Spanning Tree.

	Government College (Autonomous) Rajahmundry				
Course Code MSC102	TITLE OF THE COURSE Advanced Data Structures and Algorithm Analysis	Program & Semester I M.Sc. (I Sem)			
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
Pre-requisites:	C Programming	5		-	4

Course Objectives:

1. The fundamental design, analysis, and implementation of basic data structures.
2. Basic concepts in the specification and analysis of programs.
3. Principles for good program design, especially the uses of data abstraction.
4. Significance of algorithms in the computer field
5. Various aspects of algorithm development and Qualities of a good solution

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Basic ability to analyze algorithms and to determine algorithm correctness and time efficiency class.
CO2	Master a variety of advanced abstract data type (ADT) and data structures and their implementations.
CO3	Master different algorithm design techniques (brute-force, divide and conquer, greedy, etc)
CO4	Ability to apply and implement learned algorithm design techniques and data structures to solve problems Ability to Compare different data structures

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	
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Syllabus:

UNIT –I

Algorithms, Performance analysis- time complexity and space complexity, Asymptotic Notation-Big Oh, Omega and Theta notations.

Binary Trees Properties of Binary trees, Binary tree ADT, representations, recursive and non-recursive traversals, Binary tree creation using Inorder, preorder, post order traversals. Search trees- Binary search tree-Binary search tree ADT, insertion, deletion and searching operations, Balanced search trees, AVL trees, Red Black trees and Splay Trees, B-Trees- definition, insertion and searching operations, B+ Trees, Comparison of Search trees.

UNIT –II

Heap Trees (Priority Queues) – Min and Max Heaps, Operations and Applications.

Hashing General Idea, Hash Function, Separate Chaining, Hash Tables without linked lists: Linear Probing, Quadratic Probing, Double Hashing, Rehashing, Universal Hashing, Extendible Hashing.

Graphs – Terminology, Representations, Basic Search and Traversals- BFS, DFS algorithm, Connected Components and Biconnected Components.

UNIT-III

Algorithm Design methods:

Greedy method: Optimization problems, Greedy method, Applications-0/1 Knapsack Problem, Job Sequencing with deadlines, Topological sorting, Bipartite cover, Single source shortest path, Minimum cost spanning tree.

Divide and Conquer: Binary search, Quick sort, Merge sort, Closest pair of points

UNIT –IV

Dynamic Programming, Applications-All pairs shortest paths, Single Source Shortest Paths – General Weights (Bellman Ford Algorithm), 0/1 Knapsack, Noncrossing Subset of Nets, Editing, Travelling Salesperson problem.

Backtracking: General Method, 8-Queens Problem, Sum of Subsets problem, Graph Coloring, 0/1 Knapsack Problem, Max Clique

Branch and Bound: Container Loading, 0/1 Knapsack, Traveling Salesperson problem.

Text books:

1. S. Sahni, “Data structures, Algorithms and Applications in Java”, Universities Press.
[ISBN:0-07-109217-x]

GOVERNMENT AUTONOMOUS COLLEGE, RAJAMAHENDRAVARAM

M.Sc. Computer Science Semester End Examinations

Semester: I

Advanced Data Structures and Algorithm Analysis

Model Paper

Time: 3 Hours

Max. Marks: 60 M

SECTION- A (4 X 10 = 40 M)

Answer ALL Questions

UNIT-I

1. Explain Binary Search Tree and Its operations.

(OR)

2. Explain AVL tree and it's operations.

UNIT-II

3. Explain Heap tree and it's operations.

(OR)

4. Explain BFS and DFS Traversals algorithms with example.

UNIT-III

5. Explain Quick sort Algorithm with example.

(OR)

6. Explain Single source shortest path algorithm with example.

UNIT-IV

7. Explain Travelling salesman problem with example.

(OR)

8. Explain Binary Search algorithm with example.

SECTION- B

Answer any FIVE Questions

(5×4=20M)

9. Explain Post order traversal algorithm using recursion.
10. Write a short note on Asymptotic notations.
11. Explain Linear probing with example.
12. Write a short note on Connected and Bi-Connected components.
13. Solve the 0/1 Knapsack problem using Greedy method.
Input: $N = 3$, $W = 4$, $\text{profit}[] = \{1, 2, 3\}$, $\text{weight}[] = \{4, 5, 1\}$
14. Write a short note on minimum cost spanning tree.
15. Explain about graph coloring with example.
16. Explain 8-Queen problem.



**Government College (Autonomous)
Rajahmundry**

Course Code MSCS103	TITLE OF THE COURSE Computer Organization and Architecture	Program & Semester I M.Sc. (I Sem)			
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
Pre-requisites:	Knowledge on basic functional units of computer systems	5		-	4

Course Objectives:

1. To conceptualize the basics of organizational and architectural issues of a digital computer.
2. To analyze performance issues in processor and memory design of a digital computer.
3. To understand various data transfer techniques in digital computer.
4. To analyze processor performance improvement using instruction level parallelism

Course Outcomes:

On Completion of the course, the students will be able to-

CO1	Ability to understand the basic structure of computer.
CO2	Ability to understand control unit operations
CO3	Ability to design memory organization that uses banks for different word size operations.
CO4	Ability to understand the concept of cache mapping techniques.
CO5	Ability to understand the concept of I/O organization.
CO6	Ability to conceptualize instruction level parallelism

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship
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Syllabus:

UNIT - I

Register Transfer and Micro operations: Register Transfer Language, Register Transfer,

Bus and Memory Transfers, Arithmetic Micro operations, Logic Micro operations, Shift Micro operations, Arithmetic Logic Shift Unit.

Basic Computer Organization and Design: Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory-Reference Instructions, Input-Output and Interrupt, Complete Computer Description, Design of Basic Computer, Design of Accumulator Logic.

UNIT-II

Micro programmed Control:

Control Memory, Address Sequencing, Micro program Example, Design of Control Unit.

Central Processing Unit: Introduction, General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer(RISC)

UNIT-III

Pipelining and Vector Processing:

Parallel processing, Pipe Lining, Arithmetic Pipeline, Instruction Pipe line, Risc Pipeline, Vector processing, Array processors

Input/output Organization: Peripheral Devices, I/O interface, Asynchronous data transfer, Modes of transfer, priority Interrupt, Direct memory access, Input-Output Processor (IOP), Serial Communication.

UNIT-IV

Memory Organization: Memory Hierarchy, Main memory, Auxiliary memory, Associate Memory, Cache Memory, and Virtual memory, Memory Management Hardware.

Text books:

1. Computer System Architecture, M. Morris Mano, Prentice Hall of India Pvt. Ltd., Third Edition, Sept. 2008
2. Computer Architecture and Organization, William Stallings, PHI Pvt. Ltd., Eastern Economy Edition, Sixth Edition, 2003.

MODEL PAPER

BLUE PRINT			
S.NO	QUESTIONS	UNITS OF THE SYLLABUS	MARKS
1	Question1 and Question2	UNIT-I	10
2	Question1 and Question2	UNIT-II	10
3	Question1 and Question2	UNIT-III	10
4	Question1 and Question2	UNIT-IV	10
5	Question 9 Short answers from (a) to (h) (Five out of Eight should be answered, each question is of 4 Marks)	Covers All Four Units of the Syllabus	5x4=20
Total			60

GOVERNMENT AUTONOMOUS COLLEGE, RAJAMAHENDRAVARAM
M.Sc. Computer Science Semester End Examinations

Semester: I
Computer Organization and Architecture
Model Paper

Time:3Hours

Max.Marks : 60

SECTION- A (4 X 10 = 40 M)
Answer ALL Questions

UNIT-I

1. a) Solve the following 5M
- i) $(57.125)_{10} = ()_8$
- ii) $(30.6875)_{10} = ()_2$
- b) Simplify the following Boolean function using map method 5M
- $F = A'B'C' + B'CD' + A'BCD' + AB'C'$
(OR)
2. Differentiate between latch and flip flop? Explain about clocked RS flip flop using NAND gates 10M

UNIT-II

3. a) Explain arithmetic micro-operations 5M
- b) Write about bus and memory transfers. 5M
- (OR)
4. a) Explain register transfer language 4M
- b) Define Instruction Cycle. Explain using a flow chart. 6M

UNIT-III

5. Define Addressing Mode? List and explain the different types of addressing modes. 10M
- (OR)
6. Write Zero Address, One Address, Two Address, Three Address instruction code for the expression $Y = (A + B) / (D * C)$ 10M

UNIT_IV

7. What is the principle of cache memory, Explain various Mapping methods. 10M

(OR)

8. Explain the operation of DMA with a block diagram and also discuss about the DMA Operating modes. 10M

SECTION- B

Short Answer Questions

Answer Any Five Questions

(5×4=20M)

9. What is gray code? Develop 3-bit gray code for 0 to 7
10. What is multiplexer? Design an 8X1 multiplexer with basic gates.
11. Explain about shift micro-operations
12. List the characteristics of RISC processor
13. List and explain the functions of a control Unit
14. Briefly explain about Asynchronous data transfer methods?
15. What is Memory Hierarchy? Show in a diagram.
16. Explain the concept of virtual memory

	Government College (Autonomous) Rajahmundry				
Course Code MSC104	TITLE OF THE COURSE Advanced Java	Program & Semester I M.Sc. (I Sem)			
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
Pre-requisites:	Basics of computer programming	3			3

Course Objectives:

1. To introduce object oriented programming concepts.
2. To understand object oriented programming concepts, and apply them in solving problems.
3. To introduce the principles of inheritance and polymorphism; and demonstrate how they relate to the design of abstract classes
4. To introduce the implementation of packages and interfaces
5. To introduce the concepts of exception handling and multithreading.
6. To introduce the design of Graphical User Interface using applets and swing controls.

