

**MANONMANIAM SUNDARANAR UNIVERSITY, TIRUNELVELI**

**UG COURSES – AFFILIATED COLLEGES**

**B.Sc . COMPUTER SCIENCE**

**Learning Outcome Based Curriculum**

(With effect from the academic year 2021-2022 onwards)

**Introduction**

Outcome Based Education is incorporated into the curriculum based on the requirements of NAAC – UGC-Quality Mandate .To fulfill these requirements, the Program Educational Objectives(PEO's) ,Program Outcomes (POs) and Program Specific Outcomes(PSOs) and Course Outcomes(CO) were framed for all programs in alignment with the Vision and Mission of the respective departments and in-turn with the Vision and Mission and Educational Objectives of the University.

**Vision Of the University**

To provide quality education to reach the unreached

**Mission Of the University**

To conduct research ,teaching and outreach programs to improve conditions of human living

To create an academic environment that honours women and men of all races, caste, creed, cultures and an atmosphere

That values intellectual curiosity ,pursuit of knowledge ,academic freedom and integrity

To offer a wide variety of off campus educational and training programs, including the use of information technology, to individuals and groups

To develop partnership with industries and government so as to improve the quality of the workplace and to serve as

Catalyst for economic and cultural development

To provide quality /inclusive education ,especially for the rural and un-reached segments of economically downtrodden students including women, socially oppressed and differently abled.

**Vision and Mission of Computer Science Department**

**Vision**

Empower students to become independent life long learners with originality and high principles of character catering to the ever changing industrial demands and societal needs

**Mission**

To be the front runner in Computer Science and to foster the students into globally

competent professionals with expertise in software development and aptitude for research and ethical values.

## **Preamble**

Education is a powerful driver of development and one of the strongest instruments in reducing poverty and improving health, gender equality, peace and stability in the community. Quality in higher education is pivotal for the progress of the country as it provides innovations with novel research initiatives and workforce in the industrial sector and in this regard, universities play a vital role in uplifting economy. It imparts skills, new knowledge, encourages entrepreneurship, escalates individual thinking, creativity, understanding, implementation skills, thereby developing an individual to compete internationally.

Based on UGC recommendations and Tamil Nadu governments education department, curriculum revision is updated and revised to ensure quality education, inclusion of present knowledge, new ideas, concepts, knowledge of the concerned discipline, national and international developments. A comprehensive course design is developed giving priority to Innovation, Application, Scope, Job opportunity and preparedness for competitive exams in upgrading the framework and above all imparting quality education for all, including from rural and backward sectors.

B. Sc. Computer Science Under Graduate programme is spread over 6 semesters of 3 years. This course aims at instilling technical competence in problem solving and application development. This programme cultivates the needed expertise in problem solving for a successful career in the IT sector thereby laying the foundation for a better computer science higher learning. This is a student oriented structure with an exposure in basics of computer sciences to the recent technologies like machine learning, Internet of Things(IoT), Digital Image processing(DIP). It also exposes students to the abilities like Big Data Analytics, Mobile Application Development.

The present curriculum of B.Sc Computer Science have been framed with the Programme Outcomes (POs)/Programme Specific Outcomes(PSOs) which have definite goals that each student will attain at the end of his graduate programme. PO goals include understanding of basic logic, ability to create novel ideas, propose new algorithms and implement them. The whole syllabus has been proposed based on Outcome Based Education(OBE) which focuses on the student procuring deeper level of understanding in the subject which lead to mastery of both knowledge and skill.

The POs/PSOs are framed based on the guidelines of Learning Outcomes-based Curriculum Framework(LOCF). At the end of each programme the PO/PSO assessment is done from the CO attainment of all curriculum components. There are 5 POs in the UG programme . PSOs are framed by the departments and they are 5 in number. For each Course, there are 5 Course

Outcomes (CO) to be achieved at the end of the course. These Course outcomes are framed to achieve the POs/PSOs.

Surely, this curriculum will aid the student in the basic as well as the recent developments in computer science when the student completes the programme.

### Eligibility Norms for Admission

Candidate should have passed the Higher Secondary Examination conducted by the Board of Higher Secondary Education , Government of Tamil Nadu or any other Examinations accepted by the syndicate as equivalent thereto with Mathematics / Computer Science as one of the subjects

### Duration of the Course

The students shall undergo the prescribed course of study for a period of not less than three academic years ( Six semesters ) .

