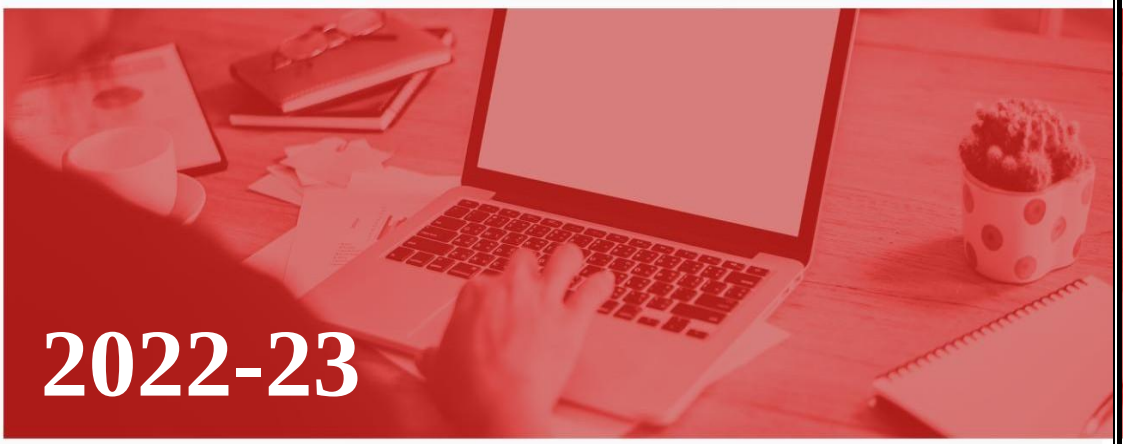
Department of Computer Science and Applications

Board of Studies

M. Sc. Computer Science



2022-23

Government College (A), Rajahmundry

Accredited with 'A+' grade by NAAC

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAMAHENDRAVARAM

DEPARTMENT OF COMPUTER SCIENCE

M.Sc. PROGRAMME – COURSE STRUCTURE

UNDER CBCS PATTERN

We have made significant changes to the following syllabus based on the feedback from learners and educators.

S. No	Semester	Course Code	Title of the Course (Paper)	Changes in the Syllabus
1	I	MSCS103	Advanced Data Structures	Advanced Data Structures paper is introduced in Semester I in place of Data Structures and algorithms
2	I	MSCS104	Object Oriented Programming through Java	JDBC connectivity is included in UNIT-III
3	II	MSCS202	Web programming	Web programing paper is introduced in place of Operations Research.
4	II	MSCS203	Data Communication and Computer Networks	Data Communication and Computer Networks is introduced in place of Computer Networks.
5	III	MSCS301	Mean Stack Development	Mean Stack Development Paper introduced.
6	III	The following courses are offered as ELECTIVE-I 1. MSCS304 - Compiler Design 2. MSCS305 - Mobile computing 3. MSCS306 - Computer Graphics		
7	III	The following courses are offered as ELECTIVE-II 1. MSCS307 MOOCs-1 (NPTEL/SWAYAM) 12 Week Program related to the programme which is not listed in the course structure		

		2. MSCS308 Data Warehouse & Data Mining 3. MSCS309 Adhoc and Sensor Networks
8	IV	Foundations of IoT is if offered as compulsory paper instead of elective.
9	IV	Data Science with R is introduced as Elective-I
10	IV	Research methodology paper is offered in place of cloud computing in Elective-II
11	IV	Operations Research paper is offered as Elective-II

ACADEMIC CELL, GOVERNMENT COLLEGE
(AUTONOMOUS) RAJAHMUNDRY

PROCEEDINGS OF THE PRINCIPAL
GOVERNMENT AUTONOMOUS COLLEGE, RAJAHMUNDRY

PRESENT: Dr.R. David Kumar, M.Sc., M.Phil., Ph.D.

RC. NO. 152/GCRJY/ACAD. CELL//BOS/2021/, DATED. 05.07.2022

Sub: GCRJY-**Conduct of BoS Meetings for the Academic Year 2022-23** - Regarding

***

ORDER:

With reference to the subject cited, the lecturers-in-Charge of all the departments are hereby informed to conduct their respective Board of Studies (BoS) meetings by the end of July 2022.

You are also informed to intimate the date of your BoS meeting well in advance to the subject experts/University nominee/Industrial Nominee/members of BoS/Student nominee concerned to get their valuable views and suggestions in the deliberations to frame the concrete syllabi for your subjects keeping in view the objectives of the college and interest of the stake holders. The date should also be indicated to Academic Cell in advance.

You are further suggested to utilize the academic autonomy in incorporating the additional modules in the syllabi and identify the pedagogical strategies to implement the same.

Please note that your BoS document should contain the following contents in order

a) Proceedings of the Principal pertaining to BoS
b) Composition of BoS
c) Table showing the Allocation of Credits in the following table for both theory and Lab in case of science subjects

S. No	Semester	Course Code	Title of the Course (Paper)	Max. Marks (SEE)	Marks in CIA	Hrs./week			
						L	T	P	C

L= Lecture, T= Tutorial, P= Practical, C= Credits

d) Agenda wise Resolutions adopted in the meeting with detailed discussions
e) Table showing Members present with signatures
f) List of Examiners & Paper setters
g) Syllabus for each course in the **Proforma given** (both theory & Practical in case of Science subjects) followed by model question papers (theory & practical)
h) Unit wise Assignment questions at the end of syllabus of each course

You are requested to submit a separate document regarding addition/deletion of specific topics from the syllabus in each course (paper) with justification, if any.

ACADEMIC CELL, GOVERNMENT COLLEGE
(AUTONOMOUS) RAJAHMUNDRY

All the ***new Courses/certificate courses*** proposed for the calendar year 2022, Seminars/ workshops, field visits, study tours for 2022-23 should be placed before the respective Board and get them approved.

You are also requested to submit 2 hard copies & 2 soft copies (CDs) of BoS document to the Academic cell along with original bills and settle the bills after completion of the BoS meeting. You can approach the Academic Cell for necessary documents.

Most Important: You are requested to submit soft & hard copies of ***Resolutions (including discussion)*** separately to IQAC immediately after BoS meeting is completed.

PRINCIPAL
GOVERNMENT AUTONOMOUS COLLEGE
RAJAHMUNDRY

Copy to:

1. Lecturers-in-Charge of all the departments
2. File

Government College (A), Rajamahendravaram

(*Accredited by NAAC "A" Grade)*

Department Of Computer Science & Applications<u>Composition of Board of Studies</u>

Chairman	D.Suneel Kumar In-charge of the Department, Department of Computer Science & Applications, Government College (A), Rajamahendravaram.
University Nominee	Dr M. Kamala Kumari, Associate Prof. in Computer Science & Engineering, AdikaviNannaya University, Rajamahendravaram.
Subject Expert	Dr. N. Sridhar In-charge of the Department, Dept. of Computer Science, Govt College (A) ,Tuni.
Subject Expert	Sri R.V.Phani Kumar, Lecturer in Computer Applications, Dept. of Computer Applications, P.R.Govt College(A), Kakinada.
Industry Expert	Surampudi Thriveni Phunyavathi Devi Associate Senior Software Engineer Cognizant Technologies Ltd.
Members	
U.Sandhya Rani	Faculty Member
H.Devaraju	Faculty Member
P. NarsingaRao	Faculty Member
D. SeethaRamulu	Faculty Member
S.JayaLakshmi	Faculty Member
Ch. Sujatha	Faculty Member
N.Priyanka	Faculty Member
V.Sailaja	Faculty Member
M. Tejaswi	Faculty Member
Kum. P. DharaniPriya	Faculty Member
DAKARAPU SAIBALA	Student Member

Chairman
Board of studies

GOVERNMENT COLLEGE (AUTONOMOUS),
RAJAMAHENDRAVARAM
(*Accredited by NAAC "A" Grade)*
DEPARTMENT OF COMPUTER SCIENCE& APPLICATIONS
CONSOLIDATED REPORT OF 1st&2ndBOARD OF STUDIES FOR THE YEAR 2019-2020

The Meeting Board of Studies of Computer Science Department was convened _____ at _____ under the Chairmanship of Mr. R V Satyanarayana Head / Lecturer-in-charge of Department of Computer Science and applications. The following members are present

S.NO.	Name	Designation	Signature
1	Prof. M. Kamala Kumari	University Nominee	
2	Dr. N. Sridhar	Local Nominee	
3	Sri R.V. Phani Kumar	Local Nominee	
4	SurampudiThriveniPhunyavathi Devi	Industrial Nominee	
5	U.SandhyaRani	Faculty Member	
6	H.Devaraju	Faculty Member	
7	P. NarsingaRao	Faculty Member	
8	D. SeethaRamulu	Faculty Member	
9	S.JayaLakshmi	Faculty Member	
10	Ch. Sujatha	Faculty Member	
11	N.Priyanka	Faculty Member	
12	V.Sailaja	Faculty Member	
13	M. Tejaswi	Faculty Member	
14	Kum. P. DharaniPriya	Faculty Member	
15	DAKARAPU SAIBALA	Student Member	

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAMAHENDRAVARAM

DEPARTMENT OF COMPUTER SCIENCE

M.Sc. PROGRAMME – COURSE STRUCTURE

UNDER CBCS PATTERN

I Semester

S. No	Semester	Course Code	Title of the Course (Paper)	Max. Marks (SEE)	Marks in CIA	Total	Hrs/ Week			C
							L	T	P	
1	I	MSCS101	Mathematical Foundations Of Computer Science	60	40	100	5	1		5
2.	I	MSCS102	Computer Organization and Architecture	60	40	100	5	1		5
3.	I	MSCS103	Advanced Data Structures	60	40	100	5	1		5
4.	I	MSCS104	Object Oriented Programming through Java	60	40	100	4	1		4
5	I	MSCS104P	Object Oriented Programming through Java Lab	60	40	100			3	2
6.	I	MSCS105	Relational Data Base Management Systems	50	50	100	4	1		4
7.	I	MSCS105P	Relational Database Management Systems Lab	50	50	100	-	-	3	2
					TOTAL	**700**				**27**

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAMAHENDRAVARAM

DEPARTMENT OF COMPUTER SCIENCE

M.Sc. PROGRAMME – COURSE STRUCTURE

UNDER CBCS PATTERN

II Semester

S. No	Semester	Course Code	Title of the Course (Paper)	Max. Marks (SEE)	Marks in CIA	Total	Hrs/ Week			C
							L	T	P	
1	II	MSCS201	Formal Languages & Automata Theory	60	40	100	5	1	-	5
2.	II	MSCS202	Web programming	60	40	100	5	1	-	5
3.	II	MSCS202P	Web programming Lab	60	40	100	5	1	-	5
4.	II	MSCS203	Data Communication and Computer Networks	60	40	100	5	1	-	5
4.	II	MSCS204	Operating Systems	60	40	100	4	1	-	4
6.	II	MSCS205	Python programming	50	50	100	4	1		4
7.	II	MSCS205P	Python programming Lab	50	50	100	-	-	3	2
					TOTAL	**700**				**27**

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAMAHENDRAVARAM

DEPARTMENT OF COMPUTER SCIENCE

M.Sc. PROGRAMME – COURSE STRUCTURE

UNDER CBCS PATTERN

III Semester

S.No	Semester	Course Code	Title of the Course (Paper)		Max. Marks (SEE)	Marks in CIA	Total	Hrs/ Week			C
								L	T	P	
1	III	MSCS301	Mean Stack Development		60	40	100	5	1	-	5
1	III	MSCS301P	Mean Stack Development Lab		60	40	100			3	2
2.	III	MSCS302	Object Oriented Software Engineering		60	40	100	4	1	-	4
3.	III	MSCS303	Information Security and Cryptography		60	40	100	4	1	-	4
5	III	MSCS303P	Information Security and Cryptography Lab		50	50	100	-	-	3	2
6.	III	MSCS304	Compiler Design	ELECTIVE I	60	40	100	5	1	-	5
7.	III	MSCS305	Mobile computing								
9.	III	MSCS306	Computer Graphics								
10.	III	MSCS307	MOOCs-1 (NPTEL/SWAYAM) 12 Week Program related to the programme which is not listed in the course structure	ELECTIVE II	60	40	100	5	1	-	5
11	III	MSCS308	Data Warehouse & Data Mining								
12	III	MSCS309	Adhoc and Sensor Networks								
						TOTAL	**700**				**27**

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAMAHENDRAVARAM

DEPARTMENT OF COMPUTER SCIENCE

M.Sc. PROGRAMME – COURSE STRUCTURE

UNDER CBCS PATTERN

IV Semester

S.No	Semester	Course Code	Title of the0 Course (Paper)		Max. Marks (SEE)	Marks in CIA	Total	Hrs/ Week			C
								L	T	P	
1	IV	MSCS401	Foundations of IoT		60	40	100	5	1	-	5
2.	IV	MSCS402	Data Science with R	ELECTIVE I	60	40	100	5	1	-	5
3	IV	MSCS403	Statistical Quality Assurance Techniques								
4	IV	MSCS404	Geo Informatics								
5	IV	MSCS405	Sematic Web								
6	IV	MSCS406	Research Methodology	ELECTIVE II	60	40	100	5	1	-	5
7	IV	MSCS407	Pervasive Computing								
8	IV	MSCS408	Operations Research								
9	IV	MSCS409	Parallel computing								
10	IV	MSCS410	Project work		100	100	200				12
						TOTAL	**500**				**27**

	Government College (Autonomous) Rajahmundry				
Course Code MSCS101	**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**	**1**	**-**	**5**

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	

Syllabus:

UNIT –I

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

Set theory: Introduction, Basic Concepts of Set Theory, Representation of Discrete Structures, 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: Basic Concepts, 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)
2. Discrete Mathematics for Computer Scientists & Mathematicians, Joe L. Mott, Abraham Kandel, Theodore P. Baker, Pearson , 2nd ed. (Units - III, IV)

Reference books:

1. Discrete Mathematics with Applications, Thomas Koshy, Elsevier.
2. Discrete and Combinatorial Mathematics, R. P. Grimaldi, Pearson.

Web Links:

1. https://nptel.ac.in/courses/106/106/106106094/

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1													
CO2													
CO3													
CO4													
CO5													

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

MSCS101: Mathematical Foundations of Computer Science

Model Paper

Time:3Hours Max.Marks: 60

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

UNIT-I

1. What is proposition? Explain about theory of inference for the 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 $a_n-7a_{n-1}+10a_{n-1}=0$ for n>=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 planar graph with examples and write properties of planar graph.

SECTION- B

Answer any FIVE Questions **(5×4=20M)**

9. Construct the truth table for $p \wedge (\sim q \vee q)$
10. Write the following in symbolic form
11. Every person is precious.
12. Compute 20!18!
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. Find the duals of $x(y+0)$ and $x.\bar{1}+(\bar{y}+z)$

	Government College (Autonomous) Rajahmundry	Program & Semester I M.Sc. (I Sem)			
Course Code MSCS102	**TITLE OF THE COURSE** Computer Organization and Architecture				
Teaching	Hours Allocated: 60 (**Theory**)	L	T	P	C
Pre-requisites:	Knowledge on basic functional units of computer systems	5	1	-	5

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

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Ability to understand 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 

Syllabus:

UNIT –I

Number Systems: Binary Numbers, Octal and Hexadecimal Numbers, Complements.

Decimal Codes: BCD Code &Alphanumeric Codes: ASCII Character Code, Parity Bit, gray code, Binary Logic and Gates, NAND, NOR, XOR gates.

Boolean algebra &Standard forms: Sum of Products and Product of Sums, Map Simplification, Half Adder, Full Adder, Multiplexer and Decoder, Flip-Flops: SR Flip-Flop, D Flip-Flop, JK

Flip-Flop, T Flip-Flop

UNIT –II

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.

UNIT –III

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 –IV

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.

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

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.

Reference books:

1. "Computer System Architecture", John. P. Hayes.
2. Computer Architecture A quantitative approach 3rd edition John L. Hennessy & David A. Patterson Morgan Kufmann (An Imprint of Elsevier).

Web Links:

1. https://nptel.ac.in/courses/106/105/106105163/

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1													
CO2													
CO3													
CO4													
CO5													

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
MSCS102: 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

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

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	Program & Semester I M.Sc. (I Sem)			
Course Code MSCS103	**TITLE OF THE COURSE** **Advanced Data Structures**				
Teaching	Hours Allocated: 60 (**Theory**)	L	T	P	C
Pre-requisites:	C Programming	5	1	-	5

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	

Syllabus:

UNIT –I

Algorithms, Performance analysis- time complexity and space complexity, Asymptotic Notation-Big Oh, Omega and Theta notations, Complexity Analysis Examples. Data structures-Linear and non-linear data structures, ADT concept, Linear List ADT, Array representation, Linked representation, Vector representation, singly linked lists -insertion, deletion, search operations,

doubly linked lists-insertion, deletion operations, circular lists. Representation of single, two dimensional arrays, sparse matrices and their representation.

UNIT –II

Stack and Queue ADTs, array and linked list representations, infix to postfix conversion using stack, implementation of recursion, Circular queue-insertion and deletion, Dequeue ADT, array and linked list representations, Priority queue ADT, implementation using Heaps, Insertion into a Max Heap, Deletion from a Max Heap

UNIT –III

Searching–Linear and binary search methods, Hashing-Hash functions, Collision Resolution methods-Open Addressing, Chaining, Sorting –Bubble sort, Insertion sort, Quick sort, Merge sort, Heap sort, Radix sort, comparison of sorting methods, External Sorting- Model for external sorting, Multiway merge, Poly-phase merge.

UNIT –IV

Trees- Ordinary and Binary trees terminology, Properties of Binary trees, Binary tree ADT, representations, recursive and non-recursive traversals, Threaded binary trees.

Graphs- Graphs terminology, Graph ADT, representations, graph traversals/search methods-DFS and BFS, Applications of Graphs-Minimum cost spanning tree using Kruskal's algorithm, Dijkstra's algorithm for Single Source Shortest Path Problem.

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.