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Demonstrate proficiency in using the Java Collections Framework to manage data through various collection interfaces and classes.
CO2	Develop interactive GUI applications using Swing components, incorporating layout management and event handling.
CO3	Implement database connectivity in Java applications using JDBC, including performing CRUD operations and managing SQL exceptions.
CO4	Create dynamic web applications using Servlets and JSP, effectively managing user sessions and integrating with databases.

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship
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Syllabus:

UNIT-I

JAVA Collect framework & Introduction to GUI

Collection Interfaces- Collection Interface, List Interface, Set Interface, Queue Interface

Collection Classes- ArrayList, LinkedList, HashSet, TreeSet, Priority Queue, Working with Maps, Comparators.

GUI Programming with Swing:

Introduction: Concept of AWT, AWT vs Swing, Swing Class Hierarchy, Component and Containers

GUI Controls: JLabel, JTextField, Swing Buttons- JButton- JToggleButton -CheckBoxes- RadioButtons, Jlist, Jmenu, JComboBox, JTable, JScrollPane, JTabbedPane.

UNIT-II

Advanced GUI Components and Event Handling

Swing Menus: Menu, Menu Item, Icons in Menu Items, Check Box and Radio Buttons in Menu Items, Pop-up Menus, Toolbars, Tooltips, Option Dialogs, Creating Dialogs, File Choosers, Color Choosers

Simple Swing GUI Application

Layout Management: No Layout, Flow layout, Border Layout, Grid Layout, Gridbag Layout, Group Layout.

Event Handling: Event Handling Concept, Event Classes, Listener Interfaces, Using Action Commands, Adapter Classes, **Handling Action Events,** Key Events, Focus Events, Mouse Event, Window Event, Item Events

UNIT-III

Database Connectivity

JDBC Architecture, JDBC Driver Types, JDBC Configuration, Managing Connections, Statements, Result Set, SQL Exceptions, DDL and DML Operations using Java, Prepared

Statements, Multiple Results, Scrollable Result Sets, Updatable Result Sets, Row Sets and Cached Row Sets , Transactions, SQL Escapes.

UNIT-IV

Servlets & JSP

Servlets: Life Cycle of a Servlet, Create and Compile Servlet source code, The Servlet API, The javax.servlet Package, Reading Servlet parameters, The javax.servlet.http Package, Handling HTTP Requests and Responses, Using Cookies, Session Tracking.

Java Server Pages: Overview of JSP, JSP versus Servlet, JSP Tags: Variables and Objects, Directives, Scripting Elements, Standard Actions, Implicit Objects, Scope, Java Server Pages with Beans, Tomcat, User Sessions, Cookies, Session Objects, JSP with JDBC, Creating Custom JSP Tag Libraries.

Text books:

1. Java The complete reference, 9th edition, Herbert Schildt, McGraw Hill.
2. J2EE: THE COMPLETE REFERENCE , [Jim Keogh](#), McGraw Hill.
3. Cay S. Horstmann, Core Java Volume I--Fundamentals, Pearson, Eleventh Edition, 2018
4. Cay S. Horstmann, Core Java Volume II-Advance Features, Pearson, Eleventh Edition, 2019

Reference books:

1. An Introduction to programming and OO design using Java, J. Nino and F.A. Hosch, John Wiley & sons.
2. Introduction to Java programming, Y. Daniel Liang, Pearson Education.
3. Object Oriented Programming through Java, P. Radha Krishna, University Press.
4. Programming in Java, S. Malhotra, S. Chudhary, 2nd edition, Oxford Univ. Press.
5. Java Programming and Object oriented Application Development, R. A. Johnson, Cengage Learning.

Web Links:

1. <https://nptel.ac.in/courses/106/105/106105191/>

MODEL PAPER

BLUE PRINT			
S.NO	QUESTIONS	UNITS OF THE SYLLABUS	MARKS
1	Question1 and Question2	UNIT-I	10
2	Question1 and Question2	UNIT-II	10
3	Question1 and Question2	UNIT-III	10
4	Question1 and Question2	UNIT-IV	10
5	Question 9 Short answers from (a) to (h) (Five out of Eight should be answered, each question is of 4 Marks)	Covers All Four Units of the Syllabus	5x4=20
Total			60

GOVERNMENT AUTONOMOUS COLLEGE, RAJAMAHENDRAVARAM
M.Sc. Computer Science Semester End Examinations

Semester: I
Advanced Java
Model Paper

Time:3Hours

Max.Marks : 60

SECTION- A (4 X 10 = 40 M)

Answer ALL Questions

UNIT-I

1. Explain List, Set, and Queue interfaces in Java

(OR)

2. Explain JLabel, JTextField, Swing Buttons- JButton- JToggleButton -CheckBoxes in Java

UNIT-II

3. Explain Layout Management in Java.

(OR)

4. Explain Keyboard and Mouse Events in Java.

UNIT-III

5. Explain JDBC architecture, JDBC drivers in Java.

(OR)

6. Explain how to create and manipulate data base though JDBC.

UNIT-IV

7. Explain Java Servlet life cycle.

(OR)

8. Explain Cookies and Session tracking in Servlets.

Short Answer Questions

Answer Any Five Questions

(5×4=20M)

9. Write short note AWT vs Swings.

10. Write short note on Components and Containers in Java.

11. Write short note Swing menus.

12. Write short on Listener Interfaces.

13. Write short note on Row sets and cached Row sets.

14. Write short note on SQL escapes.

15. Write short note on JSP Directives.

16. Write short note on JSP Scripting elements.

	Government College (Autonomous) Rajahmundry				
Course Code MSC104P	TITLE OF THE COURSE Advanced Java Lab	Program & Semester I M.Sc. (I Sem)			
Teachin	Hours Allocated: 40 (Lab)	L	T	P	C
Pre-requisites:	Basics of computer programming			2	1

Objectives:

1. To understand object oriented programming concepts, and apply them in solving problems.

List of Experiments/Syllabus:

1. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -, *, % operations. Add a text field to display the result. Handle any possible exceptions like divided by zero.
2. Develop an applet in Java that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named "Compute" is clicked.
3. Write a Java program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num 2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception. Display the exception in a message dialog box.
4. Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with "Stop" or "Ready" or "Go" should appear above the buttons in selected color. Initially, there is no message shown.
5. Write a Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired (Use Adapter classes).

6. Write a Java program that correctly implements the producer – consumer problem using the concept of inter-thread communication.
7. Java program to display all records from a table using JDBC
8. Write a program to implement the Linked List using a collection framework.
9. Write a program to implement Priority Queue using a collection framework.
10. Write a program to implement a Map using a collection framework.

Reference books:

1. Java The complete reference, 9th edition, Herbert Schildt, McGraw Hill.

Virtual Lab Links:

1. <http://vlabs.iitb.ac.in/vlabs-dev/labs/java-iitd/index.html>

	Government College (Autonomous) Rajahmundry				
Course Code MSCS105	TITLE OF THE COURSE Mobile Application Development	Program & Semester I M.Sc. (I Sem)			
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
Pre-requisites:	Basics of computer programming	4	1	-	4

Course Objectives

1. To provide students with a comprehensive understanding of mobile application development using the Android platform.

Course Outcomes:

On Completion of the course, the students will be able to-

CO1	Gain a solid understanding of mobile application development principles
CO2	Develop proficiency in setting up the Android development environment
CO3	Acquire the necessary skills to handle and manage Android resources effectively
CO4	Develop expertise in designing user interfaces by utilizing a wide range of UI widgets
CO5	Learn various storage techniques in Android and Understand how to integrate web applications

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship
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Syllabus:

UNIT –I

Mobile Application Development Introduction, advantages, difference between mobile application, Web application and Hybrid Application.