## Program Structure B.Sc Computer Science 21-22

Sem	Part I/II/ III/ IV/ V	Subject No.	Subject Status	Subject Title	Contact Hrs/ Week	L	T	P	Credits
I	I	1	Language	Tamil/Other Language	6	6	0	0	4
	II	2	Language	Communicative English I	6	6	0	0	4
	III	3	Core	Programming in C	4	3	1	0	4
	III	4	Major Practical - I	Programming in C	4	0	0	4	2
	III	5	<b>Allied - I</b> a) For the B.Sc.(CS) Programme b) For other U.G. Programme*	a) Discrete Mathematics	4	4	0	0	3
				b) Introduction to Computers	4	4	0	0	3
				MSOffice Practical	2	0	0	2	2
	III	6	Professional English for Physical Sciences I		4	4	0	0	4
IV	7	Common	Environmental Studies	2	2	0	0	2	
<b>Subtotal</b>					<b>30</b>	<b>25</b>	<b>1</b>	<b>4</b>	<b>23</b>
	I	8	Language	Tamil/Other Language	6	6	0	0	4
	II	9	Language	Communicative English II	6	6	0	0	4
	III	10	Core	Programming in C++	4	3	1	0	4
	III	11	Major Practical - II	Programming in C++	4	0	0	4	2
	III	12	Professional English for Physical Sciences II		4	4	0	0	4

II	III	13	<b>Allied Practical – I</b> a) For the B.Sc.(CS) Programme	a) Linux	4	0	0	4	2
			b) For other U.G. Programme*	b) C Programming C programming lab Lab	4 2	4 0	0 0	0 2	3 2
	IV	14	Common	Value Based Education	2	2	0	0	2
<b>Subtotal</b>					<b>30</b>	<b>21</b>	<b>1</b>	<b>8</b>	<b>22</b>
III	I	15	Language	Tamil/Other Language	6	6	0	0	4
	II	16	Language	English	6	6	0	0	4
	III	17	Core-3	Java Programming	4	4	0	0	4
	III	18	Major Practical -3	Java Programming Lab	3	0	0	3	2
	III	19	Allied II	Scripting Languages	3	3	0	0	3
	III	20	Allied Practical - II	Scripting Languages Lab	2	0	0	2	2
	III	21	Skill Based Core-I	Digital Design	4	4	0	0	4
	IV	22	Non-Major Elective	1. Fundamentals of Internet and Emerging Technologies 2. Basic Programming Design	2	2	0	0	2
		23	Common	Yoga*	2	2	0	0	2
<b>Subtotal (excluding Yoga)</b>					<b>30</b>	<b>25</b>	<b>0</b>	<b>5</b>	<b>25</b>
IV	I	24	Language	Tamil/Other Language	6	6	0	0	4
	II	25	Language	English	6	6	0	0	4
	III	26	Core-4	Data Structures	4	4	0	0	4
	III	27	Major Practical - IV	Data Structures lab	3	0	0	3	2
	III	28	Allied -II	Machine Learning Techniques	3	3	0	0	3
	IV	29	Allied II Practicals	PYTHON	2	0	0	2	2
	III	30	Skill Based – Core II	Computer Architecture	4	4	0	0	4

	IV	31	Non-Major Elective	1. HTML 2. Programming in C	2	2	0	0	2
		32	Common	Computers for Digital Era *	2	2	0	0	2
	V	33	Extension Activity	NCC, NSS, YRC, YWF	0	0	0	0	1
		<b>Subtotal (Excluding Computer for Digital Era)</b>				<b>30</b>	<b>25</b>	<b>0</b>	<b>5</b>
V	III	34	Core-5	Relational Database Management Systems	5	5	0	0	4
	III	35	Core-6	Data Communication and Computer networks	4	4	0	0	4
	III	36	Core-7	PHP and mySQL	4	4	0	0	4
	III	37	Major Practical - V	PHP	4	0	0	4	2
	III	38	Major Practicals VI	Machine Learning lab	4	0	0	4	2
	III	39	Major practicals - VII	Green Foot Lab	3	0	0	3	2
	III	40	Major Elective – I (Anyone)	1. Mobile application Development 2. Introduction to Security in Computing 3. Cloud Computing	4	4	0	0	4
	III	41	Skill Based Common	Personality Development/ Effective Communication/ Youth Development	2	2	0	*	2
	<b>Subtotal</b>					<b>30</b>	<b>19</b>	<b>0</b>	<b>11</b>
VI	III	42	Core-8	Operating System	4	4	0	0	4
	III	43	Core-9	Software Engineering and Testing	4	4	0	0	4
	III	44	Core-10	Computer Graphics and Visualization	4	3	1	0	4
	III	45	Major Practical - VIII	Computer Graphics Lab	4	0	0	4	2