Text books:

1. S. Sahni, "Data structures, Algorithms and Applications in Java", Universities Press. [ISBN:0-07-109217-x]
2. Adam Drozdek, "Data structures and Algorithms in Java", 3rd edition, Cengage Learning. [ISBN:978-9814239233]

Reference books:

1. R.Lafore “Data structures and Algorithms in Java”, Pearson education. ISBN: 9788 131718124.
2. J.P.Tremblay and G.A.Cheston “Data structures and Software Development in an Object Oriented Domain”, Java edition, Pearson Education.

Web Links:

1. https://nptel.ac.in/courses/106/102/106102064/

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1													
CO2													
CO3													
CO4													
CO5													

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
MSCS103: DATA STRUCTURES and ALGORITHMS

Model Paper

Time: 3 Hours Max.Marks: 60

SECTION- A (4 X 10 = 40 M)

Answer ALL Questions

1.

a) Explain the basics of time complexity estimates with an example. 10M

(OR)

b) Define concept of ADT. Explain implementation of double linked list. 10M

2.

a) What is Heap? Explain insertion and deletion operations in a MAX Heap 10M

(OR)

b) Explain the algorithm to convert infix to postfix using stack 10M

3.

a) What is Hashing? Explain various Collision Resolution Techniques 10M

(OR)

b) Explain Quick Sort technique with example 10M

4.

a) What is Minimum Spanning Tree? Explain algorithms to find minimum cost Spanning tree 10M

(OR)

b) Briefly Explain AVL Trees 10M

SECTION- B

Answer any FIVE Questions **(5×4=20M)**

5. Write a short note on

a) Sparse Matrix.
b) Priority Queue ADT
c) Binary Search
d) External Sorting Techniques
e) Threaded Binary Trees
f) DFS
g) Difference between B Trees and B+ Trees
h) Tree Traversal Techniques

	Government College (Autonomous) Rajahmundry				
Course Code MSCS104	**TITLE OF THE COURSE** **Object Oriented Programming through Java**	**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 introduce the 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	Able to solve real world problems using OOP techniques.
CO2	Able to understand the use of abstract classes.
CO3	Able to solve problems using java collection framework and I/o classes.
CO4	Able to develop multithreaded applications with synchronization.
CO5	Able to develop applets for web applications.
CO6	Able to design GUI based applications

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development  Employability Entrepreneurship 

Syllabus:

UNIT –I

Summary of Object-Oriented concepts, Java buzzwords, Java Data types, Arrays, operators, control statements.

Introducing classes, Methods and Classes,

Inheritance– Inheritance concept, Inheritance basics, benefits of inheritance, and costs of inheritance, Member access, Constructors, Creating Multilevel hierarchy, super uses, this uses, final with inheritance, method overloading, method overriding, abstract classes, Interfaces.

UNIT –II

Packages- Defining a Package, CLASSPATH, Access protection, importing packages.

Stream based I/O(java.io) – The Stream classes-Byte streams and Character streams, Reading console Input and Writing Console Output, File class, Reading and writing Files, Random access file operations, The Console class, Serialization, Enumerations, auto boxing, generics.

Exception handling - Fundamentals of exception handling, Exception types, Uncaught exceptions, using try and catch, multiple catch clauses, nested try statements, throw, throws and finally, built- in exceptions, creating own exception sub classes.

UNIT –III

Multithreading- Differences between thread-based multitasking and process-based multitasking, Java thread model, creating threads, thread priorities, synchronizing threads, inter thread communication.

Java Database Connectivity: Introduction, JDBC Architecture, Installing MySQL and MySQL Connector/J, JDBC Environment Setup, Establishing JDBC Database Connections, Result Set Interface, Creating JDBC Application

UNIT –IV

GUI Programming with Swing – Introduction, limitations of AWT, MVC architecture, components, containers. Understanding Layout Managers, Flow Layout, Border Layout, Grid Layout, Card Layout, Grid Bag Layout.

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

A Simple Swing Application, Applets – Applets and HTML, Security Issues, Applets and Applications, passing parameters to applets. Creating a Swing Applet, Painting in Swing, A Paint example, Exploring Swing Controls- JLabel and Image Icon, JText Field, The Swing Buttons- JButton, JToggle Button, JCheck Box, JRadio Button, JTabbed Pane, JScroll Pane, JList, JCombo Box, Swing Menus, Dialogs.

Text books:

1. Java The complete reference, 9th edition, Herbert Schildt, McGraw Hill.
2. Understanding Object-Oriented Programming with Java, updated edition, T. Budd, Pearson Education.

Reference books:

1. An Introduction to programming and OO design using Java, J. Nino and F.A. Hosch, John Wiley & sons.
2. Introduction to Java programming, Y. Daniel Liang, Pearson Education.
3. Object Oriented Programming through Java, P. Radha Krishna, University Press.
4. Programming in Java, S. Malhotra, S. 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/

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1													
CO2													
CO3													
CO4													
CO5													

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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 (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
MSCS104: Object Oriented Programming using Java
Model Paper

Time: 3 Hours Max.Marks: 60

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

UNIT-I

1. What is inheritance? Explain types of Inheritance with examples. 10M

(OR)

2. What is polymorphism? Explain different types of polymorphisms with examples. 10M

UNIT-II

3. Explain about various exception handling techniques in Java. 10M

(OR)

4. a) Explain about byte streams and character streams in Java. 5M
   b) Explain about serialization with example. 5M

UNIT-III

5. Explain about Inter-Thread communication in Java with example. 10M

(OR)

6. Explain about JDBC architecture and JDBC connection. 10M

UNIT-IV

7. What is an applet? Explain the life cycle of Applet with a sample program. 10M

(OR)

8. What is Layout manager? Explain Grid Layout and Flow Layout with examples. 10M

SECTION- B (5×4=20M)

Answer any FIVE Questions

Write a short note on

9. What is abstract class? Give example.
10. Explain the use of ‘for’ statement in Java with an example.
11. Define a Package? What is its use in java? Explain.
12. List out the benefits of Stream oriented I/O.
13. How do we start and stop a thread?
14. Write the complete life cycle of a thread.
15. What are the limitations of AWT?
16. Explain about JCheck Box with example.

	Government College (Autonomous) Rajahmundry	Program & Semester I M.Sc. (I Sem)			
Course Code MSCS104P	**TITLE OF THE COURSE** **Java and Data Structures Lab**				
Teaching	Hours Allocated: 40 (**Lab**)	L	T	P	C
Pre-requisites:	Basics of computer programming	0	0	3	2

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 implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number.
5. Write a Java program to create an abstract class named Shape that contains two integers and an empty method named print Area (). Provide three classes named Rectangle, Triangle, and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method print Area () that prints the area of the given shape.
6. 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).

7. Write a Java program that correctly implements the producer – consumer problem using the concept of inter-thread communication.
8. Java program to display all records from a table using JDBC
9. Write a program to implement the Linked List Operations
10. Write a program to implement the Stack Operations using an Array
11. Write a program to implement Queue operations using a Singly Linked List
12. Write a program to search an item in a given list using Linear Search and Binary Search
13. Write a program for Quick Sort
14. Write a program for Merge Sort
15. Write a program on Binary Search Tree operations (Insertion, deletion and traversals)

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	Program & Semester I M.Sc. (I Sem)			
Course Code MSCC105	**TITLE OF THE COURSE** **Relational Database Management Systems**				
Teaching	Hours Allocated: 60 (**Theory**)	L	T	P	C
Pre-requisites:	Knowledge on basic mathematics	4	1	-	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	Demonstrate the basic elements of a relational database management system.
CO2	Ability to identify the data models for relevant problems.
CO3	Ability to design entity relationship model and convert entity relationship diagrams into RDBMS and formulate SQL queries on the data.
CO4	Apply normalization for the development of application software.
CO5	Demonstrate the basic elements of a relational database management system.

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development  Employability Entrepreneurship 

Syllabus:

UNIT –I

Introduction: Database System Applications, Purpose of Database Systems, View of Data, Database Languages – DDL, DML, Relational Databases, Database Design, Data Storage and Querying, Transaction Management, Database Architecture, Data Mining and Information Retrieval, Specialty Databases, Database Users and Administrators,
History of Database Systems.

Introduction to Data base design: Database Design and ER diagrams, Entities, Attributes and Entity sets, Relationships and Relationship sets, Additional features of ER Model, Conceptual Design with the ER Model, Conceptual Design for Large enterprises.

Relational Model: Introduction to the Relational Model, Integrity Constraints.
Over Relations, Enforcing Integrity constraints, Querying relational data, Logical data base Design: ER to Relational, Introduction to Views, Destroying/ Altering Tables and views.

UNIT –II

Relational Algebra and Calculus: Preliminaries, Relational Algebra, Relational calculus –Tuple relational Calculus, Domain relational calculus, Expressive Power of Algebra and calculus.

SQL: Queries, Constraints, Triggers: Form of Basic SQL Query, UNION,INTERSECT, and EXCEPT, Nested Queries, Aggregate Operators, NULL values Complex Integrity Constraints in SQL, Triggers and Active Data bases.

Schema Refinement and Normal Forms: Introduction to Schema Refinement, Functional Dependencies -Reasoning about FDs, Normal Forms, Propertiesof Decompositions, Normalization, Schema Refinement in Database Design, Other Kinds of Dependencies.

UNIT –III

Transaction Management: Transactions, Transaction Concept, A Simple Transaction Model, Storage Structure, Transaction Atomicity and Durability, Transaction Isolation, Serializability, Transaction Isolation and Atomicity Transaction Isolation Levels, Implementation of Isolation Levels.

Concurrency Control: Lock–Based Protocols, Multiple Granularity, Timestamp-Based Protocols, Validation-Based Protocols, Multiversion Schemes. Recovery System-Failure

Classification, Storage, Recovery and Atomicity, Recovery Algorithm, Buffer Management, Failure with loss of non-volatile storage, Early Lock Release and Logical Undo Operations, Remote Backup systems.

UNIT –IV

Storage and Indexing: Overview of Storage and Indexing: Data on External Storage, File Organization and Indexing, Index Data Structures, Comparison of File Organizations.

Tree-Structured Indexing: Intuition for tree Indexes, Indexed Sequential Access Method (ISAM), B+ Trees: A Dynamic Index Structure, Search, Insert, Delete. Hash- Based Indexing: Static Hashing, Extendible hashing, Linear Hashing, Extendible vs. Linear Hashing.

Text books:

1. Data base Management Systems, Raghu Ramakrishnan, Johannes Gehrke, McGraw Hill Education (India) Private Limited, 3rd Edition. (Part of UNIT-I, UNIT-II, UNIT-III, UNIT-V)
2. Data base System Concepts, A. Silberschatz, Henry. F. Korth, S. Sudarshan, McGraw Hill Education(India) Private Limited l, 6th edition.(Part of UNIT-I, UNIT-IV)

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.

Web Links:

1. https://nptel.ac.in/courses/106/105/106105175/

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1													
CO2													
CO3													

CO4													
CO5													

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

MSCS105: **Relational Database Management Systems**

Model Paper

Time: 3 Hours Max.Marks: 60

SECTION- A (4 X 10 = 40 M)

Answer ALL Questions

UNIT-I

1. What is a data model? What are the different data models? Explain E-R model and relation model briefly. 10M

(OR)

2. State and explain various features of E-R Models. 10M

UNIT-II

3. Write short notes on difference, union, rename and Cartesian product operations in relational algebra. 10M

(OR)

4. What is meant by functional dependencies? Discuss about second normal form. 10M

UNIT-III

5. Explain ARIES in detail. 10M

(OR)

6. a) How the lock Vanager implements lock and unlock requests? Explain. 5M
   b) What is schedule? Explain about serial and non-serial schedule. 5M

UNIT-IV

7. Explain B+ tree index structure and various operations. 10M

(OR)

8. Explain static and dynamic hashing techniques? 10M

SECTION- B

Answer any FIVE Questions **(5×4=20M)**

9. Explain the three levels of abstraction.
10. What are the functions of Database Administrator?
11. What is week entity? Explain with suitable example.
12. Explain integrity constraints over relations.
13. What are ACID properties? Explain.
14. What are the different RAID levels? Explain.
15. Compare linear hashing and extendable hashing.
16. What are the steps to be followed to convert a relation in 3NF to BCNF?

	Government College (Autonomous) Rajahmundry	Program & Semester I MSC (I Sem)			
Course Code MSCS105P	**TITLE OF THE COURSE** **Relational Data Base Management Systems Lab**				
Teaching	Hours Allocated: 40 (**Lab**)	L	T	P	C
Pre-requisites:	Knowledge about Relational data model	0	0	3	2

Objectives:

1. To master the basics of SQL and construct queries using SQL.
2. To become familiar with database storage structures and access techniques.
3. Provide programming skills in PL/SQL

List of Experiments/Syllabus:

1. Creation, altering and dropping of tables and inserting rows into a table (use constraints while creating tables) examples using SELECT command.
2. Queries (along with sub Queries) using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, Constraints.
   Example:- Select the roll number and name of the student who secured fourth rank in the class.
3. Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.
4. Queries using Conversion functions (to_char, to_number and to_date), string functions (Concatenation, lpad, rpad, ltrim, rtrim, lower, upper, initcap, length, substr and instr), date functions (Sysdate, next_day, add_months, last_day, months_between, least, greatest, trunc, round, to_char, to_date)
5. i)Creation of simple PL/SQL program which includes declaration section, executable section and

exception –Handling section (Ex. Student marks can be selected from the table and printed for

those who secured first class and an exception can be raised if no records were found) ii)Insert data into student table and use COMMIT, ROLLBACK and SAVEPOINT in PL/SQL

block.

6. Develop a program that includes the features NESTED IF, CASE and CASE expression. The program can be extended using the NULLIF and COALESCE functions.
7. Program development using WHILE LOOPS, numeric FOR LOOPS, nested loops using ERROR Handling, BUILT –IN Exceptions, USE defined Exceptions, RAISE-APPLICATION ERROR.
8. Programs development using creation of procedures, passing parameters IN and OUT of PROCEDURES.
9. Program development using creation of stored functions, invoke functions in SQL Statements and

write complex functions

10. Program development using creation of package specification, package bodies, private objects, package variables and cursors and calling stored packages.
11. Develop programs using features parameters in a CURSOR, FOR UPDATE CURSOR, WHERE CURRENT of clause and CURSOR variables.
12. Develop Programs using BEFORE and AFTER Triggers, Row and Statement Triggers and INSTEAD OF Triggers

Reference books:

1. SQL, PL/SQL the Programming Language of Oracle By Ivan Bayross
2. ORACLE PL/SQL by example. Benjamin Rosenzweig, Elena Silvestrova, Pearson Education 3rd Edition

Virtual Lab Links:

1. http://vlabs.iitb.ac.in/vlabs dev/labs/dblab/labs/exp4/references.php

	Government College (Autonomous) Rajahmundry				
Course Code MSCS201	**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:	Discrete Mathematics	5	1	-	5

Course Objectives:

1. Understand basic properties of formal languages and formal grammars.
2. Understand basic properties of deterministic and nondeterministic finite automata
3. Understand the relation between types of languages and types of finite automata
4. Understanding the Context free languages and grammars, and also Normalizing CFG.
5. Understanding the minimization of deterministic and nondeterministic finite automata.
6. Understand basic properties of Turing machines and computing with Turing machines.
7. Understand the concept of Pushdown automata and its application.
8. Understand the challenges for Theoretical Computer Science and its contribution to other sciences.

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Acquire a full understanding and mentality of Automata Theory as the basis of all computer science languages design
CO2	Have a clear understanding of the Automata theory concepts such as RE's, DFA's, NFA's, Turing machines, Grammar, halting problem, computability and complexity.
CO3	Be able to design FAs, NFAs, Grammars, languages modeling, small compiler
CO4	Be able to design sample automata
CO5	Be able to minimize FA's and Grammars of Context Free Languages.
CO6	Perceive the power and limitation of a computer - Solve the problems using formal language

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	

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.

Text books:

1. Introduction to Automata Theory, Languages and Computations – J.E. Hopcroft, & J.D. Ullman , Pearson Education Asia.

Reference books:

1. Introduction to languages and theory of computation – John C. Martin (MGH)
2. Theory of Computation, KLP Mishra and N. Chandra Sekhar, IV th Edition, PHI
3. Introduction to Theory of Computation – Michael Sipser (Thomson Nrools/Cole)

Web Links:

1. https://nptel.ac.in/courses/106/106/106106049/

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1													
CO2													
CO3													
CO4													
CO5													

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

MSCS201: Formal Languages & Automata Theory

Model Paper

Time: 3 Hours 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) Design a DFA which accepts Even number of 0'sand1's? 5M

(OR)

2. State and prove equivalence of NFA and DF 10M

UNIT-II

3. State and prove pumping lemma for CFL? 10M

(OR)

4. Design a PDA for the language L= $\{WW^R/Win(a,b)^*\}$? 10M

UNIT-III

5. Design a Turing machine to accept all strings of $0^n1^n2^n$ 10M

(OR)

6. a) Explain about Universal Turing Machine 5M

b) Discuss Halting problem of Turing machine 5M

UNIT-IV

7. Briefly discuss different grammars with examples? 10M

(OR)

8. Explain Relationship between Classes of Languages. 10M

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.

iii. $S \rightarrow 0\ S\ 1 \mid 01$ (ii) $S \rightarrow aSa \mid bSb \mid \varepsilon$

iv. List any four closure properties of regular languages.

12. Differentiate Recursive and Recursive enumerable languages.

13. Explain briefly about two stack PDA.

14. Show that the following grammar is ambiguous: S->aSbS|bSaS|ε

15. Construct NFA for the following regular expression: (00+11)*.

16. Briefly explain about Chomsky hierarchy of languages.

Course Code MSCS	**TITLE OF THE COURSE** **Web Programming**				
Teaching	Hours Allocated: 60 (**Theory**)	L	T	P	C
Pre-requisites:	Basic Programming Knowledge	5	1	-	5

Course Objectives:

1. To learn HTML tags and JavaScript Language programming concepts and techniques.
2. To Manage browser and Media using JSon and Jquery.
3. To create web pages using Bootstrap components.
4. To create dynamic web pages using PHP and MYSQL.

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	To create static web pages using HTML.
CO2	Use Java script to validate web pages.
CO3	To Manage browser and Media using JSon and Jquery.
CO4	To create web pages using Bootstrap components.
CO5	To create dynamic web pages using PHP and MYSQL.