Android Operating System Introduction, Android Versions with Features, Android Architecture, OHA

Android Application Development Environment: Introduction of Android Studio, Android SDK, Android Development Tools, Android Virtual Devices, Directory Structure of Android Application, Activity & Application Life Cycle, Anatomy of Android Application, Android Manifest File

UNIT –II

Android Terminologies & Resource handling Terminologies: Context, Activity, Intent, Service, Broadcast Receiver, Fragment

Resources: Working with Different Types of Resources Like String, Dimen, Integer, Drawable, Color, Style, Material Design etc.

Animation: Tween Animation and Frame by Frame Animation

UNIT –III

UI Widgets: TextView, Button, EditText, CheckBox, RadioButton & RadioGroup, AutoCompleteTextView, Spinner, ImageView, Seekbar, ProgressBar, Dialogs

Android Layouts, Menu and Views Layouts: Linear Layout, Absolute Layout, Frame Layout, Relative Layout, Constraint Layout Creation of Layout Programmatically Menu: Option, Context **Views:** Adapters, ListView, ScrollView, WebView, CardView, RecyclerView

UNIT –IV

Android Storage Techniques: Shared Preferences, Files & Directories, SQLite Database Connectivity & Operations, Sharing Data Between Application Using Content Providers.

Web Application Integration Techniques and Android APIs: Introduction of JSON, JSON Parsing, Networking API, Telephony API, Web API, Building and Publishing Application to Online Application Store

Text Books:

1. Lauren Darcey and Shane Conder “Android Wireless Application Development”, 2nd Edition, Pearson Education,
2. David Griffiths and Dawn Griffiths, “Head First Android Development: A Brain Friendly Guide”, O’Reilly

Reference Books:

GOVERNMENT AUTONOMOUS COLLEGE, RAJAMAHENDRAVARAM
M.Sc. Computer Science Semester End Examinations

Semester: I
Mobile Application Development
Model Paper

Time:3Hours

Max.Marks : 60

SECTION- A (4 X 10 = 40 M)
Answer ALL Questions

UNIT-I

1. Explain Android Development tools.
- (OR)
2. Explain Activity and Application life cycle.

UNIT-II

3. Working with Different Types of Resources Like String, Dimen, Integer, Drawable, Color.
- (OR)
4. Tween Animation and Frame by Frame Animation

UNIT-III

5. Explain UI Widgets
- (OR)
6. Explain Android Layouts.

UNIT-IV

7. Explain SQLite Database Connectivity & Operations.
- (OR)
8. Explain Files and Directories in Android.

SECTION-B

Short Answer Questions

Answer Any Five Questions

(5×4=20M)

9. Write a short note on Mobile Application, Web application development.
10. Write a short note on OHA.
11. Write a short note on Broadcast Receiver, Fragment.
12. Write a short note on Style, Material Design.
13. Write a short note on Views in Android.
14. Write a short note on menus in Android.
15. Write a short note on Networking API, Telephony API
16. Write a short note on Shared preferences.

	Government College (Autonomous) Rajahmundry				
Course Code MSC105P	TITLE OF THE COURSE Mobile Application Development Lab	Program & Semester I M.Sc. (I Sem)			
Teaching	Hours Allocated: 40 (Lab)	L	T	P	C
Pre-requisites:	Basics of computer programming			2	1

Objectives:

1. To provide students with a comprehensive understanding of mobile application development using the Android platform.

List of Experiments/Syllabus:

1. Study of various IDEs for Android development
2. Setting up Android Studio in Windows
3. Develop an application that uses GUI components, Font and Colours
4. Develop an application that uses Layout Managers and event listeners.
5. Write an application that draws basic graphical primitives on the screen.
6. Develop an application that makes use of databases.
7. Develop an application that makes use of Notification Manager.
8. Implement an application that uses multi-threading.
9. Develop a native application that uses GPS location information
10. Implement an application that writes data to the SD card.
11. Implement an application that creates an alert upon receiving a message
12. Write a mobile application that makes use of RSS feed
13. Develop a mobile application to send an email.

Reference books:

1. Mark L Murphy, "Beginning Android", Apress, 2011
2. Prasanna Kumar Dixit, "Android", Vikas Publishing House Pvt Ltd.

	Government College (Autonomous) Rajahmundry				
Course Code MSCC106	TITLE OF THE COURSE ADVANCED DATA BASE MANAGEMENT SYSTEMS	Program & Semester I M.Sc. (I Sem)			
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
Pre-requisites:		5		-	4

Course Objectives:

1. To understand the basic concepts and the applications of database systems.
2. To master the basics of SQL and construct queries using SQL.
3. To understand the relational database design principles.
4. To become familiar with the basic issues of transaction processing and concurrency control.
5. To become familiar with database storage structures and access techniques.

Course Outcomes:

On Completion of the course, the students will be able to-

CO1	Demonstrates Database design, Database creation using SQL.
CO2	Illustrates the usage of PL/SQL constructs
CO3	Illustrates Transaction, Concurrency control, Recovery techniques.
CO4	Demonstrate the Document Oriented Data bases.

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	
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Syllabus:

UNIT - I

Database Introduction Characteristics of the Database Approach, advantages of DBMS.

DBMS Architecture & Data Independence, Relational Model.

Database Design: Functional Dependencies, First Normal Form, Second Normal Form, Third Normal Form, Boyce-Codd normal form (BCNF), Multi valued Dependency and Fourth Normal Form, Join Dependencies and Fifth Normal Form.

SQL: The CREATE, Insert update delete statements in SQL, Specifying Constraints in SQL, views, Basic retrieval Queries in SQL, Nested Queries, Correlated Nested Queries, Exists, Unique function in SQL, Joined tables in SQL and Outer Joins, Aggregate Functions in SQL, Group By and Having clause in SQL, Specifying constraints as Assertions.

UNIT - II

PL/SQL: Introduction, Shortcoming in SQL, Structure of PL/SQL, PL/SQL Language Elements, Data Types, Operators Precedence, Control Structure, Steps to Create a PL/SQL, Program, Iterative Control, Cursors, Steps to create a Cursors, Procedure, Function, Packages, Exceptions Handling, Database Triggers, Types of Triggers.

UNIT - III

Transactions, Concurrency Control, Recovery Techniques

Basic concept; ACID properties; transaction state; implementation of atomicity and durability; concurrent executions; basic idea of serializability; view and conflict serializability Recovery Techniques Failure Classification , Storage Structure, Recovery and Atomicity Log Based Recovery, Shadow Paging ,stable storage implementation, data access; recovery and atomicity - log based recovery, deferred database modification, immediate database modification, checkpoints. TCL, DCL commands.

UNIT - IV

Documented oriented database and NoSQL

Overview and History of NoSQL Databases. Definition of the Types of NoSQL Database.

Introduction to Documents- JSON File format for storing documents, Collections ,Database Commands in MongoDB, Inserting and Saving Documents, Inserting multiple documents, CRUD operation , Updating Documents ,Removing Documents,Document Replacement , Operator and Modifiers, Indexing in MongoDB, Single index , Finding index, Multikey index

BLUE PRINT

S.NO	QUESTIONS	UNITS OF THE SYLLABUS	MARKS
1	Question1 and Question2	UNIT-I	10
2	Question1 and Question2	UNIT-II	10
3	Question1 and Question2	UNIT-III	10
4	Question1 and Question2	UNIT-IV	10
5	Question 9 Short answers from (a) to (e) (Five out of Eight should be answered, each question is of 4 Marks)	Covers All Four Units of the Syllabus	5x4=20
Total			60

GOVERNMENT AUTONOMOUS COLLEGE, RAJAMAHENDRAVARAM
M.Sc. Computer Science Semester End Examinations
Semester: I

ADVANCED DATA BASE MANAGEMENT SYSTEMS

Model Paper

Time:3Hours

Max.Marks : 60

SECTION- A (4 X 10 = 40 M)

Answer ALL Questions

UNIT-I

1. Explain Data base Archetecture.

(OR)

2. Explain First Normal form, Second Normal Form, Third Normal form.

UNIT-II

3. Explain control structures in PL/SQL.

(OR)

4. Explain Database triggers.

UNIT-III

5. a) Explain ACID properties.

b) Explain Conflict and view serializabilty.