	III	46	Major Practical IX	My SQL Lab	4	0	0	4	2
	III	47	Major Elective II	1. Internet of Things (IoT) 2. Introduction to Digital Image Processing 3. Neural Networks	4	4	0	0	4
	III	48	Project	Digital Image Processing using SciLab	6	0	0	6	6
	<b>Subtotal</b>				<b>30</b>	<b>15</b>	<b>1</b>	<b>14</b>	<b>26</b>
	<b>Total credits(including Yoga &amp; Computers for Digital Era)</b>								<b>150</b>

L-Lecture T-Tutorial P-Practical

### **Distribution of marks between External and Internal Assessment is**

For Theory , External -75 , Internal- 25

For Practical External -50 , Internal- 50

### **Internal Marks for Practical shall be allotted in the following manner**

**Continuous Assessment:** 25 marks “N” number of practical’s being conducted based on the practical prescribed in the syllabus and the marks should be distributed equally for each practical.

**Calculation of marks:** Sum of marks awarded to number of practicals + the average marks of two tests (25 marks)

### **Total-50 marks**

**Internal Test:** 20 marks . Three tests should be conducted and the average of best two tests be taken for 20 marks. Assignment – 5 marks

Passing minimum 40 out of 100

### **Program Educational Objectives(PEO’s)**

The B.Sc Computer Science Program will enable the student to

**PEO1:** Provide with the educational experiences that will enable them to cope with the rapidly changing subject of computer science

**PEO2:** Provide with up - to - date training in the discipline so as to prepare them to take on entry level positions in the local Information Technology sector , ( with the exception of hardware engineer and technician ) and to grow into other positions with one or two years working experience

**PEO3 :** Provide with a sufficiently broad range of courses to enable them to be successful in

postgraduate programmes anywhere in the world .

**PEO4:** Stimulate interest in humanities and thereby encourage an inter - disciplinary interest

**PEO5:** Create an awareness on social , ethical and professional issues related to computers

### **Program Outcomes(POS)**

Upon Completion of B.Sc the general intended learning outcomes are that students will:

**PO1:** Be aware of the history of the discipline of latest technology and understand the conceptual underpinnings of the subject

**PO2:** Illustrate the nature of the software development process , including the need to provide appropriate documentation

**PO3:** Be able to develop program in one or two programming languages

**PO4:** Be able to analyze a technique for a specific problem to meet a particular objective .

**PO5:** Compare the basic theory of computer architectures , including computer hardware and networking

**PO6:** Construct new information technology applicable to the society , business and the individual , both from a technical and from an ethical and legal point of view

### **Program Specific Outcomes(PSOs)**

Upon Completion of B.Sc Computer Science the student will be able to

**PSO1:** Define Fundamental principles and methods of Computer Science to a wide range of applications

**PSO2:** Demonstrate and document solutions to significant computational problems

**PSO3:** Apply design ,programming skills and develop principles in the construction of software systems

**PSO4:** Decide for continued professional Development

**PSO5:** Design new technologies in web development

**MSU/ 2021-22 / UG-Colleges /Part-III (B.Sc. Computer Science) / Semester – I /  
Core-1**

**L T P C  
3 1 0 4**

**PROGRAMMING IN C**

**COURSE OUTCOMES**

On Successful completion of the course, the student will be able to

- CO1:To obtain knowledge about the structure of the programming language C
- CO2:To develop the program writing and logical thinking skill.
- CO3:To summarize statements and arrays
- CO4:To make use of defined functions
- CO5:To explain pointers and files

**Unit – I: INTRODUCTION**

**14 Hours**

C Declarations:- Character Set – C tokens – Keywords and Identifiers – Identifiers – Constants – Variables – Data types – Declaration of Variables – Declaration of Storage Class – Assigning Values to Variables – Defining Symbolic Constants – Declaring Variable as Constant. Operators and Expressions:- Introduction – Arithmetic Operators – Relational Operators – Logical Operators – Assignment Operators Increment and Decrement Operators – Conditional Operator – Bitwise Operators – Special Operators -Arithmetic Expressions – Evaluation of Expressions – Precedence of Arithmetic Expressions. Managing Input and Output Operations:- getchar( ) – putchar( ) – scanf( ) – printf( ).