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	

Syllabus:

UNIT I

INTRODUCTION TO WWW: Internet Standards – Introduction to WWW – WWW Architecture Overview of HTTP, HTTP request – response — Generation of dynamic web pages.

Basics of Html -Syntax and tags of Html- Introduction to HTML5 Semantic/Structural Elements - HTML5 style Guide and Coding Convention– HTML Svg and Canvas – Html API‟s - Audio & Video - Drag/Drop - Local Storage - Web socket API– Debugging and validating Html.

UNIT II

Cascading Style Sheet (CSS3): The need for CSS – Basic syntax and structure Inline Styles – Embedding Style Sheets - Linking External Style Sheets - Introduction to CSS3 – Backgrounds - Manipulating text - Margins and Padding - Positioning using CSS - Responsive Web Design - Introduction to LESS/SASS

OVERVIEW OF JAVASCRIPT: Introduction - Core features - Data types and Variables - Operators, Expressions, and Statements Functions - Objects - Array, Date and Math Related Objects - Document Object Model - Event Handling - Controlling Windows & Frames and Documents - Form validations.

UNIT III

ADVANCED FEATURES OF JAVASCRIPT

Browser Management and Media Management – Classes – Constructors – Object-Oriented Techniques in JavaScript – Object constructor and Prototyping - Sub classes and Super classes – Introduction to JSON – JSON Structure –Introduction to jQuery –Introduction to AJAX.

UNIT IV

PHP: Introduction - How web works - Setting up the environment (XAMPP server) - Programming basics Print/echo - Variables and constants – Strings and Arrays – Operators, Control structures and looping structures – Functions – Reading Data in Web Pages - Embedding PHP within HTML - Establishing connectivity with MySQL database.

Text books:

1. David Flanagan, “JavaScript: The Definitive Guide, Sixth Edition”, O'Reilly Media, 2011
2. Harvey & Paul Deitel& Associates, Harvey Deitel and Abbey Deitel, “Internet and World Wide Web - How To Program”, Fifth Edition, Pearson Education, 2011
3. James Lee, BrentWare , “Open Source Development with LAMP: Using Linux, Apache, MySQL, Perl, and PHP” AddisonWesley, Pearson 2009
4. Thomas A. Powell, “HTML & CSS: The Complete Reference”, Fifth Edition, 2010

Reference books:

1. Thomas A Powell, Fritz Schneider, “JavaScript: The Complete Reference”, Third Edition, Tata McGraw Hill, 2013
2. Thomas A Powell, “Ajax: The Complete Reference”, McGraw Hill, 2008

Web Links:

1. https://nptel.ac.in/courses/106105084

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1													
CO2													
CO3													
CO4													
CO5													

BLUE PRINT			
S.NO	**QUESTIONS**	**UNITS OF THE SYLLABUS**	**MARKS**
1	Question1 and	UNIT-I	10

	Question2		
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

MSCS202: Web Programming

Model Paper

Time: 3Hours Max. Marks: 60

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

UNIT-I

1. Explain about Table tags and form tags in HTML.

(OR)

2. Explain about HTTP protocol.

UNIT-II

3. Explain about CSS style types.

(OR)

4. Explain about data types and operators in Java Script.

UNIT-III

5. Explain about Object constructor and Prototyping in Java Script.

(OR)

6. Explain about JSON.

UNIT-IV

7. Explain about Operators and control structures in PHP.

(OR)

8. Explain about Arrays and Functions in PL/SQL.

SECTION- B (5×4=20M)

Answer any FIVE Questions

9. Write a short note on Internet Standards.

10. Write a short note on List element in html.

11. Write a short note on Data types in JavaScript.

12. Write a short note on margins and paddings in CSS.

13. Write a short note on subclass and superclass in JavaScript.

14. Write a short note on JQuery.

15. Explain about how to establish connectivity with PHP and MYSQL.

16. Write a short note on XAMPP server environment.

MSCS104P	**Web programming Lab**				
Teaching	Hours Allocated: 40 (**Lab**)	L	T	P	C
Pre-requisites:	Basics of computer programming	0	0	3	2

Objectives:

1. Demonstrate the ability to retrieve data from a database and present it in a webpage.
2. Use FTP to transfer web pages to a server.
3. Construct pages that meet guidelines for efficient download and cater to the needs of an identified audience.
4. Evaluate the functions of specific types of web pages in relationship to an entire web site.
5. Create web pages that meet accessibility needs of those with physical disabilities and apply the effects of CSS in web page creation.

List of Experiments/Syllabus:

WEEK-1 INSTALLATIONS

Installation of XAMPP and WAMP servers.

WEEK-2 HTML

a. Create a table to show your class time table.

b. Use tables to provide layout to your HTML page describing your college infrastructure.

c. Use and tags to provide a layout to the above page instead of a table layout.

WEEK-3 HTML

a. Use frames such that page is divided into 3 frames 20% on left to show contents of pages, 60% in

center to show body of page, remaining on right to show remarks.

b. Embed Audio and Video into your HTML web page.

WEEK-4 HTML

a. Create a webpage with HTML describing your department use paragraph and list tags.

b. Apply various colors to suitably distinguish key words , also apply font styling like italics, underline and two other fonts to words you find appropriate , also use headertags.

c. Insert an image and create a link such that clicking on image takes user to other page.

d. Change the background color of the page; At the bottom create a link to take user to the top of the page.

WEEK-5 HTML

Develop static pages (using only HTML) of an online book store, the pages should resemble: www.amazon.com, the website should consist the following pages, home page, registration and user

login, user profile page, books catalog, shopping cart, payment by credit card, order confirmation.

WEEK-6 CASCADING STYLE SHEET

Write an HTML page that contains a selection box with a list of 5 countries, when the user selects a country, its capital should be printed next to the list; Add CSS to customize the properties of the font of the capital (color, bold and font size).

WEEK-7 JAVASCRIPT

a. Write a java script program to test the first character of a string is uppercase or not.

b. Write a pattern that matches e-mail addresses.

c. Write a java script function to print an integer with commas as thousands separators.

WEEK-8 JAVASCRIPT

a. Write a java script program to sort a list of elements using quicksort.

b. Write a java script for loop that will iterate from 0 to 15 for each iteration, it will check ifthe current number is odd or even, and display a message to the screen.

WEEK-9 JAVASCRIPT

a. Write a java script program which compute, the average marks of the following students then this average is used to determine the corresponding grade.

b. Write a java script program to sum the multiple s of 3 and 5 under 1000.

c. To design the scientific calculator and make event for each button using java script.

WEEK-10 PHP

a. A simple calculator web application that takes two numbers and an operator (+, ,/,*and %)from an HTML page and returns the result page with the operation performed on the operands.

b. Write PHP program how to send mail using PHP.

WEEK-11 PHP

a. Write PHP program to convert a string, lower to upper case and upper case to lower case or capital case.

b. Write PHP program to change image automatically using switch case.

c. Write PHP program to calculate current age without using any pre-define function.

d. Write PHP program to upload image to the server using html and PHP.

WEEK-12 PHP

a. Write PHP program to upload registration form into database.

b. Write PHP program to display the registration form from the database.

WEEK-13 PHP

a. Write PHP program to update the registration form present in database.

b. Write PHP program to delete the registration form from database.

Reference books:

1. Harvey & Paul Deitel& Associates, Harvey Deitel and Abbey Deitel, "Internet and World Wide Web - How To Program", Fifth Edition, Pearson Education, 2011

Virtual Lab Links:

1. https://html-iitd.vlabs.ac.in/exp/introduction-to-html/references.html

Course Code MSCS	**TITLE OF THE COURSE** **Data Communication and Computer Networks**				
Teaching	Hours Allocated: 60 (**Theory**)	L	T	P	C
Pre-requisites:	Basic Programming Knowledge	5	1	-	5

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 Model.
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	

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 control protocol

Standard Client Server Protocols: World wide-web and HTTP, FTP, Electronic mail, Telnet, Secured Shell, Domain name system.

Text books:

1. Data Communication and Networking Behrouz A. Forouzan Tata McGraw Hill 5th edition.
2. TCP/IP Protocol TCP/IP Protocol Suite Tata McGraw Hill Suite 4th edition 2010.

Reference books:

1. Computer Networks Andrew Tanenbaum Pearson, 5th edition 2013

Web Links:

1. https://nptel.ac.in/courses/106105082

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1													
CO2													
CO3													
CO4													
CO5													

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
MSCS202: 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. Explain various digital to analog conversion techniques.

(OR)

2. Explain about OSI reference model.

UNIT-II

3. Explain about guided and unguided transmission media.

(OR)

4. Explain about HDLC protocol.

UNIT-III

5. Explain about IPv4 addressing.

(OR)

6. Explain about unicast routing algorithms.

UNIT-IV

7. Explain about Transport layer protocol.

(OR)

8. Explain about HTTP and FTP protocols.

SECTION- B (5×4=20M)

Answer any FIVE Questions

9. Write a short note on Internet standards.

10. Write a short note on multiplexing.

11. Write a short note on Cyclic Redundancy Check.

12. Write a short note on circuit switching.

13. Write a short note packet switching.

14. Write a short note on gigabit ethernet.

15. Write a short note Domain Name System.

16. Write a short note on Telnet.

Course Code MSCS204	**TITLE OF THE COURSE** **Operating Systems**	I M.Sc. (II Sem)			
Teaching	Hours Allocated: 60 (**Theory**)	L	T	P	C
Pre-requisites:	Basic functional units of a computer	4	1	-	4

Course Objectives:

1. To introduce students with basic concepts of Operating System, its functions and services. d
2. To familiarize the students with various views and management policies adopted by O.S. as pertaining with processes , Deadlock , memory , File and I/O operations.
3. To provide the knowledge of basic concepts towards process synchronization and related issues.

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Appreciate the role of operating system as System software.
CO2	Compare the various algorithms and comment about performance of various algorithms used for management of memory, CPU scheduling, File handling and I/O operations.
CO3	Apply various concept related with Deadlock to solve problems related with Resources allocation, after checking system in Safe state or not.
CO4	To appreciate role of Process synchronization towards increasing throughput of system.

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	

Syllabus:

UNIT –I

Introduction: Definition of Operating System, Types Of Operating Systems, Operating System Structures, Operating-System Services, System Calls, Virtual Machines, Operating System Design and Implementation

Process Management: Process Concepts, Operations on Processes, Cooperating Processes, Threads, Inter Process Communication, Process Scheduling, Scheduling Algorithms, Multiple - Processor Scheduling. Thread Scheduling.

UNIT –II

Process Synchronization: The Critical Section Problem, Semaphores, And Classical Problems of Synchronization, Critical Regions, Monitors, Synchronization examples. **Deadlocks:** Principles of Deadlocks, System Model, Deadlocks Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Avoidance, Detection & Recovery from Deadlocks.

UNIT –III

Memory Management: Logical Versus Physical Address, Swapping, Contiguous Memory Allocation, Paging, Structure of the Page Table, Segmentation, Virtual Memory, Demand Paging, Page Replacement Algorithms, Thrashing

File System Implementation: Concept of a file, Access Methods, Directory Structure, File System Structure, Allocation Methods, Free Space Management, Directory Management, Device Drivers. Mass-storage structure: overview of Mass-storage structure, Disk structure, disk attachment, disk scheduling, swap-space management.

UNIT –IV

Protection: Goals and Principles of Protection, Access matrix implementation, Access control, Revocation of access rights. Case study: LINUX, Windows Operating Systems.

Text books:

1. OperatingSystemPrinciplesbyAbrahamSilberschatz,PeterGalvin,GregGagne.Seventh Edition, Wiley Publication

Reference books:

1. Operating Systems, William Stallings 5th Edition – PHI
2. Modern Operating Systems, Andrew S.Tanenbaum, , 2nd edition, 1995, PHI.
3. Operating Systems - A concept based approach, Dhamdhere, 2nd Edition, TMH, 2006.
4. Understanding the Linux Kernel, Daniel P Bovet and Marco Cesati, 3rd Edition,' Reilly, 2005

Web Links:

1. https://nptel.ac.in/courses/106/105/106105214/

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1													
CO2													
CO3													
CO4													
CO5													

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

MSCS204: Operating Systems
Model Paper

Time: 3Hours Max. Marks: 60

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

UNIT-I

1. Discuss the functions and objectives of OS 10 M

(OR)

2. Explain in detail about time shared and Distributed systems 10 M

UNIT-II

3. Explain in detail about FCFS and SJF algorithms with examples 10 M

(OR)

4. Explain in detail about Semaphores 10 M

UNIT-III

5. Explain about Contiguous memory Allocations 10 M

(OR)

6. Explain the steps in handling a page fault 10 M

UNIT-IV

7. Explain in detail about FCFS and SCAN disk scheduling algorithms 10 M

(OR)

8. Explain in detail about file attributes and file operations 10 M

SECTION- B

Answer any FIVE Questions (5×4=20M)

9. Discuss about the structure and operations of Operating System
10. Discuss about segmentation
11. Discuss about critical-section problem
12. Explain about Semaphores
13. Discuss in detail about the process control block
14. Write about Swapping

15. Explain about File Access Methods
16. Explain File System Architecture.

	Government College (Autonomous) Rajahmundry	Program & Semester I M.Sc. (II Sem)			
Course Code MSCS205	**TITLE OF THE COURSE** **Python Programming**				
Teaching	Hours Allocated: 60 (**Theory**)	L	T	P	C
Pre-requisites:	Basic knowledge of any programming language concepts	4	1	-	4

Course Objectives:

1. Introduction to Scripting Language
2. Exposure to various problems solving approaches of computer science

Outcomes:

On Completion of the course, the students will be able to-	
CO1	Making Software easily right out of the box.
CO2	Experience with an interpreted Language.
CO3	To build software for real needs.
CO4	Prior Introduction to testing software

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	

Syllabus:

UNIT – I

Introduction: History of Python, Need of Python Programming, Applications Basics of Python Programming Using the REPL (Shell), Running Python Scripts, Variables, Assignment, Keywords, Input-Output, Indentation.

Types, Operators and Expressions: Types - Integers, Strings, Booleans; Operators-Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators, Expressions and order of evaluations Control Flow- if, if-else if-else, for, while, break,continue, pass

UNIT – II

Data Structures Lists - Operations, Slicing, Methods; Tuples, Sets, Dictionaries, Sequences, Comprehensions.
Functions - Defining Functions, Calling Functions, Passing Arguments, Keyword Arguments, Default Arguments, Variable-length arguments, Anonymous Functions, Fruitful Functions (Function Returning Values), Scope of the Variables in a Function - Global and Local Variables.

UNIT – III

Modules: Creating modules, import statement, from. Import statement, name spacing, Python packages, Introduction to PIP, Installing Packages via PIP, Using Python Packages
Object Oriented Programming OOP in Python: Classes, 'self-variable', Methods, Constructor Method, Inheritance, Overriding Methods, Data hiding,

UNIT – IV

Error and Exceptions: Difference between an error and Exception, Handling Exception, try except block, Raising Exceptions, User Defined Exceptions
Brief Tour of the Standard Library - Operating System Interface - String Pattern, Matching, Mathematics, Internet Access, Dates and Times, Data Compression, Multithreading, GUI Programming, TKinter python library-widgets-Turtle Graphics
Testing: Why testing is required?, Basic concepts of testing, Unit testing in Python,Writing Test cases, Running Tests.

Text books:

1. Python Programming: A Modern Approach, VamsiKurama, Pearson
2. Learning Python, Mark Lutz, Orielly

Reference books:

1. Think Python, Allen Downey, Green Tea Press
2. Core Python Programming, W.Chun, Pearson.

3. Introduction to Python, Kenneth A. Lambert, Cengage

Web Links:

1. https://nptel.ac.in/courses/106/106/106106182/

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation)

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CO1													
CO2													
CO3													
CO4													
CO5													

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 Degree Examinations
Semester: II
MSCS205: Python programming
Model Paper

Time:3 Hours Max. Marks: 60

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

UNIT-I

1. a) What are different applications of Python? Give examples. 5M

   b) Write a Python program to convert height in feet and inches to cm.
   [1 feet = 12 inch and 1 inch= 2.54 cm] (Sample input: 2 feet 7 inch
   Sample output: 78.74 cm) 5M

(OR)

2. a) List and explain different arithmetic operators supported by Python. 5M

   b) Write a Python program to print all prime numbers less than 256. 5M

UNIT-II

3. a) What is Sequence in Python? Explain its operations with suitable examples. 5M

   b) Write a Python program to illustrate the comparison operators in tuples. 5M

(OR)

4. a) Write a Python program that interchanges the first and last characters of a given string. 5M

   b) Give a comparison between lists, tuples, dictionaries and sets. 5M

UNIT-III

5. a) List out the types of Modules and explain any two types in detail. 5M

   b) Explain installing packages via PIP 5M

(OR)

6. Explain how to implement inheritance in Python. 10M

7. How to handle an exception using try except block? Explain with the help of a program. 10M

(OR)

8. a) Explain various String pattern matching functions in Python. 5M

   b) Discuss about unit testing in Python. 5M

SECTION- B **(5×4=20M)**

Answer any FIVE Questions

9. How is Python developed and supported?

10. What are literals? Explain with the help of examples.

11. Explain different Logical operators in python with appropriate examples

12. Explain methods in Lists of Python with appropriate examples.

13. Explain different Object Oriented features supported by Python.

14. How to handle an exception using try except block? Explain with the help of a program.

15. Write in brief about anonymous functions.

16. Write in brief about Dictionary in python. Write operations with suitable examples.

	Government College (Autonomous) Rajahmundry				
Course Code MSCS205P	**TITLE OF THE COURSE** **Python Programming Lab**	**Program & Semester** I M.Sc. (II Sem)			
Teaching	Hours Allocated: 40 (**Lab**)	L	T	P	C
Pre-requisites:	Basic knowledge of any programming language concepts	0	0	3	2

Objectives:

1. Enhances Problem solving skills in python

List of Experiments/Syllabus:

Exercise 1 - Basics

a) Running instructions in Interactive interpreter and a Python Script

b) Write a program to purposefully raise Indentation Error and correct it

Exercise 2 - Operations

a) Write a program to compute distance between two points taking input from the user (Pythagorean Theorem)

b) Write a program add.py that takes 2 numbers as command line arguments and prints its sum.