(OR)

6. Explain TCL, DCL commands.

UNIT-IV

7. Explain database commands in MongoDB.

(OR)

8. Explain about Indexing in MongoDB

SECTION-B

Short Answer Questions

Answer Any Five Questions

(5×4=20M)

9. Explain Aggregate functions in SQL.
10. Explain DDL commands in SQL.
11. Explain structure of PL/SQL
12. Explain data types in PL/SQL.
13. Explain Log based recovery in DBMS.
14. Write a short note on Failure classification.
15. Explain History of NoSQL Database.
16. Explain types of NoSQL Database.



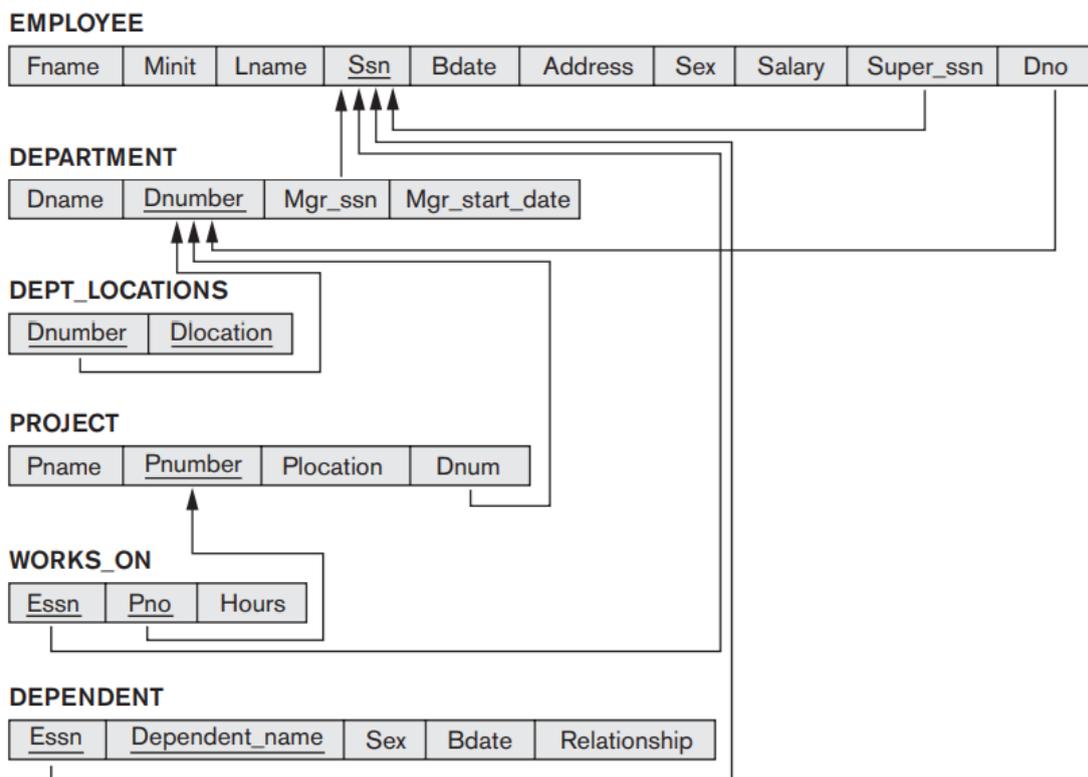
**Government College (Autonomous)
Rajahmundry**

Course Code	TITLE OF THE COURSE	Program & Semester			
MSC105P	Advanced Database Management Systems	I M.Sc. (I Sem)			
Teachin	Hours Allocated: 40 (Lab)	L	T	P	C
Pre-requisites:	Basics of computer programming			2	1

Objectives:

To provide students with a comprehensive understanding of SQL,PL/SQL, NoSQL

List of Experiments/Syllabus:



1. Create Company database based on the following schematic diagram.
2. Insert, Update, Delete data from company database
3. Retrieve the name and address of all employees who work for the 'Research' department.

4. For every project located in 'Stafford', list the project number, the controlling department number, and the department manager's last name, address, and birth date.
5. For each employee, retrieve the employee's first and last name and the first and last name of his or her immediate supervisor.
6. Make a list of all project numbers for projects that involve an employee whose last name is 'Smith', either as a worker or as a manager of the department that controls the project.
7. Retrieve all employees whose address is in Houston, Texas.
8. Find all employees who were born during the 1950s.
9. Show the resulting salaries if every employee working on the 'ProductX' project is given a 10 percent raise.
10. Retrieve all employees in department 5 whose salary is between \$30,000 and \$40,000.
11. Retrieve all employees in department 5 whose salary is between \$30,000 and \$40,000.
12. Retrieve the names of all employees who do not have supervisors.
13. Retrieve the name of each employee who has a dependent with the same first name and is the same sex as the employee.
14. Retrieve the names of employees who have no dependents.
15. List the names of managers who have at least one dependent.
16. Create views on Company database
17. Create triggers on company database.
18. Perform crud operations in MongoDB
19. Create Indexes on Database.
20. Create cursors and retrieve data from database.

Reference books:

1. Database Systems, 6th edition, R Elmasri, ShamkantB.Navathe, Pearson Education.
2. Database System Concepts, Peter Rob & Carlos Coronel, Cengage Learning.
3. Introduction to Database Management, M. L. Gillenson and others, Wiley Student Edition.
4. Introduction to Database Systems, C. J. Date, Pearson Education.

SEMESTER-II

	Government College (Autonomous) Rajahmundry				
Course Code MSC201	TITLE OF THE COURSE Formal Languages & Automata Theory	Program & Semester I M.Sc. (II Sem)			
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
Pre-requisites:	Basic Mathematics	5		-	4

Course Objectives:

1. To introduce the fundamental concepts of formal languages, grammars and automata theory
2. Classify machines by their power to recognize languages.
3. Employ finite state machines to solve problems in computing.
4. To understand deterministic and non-deterministic machines.
5. To understand the differences between decidability and un-decidability.

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Able to employ finite state machines for modeling and solving computing problems.
CO2	Able to design context free grammars for formal languages.
CO3	Able to distinguish between decidability and un decidability.
CO4	Able to gain proficiency with mathematical tools and formal methods.

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	
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Syllabus:

UNIT –I

Finite Automata and Regular Expressions: Basic Concepts of Finite State Systems, Deterministic and Non-Deterministic Finite Automata, Finite Automata with ϵ -moves, Regular Expressions, Mealy and Moore Machines, Two-Way Finite Automate, Applications of FSM.

Regular sets & Regular Grammars: Basic Definitions of Formal Languages and Grammars, Regular Sets and Regular Grammars, Closure Properties of Regular Sets, Pumping Lemma for Regular Sets, Decision Algorithm for Regular Sets, Myhill-Nerode Theorem, Minimization of Finite Automata.

UNIT –II

Context Free Grammars and Languages: Context Free Grammars and Languages, Derivation Trees, Simplification of Context Free Grammars, Normal Forms, Pumping Lemma for CFL, Closure properties of CFL's, Decision Algorithm for CFL.

Push down Automata: Informal Description, Definitions, Push-Down Automata and Context free Languages, Parsing and Push-Down Automata.

UNIT –III

Turing Machines: The Definition of Turing Machine, Design and Techniques for Construction of Turing Machines, Combining Turing Machines.

Universal Turing Machines and Undecidability: Universal Turing Machines. The Halting Problem, Variants of Turing Machines, Restricted Turing Machines, Decidable & Undecidable Problems - Post Correspondence Problem.

UNIT –IV

Chomsky Hierarchy of Languages: Regular Grammars, Unrestricted Grammars, Context Sensitive languages, Relationship between Classes of Languages.