**Unit – II: CONTROL STRUCTURES**

**10 Hours**

Decision Making and Branching:- Decision Making with IF Statement – Simple IF statement – The IF...Else Statement – Nesting of IF...Else Statements – The ELSE IF ladder – The Switch Statement – The ?: Operator – The GOTO statement. Decision Making and Looping:- The WHILE Statement – The DO Statement – The FOR statement.



**Unit – III: ARRAYS****10 Hours**

One-dimensional arrays – Declaration of One-dimensional arrays – Initialization of One- dimensional arrays - Two-dimensional arrays – Initialization of Two-dimensional arrays – Multi- dimensional arrays. Character Arrays and Strings:- Declaring and Initializing String Variables – Reading Strings from Terminal – Writing Strings to Screen – String Handling Functions.

**Unit – IV: FUNCTIONS****14 Hours**

User-Defined functions:- Need for User-defined functions – Definition of functions – Return Values and their Types – Function Calls – Function Declaration – Category of functions – No Arguments and No return values – Arguments but No return Values – Arguments with return values – No arguments but a return a value – Recursion – Passing Arrays to functions – Passing Strings to functions – The Scope, Visibility and lifetime of a variables. Structures and Unions:- Defining a Structure – Declaring Structure Variables – Accessing Structure Members – Structure Initialization – Arrays of structures –Unions.

**Unit – V: POINTERS AND FILES****12 Hours**

Pointers:- Understanding pointers – Accessing the Address of a Variable – Declaring Pointer Variables – Accessing a variable through its pointer – Pointer Expressions –Pointers as function arguments. File Management in C:- Defining and Opening a file – Closing a File – Input/output Operations on files – Error Handling during I/O Operations.

**Text Book :**

Programming in ANSI C – 6<sup>th</sup> Edition by E Balagurusamy – Tata McGraw Hill Publishing Company Limited.

**Reference Books:**

1. Computer System and Programming in C by Manish Varhney, Naha Singh – CBS Publishers and DistributorsPvt Ltd.
2. Introduction to Computer Science, IITL Education Solutions Limited, Second Edition, Pearson Education Computer Basics and C Programming by V. Rajaraman – PHI Learning Private Limited

3. Programming with C, Third Edition, Byron S Gottfried, Tata McGraw Hill Education Private Limited.
4. The Art of C Programming | Robin Jones | Springer <https://www.springer.com> › book
5. ISBN 978-1-4613-8685-8 · Digitally watermarked, DRM-free
6. C Programming Tutorial PDF <https://www.unf.edu/~wkloster> › ppts › cprogra.

### LOCF MAPPING

Course code and title : PROGRAMMING iN C											
CO/PO	PO					PSO					% of co's
	1	2	3	4	5	1	2	3	4	5	
CO1	3	3	2	2	2	3	3	2	2	2	2.4
CO2	3	3	3	2	2	3	3	2	3	3	2.7
CO3	2	3	2	2	2	2	3	3	3	2	2.4
CO4	2	3	2	3	2	2	2	3	3	3	2.5
CO5	2	2	3	3	3	2	2	2	3	2	2.4
Average of CO's = 2.48(high)											

**Strongly correlated -3 Moderately correlated -2 weakly correlated-1 No correlation -0**

## MODEL QUESTION

B.Sc (CBCS) DEGREE EXAMINATION

**Programming in C**

Semester: I

TIME: Three hours

Maximum:75 Marks

PART A-(10X1=10 Marks)

Answer all Questions

Choose the correct answer

1. Constant contains single character enclosed in single quotes.  
a. Character constant    b. String constant    c. integer constant
2. Value which does not vary during the execution of program  
a. variable    b. constant    c. data    d.. none
3. Which operator returns remainder  
a. /\*    b. \*/8. //    c. %    d. +
4. In C language && is a \_\_\_\_\_ operator  
a. assignment    b. logical    c. relational    d. none
5. ----- statement used to jump out of a program  
a. break.    b. continue    c. go to    d. none
6. int digits[10]={1,2,3,4,5,6,7,8,9,10}; which element is in the position digits[5]  
a. 5    b. 6    c. 8    d. 7
7. \_\_\_\_\_ is a indirection operator  
a. &    b. \*    c. %    d. none
8. Return statement can be used to \_\_\_\_\_.  
a. return the control to the called function    b. call the function  
c. return the value if any to the calling function    d. none
9. Select the keyword among the following.  
a. member    b. Input    c. union    d. none
- 10.----- function is used to write a set value to a file..  
a. fprintf    b. gets    c. puts    d. fscanf

PART B-(5X5=25 Marks)

Answer all Questions, choosing either (a) or (b)

Each answer should not exceed 250 words

- 11 a. What is meant by C Character set. Give an example.    Or  
b. What is constants And variables. Give an example..