Exercise - 3 Control Flow

a) Write a Program for checking whether the given number is a even number or not.

b) Using a for loop, write a program that prints out the decimal equivalents of 1/2, 1/3, 1/4, . . . , 1/10

c) Write a program using a for loop that loops over a sequence. What is sequence?

d) Write a program using a while loop that asks the user for a number, and prints a count down from that number to zero.

Exercise 4 - Control Flow - Continued

a) Find the sum of all the primes below two million.

Each new term in the Fibonacci sequence is generated by adding the previous two terms. By starting with 1 and 2, the first 10 terms will be:

1, 2, 3, 5, 8, 13, 21, 34, 55, 89,...

b) By considering the terms in the Fibonacci sequence whose values do not exceed four million, find the sum of the even-valued terms.

Exercise - 5 - DS

a) Write a program to count the numbers of characters in the string and store them in a Dictionary data structure

b) Write a program to use split and join methods in the string and trace a birthday with a dictionary data structure.

Exercise - 6 DS - Continued

a) Write a program combine lists that combines these lists into a dictionary.

b) Write a program to count frequency of characters in a given file. Can you use character frequency to tell whether the given file is a Python program file, C program file or a text file?

Exercise - 7 Files

a) Write a program to print each line of a file in reverse order.

b) Write a program to compute the number of characters, words and lines in a file.

Exercise - 8 Functions

a) Write a function ball collide that takes two balls as parameters and computes if they are colliding. Your function should return a Boolean representing whether or not the balls are colliding.

Hint: Represent a ball on a plane as a tuple of (x, y, r), r being the radius

If (distance between two balls centers) <= (sum of their radii) then (they are colliding)

b) Find mean, median, mode for the given set of numbers in a list.

Exercise - 9 Functions - Continued

a) Write a function nearly equal to test whether two strings are nearly equal. Two strings a and bare nearly equal when a can be generated by a single mutation on b.

b) Write a function dups to find all duplicates in the list.

c) Write a function unique to find all the unique elements of a list.

Exercise - 10 - Functions - Problem Solving

a) Write a function cumulative product to compute cumulative product of a list of numbers.

b) Write a function reverse to reverse a list. Without using the reverse function.

c) Write function to compute GCD, LCM of two numbers. Each function shouldn’t exceed one line.

Exercise 11 - Multi-D Lists

a) Write a program that defines a matrix and prints

b) Write a program to perform addition of two square matrices

c) Write a program to perform multiplication of two square matrices

Exercise - 12 - Modules

a) Install packages requests, flask and explore them. using (pip)

b) Write a script that imports requests and fetch content from the page. Eg. (Wiki)

c) Write a simple script that serves a simple HTTP Response and a simple HTML Page

Exercise - 13 OOP

a) Class variables and instance variable

i) Robot

ii) ATM Machine

Exercise - 14 - Testing

a) Write a test-case to check the function even numbers which return True on passing a list of all even numbers

b) Write a test-case to check the function reverse string which returns the reversed string

Reference books:

1. Python Programming: A Modern Approach, VamsiKurama, Pearson
2. Learning Python, Mark Lutz, Orielly

Virtual Lab Links:

1. http://vlabs.iitb.ac.in/vlabs-dev/labs/python-basics/index.html

	Government College (Autonomous) Rajahmundry	Program & Semester II M.Sc. (III Sem)			
Course Code MSCS304	**TITLE OF THE COURSE** **MEAN Stack Technologies**				
Teaching	Hours Allocated: 60 (**Theory**)	L	T	P	C
Pre-requisites:	Discrete mathematics	5	1	-	5

Course Objectives:

1. Translate user requirements into the overall architecture and implementation of new systems and Manage Project and coordinate with the Client.
2. Writing optimized front end code HTML and JavaScript.
3. Monitor the performance of web applications & infrastructure and Troubleshooting web application with a fast and accurate a resolution
4. Design and implementation of Robust and Scalable Front End Applications.

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Develop web Applications using Scripting Languages & Frameworks.
CO2	Make use of Express JS and Node JS frameworks
CO3	Illustrate the uses of web services concepts like restful, react js.
CO4	Adapt to Deployment Techniques & Working with cloud platform.

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	

Syllabus:

UNIT I:

JavaScript: The Basic of JavaScript: Objects, Primitives Operations and Expressions, Control Statements, Arrays, Functions, Constructors, Pattern Matching using Regular Expressions. Angular

Java Script Angular JS Expressions: ARRAY, Objects, $eval, Strings, Angular JS Form Validation & Form Submission, Single Page Application development using Angular JS

UNIT II:

Node.js: Introduction, Advantages, Node.js Process Model, Node JS Modules. Express.js: Introduction to Express Framework, Introduction to Nodejs , What is Nodejs, Getting Started with Express, Your first Express App, Express Routing, Implementing MVC in Express, Middleware, Using Template Engines, Error Handling , API Handling , Debugging, Developing Template Engines, Using Process Managers, Security & Deployment.

UNIT III:

RESTful Web Services: Using the Uniform Interface, Designing URIs, Web Linking, Conditional Requests. React Js: Welcome to React, Obstacles and Roadblocks, React's Future, Keeping Up with the Changes, +, Pure React, Page Setup, The Virtual DOM, React Elements, ReactDOM, Children, Constructing Elements with Data, React Components, DOM Rendering, Factories

UNIT IV:

Mongo DB: Introduction, Architecture, Features, Examples, Database Creation & Collection in Mongo DB. Deploying Applications: Web hosting & Domains, Deployment Using Cloud Platforms.

Text books:

1. Programming the World Wide Web, Robet W Sebesta, 7ed, Pearson.
2. Web Technologies, Uttam K Roy, Oxford
3. Pro Mean Stack Development, ELadElrom, Apress
4. Restful Web Services Cookbook, Subbu Allamraju, O'Reilly
5. JavaScript & jQuery the missing manual, David sawyer mcfarland, O'Reilly Artificial Intelligence, Elaine Rich, Mcgraw-Hill Publications.
6. Web Hosting for Dummies, Peter Pollock, John Wiley Brand

Reference books:

1. Ruby on Rails up and Running, Lightning fast Web development, Bruce Tate, Curt Hibbs, Oreilly (2006)

2. Programming Perl, 4ed, Tom Christiansen, Jonathan Orwant, Oreilly (2012)
3. Web Technologies, HTML< JavaScript, PHP, Java, JSP, XML and AJAX, Black book, Dream Tech
4. An Introduction to Web Design, Programming, Paul S Wang, Sanda S Katila, Cengage Learning
5. Express.JS Guide, The Comprehensive Book on Express.js, Azat Mardan, Lean Publishing.

Web Links:

1. https://nptel.ac.in/courses/106106156

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1													
CO2													
CO3													
CO4													
CO5													

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: III
MSCS304: MEAN Stack Technologies
Model Paper

Time: 3Hours Max. Marks: 60

SECTION- A

Answer ALL Questions **(4 X 10 = 40 M)**

UNIT-I

1. Angular JS Form Validation & Form Submission 10M

(OR)

2. Explain about Angular JS expression. 10M

UNIT-II

3. Explain about Node.js modules. 10M

(OR)

4. Explain about Implementation of MVC in Express. 10M

UNIT-III

5. Explain about ReactJS. 10M

(OR)

6. Explain the role of difference tables in Means –Ends analysis. 10M

UNIT-IV

7. Explain about Mango DB architecture. 10M

(OR)

8. Explain about Database Creation & Collection in Mongo DB 10M

SECTION- B

Answer any **FIVE** Questions **(5×4=20M)**

9. Explain about Arrays in JavaScript.
10. Write a short note on Constructors in JavaScript.
11. Write a short note on Debugging in JavaScript.
12. Write a short note on Node.js Process Model.
13. Write a short note on Virtual DOM.
14. Write a short note on React components.
15. Write a short note on Mango DB Features
16. Write a short note on Web Hosting and Domain.

	Government College (Autonomous) Rajahmundry	Program & Semester I M.Sc. (III Sem)			
Course Code MSCS205P	**TITLE OF THE COURSE** **Mean stack technologies Lab**				
Teaching	Hours Allocated: 40 (**Lab**)	L	T	P	C
Pre-requisites:	Basic knowledge of any programming language concepts	0	0	3	2

Objectives:

1. Learn the core concepts of both the frontend and backend programming course.
2. Get familiar with the latest web development technologies.
3. Learn all about SQL and Mongo databases.
4. Learn complete web development process

List of Experiments/Syllabus:

Experiment-1:

Develop static pages (using only HTML) of an online Book store. The pages should resemble: www.amazon.com. The website should consist of the following pages. Home page

- Registration and user Login
- User profile page
- Books catalog
- Shopping cart
- Payment by credit card Order Conformation

Experiment-2:

Write an HTML page including any required JavaScript that takes a number from text field in the range of 0 to 999 and shows it in words. It should not accept four and above digits, alphabets and special characters.

Experiment-3:

Develop and demonstrate JavaScript with POP-UP boxes and functions for the following problems:

a) Input: Click on Display Date button using on click ( ) function Output: Display date in the textbox

b) Input: A number n obtained using prompt Output: Factorial of n number using alert

c) Input: A number n obtained using prompt Output: A multiplication table of numbers from 1 to 10 of n using alert

d) Input: A number n obtained using prompt and add another number using confirm Output: Sum of the entire n numbers using alert

Experiment-4:

Create a simple visual bean with a area filled with a color. The shape of the area depends on the property shape. If it is set to true then the shape of the area is Square and it is Circle, if it is false. The color of the area should be changed dynamically for every mouse click.

Experiment-5:

Create an XML document that contains 10 users information. Write a Java Program, which takes User Id as input and returns the user details by taking the user information from XML document using DOM parser or SAX parser.

Experiment-6:

Develop and demonstrate PHP Script for the following problems:

a) Write a PHP Script to find out the Sum of the Individual Digits.

b) Write a PHP Script to check whether the given number is Palindrome or not

Experiment-7:

Implement the following in CSS

a) Implementation of ‘get’ and ‘post’ methods.

b) Implementation in colors, boarder padding.

c) Implementation button frames tables, navigation bars.

Experiment-8:

Implement the web applications with Database using

a) PHP,

b) Servlets and

c) JSP.

Experiment-9:

Write a program to design a simple calculator using

a) JavaScript

b) PHP

c) Servlet and

d) JSP.

Experiment-10:

Create registration and login forms with validations using Jscript query.

Experiment-11:

Jscript to retrieve student information from student database using database connectivity.

Experiment-12:

Implement the following in React JS

a) Using React Js creating constructs data elements.

b) Using React Js implementations DoM.

Experiment-13:

Implement the following in Angular JS

a) Angular Js data binding.

b) Angular JS directives and Events.

c) Using angular Js fetching data from MySQL.

Experiment-14:

Develop and demonstrate Invoking data using Jscript from Mongo DB.

Experiment-15:

Create an Online fee payment form using JSCript and MangoDB.

Reference books:

1. Pro Mean Stack Development, ELadElrom, Apress
2. Restful Web Services Cookbook, Subbu Allamraju, O'Reilly
3. JavaScript & jQuery the missing manual, David sawyer mcfarland, O'ReillyPython Programming: A Modern Approach, VamsiKurama, Pearson

Virtual Lab Links:

	Government College (Autonomous) Rajahmundry	Program & Semester II M.Sc. (III Sem)			
Course Code MSCS302	**TITLE OF THE COURSE** **Object Oriented Software Engineering**				
Teaching	Hours Allocated: 60 (**Theory**)	L	T	P	C
Pre-requisites:	Object Oriented Programming concepts	4	1	-	4

Course Objectives:

1. The aim of this course is to train the students on Object Oriented Software Engineering features.
2. It helps the students to develop projects using object-oriented analysis, design and testing techniques.

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Understands life cycles models
CO2	To analyze the requirements
CO3	To design software through UML language constructs
CO4	Use various testing methodologies
CO5	Illustrates Software project management

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	

Syllabus:

UNIT –I

Introduction to Object Oriented Software Engineering: Nature Of The Software, Types Of Software , Software Engineering Projects, Software Engineering Activities, Software Quality, Introduction To Object Orientation, Concepts Of Data Abstraction, Inheritance & Polymorphism, Software Process Models-Waterfall Model, The Opportunistic Model , The Phased Released Model, The Spiral Model, Evolutionary Model, The Concurrent Engineering Model

Requirements Engineering: Domain Analysis, Problem Definition And Scope, Requirements Definition, Types Of Requirements, Techniques For Gathering And Analyzing Requirements, Requirement Documents, Reviewing, Managing Change In Requirements.

UNIT - II

Unified Modelling Language & Use Case Modelling: Introduction To UML, Modelling Concepts, Types Of UML Diagrams With Examples; User-Centred Design, Characteristics Of Users, Developing Use Case Models Of Systems, Use Case Diagram, Use Case Descriptions, The Basics Of User Interface Design, Usability Principles, User Interfaces.

Class Design and Class Diagrams: Essentials Of UML Class Diagrams, Associations And Multiplicity, Other Relationships, Generalization, Instance Diagrams, Advanced Features Of Class Diagrams, Interaction And Behavioural Diagrams: Interaction Diagrams, State Diagrams, Activity Diagrams, Component And Deployment Diagrams.

UNIT - III

Software Design And Architecture: The Process Of Design, Principles Leading To Good Design, Techniques For Making Good Design Decisions, Writing A Good Design Document., Pattern Introduction, Design Patterns: The Abstraction-Occurrence Pattern, General Hierarchical Pattern, The Play-Role Pattern, The Singleton Pattern, The Observer Pattern, The Delegation Pattern, The Adaptor Pattern, The Façade Pattern, The Immutable Pattern, The Read-Only Interface Pattern And The Proxy Pattern; Software Architecture Contents Of An Architecture Model, Architectural Patterns: The Multilayer, Client-Server, Broker, Transaction Processing, Pipe & Filter And MVC Architectural Patterns.

UNIT - IV

Software Testing: Overview Of Testing, Testing Concepts, Testing Activities, Testing Strategies, Unit Testing, Integration Testing, Function Testing, Structural Testing, Class Based Testing Strategies, Use Case/Scenario Based Testing, Regression Testing, Performance Testing, System Testing, Acceptance Testing, Installation Testing, OO Test Design Issues, Test Case Design, Quality Assurance, Root Cause Analysis, Post-Mortem Analysis.

Software Project Management: Introduction To Software Project Management, Activities Of

Software Project Management, Structure Of Project Plan, Software Engineering Teams, Software Cost Estimation, Project Scheduling, Tracking And Monitoring.

CASE STUDY

1. Simple Chat Instant Messaging System
2. GPS Based Automobile Navigation System
3. Waste Management Inspection Tracking System (WMITS)
4. Geographical Information System

Text books:

1. Object-Oriented Software Engineering Practical software development using
2. UML and Java by Timothy C. Lethbridge & Robert, LanganiereMcgraw-Hill

Reference books:

1. Object-Oriented Software Engineering: Using UML, Patterns and Java, Bernd Bruegge and Allen H. Dutoit, 2nd Edition, Pearson Education Asia.
2. Software Engineering: A Practitioner's Approach, Roger S Pressman.
3. A Practical Guide to Testing Object-Oriented Software, John D. McGregor; David A. Sykes, Addison-Wesley Professional.

Web Links:

1. https://nptel.ac.in/courses/106/105/106105153/

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1													
CO2													
CO3													
CO4													
CO5													

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: III
MSCS302: Object Oriented Software Engineering
Model Paper

Time: 3Hours **Max.Marks: 60**

SECTION- A

Answer ALL Questions **(4 X 10 = 40 M)**

UNIT-I

1. Explain Software Process Models and their applicability 10M

(OR)

2. Explain the components of an SRS. 10M

UNIT-II

3. Explain RUP. 10M

(OR)

4. Draw UML diagrams for online quiz system. 10M

UNIT-III

5. Explain design principles with relevant examples. 10M

(OR)

6. Explain different design patterns with suitable examples. 10M

UNIT-IV

7. Explain different testing strategies. 10M

(OR)

8. Explain the activities of software project management. 10 M

SECTION- B

Answer any **FIVE** Questions **(5×4=20M)**

9. Write short notes on Conventional vs. object oriented software engineering.
10. Write short notes on Scope of a problem.
11. Write short notes on Usability principles.
12. Write two disadvantages of the waterfall model
13. Write short notes on Cohesion vs. Coupling
14. Explain about project scheduling
15. Write about user interface design
16. Write short notes on alpha and beta testing

	Government College (Autonomous) Rajahmundry	Program & Semester II M.Sc. (III Sem)			
Course Code MSCS303	**TITLE OF THE COURSE** **Information Security and Cryptography**				
Teaching	Hours Allocated: 60 (**Theory**)	L	T	P	C
Pre-requisites:	Computer Networks	4	1	-	4

Course Objectives:

1. Explain the objectives of information security
2. Understand various cryptographic algorithms.
3. Understand the basic categories of threats to computers and networks
4. Describe public-key cryptosystem.
5. Describe the enhancements made to IPv4 by IPSec
6. Understand Intrusions and intrusion detection
7. Generate and distribute a PGP key pair and use the PGP package to send an encrypted e-mail message.
8. Discuss Web security and Firewalls

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Student will be able to understand basic cryptographic a algorithms, message and web authentication and security issues.
CO2	Ability to identify information system requirements for both of them such as client and server.
CO3	Ability to understand the current legal issues towards information security.

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	

Syllabus:

UNIT - I

Attacks on Computers and Computer Security: Introduction, The need for security, Security approaches, Principles of security, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security

Cryptography: Concepts and Techniques: Introduction, plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography, stenography, key range and key size, possible types of attacks.

UNIT – II

Symmetric key Ciphers: Block Cipher principles & Algorithms(DES, AES, Blowfish), Differential and Linear Crypt analysis, Block cipher modes of operation, Stream ciphers, RC4,Location and placement of encryption
Function, Key distribution

Asymmetric key Ciphers: Principles of public key cryp to systems, Algorithms(RSA, Diffie-Hellman, ECC), Key Distribution.

UNIT – III

Message Authentication Algorithms and Hash Functions: Authentication requirements, Functions, Message authentication codes, Hash Functions, Secure hash algorithm, Whirlpool, HMAC, CMAC, Digital signatures, knapsack algorithm

Authentication Applications: Kerberos, X.509 Authentication Service, Public – Key Infrastructure, Biometric Authentication.