Basic Introduction to Complexity: Introductory ideas on Time complexity of deterministic

BLUE PRINT

S.NO	QUESTIONS	UNITS OF THE SYLLABUS	MARKS
1	Question1 and Question2	UNIT-I	10
2	Question1 and Question2	UNIT-II	10
3	Question1 and Question2	UNIT-III	10
4	Question1 and Question2	UNIT-IV	10
5	Question 9 Short answers from (a) to (e) (Five out of Eight should be answered, each question is of 4 Marks)	Covers All Four Units of the Syllabus	5x4=20
Total			60

GOVERNMENT AUTONOMOUS COLLEGE, RAJAMAHENDRAVARAM
M.Sc. Computer Science Semester End Examinations
Semester: II

Formal Languages & Automata Theory

Model Paper

Time:3Hours

Max.Marks : 60

SECTION- A (4 X 10 = 40 M)

Answer ALL Questions

UNIT-I

1. A) Define DFA and NFA with examples. Differentiate them - 5M
- B) Define Mealy and Moore Machines - 5M

(OR)

2. C) Explain about Myhill-Nerode Theorem and Minimization of Finite Automata 5M
- D) Explain the Closure Properties of Regular Sets - 5M

UNIT-II

3. A) State and prove Pumping Lemma for Context Free Language - 10M

(OR)

4. B) Design a PDA for the language $L = \{ WW^R / Win(a,b)^* \}$ - 5M
- C) Explain about Push-Down Automata - 5M

UNIT-III

5. A) Definition of Turing Machine and design a Turing machine to accept all strings of $\{0^n 1^n 2^n\}$ - 10M

(OR)

6. B) Explain about Universal Turing Machine - 5M
- C) Discuss Halting problem of Turing Machine - 5 M

UNIT-IV

7. A) Explain about Regular Grammar and Unrestricted Grammar - 10M

(OR)

8. B) Explain Relationship between Classes of Languages - 5M

C) Explain about Context Sensitive Language - 5M

SECTION-B

Answer Any Five Questions

(5×4=20M)

9. Define DFA. Construct a DFA recognizing the language generated by $(a+b)^*b$

10. Write the regular expressions for the following languages:

i). All the strings of a's and b's where every string ends with "abab"

ii). All the strings which begin or end with either 00 or 11 over the set $\{0,1\}$

11. Define the language for the following Context Free Grammars.

i) $S \rightarrow 0 S 1 \mid 01$ (ii) $S \rightarrow aSa \mid bSb \mid \epsilon$

12. Differentiate between Recursive and Recursive enumerable languages.

13. Define Decidable and Undecidable Problems

14. Define the techniques for Turing Machine Construction

15. Define the Time complexity of Deterministic and Nondeterministic Turing Machines

16. Define NP- Complete problems

	Government College (Autonomous) Rajahmundry				
Course Code MSC202	TITLE OF THE COURSE Data Communication and Computer Networks	Program & Semester I M.Sc. (II Sem)			
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
Pre-requisites:	Basic Mathematics	5		-	4

Course Objectives:

1. To learn OSI reference model.
2. To learn about transmission media.
3. To learn data link layer and network layer protocols.
4. To learn about transport layer protocols.

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	To understand network communication using the layered concept, Open System Interconnect (OSI) and the Internet Mode
CO2	To understand various types of transmission media, network devices; and parameters of evaluation of performance for each media and device.
CO3	To understand the concept of flow control, error control and LAN protocols;
CO4	To understand the functions performed by a Network Management System and to analyze connection establishment and congestion control with respect to TCP Protocol.
CO5	Shall understand the principles and operations behind various application layer protocols like HTTP, SMTP, FTP.

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	
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Syllabus:

UNIT I

Introduction: Data communications, networks, network types, Internet history, standards and administration.

Network Models: Protocol layering, TCP/IP protocol suite, The OSI model.

Introduction to Physical layer: Data and signals, periodic analog signals, digital signals, transmission impairment, data rate limits, performance.

Digital and Analog transmission: Digital-to-digital conversion, analog-to-digital conversion, transmission modes, digital-to-analog conversion, analog-to-analog conversion.

Bandwidth Utilization: Multiplexing and Spectrum Spreading: Multiplexing, Spread Spectrum

UNIT II

Transmission media: Guided Media, Unguided Media

Switching: Introduction, circuit switched networks, packet switching, structure of a switch.
Introduction to the Data Link Layer:Data Link Layer Design Issues, Error detection and correction, block coding, cyclic codes, checksum, forward error correction, error correcting codes, error detecting codes.

Data Link Control: DLC services, data link layer protocols, HDLC, Point-to-point protocol.

UNIT III

Media Access Control: Random access, controlled access, channelization, Wired LANs – Ethernet Protocol, standard ethernet, fast ethernet, gigabit ethernet, 10 gigabit ethernet networks.

Introduction to the Network Layer: Network layer services, packet switching, network layer performance, IPv4 addressing, forwarding of IP packets, Internet Protocol, ICMPv4, Mobile IP

Unicast Routing: Introduction, routing algorithms, unicast routing protocols.

UNIT IV

Introduction to the Transport Layer: Introduction, Transport layer protocols (Simple protocol, Stop-and-wait protocol, Go-Back-n protocol, Selective repeat protocol, Bidirectional protocols), Transport layer services, User datagram protocol, Transmission

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S.NO	QUESTIONS	UNITS OF THE SYLLABUS	MARKS
1	Question1 and Question2	UNIT-I	10
2	Question1 and Question2	UNIT-II	10
3	Question1 and Question2	UNIT-III	10
4	Question1 and Question2	UNIT-IV	10
5	Question 9 Short answers from (a) to (e) (Five out of Eight should be answered, each question is of 4 Marks)	Covers All Four Units of the Syllabus	5x4=20
Total			60

GOVERNMENT AUTONOMOUS COLLEGE, RAJAMAHENDRAVARAM
M.Sc. Computer Science Semester End Examinations
Semester: II

Data Communication and Computer Networks

Model Paper

Time:3Hours

Max.Marks : 60

SECTION- A (4 X 10 = 40 M)
Answer ALL Questions

UNIT-I

1. A) Explain OSI Reference Model - 5M
- B) Explain TCP/IP protocol Model - 5M
- (OR)**
2. C) Explain the conversion of Digital-to-Analog and Analog-to-Digital -
5M
- D) Explain about Bandwidth Utilization - 5M

UNIT-II

3. A) Briefly explain the Error Detection and Correction - 10M
- (OR)**
4. B) Explain about Data Link layer Protocols - 5M
- C) Explain about HDLC - 5M

UNIT-III

5. A) Explain Network Layer Services and Network Layer Performance - 10M
- (OR)**
6. B) Explain Routing Algorithms - 5M
- C) Explain fast Ethernet and standard Ethernet - 5 M

UNIT-IV

7. A) Explain the types of Transport Layer Protocols - 10M

(OR)

8. B) Explain about User datagram protocol - 5M
C) Explain about Transmission control protocol - 5M

SECTION-B

Short Answer Questions

Answer Any Five Questions

(5×4=20M)

9. Define the types of networks
10. Explain about Multiplexing
11. Define circuit switched networks and packet switched networks
12. Define Point-to-Point Protocol
13. Define Unicast Routing Protocol
14. Define IPV4 Addressing
15. Define World Wide Web and HTTP
16. Define Transport Layer Services

	Government College (Autonomous) Rajahmundry				
Course Code MSC203	TITLE OF THE COURSE Computer Graphics	Program & Semester I M.Sc. (II Sem)			
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
Pre-requisites:	Basic Mathematics	5		-	4

Course Objectives:

1. The course introduces the basic concepts of computer graphics. It provides the necessary theoretical background and demonstrates the application of computer science to graphics.

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Learn various graphic devices, graphic software
CO2	Learn two and three dimensional transformations
CO3	Learn viewing trans formations
CO4	Learn visual computing

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	
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Syllabus:

UNIT I

Introduction Computer Graphics and Primitive Algorithms: Introduction to Image and Objects, Image Representation, Basic Graphics Pipeline, Bitmap and Vector-Based Graphics, Applications of Computer Graphics, Display Devices, Cathode Ray Tubes, Raster-Scan Display, Random-Scan Display, Flat Panel Display, Input Technology, Coordinate System

Overview, Scan-Conversion of graphics primitives: Scan-Conversion of a Lines (Digital Differential Analyzer Algorithm, Bresenham's LineDrawing Algorithm, Scan-Conversion of Circle and Ellipse (Bresenham's Method of Circle Drawing, Midpoint Circle Algorithm), Drawing Ellipses and Other Conics.

UNIT II

Two Dimensional Transformation: Introduction to transformations, Transformation Matrix, Types of Transformations in Two-Dimensional Graphics: Identity Transformation, Scaling, Reflection, Shear Transformations, Rotation, Translation, Rotation about an Arbitrary Point, Combined Transformation, Homogeneous Coordinates, 2D Transformations using Homogeneous Coordinates

UNIT III

Three-dimensional transformations, Objects in Homogeneous Coordinates; Three-Dimensional Transformations: Scaling, Translation, Rotation, Shear Transformations, Reflection, World Coordinates and Viewing Coordinates, Projection, Parallel Projection, Perspective Projection.

UNIT IV

Viewing and Solid Area Scan-Conversion : Introduction to viewing and clipping, viewing Transformation in Two Dimensions, Introduction to Clipping, Two-Dimensional Clipping, Point Clipping, Line Clipping, Introduction to a Polygon Clipping, Viewing and Clipping in Three Dimensions, Three-Dimensional Viewing Transformations, Text Clipping, Aliasing, Anti-Aliasing, Spline Curve Representation, Bezier Curves, B-Spline Curves

Text books:

1. Computer Graphics C Version, Donald Hearn & M.Pauline Baker, Pearson Education.
2. D. Forsyth and J. Ponce, Computer Vision: A Modern Approach, Prentice Hall Inc., 2003

BLUE PRINT

S.NO	QUESTIONS	UNITS OF THE SYLLABUS	MARKS
1	Question1 and Question2	UNIT-I	10
2	Question1 and Question2	UNIT-II	10
3	Question1 and Question2	UNIT-III	10
4	Question1 and Question2	UNIT-IV	10
5	Question 9 Short answers from (a) to (e) (Five out of Eight should be answered, each question is of 4 Marks)	Covers All Four Units of the Syllabus	5x4=20
Total without choice			60

GOVERNMENT AUTONOMOUS COLLEGE, RAJAMAHENDRAVARAM

**M.Sc. Computer Science Semester End Examinations
Semester: II**

Computer Graphics

Model Paper

Time: 3Hours

Max.Marks : 60

SECTION- A (4 X 10 = 40 M)

Answer ALL Questions

UNIT-I

1. A) Explain the Applications of Computer Graphics - 5M
- B) Explain TCP/IP protocol Model - 5M

(OR)

2. C) Describe the Brenham's Line Drawing Algorithm - 5M
- D) Explain about DDA Algorithm - 5M

UNIT-II

3. A) Describe the Matrix forms of Two-Dimensional Transformation of Translation, Rotation and Scaling - 10M

(OR)

4. B) Explain the types of Transformations in 2-Dimensional Graphics - 5M
- C) Explain 2-Dimensioal Transformations using Homogenous coordinates - 5M

UNIT-III

5. A) Describe the 3-Dimensional Transformations for Rotation, Scaling and Translation -10M

(OR)

6. B) Explain World Coordinates and Viewing Coordinates - 5M
- C) Explain Parallel and Perspective Projections in 3-D Transformations - 5 M

UNIT-IV

7. A) Explain Line Clipping and Polygon clipping - 10M
(OR)
8. B) Explain Bezier and B-Spline Curves - 5M
C) Describe Cohen-Sutherland Line Algorithm - 5M

SECTION-B

Short Answer Questions

Answer Any Five Questions

(5×4=20M)

9. Difference between Raster Scan and Random Scan Devices
10. Define Display Devices
11. Define Shear Transformations in 2-Dimensional Transformation
12. Define Translation in 2-Dimensional Transformation
13. Define Reflection in 3-Dimensional Transformation
14. Define Projection in 3-Dimensional Transformation
15. Define Aliasing
16. Define Viewing and Clipping in 3-D

	Government College (Autonomous) Rajahmundry				
Course Code MSC204	TITLE OF THE COURSE Data Science Using R	Program & Semester I M.Sc. (II Sem)			
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
Pre-requisites:	C Programming	4	1	-	4

Course Objectives:

1. This course will introduce students to the collection, preparation, analysis, modeling and visualization of data, covering both conceptual and practical issues. Examples and case studies from diverse fields will be presented, and hands-on use of statistical and data manipulation software will be included.

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Recognize the various disciplines that contribute to a successful data science effort.
CO2	Understand the processes of data science identifying the problem to be solved, data collection, preparation, modeling, evaluation and visualization.
CO3	Be aware of the challenges that arise in Data Sciences.
CO4	Be able to identify the application of the type of algorithm based on the type of the problem.
CO5	Be comfortable using commercial and open source tools such as the R/Python language and its associated libraries for data analytics and Visualization.

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	
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Syllabus:

UNIT-I

Introduction to Data Science- Introduction- Definition - Data Science in various fields - Examples - Impact of Data Science - Data Analytics Life Cycle - Data Science Toolkit - Data Scientist - Data Science Team Understanding data: Introduction – Types of Data: Numeric – Categorical – Graphical – High Dimensional Data – Classification of digital Data: Structured, Semi-Structured and UnStructured - Example Applications. Sources of Data: Time Series – Transactional Data – Biological Data – Spatial Data – Social Network Data – Data Evolution.

UNIT-II

Introduction to R- Features of R - Environment - R Studio. Basics of R-Assignment - Modes - Operators - special numbers - Logical values - Basic Functions - R help functions - R Data Structures - Control Structures. Vectors: Definition- Declaration - Generating - Indexing - Naming - Adding & Removing elements - Operations on Vectors - Recycling - Special Operators - Vectorized if- then else-Vector Equality – Functions for vectors - Missing values - NULL values - Filtering & Subsetting.

UNIT-III

Matrices - Creating Matrices - Adding or Removing rows/columns - Reshaping - Operations - Special functions on Matrices. Lists - Creating List – General List Operations - Special Functions - Recursive Lists. Data Frames - Creating Data Frames - Naming - Accessing - Adding - Removing - Applying Special functions to Data Frames - Merging Data Frames Factors and Tables.

Input / Output – Reading and Writing datasets in various formats - Functions - Creating Userdefined functions - Functions on Function Object - Scope of Variables - Accessing Global, Environment - Closures - Recursion.

UNIT-IV

Exploratory Data Analysis - Data Preprocessing - Descriptive Statistics - Central Tendency - Variability - Mean - Median - Range - Variance - Summary - Handling Missing values and Outliers - Normalization Data Visualization in R : Types of visualizations - packages for visualizations - Basic Visualizations, Advanced Visualizations and Creating 3D plots. Unit-5: Inferential Statistics with R - Types of Learning - Linear Regression- Simple Linear Regression - Implementation in R - functions on lm() - predict() - plotting and fitting

BLUE PRINT

S.NO	QUESTIONS	UNITS OF THE SYLLABUS	MARKS
1	Question1 and Question2	UNIT-I	10
2	Question1 and Question2	UNIT-II	10
3	Question1 and Question2	UNIT-III	10
4	Question1 and Question2	UNIT-IV	10
5	Question 9 Short answers from (a) to (e) (Five out of Eight should be answered, each question is of 4 Marks)	Covers All Four Units of the Syllabus	5x4=20
Total without choice			60

GOVERNMENT AUTONOMOUS COLLEGE, RAJAMAHENDRAVARAM

**M.Sc. Computer Science Semester End Examinations
Semester: II**

Data Science using R

Model Paper

Time:3Hours

Max.Marks : 60

SECTION- A (4 X 10 = 40 M)

Answer ALL Questions

UNIT-I

1. A) Explain the Life Cycle of Data Analytics - 5M
B) Explain the sources of Data in Data Science - 5M

(OR)

2. C) Explain Transactional Data and Spatial Data - 5M
D) Explain the classifications of Data in Data Science - 5M

UNIT-II

3. A) Explain Control structures in R-Programming - 10M

(OR)

4. B) Explain Operators in R-Programming - 5M
C) Explain Vectors and functions in R-Programming - 5M

UNIT-III

5. A) Explain about Data frames? How to Read and Write data from files
- 10M

(OR)

6. B) Explain matrices and operations in R - 5M
C) Explain user defined functions in R - 5 M

UNIT-IV

7. A) Explain the types of Visualization and Packages - 10M

(OR)

8. B) Explain the types of Regression - 5M
C) Describe Inferential Statistics with R - 5M

SECTION-B

Short Answer Questions

Answer Any Five Questions

(5×4=20M)

9. Define Structured, Semi-structured and Un-structured methods
10. Define the types of Data in Data Science
11. Define Vectors in R
12. Write the features of R-Programming
13. Define lists and their operations
14. Define Recursion in R
15. Difference between Target Variables and Predictors
16. Define Mean, Median, Range and Variance

	Government College (Autonomous) Rajahmundry				
Course Code MSC204P	TITLE OF THE COURSE Data Science Using R	Program & Semester I M.Sc. (II Sem)			
Teaching	Hours Allocated: 40 (Lab)	L	T	P	C
Pre-requisites:	C Programming			2	1

Objectives :

1. This course provides practical knowledge to the students regarding Rprogramming for Data Science.

List of Experiments:

1. Installing R and R studio, with proper notes on version management, cosmetic settings and different libraries.
2. Basic operations in r with arithmetic and statistics.
3. Getting data into R, Basic data manipulation, Loading Data into R
4. Basic plotting
5. Loops and functions
6. Create Vectors, Lists, Arrays, Matrices, Data frames and operations on them.
7. Demonstrate the visualization and graphics using visualization packages like ggplot2.
8. Implement Loop functions with lapply(), sapply(), tapply(), apply(), mapply().
9. Explore data using Single Variables: Unimodal, Bimodal, Histograms, Density Plots, Barcharts
10. Explore data using two Variables: Line plots, Scatter Plots, smoothing cures, Bar charts
11. Explore and implement commands using dplyr package
12. Download a dataset and work on basic data manipulation followed by inferential statistics.