E-Mail Security: Pretty Good Privacy, S/MIME

UNIT – IV

IP Security: IP security overview, IP Security architecture, Authentication Header, Encapsulating security payload, combining security associations, key management.

Web Security: Web security considerations, Secure Socket Layer and Transport Layer Security, Secure electronic transaction

Intruders, virus and Firewalls: Intruders, Intrusion detection, password management, virus and related threats, Countermeasures, Firewall design principles, types of firewalls

Case Studies on Cryptography and security: Secure Inter-branch Payment Transactions, Cross site Scripting Vulnerability, Virtual E lections

Text books:

1. Network Security Essentials: Applications and Standards, William Stallings PEA.
2. Cryptography and Network Security, AtulKahate, Tata McGraw Hill

Reference books:

1. Cryptography and Network Security: C K Shyamala, N Harin i, Dr T R Padmanabhan, Wiley India, 1”
2. Cryptography and Network Security : Forouzan Mukhopadhyay, MC Graw Hill, 2”” Edition
3. Information Security, Principles and Practice: Mark Stamp, Wiley India.
4. Principles of Computer Security: WM.Arthur Conklin, Greg White, TMH
5. Introduction to Network Security: Neal Krawetz, CENGAGE Learning
6. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning

Web Links:

1. https://nptel.ac.in/courses/106/106/106106129/

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1													
CO2													
CO3													
CO4													
CO5													

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: III
MSCS303: Information Security and Cryptography
Model Paper

Time: 3Hours **Max. Marks: 60**

SECTION- A

Answer ALL Questions **(4 X 10 = 40 M)**

UNIT-I

1. Describe the cipher block modes operation. 10M

(OR)

2. What are the various approaches to message authentication. 10 M

UNIT-II

3. a) What is Cryptography? Explain the key elements of a Cryptographic system. 5M
   b) Write about Conventional and Public-key cryptographic methods available. 5M

(OR)

4. Describe Electronic mail security using PGP. 10 M

UNIT-III

5. What are web security requirements? Explain 10 M

(OR)

6. What is SNMP? Explain how it is useful in Network management. 10 M

UNIT-IV

7. What is an Authentication Service? Write about Kerberos and X.509 Authentication Services. 10 M

(OR)

8. What is intrusion detection? Describe two approaches for intrusion detection. 10M

SECTION- B

Answer any **FIVE** Questions **(5×4=20M)**

9.	Types of attacks	4 M
10.	Issues in Key distribution	4 M
11.	Digital signature	4 M
12.	Viruses	4 M
13.	Authentication	4 M
14.	Firewalls	4 M
15.	MD5	4 M
16.	Trojan Horse	4 M

	Government College (Autonomous) Rajahmundry				
Course Code MSCS303p	**TITLE OF THE COURSE** **Information Security and Cryptography Lab**	**Program & Semester** II B.Sc. (III Sem)			
Teaching	Hours Allocated: 60 (**Lab**)	L	T	P	C
Pre-requisites:	C / JAVA Programming	0	0	3	2

Objectives:

1. The Objective of this course is to provide knowledge on implementation of various cryptographic algorithms and network security techniques.

List of Experiments/Syllabus:

1. Breaking the Shift Cipher
2. Breaking the Mono-alphabetic Substitution Cipher
3. One-Time Pad and Perfect Secrecy
4. Message Authentication Codes
5. Cryptographic Hash Functions and Applications
6. Symmetric Key Encryption Standards (DES)
7. Symmetric Key Encryption Standards (AES)
8. Diffie-Hellman Key Establishment
9. Public-Key Cryptosystems (PKCSv1.5)
10. Digital Signatures

Reference books:

1. Network Security Essentials: Applications and Standards, William Stallings PEA.
2. Cryptography and Network Security, AtulKahate, Tata McGraw Hill.

Virtual Lab Links:

1. http://cse29-iiith.vlabs.ac.in/Experiments.html

	Government College (Autonomous) Rajahmundry	Program & Semester II M.Sc. (III Sem)			
Course Code MSCS402	**TITLE OF THE COURSE** **Elective I: Compiler Design**				
Teaching	Hours Allocated: 60 (**Theory**)	L	T	P	C
Pre-requisites:	Formal Language and Automata Theory	5	1	-	5

Course Objectives:

1. To make the student to understand the process involved in a compiler design.
2. Create an overall understanding on various types of translators and phases of a compiler.
3. To make the student understand what is syntax analysis, various types of parsers especially the top down approach, and various types of bottom up parsers.
4. To make the understand the syntax analysis and, intermediate code generation, type checking, the role of symbol table and its organization, Code generation, machine independent code optimization and instruction scheduling.

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	To introduce the major concept areas of language translation and compiler design
CO2	To develop an awareness of the function and complexity of compilers.
CO3	To provide practical, hands on experience in compiler design
CO4	Identify the similarities and differences among various parsing techniques and grammar transformation techniques.

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	

Syllabus:

UNIT –I

Overview of language processing – pre-processors – compiler – assembler – interpreters, pre-processors, – linkers & loaders – structure of a compiler – phases of a compiler . Lexical Analysis – Role of Lexical Analysis – Lexical Analysis Vs. Parsing – Token, patterns and Lexemes – Lexical Errors – Regular Expressions – Regular definitions for the language constructs – Strings, Sequences, Comments – Transition diagram for recognition of tokens, Reserved words and identifiers, Examples.Syntax Analysis – discussion on CFG, LMD,RMD, parse trees, Role of a parser – classification of parsing techniques – Brute force approach, left recursion, left factoring, Top down parsing – First and Follow- LL(1) Grammars, Non-Recursive predictive parsing – Error recovery in predictive parsing.

UNIT –II

What is bottom up parsing approach, Types of Bottom up approaches; Introduction to simple LR – Why LR Parsers – Model of an LR Parsers – Operator Precedence- Shift Reduce Parsing – Difference between LR and LL Parsers, Construction of SLR Tables. More powerful LR parses, construction of CLR (1), LALR Parsing tables, Dangling ELSE Ambiguity, Error recovery in LR Parsing. Comparison of all bottoms up approaches with all top down approaches.

UNIT –III

Semantic analysis, SDT Schemes, evaluation of semantic rules. Intermediate code, three address code, quadruples, triples, abstract syntax trees. Types and declarations, type Checking.

Symbol tables: use and need of symbol tables. Runtime Environment: storage organization, stack allocation, access to non-local data, heap management, parameter passing mechanisms, introduction to garbage collection. Reference counting garbage collectors.

UNIT –IV

Code generation: Issues, target language, Basic blocks & flow graphs, Simple code generator, Peephole optimization, Register allocation and assignment.Machine independent code optimization – semantic preserving transformations, global common sub expression elimination, copy propagation, dead code elimination, constant folding, strength reduction, loop optimization.

Instruction scheduling, inter procedural optimization

Text books:

1. Compilers, Principles Techniques and Tools- Alfred V Aho, Monica S Lam, Ravi Sethi, Jeffrey D. Ullman,2nd ed, Pearson,2007.

Reference books:

1. Compiler Design, K. Muneeswaran, Oxford.
2. Engineering a compiler, 2nd edition, Keith D.Cooper& Linda Torczon, Morgan Kaufman.
3. Principles of compiler design, V. Raghavan, 2nd ed, TMH, 2011.
4. Compiler construction, Principles and Practice, Kenneth C Louden, CENGAGE
5. Implementations of Compiler, A new approach to Compilers including the algebraic methods, Yunlinsu, SPRINGER

Web Links:

1. https://nptel.ac.in/courses/106/105/106105190/

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1													
CO2													
CO3													
CO4													
CO5													

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**

M.Sc. Computer Science Semester End Examinations
Semester: IV
MSCS403- Elective IV: Compiler Design
Model Paper

Time: 3Hours Max.Marks: 60

SECTION- A **(4 X 10 = 40 M)**

Answer ALL Questions

UNIT-I

1. Explain in detail structure of a compiler. 10M

(OR)

2. Briefly explain classification of parsing techniques 10M

UNIT-II

3. What is bottom up parsing approach? Explain Types of Bottom up approaches.10M

(OR)

4. Compare between bottoms up approaches and top down approaches. 10M

UNIT-III

5. Define semantic rules. Explain evaluation of semantic rules in detail. 10M

(OR)

6. Explain about use and need of symbol tables? 10M

UNIT-IV

7. Explain about Register allocation and assignment. 10M

(OR)

8. Write a note on semantic preserving transformations. 10M

SECTION- B

Answer any FIVE Questions **(5×4=20M)**

9. Explain Lexical Analysis Vs. Parsing. 4 M

10. Write Recursive predictive parsing. 4 M

11. Difference between LR and LL Parsers 4 M

12. Explain Error recovery in LR 4 M

13. Write a short note on abstract syntax trees 4 M

14. Explain heap management 4 M

15. What is meant by Simple code generator 4 M

16. Explain loop optimization 4 M

	Government College (Autonomous) Rajahmundry	Program & Semester II M.Sc. (III Sem)			
Course Code MSCS309	**TITLE OF THE COURSE** **Elective II: Mobile Computing**				
Teaching	Hours Allocated: 60 (**Theory**)	L	T	P	C
Pre-requisites:	Computer Networks	5	1	-	5

Course Objectives:

To impart fundamental concepts in the area of mobile computing, to provide a computer systems perspective on the converging areas of wireless networking, embedded systems, and software.

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Learn wireless sensor networking
CO2	Learn mobile topologies
CO3	Learns wireless application protocol

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development Employability Entrepreneurship

Syllabus:

UNIT –I

Introduction to Mobile Computing, Overview of Mobile Technologies, Limitations, The Ubiquitous Network, Architecture for Mobile Computing, Three-Tier Architecture, Design Considerations for Mobile Computing, Mobile Computing Through Internet, Mobile Devises and Mobile-Enabled Applications.

Introduction To Wireless Networking, Various Generations of Wireless Networks, Wireless LANs, Advantages and Disadvantages of WLANs, Fixed Network Transmission Hierarchy, Differences in Wireless and Fixed Telephone Networks, Traffic Routing in Wireless Networks, WAN Link Connection Technologies, Cellular Networks.

UNIT –II

WLAN Topologies, WLAN Standard IEEE 802.11, Comparison Of IEEE 802.11a, B, G and N Standards, Wireless PANs, Hiper LAN, Wireless Local Loop, ATM, Virtual Private Networks, Wireless Data Services, Common Channel Signaling, Various Networks for Connecting to The

Internet.
Emerging Technologies: Introduction – Bluetooth – Radio Frequency Identification (RFID), WIMAX -Mobile IP – Ipv6 – Java Card, TCP/IP in the Mobile Setting, GSM and GPS

UNIT –III

Data Management Issues, Data Replication For Mobile Computers, Adaptive Clustering for Mobile Wireless Networks, File System, Disconnected Operations, Data Services in GPRS - Applications for GPRS – Limitations – Billing and Charging.
Communications Asymmetry, Classification of New Data Delivery Mechanisms, Push-Based Mechanisms, Pull-Based Mechanisms, Hybrid Mechanisms, Selective Tuning (Indexing) Techniques. CDMA, GSM , Wireless Data, 3Gnetworks and Applications

Unit IV

Introduction to Mobile IP, Introduction To Wireless Application Protocol, Application Layer MMS – GPRS Applications, Short Message Service (SMS): Mobile Computing Over SMS – SMS – Value Added Services Through SMS -Accessing the SMS Bearer.

Text books:

1. Mobile Computing – Technology Applications And Service Creation, Asoke K Talukder and RoopaR.Yavagal, TMH 2006.
2. Mobile Cellular Communication, GottapuSasibhushanaRao,, Pearson Education, First Edition, 2013.

Reference books:

1. Principles Of Computing, Uwe Hansmann, Lother Merk, Martin S.Nicklous, Thomas Staber, 2nd Ed., Springer International Edition.
2. Mobile Communications, J.Schiller, Addison-Wesley, 2003
3. Stojmenovic And Cacute, “Handbook Of Wireless Networks And Mobile Computing”, Wiley, 2002.

Web Links:

https://nptel.ac.in/courses/106/106/106106147/

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1													
CO2													
CO3													
CO4													
CO5													

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: III
MSCS305: Elective – 1: Mobile Computing
Model Paper

Time: 3Hours Max. Marks: 60

SECTION- A

Answer ALL Questions **(4 X 10 = 40 M)**

1. a) Give a brief account of Mobile Devices and Mobile-Enabled Applications 5M
   b) What is Three-Tier Architecture for Mobile Computing? Explain 5M

(OR)

2. a) Explain various generations in Wireless Networks 5M
   b) Write all the approaches for Traffic Routing in Wireless Networks 5M

3. a) Explain WLAN Standard IEEE 802.11 in details 5M
   b) Compare IEEE 802.11a, B,G and N Standards 5M

(OR)

4. a) Differentiate between Bluetooth and Radio Frequency Identification (RFID) 5M
   b) Differentiate GSM and GPS 5M

5. a) How data is replicated for Mobile Computers 5M
   b) Explain Data Services in GPRS and applications for GPRS 5M

(OR)

6. a) Explain Push-Based and Pull-Based Mechanism 5M
   b) What is a 3G Network? Write its applications 5M

7. Explain Wireless Application Protocol and various layer 10M

(OR)

8. What is SMS and explain various added services through SMA 10 M

SECTION- B

Answer any **FIVE** Questions **(5×4=20M)**

9. Fixed Network Transmission Hierarchy 4 M
10. Wireless PANs 4 M
11. Ubiquitous Networks 4 M
12. CDMA 4 M
13. GSM 4 M
14. WiMAX 4 M
15. Cellular Networks 4 M
16. Java Card 4 M

	Government College (Autonomous) Rajahmundry	Program & Semester II M.Sc. (III Sem)			
Course Code MSCS307	**TITLE OF THE COURSE** **Elective 1: Computer Graphics**				
Teaching	Hours Allocated: 60 (**Theory**)	L	T	P	C
Pre-requisites:	Coordinate goemetry	5	1	-	5

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.

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	

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

Additional Input:

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

Reference books:

1. Procedural Elements for Computer Graphics, David F.Rogers, Tata Mc-Graw Hill Book Company, NewDelhi,2003
2. Computer Graphics: Principles & Practice in C,J.D.Foley, S.KFeiner, A Van Dam F. H John PearsonEducation,2004
3. Computer Graphics using OpenGL, Franscis SHillJr, Pearson Education,2004.
4. Computer Vision and Image Processing: A Practical Approach using CVIP tools, S. E. Umbaugh,, Prentice Hall, 1998

Web Links:

1. https://nptel.ac.in/courses/106/106/106106090/

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1													
CO2													
CO3													
CO4													
CO5													

BLUE PRINT			
S.NO	**QUESTIONS**	**UNITS OF THE SYLLABUS**	**MARKS**
	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: III
MSCS304: Elective – 1: Computer Graphics
Model Paper

Time: 3Hours Max. Marks: 60

SECTION- A

Answer ALL Questions **(4 X 10 = 40 M)**

UNIT-I

1. a) What are the difference between the Raster scan and Random scan devices 5M

b) Explain the overview of Graphics System 5M

(OR)

2. a) Describe the Bresenham's circle drawing algorithm 5M

b) Explain how the Bresenham's line drawing algorithm works for the line joining the points (-1,2) and (7,5) 5M

UNIT-II

3. a) Describe Cohen-Sutherland Algorithm for line clipping 5M

b) Explain how the Sutherland-Hodgaman Algorithm for Polygon Clipping 5M

(OR)

4. a) Describe the matrix forms of the two dimensional transformation of translation, rotation and scaling 5M

b) Derive the transformation matrix for finding the reflection of a point with respect to the Line y=mx+c 5M

UNIT-III

5. a) Explain Projections with example 5M

b) Describe the 3D transformations for rotation, scaling and translation 5M

(OR)

6. Explain Line clipping and Polygon Clipping 10M

UNIT-IV

7. Explain linear and nonlinear filtering 10M

(OR)

8. Explain computational and mathematical methods for crafting, capturing and analyzing and manipulating digital photographs 10M

SECTION- B

Answer any **FIVE** Questions **(5×4=20M)**

9. Write a short note on Homogeneous Coordinates 4 M
10. Write a short note on Frame Buffer 4 M
11. Write a short note on View port 4 M
12. Write a short note on GPS based Automatic Navigation System. 4 M
13. Write a short note on GUI 4 M
14. Write a short note on Anti-aliasing 4 M
15. Write a short note on Blending functions of B-Spline curves. 4 M
16. Write a short note on Anti-aliasing. 4 M

	Government College (Autonomous) Rajahmundry				
Course Code MSCS301	**TITLE OF THE COURSE** **Data Warehousing and Data Mining**	**Program & Semister** II M.Sc. (III Sem)			
Teaching	Hours Allocated: 60 (**Theory**)	L	T	P	C
Pre-requisites:	Data Base Management Systems	5	1	-	5

Course Objectives:

1. Students will be enabled to understand and implement classical models and algorithms in data warehousing and data mining.
2. They will learn how to analyze the data, identify the problems, and choose the relevant models and algorithms to apply.
3. They will further be able to assess the strengths and weaknesses of various methods and algorithms and to analyze their behavior.

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Understand why there is a need for data warehouse in addition to traditional operational database systems.
CO2	Identify components in a typical data warehouse architectures.
CO3	Understand why there is a need for data mining and in what ways it is different from traditional statistical techniques.
CO4	Understand the details of different algorithms made available by popular commercial data mining software.
CO5	Able to solve real data mining problems by using the right tools to find interesting patterns.

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	

Syllabus:

UNIT I

Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data

Mining systems, Data Mining Task Primitives, Integration of a Data Mining System with a Database or a Data Warehouse System, Issues in Data Mining.
Data Preprocessing: Need for Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

UNIT II

Data Warehousing and Online Analytical Processing:
What Is a Data Warehouse?, Differences between Operational Database Systems and Data Warehouses, Data Warehouse Architecture, Data Warehouse Models: Enterprise Warehouse, Data Mart, and Virtual Warehouse, Metadata Repository.

Data Warehouse Modeling: Data Cube and OLAP: A Multidimensional Data Model, Schemas for Multidimensional Data Models, Dimensions: The Role of Concept Hierarchies, Typical OLAP Operations.

Data Warehouse Implementation: Data Cube Computation: Efficient Methods for simple Data Cube Computation (Full Cube, Iceberg Cube, Closed Cube and Shell Cube), Attribute-Oriented Induction for data characterization and its implementation

UNIT III

Mining Frequent Patterns, Associations: Basic Concepts, The Apriori algorithm for finding frequent item sets using candidate generation, Generating association rules from frequent item sets, Mining frequent item sets without candidate generation, Mining various kinds of Association Rules.

Classification: General approach for classification, Classification by Decision Tree Induction, Bayesian Classification, Rule-Based Classification, Classification by Back propagation, evaluating accuracy of a Classifier.

UNIT IV

Cluster Analysis: Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, k-means and k-mediods methods, CLARANS, Agglomerative and divisive hierarchical clustering, chameleon dynamic modeling, DBSCAN, Grid based clustering method: STING, Conceptual Clustering, Constraint-Based Cluster Analysis.

Text books:

1. Data Mining concepts and Techniques, 3/e, Jiawei Han, Michel Kamber, Elsevier.
2. Introduction to Data Mining: Pang-Ning Tan & Michael Steinbach, Vipin Kumar, Pearson.

Reference books:

1. Data Mining Techniques and Applications: An Introduction, Hongbo Du, Cengage Learning.
2. Data Mining : Introductory and Advanced topics: Dunham, Pearson.
3. Data Warehousing Data Mining & OLAP, Alex Berson, Stephen Smith, TMH.
4. Data Mining Techniques, Arun K Pujari, Universities Press.

Web Links:

1. https://nptel.ac.in/courses/106/105/106105174/

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1													
CO2													
CO3													
CO4													
CO5													

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: III
MSCS301: Data Warehousing & Data Mining
Model Paper

Time: 3Hours Max.Marks: 60

SECTION- A

Answer ALL Questions **(4 X 10 = 40 M)**

UNIT-I

2. What is data mining? Explain various data mining functionalities. 10M

(OR)

3. What is preprocessing? Explain various data preprocessing techniques. 10M

UNIT-II

4. Define data warehouse? Explain Data warehouse architecture with example. 10M

(OR)

5. Explain OLAP operations with example. 10M

UNIT-III

6. Explain algorithm for mining frequent item sets without candidate set generation. 10M

(OR)

7. What is classification? Explain decision tree induction algorithm for classification. 10M

UNIT-IV

8. Explain K-Means and K-Mediod algorithm with example. 10M

(OR)

9. Explain Agglomerative and divisive hierarchical clustering algorithms with examples. 10M

SECTION- B

Answer any FIVE Questions

(5×4=20M)

10. Explain Steps involved knowledge discovery in Databases.
11. Explain Data cleaning techniques with examples.
12. Explain Star schema with example.
13. Explain Attribute-Oriented Induction for data characterization.
14. Explain support and confidence in Association analysis.
15. Write a short note on classifier performance evaluation.
16. Write a short note types of clusters.
17. Explain about Constraint-Based Cluster Analysis .

GOVERNMENT AUTONOMOUS COLLEGE, RAJAMAHENDRAVARAM
M.Sc. Computer Science Semester End Examinations
Semester: III
MSCS301: Data Warehousing & Data Mining
Model Paper

Time: 3Hours Max.Marks: 60

SECTION- A

Answer ALL Questions **(4 X 10 = 40 M)**

UNIT-I

18. What is Data Mining? Explain Data Mining functionalities? 10M

(OR)

19. a) What are the major issues in data mining? 5M

b) Explain about data cleaning and Data integration techniques. 5M

UNIT-II

20. Explain about Data Warehouse architecture? 10M

(OR)

21. Explain about Schemas for Multidimensional Data Models. 10M

UNIT-III

22. Explain algorithm for mining frequent item sets without candidate generation. 10M

(OR)

23. Explain Decision tree induction algorithm. 10M

UNIT-IV

24. Explain K means and K-Medoid clustering algorithm. 10M

(OR)

25. Explain Agglomerative and divisive clustering algorithm. 10M

SECTION- B

Answer any FIVE Questions

(5×4=20M)

5. Write a short note on

c) Steps involved in Knowledge discovery of Databases.

d) Data Reduction technique.

e) Roll up and Drill down operations of OLAP.

f) Differences between OLAP and OLTP.

g) Support and confidence in Association rule mining.

h) Evaluating the accuracy of classifier.

i) Types of Data in Cluster Analysis

j) Outlier Analysis.

	Government College (Autonomous) Rajahmundry	Program & Semester II M.Sc. (III Sem)			
Course Code MSCS310	**TITLE OF THE COURSE** **Adhoc and Sensor Networks**				
Teaching	Hours Allocated: 60 (**Theory**)	L	T	P	C
Pre-requisites:	Computer Networks	5	1	-	5

Course Objectives:

1. To understand the concepts of sensor networks
2. To understand the MAC and transport protocols for ad hoc networks
3. To understand the security of sensor networks
4. To understand the applications of adhoc and sensor networks

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Ability to understand the state-of-the-art research in the emerging subject of Ad Hoc and Wireless Sensor Networks
CO2	Ability to solve the issues in real-time application development based on ASN.
CO3	Ability to conduct further research in the domain of ASN.

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	

Syllabus:

UNIT –I

Introduction to Ad Hoc Networks - Characteristics of MANETs, Applications of MANETs and Challenges of MANETs. Routing in MANETs - Criteria for classification, Taxonomy of MANET routing algorithms, Topology based routing algorithms-Proactive: DSDV; Reactive: DSR, AODV; Hybrid: ZRP; Position-based routing algorithms-Location Services-DREAM, Quorum-based; Forwarding Strategies: Greedy Packet, Restricted Directional Flooding-DREAM,

LAR.

UNIT–II

Data Transmission - Broadcast Storm Problem, Rebroadcasting Schemes-Simple-flooding, Probability-based Methods, Area-based Methods, Neighbor Knowledge-based: SBA, Multipoint Relaying, AHBP. Multicasting: Tree-based: AMRIS, MAODV; Mesh-based: ODMRP, CAMP; Hybrid: AMRoute, MCEDAR.

UNIT - III

Geocasting: Data-transmission Oriented-LBM; Route Creation Oriented-GeoTORA, MGR. TCP over Ad Hoc TCP protocol overview, TCP and MANETs, Solutions for TCP over Ad hoc

UNIT - IV

Basics of Wireless, Sensors and Lower Layer Issues: Applications, Classification of sensor networks, Architecture of sensor network, Physical layer, MAC layer, Link layer, Routing Layer. Upper Layer Issues of WSN: Transport layer, High-level application layer support, Adapting to the inherent dynamic nature of WSNs, Sensor Networks and mobile robots.

Text books:

1. Ad Hoc and Sensor Networks – Theory and Applications, Carlos Corderio Dharma P. Aggarwal, World Scientific Publications, March 2006, ISBN – 981–256–681–3.
2. Wireless Sensor Networks: An Information Processing Approach, Feng Zhao, Leonidas Guibas, Elsevier Science, ISBN – 978-1-55860-914-3 (Morgan Kauffman).

Reference books:

1. Network Management Fundamentals, Alexender Clemn CISCI Press2007

Web Links:

1. https://nptel.ac.in/courses/106/105/106105160/

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1													
CO2													
CO3													
CO4													
CO5													

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: III
MSCS305: Elective – II: Adhoc and Sensor Networks
Model Paper

Time: 3Hours Max. Marks: 60

SECTION- A

Answer ALL Questions **(4 X 10 = 40 M)**

UNIT-I

1. Explain about Routing in MANETs 10M

(OR)

2. Explain about topology based routing algorithms. 10M

UNIT-II

3. Explain about Tree based routing algorithms. 10M

(OR)

4. Explain about Neighbor Knowledge-based algorithms. 10M

UNIT-III

5. Explain about **GeoTORA** 10M

(OR)

6. Explain about Solutions for TCP over Ad hoc 10M

UNIT-IV

7. Explain Architecture of sensor networks. 10M

(OR)

8. Explain about classification of Sensor Networks. 10M

SECTION- B

Answer any **FIVE** Questions **(5×4=20M)**

9. Write a short note on Fixed Network Transmission Hierarchy	4 M
10. Write a short note on Wireless PANs	4 M
11. Write a short note on Ubiquitous Networks	4 M
12. Write a short note on CDMA	4 M
13. Write a short note on GSM	4 M
14. Write a short note on WiMAX	4 M
15. Write a short note on Cellular Networks	4 M
16. Write a short note on Java Card	4 M

	Government College (Autonomous) Rajahmundry				
Course Code MSCS408	**TITLE OF THE COURSE** **Elective IV: Foundations of IoT**	**Program &Semester** II M.Sc. (IV Sem)			
Teaching	Hours Allocated: 60 (**Theory**)	L	T	P	C
Pre-requisites:	Computer Networks	5	1	-	5

Course Objectives:

1. To understand the concepts of Internet of Things.
2. To identify the various elements of an IoT System
3. To understand the various means of communication from Node / Gateway to Cloud Platforms
4. To identify types of data analytics and data visualization tools.
5. To make students aware of security concerns and challenges while implementing IoT solution

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Understand how to design a simple IoT system comprising sensors, edge devices, Wireless network connections and data analytics capabilities.
CO2	To understand the various elements of IoT system and hardware devices.
CO3	To learn the programming languages and platforms for building IoT applications.
CO4	To understand the cloud computing and its relevance for developing IoT applications.
CO5	To design and implement IoT applications that manages big data with data analytics and visualization tools.
CO6	To implement hands-on projects using an appropriate software and hardware devices in various applications.

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	

Syllabus:

UNIT–I

Fundamentals of IoT: Introduction, Definitions & Characteristics of IoT, IoT Architectures, Physical & Logical Design of IoT, Enabling Technologies in IoT, History of IoT, About Things in IoT, The Identifiers in IoT, About the Internet in IoT, IoT frameworks, IoT and M2M.

UNIT–II

Sensors Networks: Definition, Types of Sensors, Types of Actuators, Examples and Working, IoT Development Boards: Arduino IDE and Board Types, RaspberriPi Development Kit, RFID Principles and components, Wireless Sensor Networks: History and Context, The node, Connecting nodes, Networking Nodes, WSN and IoT

UNIT–III

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. Edge connectivity and protocols

UNIT-IV

Data Handling& Analytics Introduction, Big data, Types of data, Characteristics Big data, Data handling Technologies, Flow of data, Data acquisition, Data Storage, **Introduction to Hadoop**. Introduction to data Analytics, Types of Data analytics, Local Analytics, Cloud analytics and applications, Edge/Fog Computing

Applications of IoT Home Automation, Smart Cities, Energy, Retail Management, Logistics, Agriculture, Health and Lifestyle, Industrial IoT, Legal challenges IoT design Ethics, IoT in Environmental Protection.

Textbooks:

1. The Internet of Things: Applications and Protocols, Wiley publications. Author(s): Oliver Hersent, David Boswarthick, Omar Elloumi
2. Vijay Madisetti and ArshdeepBahga, ? “Internet of Things (A Hands-on-Approach)”, 1 st Edition, VPT, 2014
3. Architecting the Internet of Things, Springer publications. Author(s):DieterUckelmann, Mark Harrison, Florian Michahelles

Reference books:

1. Internet of Things with Arduino Cookbook, Packt Publications. Author(s): Marco Schwatrz
2. Internet of Things and Data Analytics, Wiley Publications.

WebLinks:

1. https://nptel.ac.in/courses/106/105/106105166/

CO-POMapping:

(1:Slight[Low]; 2:Moderate[Medium]; 3:Substantial[High], '-':No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1													
CO2													
CO3													
CO4													
CO5													

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**

M.Sc. Computer Science Semester End Examinations
Semester: IV
MCS 403: Foundations of IoT
Model Paper

Time: 3Hours Max.Marks: 60

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

1. Write a short notes on Logical Design of IoT

(OR)

2. Briefly discuss about various IoT enabling Technologies

3. Explain Arduino Uno Development Board

(OR)

4. Briefly discuss various types of Sensors

5. Discuss about MQTT and CoAP

(OR)

6. Explain various WPAN technologies for IoT

7. Briefly discuss Edge/Fog Computing

(OR)

8. Discuss various applications of IoT in Home Automation

SECTION- B

Answer any FIVE Questions **(5×4=20M)**

Write a short note on

9. M2M towards IOT.
10. RFID Principles
11. WSN.
12. 6LOWPAN.
13. Raspberry Pi.
14. Cloud Analytics.
15. Big Data Characteristics.
16. Characteristics of IoT.

	Government College (Autonomous) Rajahmundry	Program & Semester II M.Sc. (IV Sem)			
Course Code	**TITLE OF THE COURSE** Data Science With R				
Teaching	Hours Allocated: 60 (**Theory**)	L	T	P	C
Pre-requisites:	Database Management Systems	3	1	-	3

Course Objectives:

1. This course will introduce students to the collection. Preparation, analysis, modeling and visualization of data, covering both conceptual and practical issues.
2. 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 various disciplines that contribute to a successful data science effort Understand the processes of data science - identifying the problem to be solved, data collection, preparation, modeling, evaluation and visualization
CO2	Be aware of the challenges that arise in data sciences Develop and appreciate various techniques for data modeling and mining Be cognizant of ethical issues in many data science tasks
CO3	Be comfortable using commercial and open source tools such as the R language and its associated libraries for data analytics and visualization Learn skills to analyze real time problems using R
CO4	Able to use basic R data structures in loading, cleaning the data and preprocessing the data Able to do the exploratory data analysis on real time datasets
CO5	Able to understand and implement Linear Regression Able to understand and use - lists, vectors, matrices, dataframes, etc.

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	

Syllabus:

UNIT-I: **[13 Hrs]**

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 Un-Structured - Example Applications. Sources of Data: Time Series – Transactional Data – Biological Data – Spatial Data – Social Network Data – Data Evolution.

UNIT-II: **[13 Hrs]**

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: **[12 Hrs]**

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 User-defined functions - Functions on Function Object - Scope of Variables - Accessing Global, Environment - Closures - Recursion. Exploratory Data Analysis - Data Preprocessing - Descriptive Statistics - Central Tendency - Variability - Mean - Median - Range - Variance - Summary - Handling Missing values and Outliers – Normalization

UNIT-IV:

Data Visualization in R : Types of visualizations - packages for visualizations - Basic Visualizations, Advanced Visualizations and Creating 3D plots.

Inferential Statistics with R - Types of Learning - Linear Regression- Simple Linear Regression - Implementation in R - functions on lm() - predict() - plotting and fitting regression line. Multiple Linear Regression - Introduction -comparison with simple linear regression - Correlation Matrix - F-Statistic - Target variables Vs Predictors - Identification of significant features - Implementation of Multiple Linear Regression in R.

Text books:

1. Nina Zumel, John Mount, "Practical Data Science with R", Manning Publications, 2014.
2. Jure Leskovec, Anand Rajaraman, Jeffrey D.Ullman, "Mining of Massive Datasets",Cambridge University Press, 2014.
3. Mark Gardener, "Beginning R - The Statistical Programming Language", John Wiley & Sons, Inc., 2012.
4. W. N. Venables, D. M. Smith and the R Core Team, "An Introduction to R", 2013.

5.Tony Ojeda, Sean Patrick Murphy, Benjamin Bengfort, Abhijit Dasgupta, "Practical

Reference books:

1. Nathan Yau, "Visualize This: The FlowingData Guide to Design, Visualization, and Statistics", Wiley, 2011.
2. Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, "Professional Hadoop Solutions", Wiley, ISBN: 9788126551071, 2015.

Web Links:

1. https://nptel.ac.in/courses/111104146

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1													
CO2													
CO3													
CO4													
CO5													

Model Blue print for the question paper setter

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: III
MSCS305: Elective – II: Introduction of Data Science with R
Model Paper

Time: 3Hours Max. Marks: 60

SECTION- A

Answer ALL Questions **(4 X 10 = 40 M)**

UNIT-I

1. Explain about classification of digital DATA.

(OR)

2. Explain about Data analytics life cycle.

UNIT-II

3. Explain about features of R environment.

(OR)

4. Explain about control structures in R.

UNIT-III

5. Explain about functions in matrices.

(OR)

6. Explain about creating and merging data frames.

UNIT-IV

7. Explain about data visualization techniques in R.

(OR)

8. Explain about Linear regression implementation with R.

SECTION- B

Answer any **FIVE** Questions **(5×4=20M)**

9. Write a short note on types of data.
10. Write a short note on Data Science tool kit.
11. Write a short note on operations of vectors.
12. Write a short note on Filtering & Subsetting.
13. Write a short note on Reading and writing data in various formats.
14. Write a short note on list operations.
15. Write a short note on correlation matrix.
16. Write a short note on packages for visualization.

	Government College (Autonomous) Rajahmundry	Program & Semester II M.Sc. (IV Sem)			
Course Code MSCS403	**TITLE OF THE COURSE** **Statistical Quality Assurance Techniques**				
Teaching	Hours Allocated: 60 (**Theory**)	L	T	P	C
Pre-requisites:	Elementary probability theory	5	1	-	5

Course Objectives:

1. Create and apply a software quality assurance plan for all software projects.

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Learn quality characteristics and specifications
CO2	Identifies process capabilities and its methods of determination
CO3	Learn quality assurance and its types
CO4	Identifies reliability of a software

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	

Syllabus:

UNIT –I

Definition and Need of quality, Aspects of quality, Quality characteristic, Quality specification, Quality function, Economics of quality. Inspection, Its objectives and types, Inspection versus Quality Control, Statistical Quality Control, its Tools, Advantages, limitations and Applications.

Probability & Statistics: Definition, Laws, Probability Distributions (Normal Binomial, Poisson, Exponential) & related problems. Measures of Central tendency & Dispersion, Concept of Variation, Variable and attribute data, Frequency distribution.

UNIT –II

Control Charts: Concept of variability, Assignable & chance causes, Concept of specifications and tolerances, Definition and objectives of control charts, Control charts for variables and attributes & related problems, Variable charts vs attribute charts,
Patterns on control charts, Type–I & Type-II Errors, Process capability and its methods of determination.

UNIT –III

Acceptance Sampling: Definition, Advantages over 100% inspection, Methods of taking samples, Operating characteristics curve & its characteristics. Single, Double and Multiple, Sequential Sampling Plan & Related problems.