	Government College (Autonomous) Rajahmundry				
Course Code MSC205	TITLE OF THE COURSE Python Programming	Program & Semester I M.Sc. (II Sem)			
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
Pre-requisites:	C Programming	4	1	-	4

Course Objectives:

1. This course will enhance the problem solving skills in python.

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Understand Python Data structures
CO2	Demonstrates Python Language constructs.
CO3	Understands Files and exception handling in Python
CO4	Python Data visualization using matplotlib lib, Object oriented concepts, Django framework

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	
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Syllabus:

UNIT –I

INTRODUCTION DATA, EXPRESSIONS, STATEMENTS

Introduction to Python and installation, variables, expressions, statements, Numeric data types: Int, float, Boolean, string. Basic data types: list--- list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters. Tuple --- tuple assignment, tuple as return value, tuple methods. Dictionaries: operations and methods. Python arrays: create an array, Access the Elements of an Array, array methods.

UNIT –II

CONTROL FLOW, LOOPS, FUNCTIONS

Conditionals: Boolean values and operators, conditional (if), alternative (if-else), chained conditional (if- elif-else); Iteration: Loops, statements break, continue. Functions--- function and its use, pass keyword, flow of execution, parameters and arguments, return values, parameters, local and global scope, function composition, recursion; Advanced Functions: lambda, map, filter, reduce, basic data type comprehensions.

UNIT –III

FILES, EXCEPTIONS

File I/O, Exception Handling, introduction to basic standard libraries, Installation of pip, Demonstrate Modules:

Numpy-Computation on Arrays: Broadcasting, Comparisons, Masks, and Boolean Logic, Fancy Indexing, Sorting Arrays, Structured Data.

Data Manipulation with Pandas: Introducing Pandas Objects, Data Indexing and Selection, Operating on Data in Pandas, Handling Missing Data.

UNIT –IV

Object oriented concepts : Object,Class,Method,Inheritance, Polymorphism,Data Abstraction, Encapsulation

GUI Programming-Tkinter package: Tkinter widgets, Standard Attributes, Geometry Management, SimpleDialog, The FileDialog Module, ColorChooser, ttk module Combobox Widget, Progressbar, Notebook, Treeview,Sizegrip, Separator
General Matplotlib, Simple Line Plots, Simple Scatter Plots, Density and Contour Plots, Histograms, Binnings, and Density, Customizing Plot Legends, Customizing Colorbars, Text and Annotation

BLUE PRINT

S.NO	QUESTIONS	UNITS OF THE SYLLABUS	MARKS
1	Question1 and Question2	UNIT-I	10
2	Question1 and Question2	UNIT-II	10
3	Question1 and Question2	UNIT-III	10
4	Question1 and Question2	UNIT-IV	10
5	Question 9 Short answers from (a) to (e) (Five out of Eight should be answered, each question is of 4 Marks)	Covers All Four Units of the Syllabus	5x4=20
Total without choice			60

GOVERNMENT AUTONOMOUS COLLEGE, RAJAMAHENDRAVARAM

**M.Sc. Computer Science Semester End Examinations
Semester: II**

Python Programming

Model Paper

Time:3Hours

Max.Marks : 60

SECTION- A (4 X 10 = 40 M)

Answer ALL Questions

UNIT-I

1. A) Explain the Installation and Configuration of Python - 5M
B) Explain Data types in Python - 5M

(OR)

- 2 C) Explain Lists and Tuples in Python - 5M
D) Explain about Arrays in Python - 5M

UNIT-II

3. A) List and explain different types of operators in Python - 10M

(OR)

4. B) Explain Conditional and Loop statements in Python - 5M
C) Explain functions in Python - 5M

UNIT-III

5. A) List out the types of Modules and explain their types in details - 10M

(OR)

6. B) Explain Installing packages via PIP - 5M
C) How to handle an exception using try except block with the help of a program - 5 M

UNIT-IV

7. A) Explain Object Oriented Concepts - 10M

(OR)

8. B) Explain GUI programming with Tkinter - 5M
C) Explain Histograms and Matplotlib - 5M

SECTION - B

Short Answer Questions

Answer Any Five Questions

(5×4=20M)

9. Define Variables and Expression in Python
10. Write Dictionaries in Python
11. Define Recursion
12. Define Pandas in Python
13. Define Numpy in Python
14. Define Recursion in R
15. How to implement inheritance in Python
16. Write the types of Plots in Python

	Government College (Autonomous) Rajahmundry				
Course Code	TITLE OF THE COURSE	Program & Semester			
MSC205P	Python Programming lab	I M.Sc. (II Sem)			
Teaching	Hours Allocated: 40 (lab)	L	T	P	C
Pre-requisites:	C Programming			2	1

Objectives :

1. This course provides practical knowledge to the students regarding R programming for Data Science.

List of Experiments :

1. Swap two numbers.
2. Find the square root of a number
3. Exponentiation (power of a number)
4. Find the maximum of a list of numbers
5. Programs that take command line arguments (word count)
6. Write a program to check whether the given number is Armstrong or not
7. Write a program to generate the Fibonacci sequence
8. Write a program to generate all the prime numbers between 1 and n, where n is a value supplied by the user
9. Write a program to perform various string operations
10. Various operations on lists, tuples and sets.
11. Write a program Using Django frame work to create a web application.
12. Write a program to draw rectangle, hexagon, circle using Turtle.
13. Write a program to demonstrate pandas library.
14. Write a program to visualize data using matplotlib lib

	Government College (Autonomous) Rajahmundry				
Course Code MSC206	TITLE OF THE COURSE MERN Stack Development	Program & Semester I M.Sc. (II Sem)			
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
Pre-requisites:	HTML,CSS,JAVASCRIPT	4	1	-	4

Course Objectives:

1. To create interactive web applications using MERN stack.

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	To Understand React & JSX components
CO2	To understand Node.js Advanced Concepts
CO3	To create RESTful APIs with Node & Express.js
CO4	To create database using MongoDB

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	
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Syllabus:

UNIT –I

Introduction to React & JSX: Introduction to JavaScript and JavaScript Frameworks, Introduction to React and its features, Setting up a React development environment, JSX syntax and its benefits, Creating React components- React Components, Props & Conditional Rendering, React States & Hooks, Introduction to React Hooks, React Routing and Types of Routers, Class-Based Components, React Lifecycle & Context

UNIT –II

Introduction to Node.js: Introduction to Node.js and its features Understanding the basics of web servers and HTTP requests, Node Modules - HTTP, File Systems, etc. Understanding the Node.js event loop and asynchronous programming

Node.js Advanced Concepts Using callbacks, promises, and async/await in Node.js Handling errors and debugging Node.js applications, Implementing security best practices in Node.js

UNIT-III

Building RESTful APIs with Node & Express.js: Understanding the principles of RESTful APIs Setting up an Express.js development environment, Building a simple Express.js server, Building CRUD operations with Express.js, Implementing middleware in Express.js, Best practices for building scalable and maintainable APIs.

UNIT –IV

Introduction to MongoDB & Mongoose: Understanding NoSQL databases and MongoDB, Setting up a MongoDB development environment, Building MongoDB schema and models with Mongoose, Using Mongoose to perform CRUD operations in MongoDB.

MongoDB Indexing, Aggregation & Security Understanding MongoDB indexing and aggregation , Implementing authentication and authorization with MongoDB, Best practices for securing MongoDB applications ,Implementing data migrations and backups in MongoDB CONTENTS.

Text books:

1. Beginning MERN Stack Greg Lim

Reference books:

1. Learn MERN stack development by building modern web apps using MongoDB, Express, React, and Node.js, 2nd Edition

BLUE PRINT

S.NO	QUESTIONS	UNITS OF THE SYLLABUS	MARKS
1	Question1 and Question2	UNIT-I	10
2	Question1 and Question2	UNIT-II	10
3	Question1 and Question2	UNIT-III	10
4	Question1 and Question2	UNIT-IV	10
5	Question 9 Short answers from (a) to (e) (Five out of Eight should be answered, each question is of 4 Marks)	Covers All Four Units of the Syllabus	5x4=20
Total without choice			60

GOVERNMENT AUTONOMOUS COLLEGE, RAJAMAHENDRAVARAM

M.Sc. Computer Science Semester End Examinations

Semester: II

MERN Stack Development

Model Paper

Time:3Hours

Max.Marks : 60

SECTION- A (4 X 10 = 40 M)

Answer ALL Questions

UNIT-I

1. What is Lifecycle of React? Explain React Lifecycle and Context

(OR)

2. Explain React states and React Hooks

UNIT-II

3. Explain HTTP module in Nodejs

(OR)

4. Explain Event Loop and asynchronous programming

UNIT-III

5. Explain the principles of Restful API using nodeJS and ExpressJS.

(OR)