Quality Assurance: Need, Principles, Essentials and Advantages of Quality Assurance System, Quality Manual, Field complaints, Quality Audit & its types, Quality Assurance Methods, Quality Control vs Quality Assurance.

UNIT –IV

Quality systems: Description of ISO:9000 series of standards, ISO:9001–2000 Systems. Description of TQM, Concept of Quality Circles, JIT System, Taguchi's Concept of Quality, Zero Defect Concept, 6s Concept.

Reliability: Definitions of Reliability Failure, Elements of reliability. Quality vs reliability, System Reliability & related problems. Causes of failures, Constant Failure rate, MTBF, Bath Tub Curve

Text books:

1. EL Grant & RS Leavenworth, "Statistical Quality Control",McGraw Hill & Co.
2. M. Mahajan, "Statistical Quality Control", DhanpatRai& Co.
3. O.P. Khanna, "Statistical Quality Control", DhanpatRai& Co.
4. R.C. Gupta, "Statistical Quality Control", KhannaPulishers

Reference books:

1. AmitavMitra, "Fundamentals of Quality Control", Pearson Education
2. Feigenbaum, "Total Quality Control", McGraw Hill & Co.
3. Suresh Dalela, "Quality Systems", Standard Publishers & Distributors

4. Montgomery DC, “Introduction to Statistical Quality Control”, John Wiley & Sons Inc.
5. Stephan B. Vardeman, J Marcus Jobe, “Statistical QA Methods for Engineers”, John Wiley & Sons Inc.

Web Links:

1. https://nptel.ac.in/courses/106/105/106105150/

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1													
CO2													
CO3													
CO4													
CO5													

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: IV
MSCS403: : Elective III: Statistical Quality Assurance Techniques
Model Paper

Time: 3Hours Max. Marks: 60

SECTION- A **(4 X 10 = 40 M)**

Answer ALL Questions

UNIT-I

1. a) Explain Quality function deployment in detail.
   b) Explain the seven basic quality control tools in detail. 10M

(OR)

2. a) Explain how software quality assurance is ensured in a software firm.
   b) Explain the Probability distributions with an example. 10M

UNIT-II

3. a) Briefly explain the group control chart? State the applications of group control chart.
   b) Explain the Type-I & Type-II errors with an example. 10M

(OR)

4. a) Name the control charts used for 'off- line quality control'.
   b) Distinguish between Variables and Attributes. 10M

UNIT-III

5. a) What is an item by item sequential sampling plan? Explain stating its application.10M
   b) Explain the Kanban systems with reference to quality control. 10M

(OR)

6. a) Explain the principles of Quality Assurance system. 5M
   b) Explain the Quality Assurance method. 5M

UNIT-IV

7. a) Write detail notes on ISO-9000 series of quality management standards. 5M
   b) Explain JIT system with an example. 5M

(OR)

8. a) Distinguish between quality and reliability. 5M
   b) Explain the Elements of reliability with an example. 5M

SECTION- B **(5×4=20M)**

Answer any FIVE Questions

9. Sum of Type-I and Type-II errors is equal to one. Do you agree or not? Why
10. What are appraisal costs?
11. What is out-of-control run length?
12. What is process capability ratio?
13. How do you find ASN for a double sampling plan?
14. Bathtub curve.
15. Prevention costs.
16. MTBF.

	Government College (Autonomous) Rajahmundry				
Course Code MSCS404	**TITLE OF THE COURSE** **Geo Informatics**	**Program & Semester** II M.Sc. (IV Sem)			
Teaching	Hours Allocated: 60 (**Theory**)	L	T	P	C
Pre-requisites:		5	1	-	5

Course Objectives:

1. The objective of the course is to provide knowledge on to students for various applications in Remote-Sensing (RS), GIS, digital analysis of geo-spatial data

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Understands fundamentals of geo informatics
CO2	Understands data representation and data processing of geo graphic data.
CO3	Visualization of Geographic Information and Generation:
CO4	Understands spatial analysis and modeling.

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	

Syllabus:

UNIT –I

Introduction: Definition of GIS and Related Terminology-Evolution of GIS-Components of GIS-Approaches to study of GIS Maps and GIS: MapScale-Classesofmaps-ThemappingProcess-Planecoordinatesystemsand Transformations-Geographic Coordinate System of Earth- Map Projection- Establishing a spatial framework for mapping Locations on Earth-Geo-referencing-Acquisition of Spatial Data for the terrain- Topographic Mapping-

Attribute Data for Thematic Mapping

UNIT –II

Digital Representation of Geographic Data: Technical Issues Pertaining to Digital Representation of Geographic Data-Database creation and management-Raster Geographic and Vector data representation-Object oriented Geographic Data representation Relationship between Data representation and Data Analysis in GIS Data Quality and Data Standards: Concepts and Definitions of Data Quality-Components of Geographic Data Quality-Assessment of Data Quality-Managing Spatial Data Errors-Geographic Data Standards-Geographic Data Standards And GIS Development

Raster and Vector-Based GIS Data Processing: Acquiring and Handling Raster Data Processing Cartographic Modelling- Characteristics of Vector-Based GIS Data Processing Vector Data Input Functions Non-topological GIS Analysis Functions Feature-Based Topological Functions Layer-Based Topological Functions Vector-Based Output Functions Application Programming

UNIT –III

Visualization of Geographic Information and Generation: Cartography in the Context of GIS Human Computer Interaction and GIS- Visualization of Geographic Information Principles of Cartographic Design in GIS-Generation of Information Products Remote Sensing and GIS Integration: Principles of Electromagnetic Remote Sensing System Classifications-Imaging Characteristics of Remote Sensing Systems-Extraction of Metric Information from Remotely Sensed Images-Extraction of Thematic Information from Remotely Sensed Images-Integration of Remote Sensing and GIS

Digital Terrain Modelling: Definitions and Terminology Approaches to Digital Terrain-Data Sampling- Acquisition of Digital Terrain Data-Data Processing, Analysis, and Visualization-Applications of Digital Terrain Models.

UNIT –IV

Spatial Analysis and Modelling: Descriptive Statistics-Spatial Auto Correlation- Quadratic Counts and Nearest- Neighbour Analysis-Trend Surface Analysis-Gravity Models-Network Analysis-GIS Modelling GIS Implementation and Project Management: Software

Engineering as Applied to GIS-GIS Project Planning-Systems Analysis and User Requirements-Geo-graphic Database Design Methodology-GIS Application Software DesignMethodology-SystemsImplementationandTechnologyRollout-SystemsMaintenance and Technical Support, GIS Issues and Prospects: Issues of Implementing GIS-The Trend of GIS-Development Frontiers of GIS Research.

Text books:

1. Concepts and Techniques of Geographic Information Systems, by P.Lo&AlbertK.W. Yeung, Prentice Hall of India Ltd

Reference books:

1. An Introduction to Geographical Information Systems, by Ian Heywood, Sarah Cornelium& Steve Carver, Pearson Education
2. IntroductiontoGeographicInformationSystems,byKang-rsungChang,TataMcGrawHill
3. Publishing Company Limited

Web Links:

1. https://nptel.ac.in/courses/105/108/105108073/

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1													
CO2													
CO3													
CO4													
CO5													

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: IV
MSCS403: :Elective I: Geo Informatics
Model Paper

Time: 3Hours Max. Marks: 60

SECTION- A **(4 X 10 = 40 M)**

Answer ALL Questions

UNIT-I

1. Explain map projections. Classify data in GIS context and explain spatial data editing. 10M

(OR)

2. Give the details of vector data structure and mention its merits and demerits in comparison with raster data. 10M

UNIT-II

3. a) Explain Digital Representation of Geographic Data-Database.
   b) Explain the Relationship between Data representation and Data Analysis in GIS Data Quality and Data Standards. 10M

(OR)

4. a) Explain the Raster and Vector -Based GIS Data Processing. 5M
   b) Write about Data Quality-Components of Geographic. 5M

UNIT-III

5. a) Explain crop inventory using remote sensing. 5M
   b) Give the details of the sensor requirements for forestry applications. 5M

(OR)

6. a) Which sensors are useful for land use/ land cover studies? 5M
   b) How do you conduct crop inventory using remote sensing data? Explain. 5M

UNIT-IV

7. a) Explain the importance of overlaying index methods in GIS.

   b) What is network analysis? Explain its uses. 10M

(OR)

8. Explain GIS Application Software. 10 M

SECTION- B **(5×4=20M)**

Answer any FIVE Questions

9. What is active remote sensing?
10. What is digital image processing?
11. Define GIS.
12. Define overlay function.
13. Which sensors are useful for land use/ land cover studies?
14. What are the GIS layers developed for ground water potential zoning mapping?
15. List out the remote sensing requirements for forestry applications?
16. What are the GIS layers developed for watershed characterization?

	Government College (Autonomous) Rajahmundry				
Course Code MSCS405	**TITLE OF THE COURSE** **Elective III: Semantic Web**	**Program & Semester** II M.Sc. (IV Sem)			
Teaching	Hours Allocated: 60 (**Theory**)	L	T	P	C
Pre-requisites:	Web Technologies	5	1	-	5

Course Objectives:

1. The aim of this course is to teach the students the concepts, technologies and Techniques underlying and making up the Semantic Web.

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Understand the rationale behind Semantic Web
CO2	Model ontologies using Resource Description Framework (RDF).
CO3	Design RDF Schemas for ontologies.
CO4	Model and design ontologies using Web Ontology Language (OWL).
CO5	Query ontologies using SPARQL
CO6	Apply sematic web technologies to real world applications

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	

Syllabus:

UNIT –I

Unit I: Introduction to Semantic Web: Introduction, Semantic Web, URI, RDF, Ontologies, Inferences, DAML, Semantic Web Languages, Semantic Annotation, Classification, Information Extraction, Ontology Assignment, XML, Syntax of XML,XML Schema, Semantic Web Applications to E-Commerce, E-Government and E-Banking, Semantic Web in Life Sciences, RIF Applications.

UNIT –II

Semantic Web Structure: Semantic Web Layers Architecture, Different Layers, Match Making, Multi Information Retrieving, Digital Signature, Semantic Memory, Semantic Web Enabled Service Oriented Architecture(SESA), SESA Services, SESA Middle Ware.

Resource Descriptive Languages RDF: Introduction to RDF, Syntax of RDF, Advanced Feature, Simple Ontologies in RDF Schema, Encoding Special Data Structures, Semantics Model Theoritic Sentics for RDFs, Syntactic Reasoning with Deduction Rules Syntactic Limits of RDFs,

UNIT –III

Web Ontology Languages: OWL Syntax, OWL Species, OWL2 Standards, OWL Formal Semantics, Description Logics, Model Theoretic Semantics of OWL, SWRL, Semantic Web Rules, Languages, Syntax of SWRL, Rules and Safety, Implementation & Applications.

Ontology Engineering: Requirement Analysis, Ontology Knowledge Creation, Ontologies and Rules: Definition of a Rule, Data log as First order Rule Language, Combining Rules With OWDL, Rule Interchanging Formats RIF, Quality Assurance of Ontologies, Modular Ontologies, Divide and Conquer, Software Tools.

Ontology Query Languages: Semantic Web Query Languages and Implementations, ROPS(RDF OWL Processing Systems),SWOPS(SWRL Ontology Processing System, Bench Marking Results, SPARQL, Query Languages for RDF, Conjunctive Queries for OWLDL.

UNIT –IV

Semantic Web Mining: Introduction, Concepts in Semantic Web Mining, XML, RDF & Web Data Mining, Ontologies and Web Data Mining, Agents in Web Data Mining, Web Mining and Semantic Web As a Data Base, semantic Interoperability and Web Mining Web Mining Vs Semantic Web Mining

Semantic Web Tools & Applications: Web Data Exchange and Syndication, Semantic WIKI's, Semantic Portals, Semantic Meta Data in Data formats, Semantic Web Services Modeling Ontologies, Semantic Web Service Design Tools, Ontologies for Standardizations WMO and SWMO Applications

Text books:

1. Foundations of Semantic Web Technologies, Pascal Hitzler, Markus Krotzsch, Sebastian Rudolph, CRC Press

Reference books:

1. Web Data Mining and Applications in Business Intelligence and Counter Terrorism, Bavani Thuraisingham, CRC Press, June 2003
2. Implementing Semantic Web Services-The SESA Frame Work, D. Fensel; M.Kerrigan; M. Zaremba, Springer
3. Enabling Semantic Web Services- The Web Service Modeling Ontology, Fensel,D; Lausen,H;Pollers,ABruijn,J;Stollberg,M;Spriger
4. A Semantic Web Primer, Paul Groth, Frank van Harmelen, Rinke Hoekstra, The MIT Press, 2012
5. Programming the Semantic Web, Toby Segaran, Colin Evans, Jamie TaylorOreilly Publications, July 2009

Web Links:

1. http://www.cs.jyu.fi/ai/vagan/itks544.html

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1													
CO2													
CO3													
CO4													
CO5													

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: III
MSCS304: Elective III: Semantic Web
Model Paper

Time: 3Hours Max. Marks: 60

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

UNIT-I

1. a) What is Semantic Web Structure? 5M
   b) Explain the process of Multi Information Retrieving. 5M

(OR)

2. a) Explain the process of Syntactic Reasoning with Deduction Rule 5M
   b) What are the Syntactic Limits of RDFs 5M

UNIT-II

3. a) Explain OWL Formal Semantics and Description Logics. 5M
   b) What is SWRL? Explain Semantic Web Rules and Syntax of SWRL 5M

(OR)

4. a) Definition of a Rule. Explain how one can combine rules With OWDL. 5M
   b) Explain Rule Interchanging Formats RIF. Briefly explain Modular Ontologism. 5M

UNIT-III

5. a) Give a brief explanation of Semantic Web Query Languages-ROPS, SWOPS and SPAROL. 5M
   b) Explain Conjunctive Queries for OWLDL in detail. 5M

(OR)

6. a) What is the purpose of agents in Web Data Mining? Explain how Semantic Web can be used as a Data Base. 5M
   a) Compare and contrast Web Mining and Semantic Web Mining. 5M

UNIT-IV

7. a) Explain about Semantic WIKI's and Semantic Portals. 5M

   b) Explain the Semantic Web in Life Sciences. 5M

(OR)

8. a) Write about RIF Applications 5M

   b) Ontologies for Standardizations WMO and SWMO Applications 5M

SECTION- B **(5×4=20M)**

Answer any FIVE Questions

9. Write a short note on URI
10. Write a short note on RDF
11. Write a short note on Ontologies
12. Write a short note on Inferences
13. Write a short note on DAML
14. Write a short note on Semantic Web Languages
15. Write a short note on Semantic Annotation
16. Write a short note on Semantic Web Tools

	Government College (Autonomous) Rajahmundry				
Course Code MSCS406	**TITLE OF THE COURSE** **Research Methodology**	**Program & Semester** II M.Sc. (IV Sem)			
Teaching	Hours Allocated: 60 (**Theory**)	L	T	P	C
Pre-requisites:	Internet and Intranet basics	5	1	-	5

Course Objectives:

1. Present research methodology and the technique of defining a research problem.
2. Learn the meaning of interpretation, techniques of interpretation, precautions is to be taken in.
3. Interpretation for research process,
4. Application of statistical methods in research
5. Learn intellectual property rights and its constituents.

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Design and formulation of research problem.
CO2	Analyze research related information and statistical methods in research.
CO3	Carry out research problem individually in a perfect scientific method
CO4	Understand the filing patent applications processes, Patent search, and various tools of IPR

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	

Syllabus:

UNIT-I

Introduction to research, Definitions and characteristics of research, Types of Research, Research Process, Problem definition, Objectives of Research, Research Questions, Research

design, Quantitative vs. Qualitative Approach, Building and Validating Theoretical Models, Exploratory vs. Confirmatory Research, Experimental vs. Theoretical Research, Importance of reasoning in research.

UNIT-II

Problem Formulation, Understanding Modeling & Simulation, Literature Review, Referencing, Information Sources, Information Retrieval, Indexing and abstracting services, Citation indexes, Development of Hypothesis, Measurement Systems Analysis, Error Propagation, Validity of experiments, Statistical Design of Experiments, Data/Variable Types & Classification, Data collection, Numerical and Graphical Data Analysis: Sampling, Observation, Interpretation of Results.

UNIT-III

Statistics: Probability & Sampling distribution, Estimation, Measures of central Tendency, Arithmetic mean, Median, Mode, Standard deviation, Coefficient of variation (Discrete serious and continuous serious), Hypothesis testing & application, Correlation & regression analysis, Orthogonal array, ANOVA, Standard error, Concept of point and interval estimation, Level of significance, Degree of freedom, Analysis of variance, One way and two way classified data, 'F' test.

UNIT-IV

Preparation of Dissertation and Research Papers, Tables and illustrations, Guidelines for writing the abstract, introduction, methodology, results and discussion, conclusion sections of a manuscript. References, Citation and listing system of documents.

Intellectual property rights (IPR) patents copyrights Trademarks Industrial design geographical indication. Ethics of Research Scientific Misconduct Forms of Scientific Misconduct. Plagiarism, Unscientific practices in thesis work, Ethics in science.