6. Explain building simple ExpressJS Server.

UNIT-IV

7. Explain CRUD operations in MongoDB using Mongoose

(OR)

8. Explain indexes and types of indexes in MongoDB

SECTION - B

Short Answer Questions

Answer Any Five Questions

(5×4=20M)

9. Short note on Conditional Rendering
10. Write about Class Based Components.
11. Write about callback functions in NodeJS
12. Short note on Reading and writing Files in NodeJS
13. Write about Implementing Middleware in ExpressJS.
14. Explain CRUD operations in ExpressJS
15. Write about Nosql Database
16. Implementing Data migrations in MongoDB

	Government College (Autonomous) Rajahmundry				
Course Code MSC206P	TITLE OF THE COURSE MERN Stack Development	Program & Semester I M.Sc. (II Sem)			
Teaching	Hours Allocated: 40 (Lab)	L	T	P	C
Pre-requisites:	HTML,CSS,JAVASCRIPT			2	1

Course Objectives:

1. To create interactive web applications using MERN stack.

List of Experiments

1. Setup a Basic MERN Stack Project
2. CRUD Operations with Express and MongoDB
3. Create a REST API with Express and MongoDB
4. Integrate React with Express Backend
5. Form Handling and Validation in React
6. User Authentication and Authorization
7. State Management with Redux in React
8. File Uploads with MERN Stack
9. Implementing Pagination and Search
10. Deploying MERN Stack Application

Reference books:

1. Beginning MERN Stack Greg Lim
2. Learn MERN stack development by building modern web apps using MongoDB, Express, React, and Node.js, 2nd Edition

Web Links:

1. https://www.w3schools.com/whatis/whatis_fullstack.asp

	Government College (Autonomous) Rajahmundry				
Course Code MSC207	TITLE OF THE COURSE IoT Development	Program & Semester I M.Sc. (II Sem)			
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
Pre-requisites:	C Programming	4	1	-	4

Course Objectives:

1. To study fundamental concepts of IoT
2. To understand roles of sensors in IoT
3. To Learn different protocols used for IoT design

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Understand the various concepts, terminologies and architecture of IoT systems.
CO2	Illustrate Arduino board, Raspberrypi
CO3	Familiar with Basic Concepts of Linux
CO4	Design real time IoT Devices.
CO5	Familiar with basic foundations of Python Programming and libraries

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	
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Syllabus:

UNIT –I

Definitions & Characteristics of IoT, IoT Architectures, Physical & Logical Design of IoT, Sensors Networks : Definition, Types of Sensors, Types of Actuators.

Wireless Technologies for IoT: WPAN Technologies for IoT: IEEE 802.15.4, Zigbee, HART, NFC, Z-Wave, BLE, Bacnet, Modbus.

IP Based Protocols for IoT : IPv6, 6LowPAN, RPL, REST, AMPQ, CoAP, MQTT.

UNIT-II

Getting Started with Arduino

Introduction to Arduino, Architecture of Arduino UNO, Arduino UNO pin description, On board LED interfacing, Basic syntax and programming with Arduino UNO.

Getting Started with Raspberry Pi: Basic functionality of Raspberry Pi B+ board, setting up the board, configuration and use, implications of an operating system on the behavior of the Raspberry Pi as an IoT device, booting Raspberry Pi 3, Downloading an Operating System, format an SD card and booting the OS, Basics of Linux and its use, main features including navigating the file system and managing processes, text based user interface through the shell, overview of the graphic user interface for Raspbian Linux distribution.

UNIT-III

Interfacing Hardware with the Raspberry Pi: Raspberry Pi Remote Access, operate the RaspberryPi in —headless model, Bash Command line, operating Raspberry Pi without needing a GUI interface. Basics of the Python programming language, programming on the Raspberry Pi. Python on Raspberry Pi, Python Programming Environment, Python Expressions, Strings, Functions and Function arguments, Lists, List Methods, Control Flow.

UNIT-IV

Communication with devices through the pins of the Raspberry Pi: RPi.GPIO library, Python Functions, setting up the pins, General purpose IO Pins, Protocol Pins, GPIO Access, applying digital voltages, and generating Pulse Width Modulated signals, Tkinter Python library, accessing pins through a graphic user interface

IoT Design using Raspberry Pi IoT Applications based on Pi: LAMP Web-server, GPIO Control over Web Browser, Creating Custom Web Page for LAMP, Communicating data using on-board module, Home automation using Pi, Node-RED, MQTT Protocol, Using Node-RED, Visual Editor on Rpi

Text books:

1. Vijay Madiseti and ArshdeepBahga, — —Internet of Things (A Hands-on- Approach)ll, 1st Edition, VPT, 2014.
2. J. Biron and J. Follett, "Foundational Elements of an IoT Solution", O'Reilly Media, 2016.

GOVERNMENT AUTONOMOUS COLLEGE, RAJAMAHENDRAVARAM

M.Sc. Computer Science Semester End Examinations

Semester: II
IoT Development
Model Paper

Time:3Hours

Max.Marks : 60

SECTION- A (4 X 10 = 40 M)

Answer ALL Questions

UNIT-I

1. A) Explain the types of Sensors in IOT - 5M
B) Explain Wireless Technologies for IOT - 5M

(OR)

2. C) Explain IT Based Protocols for IOT - 5M
D) Explain the design and Architecture of IOT - 5M

UNIT-II

3. A) Explain the Architecture of Arduino and UPI Pin -10M

(OR)

4. B) Explain the basic functionality of Raspberry Pi - 5M
C) Explain format an SD card and booting the OS in detail - 5M

UNIT-III

5. A) Explain Lists, List Methods and their operations in Python - 10M

(OR)

6. B) Explain function arguments in Python with examples - 5M
C) How to operate Raspberry Pi without needing a GUI Interface - 5 M

UNIT-IV

7. A) Explain GPIO pins, Protocol Pins in detail - 10M

(OR)

8. B) Explain Tkinter Python Library - 5M

C) Explain about MQTT Protocol

- 5M

Short Answer Questions

Answer Any Five Questions

(5×4=20M)

9. Define the characteristics of IOT
10. Define IPv6 and MQTT
11. Describe the basic commands of Linux
12. Define Booting in Raspberry Pi 3
13. Define Strings in Python
14. Define Control flow in Python
15. Describe Visual Editor on RPI
16. Define LAMP Web Server

	Government College (Autonomous) Rajahmundry				
Course Code	TITLE OF THE COURSE	Program & Semester			
MSC207P	IoT Development	I M.Sc. (II Sem)			
Teaching	Hours Allocated: 40 (Lab)	L	T	P	C
Pre-requisites:	C Programming			2	1

Course Objectives:

3. The main aim of this lab course is to provide hands-on experience to the students towards the developing the IoT Devices with the state of art Raspberry pi microprocessor.

Lab Experiments

1. Installing and work with Arduino IDE
2. Blinking LED sketch with Arduino
3. Simulation of 4-Way Traffic Light with Arduino
4. Using Pulse Width Modulation
5. LED Fade Sketch and Button Sketch
6. Analog Input Sketch (Bar Graph with LEDs and Potentiometre)
7. Digital Read Serial Sketch (Working with DHT/IR/Gas or Any other Sensor)
8. Working with Adafruit Libraries in Arduino
9. Spinning a DC Motor and Motor Speed Control Sketch
10. Working with Shields
11. Interfacing Arduino with Cloud (Thingspeak API)
12. Getting started with Raspberry Pi, Install Raspian on your SD card
13. Linux basic commands.
14. Coding simple programs in Python.
15. How to use Python-based IDE (integrated development environments) for the Raspberry Pi and how to trace and debug Python code on the device
16. How to have your Raspberry Pi interact with online services through the use of public

APIs and SDKs

17. Understanding the connectivity of Raspberry-Pi with IR sensor. Write an application to detect obstacle and notify user using LEDs.
18. Design APP Using MIT App Inventor and Connect to Temperature Sensor

Text books:

1. Vijay Madiseti and ArshdeepBahga, — —Internet of Things (A Hands-on- Approach)ll, 1st Edition, VPT, 2014.
2. J. Biron and J. Follett, "Foundational Elements of an IoT Solution", O'Reilly Media, 2016.
3. The official raspberry Pi Projects Book https://www.raspberrypi.org/magpi-issues/Projects_Book_v1.pdf

Reference books:

1. Eben Upton and Gareth Halfacree, —Raspberry Pi User Guidel, August 2016, 4th edition, John Wiley & Sons

Web Links:

1. https://onlinecourses.nptel.ac.in/noc17_cs22/course
2. http://www.cse.wustl.edu/~jain/cse570-15/ftp/iot_prot/index.html