Text books:

1. K. S. Bordens, and B. B.Abbott, , "Research Design and Methods – A Process

Approach", 8th Edition, McGraw Hill, 2011

2. C. R. Kothari, "Research Methodology – Methods and Techniques", 2nd Edition, New Age International Publishers

Reference books:

1. Halbert, "Resisting Intellectual Property", Taylor & Francis Ltd ,2007.
2. Mayall, "Industrial Design", McGraw Hill, 1992.
3. Niebel, "Product Design", McGraw Hill, 1974.
4. Asimov, "Introduction to Design", Prentice Hall, 1962.
5. Robert P. Merges, Peter S. Menell, Mark A. Lemley, " Intellectual Property in New Technological Age", 2016.
6. T. Ramappa, "Intellectual Property Rights Under WTO", S. Chand, 2008 "Cloud Computing: Concepts, Technology & Architecture" by Thomas Erl

Web Links:

1. https://nptel.ac.in/courses/106/105/106105167/

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1													
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BLUE PRINT			
S.NO	**QUESTIONS**	**UNITS OF THE SYLLABUS**	**MARKS**
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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: IV

MSCS403: Elective IV: Research Methodology

Model Paper

Time: 3Hours Max.Marks: 60

SECTION- A **(4 X 10 = 40 M)**

Answer ALL Questions

UNIT-I

1. Explain about types of Research with examples. 10M

(OR)

2. Explain about characteristics and objectives of Research. 10M

UNIT-II

3. Explain about numerical and qualitative data analysis technique. 10M

(OR)

4. Explain about statistical design of experiments. 10M

UNIT-III

5. Explain about Measure of central tendency with example. 10M

(OR)

6. Explain about hypothesis testing. 10M

UNIT-IV

7. Explain about Intellectual property rights. 10M

(OR)

8. Explain about guidelines of writing Abstract. 10M

SECTION- B **(5×4=20M)**

Answer any FIVE Questions

9. Write a short note on differences between experimental and theoretical Research.

10. Write a short note on Building and Validating Theoretical Models.

11. Write a short note on Information retrieval.

12. Write a short note on sampling and observation.

13. Write a short note on degree of freedom.

14. Write a short note on degree of variance.

15. Write a short note on conclusion section of menuscripts.

16. Write a short note on References, Citation.

	Government College (Autonomous) Rajahmundry	Program & Semester II M.Sc. (IV Sem)			
Course Code MSCS407	**TITLE OF THE COURSE** **Elective II: Pervasive Computing**				
Teaching	Hours Allocated: 60 (**Theory**)	L	T	P	C
Pre-requisites:	Computer Networks	5	1	-	5

Course Objectives:

1. The main objective of this course is to introduce concepts related to Archetecture, connectivity if pervasive systems.
2. This course illustrates synchronization and security issues in pervasive systems.

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Understand the fundamental theoretical concepts in pervasive computing.
CO2	Understand the pervasive connectivity and its synchronization
CO3	Understand the security issues related to pervasive systems.

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	

Syllabus:

UNIT –I

Pervasive Computing: Introduction to Ubiquitous Computing (Popularly known as Pervasive Computing), Evolution of Pervasive Computing, Pervasive Computing Principles : Decentralization, Diversification, Connectivity, Simplicity, Pervasive Computing Characteristics, Pervasive Information Technology

Pervasive Architecture: Background, Scalability and Availability, Pervasive Web Application Architecture, Implementation Issues.

UNIT –II

Pervasive Devices: Device Categories, Device Characteristics, Software Components in the

Device, Information Access Devices, Smart Identification, and Embedded Controls, Hand Held Computers, Cellular Phones, Smart Phones, Smart Cards and Smart Appliances

Pervasive Connectivity: Protocols, Security, Network Management, Mobile Internet, WAN: Cellular Basics, Major Digital Cellular Systems, Advanced Cellular Radio Standards, Short Range Wireless Communication: DECT, Bluetooth, Irda, Home Networks.

UNIT –III

Pervasive Applications: Home Services: System View, Communications, Home Automation, Energy and Security Services, Remote Home Health Care Services, Business Services, Healthcare Management, Consumer Services: Interactive Advertisement, Loyalty, Shopping, Payment Services

Pervasive Synchronization: Definition of Synchronization, Models of Synchronization, Challenges In Synchronizing Data, Industry Data Synchronization Standards: Infrared Mobile Communications, WAP, Third Generation Partnership Program, Syncml, Synchronization Solutions.

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UNIT –IV

Security Issues in Pervasive Computing: Importance of Security, Cryptographic Patterns And Methods - Light Weight Cryptography -Light Weight Symmetric and Asymmetric Cryptographic Algorithms, Cryptographic Tools - Hash, MAC, Digital Signatures

Mobile Internet and Web Services: WAP Architecture, Wireless Application Environment: Wireless Markup Language, WAP Binary XML Content Format, WML Script, XHTML Mobile Proile, I-Mode, Web Services Architecture: WSDL, ADDI, SOAP, Web Services Security, Web Services For Remote Portals

Text books:

1. Pervasive Computing: The Mobile World ByUweHansmann, LotharMerk
2. Pervasive Computing: Technology And Architecture Of Mobile Internet Applications By JochenBurkhardt , Horst Henn , Stefan Hepper , Klaus Rindtorff , Thomas Schaeck

Reference books:

1. “Pervasive Computing” by BURKHARDT

Web Links:

1. https://www.geeksforgeeks.org/introduction-to-pervasive-computing/

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1													
CO2													
CO3													
CO4													
CO5													

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: IV
MSCS403: : Elective IV: Pervasive Computing
Model Paper

Time: 3Hours Max.Marks: 60

SECTION- A **(4 X 10 = 40 M)**

Answer ALL Questions

UNIT-I

1. a) Explain Pervasive Computing Principles - Decentralization, Diversification, Connectivity, Simplicity. 5M

   b) Define Pervasive Information Technology. Explain 5M

(OR)

2. a) Explain Pervasive Architecture in detail. 5M

   b) Give Pervasive Web Application Architecture. Explain in detail. 5M

UNIT-II

3. a) Give all the Pervasive Devices Categories. Write their Characteristics. 5M

   b) Explain Software Components in the Pervasive Devices. Define Smart Identification and Embedded Controls. 5M

(OR)

4. a) What are the protocols for Pervasive Connectivity? 5M
   b) What is Mobile Internet? Explain Short Range Wireless Communication mechanisms- DECT, Bluetooth, IRDA 5M

UNIT-III

5. a) Give a brief account of Home Automation systems, Energy and Security Services and Remote Home Health Care Services. 5M
   b) Explain about Interactive Advertisement, Shopping, Payment Services. 5M

(OR)

6. a) Define Pervasive Synchronization. Give various Models of Synchronization.5M

   b) Give a brief account of Industry Data Synchronization Standards-
   Infrared Mobile Communications, WAP and Syncml. 5M

UNIT-IV

7. a) Explain the Web Services Security. 5M

   b) Explain the Security in Pervasive computing. 5M

(OR)

8. a) Light Weight Symmetric Algorithms and Applications. 5M

   b) Light Weight Asymmetric Cryptographic Algorithms. 5M

SECTION- B **(5×4=20M)**

Answer any FIVE Questions

9. Write a short note on Ubiquitous Computing.
10. Write a short note on Smart Cards and Smart Appliances
11. Write a short note on Home Networks.
12. Write a short note on WAP.
13. Write a short note on Digital Signatures.
14. Write a short note on Wireless Markup Language.
15. Write a short note on Bluetooth.
16. Write a short note on Web services for home portals.

	Government College (Autonomous) Rajahmundry	Program & Semester I M.Sc. (IV Sem)			
Course Code MSCS202	**TITLE OF THE COURSE** **Operations Research**				
Teaching	Hours Allocated: 60 (**Theory**)	L	T	P	C
Pre-requisites:	Discrete Mathematics	5	1	-	5

Course Objectives:

1. To introduce students to use quantitative methods and techniques for effective analysis of decisions making
2. To understand the model formulation and applications that is used in solving business decision problems.
3. To introduce students to optimization approaches and fundamental solution.
4. To learn a variety of ways in which deterministic and stochastic models in Operations Research can be used

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Identify the characteristics of different types of decision-making environments
CO2	Use appropriate decision making approaches and tools
CO3	Build various dynamic and adaptive models
CO4	Develop critical thinking and objective analysis of decision problems
CO5	Apply the OR techniques for efficacy

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	

Syllabus:

UNIT –I

Overview of Operations Research, Types of OR Models , Phases of Operations Research– OR Techniques, Introduction to Linear Programming, Formulation of Linear Programming Problem, Graphical Solution; Graphical LP solutions for both maximization and minimization models with various application examples, Graphical Sensitivity Analysis

UNIT –II

Standard Form of LPP, Basic Feasible Solutions , Unrestricted Variables, Simplex Algorithm , Artificial Variables, Big M Method , Two Phase Simplex Method, Degeneracy, Alternative Optimal, Unbounded Solutions, Infeasible Solutions, Primal And Dual Problems And Their Relations, Dual Simplex Method

UNIT –III

Transportation Problem as LPP, Initial Solutions, North West Corner Rule, Lowest Cost Method, Vogels Approximation Method, Optimum Solutions of TPP, Degeneracy in Transportation, Transportation Algorithms

Queuing Theory: Models (M/M/1): (FcFs/∞); (M/M/1) : (FcFs/N)

Assignment Problem, Assignment Problem as LPP, Hungarian Method, Travelling Salesman Problem, Solutions Of TSP, Sequencing Problems, N-Jobs Two Machine Problems, N-Jobs K Machines Problems, Two-Jobs M- Machine Problems, Crew Scheduling Problems

UNIT –IV

Recursive nature of computations in Dynamic Programming, Forward and backward recursion, Dynamic Programming Applications – Knapsack

Network Representation of A Project, CPM and PERT, Critical Path Calculations, Time – Cost Optimizations, PERT Analysis and Probability Considerations, Resource Analysis in Network Scheduling.

Introduction To Simulation, Simulation Models, Event Type Simulations, Generation of Random Numbers, Monte-Carle Simulation, Simulation Of Networks; Two Person Zero Sum Games, Mixed Strategy Games and Their Algorithms.

Text books:

1. Operations Research, KantiSwaroop, P.K. Gupta, Man Mohan, Sulthan Chand& Sons Education

2. Publishers Operations Research – An Introduction, Handy A Taha – Pearson Education.

Reference books:

1. Operations Research PanneerSelvan Prentice Hall Of India.
2. Operations Research By S.D Sharma
3. Introduction To Operations Research, F.S. Hiller, G.J. Liberman, TMH
4. Operations Research, Richard Bronson, Schaum's Series, McGraw-Hill
5. P. SankaraIyer, "Operations Research", Tata McGraw-Hill, 2008.
6. A.M. Natarajan, P. Balasubramani, A. Tamilarasi, "Operations Research", Pearson Education, 2005.

Web Links:

1. https://nptel.ac.in/courses/110/106/110106062/

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1													
CO2													
CO3													
CO4													
CO5													

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: IV
MSCS202: Operations Research
Model Paper

Time: 3Hours Max. Marks: 60

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

1.

a) Use the graphical method to solve the following LP problem:

Minimize $Z = 40x1 + 36x2$

Subject to $5x1 + 3x2 \geq 45$

$x1 \leq 8$

$x2 \leq 10$

$x1, x2 \geq 0$ 10M

(OR)

b) Write in standard form:

Maximize $Z = 2x1 + x2 + 7x3$

Subject to $2x1 - x2 + 2x3 \geq 4,$

$3x1 - 2x2 + 3x3 \leq 6;$

$x1, x2, x3 \geq 0$ 4M

c) What is Operations Research? Briefly explain Various Phases of Operation Research study 6M

2.

a) Explain the steps involved in setting up of a simplex method 10M

(OR)

b) Solve the following linear program:

Maximize $Z = x1 + 3x2$

Subject to $x1 \leq 5$

$x1 + 2x2 \leq 10$

$x2 \leq 4\ x1, x2 \geq 0$ 10M

3.

a) Explain Hungarian algorithm with an example. 5M

b) Briefly explain queuing system and its characteristics. 5M

(OR)

c) A company has three production facilities $S1$, $S2$ and $S3$ with production capacity of 7, 9 and 18 units (in 100s) per week of a product, respectively. These units are to be shipped to four warehouses $D1$, $D2$, $D3$ and $D4$ with requirement of 5, 8, 7 and 14 units (in 100s) per week, respectively.

	D_1	D_2	D_3	D_4	Capacity
S_1	19	30	50	10	7
S_2	70	30	40	60	9
S_3	40	8	70	20	18
Demand	5	8	7	14	34

The transportation costs (in rupees) per unit between factories to warehouses are given below. Obtain an optimal solution. 10M

4. A project schedule has the following characteristics.

Activity	Time (weeks)	Activity	Time (weeks)
1-2	4	5-6	4
1-3	1	5-7	8
2-4	1	6-8	1
3-4	1	7-8	2
3-5	6	8-10	5
4-9	5	9-10	7

i) Draw the network and find the critical path.

ii) Compute EST,EFT,LST,LFT, total float for each activity. 10M

(OR)

a) Explain Dynamic Programming with an example 5M

b) What is Simulation? Explain Various Simulation Models 5M

SECTION- B (5×4=20M)

Answer any FIVE Questions

5. Write a short note on

a) Duality

b) Degeneracy in Transportation Problem

c) Travelling Salesmen Problem

d) CPM and PERT

e) Two person Zero sum game

f) Slack , surplus and Artificial Variables

g) North-West Corner Rule

h) Represent the following LPP given in standard form in matrix-vector notation:

Maximize $Z = x1 + 2x2 - 3x3 + 4x4$

Subject to $2x1 + 2x2 + x3 + 5x4 = 7$

$3x2 - 2x3 + x4 = 2$

$4x1 + 7x2 + 3x3 + x4 = 5$

$x1, x2, x3, x4 \geq 0$

	Government College (Autonomous) Rajahmundry	**Program & Semester** II M.Sc. (IV Sem)			
Course Code MSCS409	**TITLE OF THE COURSE** **Elective II: Parallel Computing**				
Teaching	Hours Allocated: 60 (**Theory**)	L	T	P	C
Pre-requisites:	Computer organization and architecture, Computer Networks	5	1	-	5

Course Objectives:

1. This course gives an overview of the architectures and communication networks employed in parallel computers.
2. The course covers the foundations for development of efficient parallel algorithms, including examples from relatively simple numerical problems, sorting, and graph problems.

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Understand the architecture of parallel computing.
CO2	Understands various performance metrics related to parallel computing.
CO4	Understands various parallel computational models and algorithms

CO5	Know the parallel programming languages

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development			Employability			Entrepreneurship	

Syllabus:

UNIT –I

Introduction to Parallel Computing: Parallel Programming and Parallel Computing, Overview of Parallel Architectures and Parallel Programming Models, MIMD and SPMD Models, Problems Unique to Parallel Programming, Supercomputers and Grand Challenge Problems, Modern Parallel Computers, Data Dependence Graph, Data Parallelism, Functional Parallelism, Pipelining and Data Clustering.

UNIT –II

Interconnection Networks: Switch Network Topologies, Direct and Indirect Network Topology, Bus, Star, Ring, Mesh, Tree, Binary Tree Network, Hyper Tree Network, Hybrid, Hypercube, Perfect Shu E Network, Torus and Butterfly Network.

Performance Analysis: Introduction, Execution Time, Speedup, Linear And Super linear Speedup, Efficacy And Efficiency, Amdahls Law and Amdahl Effect, Gustafson-Barsiss Law, Minsky's Conjecture, The Karp-Flatt Metric, The Iso-Efficiency Metric, Iso-Efficiency Relation, Cost and Scalability.

UNIT –III

Parallel Computational Models: Flynns Taxonomy, PRAM, EREW, CREW, ERCW, CRCW,

Simulating CRCW, CREW And EREW, PRAM Algorithms.

Introduction To Parallel Algorithms: Parallel Programming Models, PVM, MPI Paradigms,

UNIT –IV

Parallel Programming Languages: Brents Theorem, Simple Parallel Programs in MPI Environments, Parallel Algorithms On Network, Addition Of Matrices, Multiplication Of Matrices.

Text books:

1. Computer Architecture and Parallel Processing, Hwang and Briggs, McGraw Hill.
2. Parallel Programming in C with MPI and Open MP, Michael J.Quinn, McGrawHill , 2004

Reference books:

1. Introduction to Distributed and Parallel Computing, Crichlow, PHI.
2. Designing Efficient Algorithms for Parallel Computers, M.J.Quinn, McGraw-Hill.
3. Introduction to Parallel Processing, Shashi Kumar M et al., PHI New Delhi.
4. Elements of Parallel Computing, V.Rajaraman, Prentice-Hall of India.
5. The Design and Analysis of Parallel Algorithms, S.G.Akl, PHI.

Web Links:

1. https://nptel.ac.in/courses/106/102/106102163/

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1													
CO2													
CO3													
CO4													
CO5													

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: IV
MSCS403 - Elective II: Parallel Computing
Model Paper

Time: 3Hours Max. Marks: 60

SECTION- A **(4 X 10 = 40 M)**

Answer ALL Questions

UNIT-I

1. Explain the parallel programming models. 10M

(OR)

2. What are the types of parallel computers? What are their futures? Explain. 10M

UNIT-II

3. a) State & Explain Amdahl's Law for measuring Speed up performance of parallel systems. Also list the outcomes of analysis of the Amdahl's law 5M

   b) What is the diameter of16-space hypercube 5M

(OR)

4. Write an algorithm for sorting a given set of numbers using parallel programming.10M

UNIT-III

5. What is the PRAM model? Which PRAM model can be used to execute any other PRAM algorithms? 10M

(OR)

6. Compare the distributed memory model for parallel programming in terms of various parameters. 10M

UNIT-IV

7. Compare & Contrast the shared memory and distributed memory programs approaches. 10M

(OR)

8. Explain in detail the scheduling and parallelization techniques for parallel programming. 10 M

SECTION- B **(5×4=20M)**

Answer any FIVE Questions

9. Conventional vs. object oriented software engineering.
10. Scope of a problem.
11. Usability principles.
12. Write two disadvantages of the water fall model
13. Cohesion vs. Coupling
14. Explain about project scheduling
15. Write about user interface design
16. write short notes on alpha and beta testing

	Government College (Autonomous) Rajahmundry				
Course Code MSCS410	**TITLE OF THE COURSE** **Project work**	**Program & Semester** II M.Sc. (IV Sem)			
Teaching		L	T	P	C
Pre-requisites:				-	12

Follow SDLC process for real time applications and develop real time application project

The objective of the project is to motivate them to work in emerging/latest technologies, help the students to develop ability, to apply theoretical and practical tools/techniques to solve real life problems related to industry, academic institutions and research laboratories.

The project is of 2 hours/week for one (semester VI) semester duration and a student is expected to do planning, analysing, designing, coding, and implementing the project. The initiation of project should be with the project proposal. The synopsis approval will be given by the project guides.

The project proposal should include the following:

Title

Objectives

Input and output

Details of modules and process logic Limitations of the project

Tools/platforms, Languages to be used Scope of future application

The Project work should be either an individual one or a group of not more than three members and submit a project report at the end of the semester. The students shall defend their dissertation in front of experts during viva-voce examinations.