- 12 a. Write about I/O statements in C with examples. Or  
 b. Write C program to reverse the given number.
- 13 a. Explain two dimensional array cum initialization. Or  
 b. Write a C program to exchange the variables x & y.
- 14 a. Write about function declaration with example. Or  
 b. Explain how to define structure.
- 15 a. Write about the various operation on files. Or  
 b. Write a C program to find the sum of all elements in the array using pointer.

PART C -(5X8=40Marks)

Answer all Questions, choosing either (a) or (b)

Each answer should not exceed 600 words.

- 16 a. Explain the data types available in C Or  
 b. Explain various types of operators in C.
- 17 a. Describe about decision making and branching statements in C Or  
 b. Write a program to calculate and print the Fibonacci numbers.
- 18 a. Describe about pointer declaration with example. Or  
 b. Write a program to find the product of two matrices.
- 19 a. Write a program to sort numbers using function. Or  
 b. Explain how to use structures with in structure?. Give an example.
- 20 a. Write a program to prepare student mart sheet using Structure. Or  
 b. Discuss how to read and write data file

**PROGRAMMING IN C**

**COURSE OUTCOMES**

On Successful completion of the course, the student will be able to

- CO1: To define the features of C by applying sample problems
- CO2: To explore skills in implementing algorithms through the programming Language C
- CO3: To develop array of elements
- CO4: To evaluate matrices
- CO5: To develop the programs using pointers and functions

**Each exercise should be completed within two hours.**

**It is compulsory to complete all the exercises given in the list in the stipulated time.**

1. To find all possible roots of a quadratic equation using if statement
2. Program to check vowel or consonant using switch case statement
3. Evaluate Sine series using while loop 4.  $\sin(x) = x - x^3 / 3! + x^5 / 5! - \dots x^n / n$
5. Sort a list of numbers in ascending order
6. Search an element in an array
7. Reverse a number
8. Check the given string is palindrome or not
9. Find the binomial coefficient ( $nCr$ ) value using recursion
10. Multiply two matrices (check for compatibility)
11. Transpose of a matrix
12. Find the sum of 'n' numbers by making function call
13. Alphabetical sorting (passing array as argument to function)
14. Exchange values using pointers and function
15. Prepare the student details using structure
16. Prepare mark sheet using file

## LOCF MAPPING

<b>Course code and title : PROGRAMMING IN C</b>											
CO/PO	PO					PSO					% of co's
	1	2	3	4	5	1	2	3	4	5	
CO1	2	2	2	2	2	2	3	2	2	3	2.2
CO2	2	3	2	3	3	2	3	2	3	3	2.6
CO3	2	2	3	3	3	2	2	3	3	3	2.6
CO4	2	3	2	3	2	2	2	3	3	3	2.5
CO5	2	3	3	3	3	2	2	2	3	3	2.6
Average of CO's = 2.5(high)											

**Strongly correlated -3 Moderately correlated -2 weakly correlated-1 No correlation -0**

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## DISCRETE MATHEMATICS

### *COURSE OUTCOMES*

**On** Successful completion of the course, the student will be able to

- CO1: To recall basic concepts for clear understanding of mathematical principles
- CO2: To explain practical problems.
- CO3: To construct matrices using discrete mathematics
- CO4: To analyze techniques to draw graph using mathematics
- CO5: To design graphs using the representations

### **Unit – I: RELATIONS**

**9 Hours**

Introduction to Relations – Binary relation – Classification of Relations – Composition of Relations – Inverse of Relation – Closure operation on Relations – Matrix representation of Relation - digraphs.

### **Unit – II: FUNCTIONS**

**6 Hours**

Introduction to Functions – Addition and Multiplication of Functions - Classifications of Functions – Composition of Function – Inverse Function.

### **Unit – III: MATHEMATICAL LOGIC**

**10 Hours**

Introduction – Statement (Propositions) – Laws of Formal Logic –Basic Set of Logical operators/operations - Propositions and Truth Tables – Algebra Propositions - Tautologies and Contradictions – Logical Equivalence – Logical Implication – Normal Forms.

### **Unit – IV: MATRIX ALGEBRA**

**10 Hours**

Introduction – Definition of a Matrix - Types of Matrices – Operations on Matrices – Related Matrices – Transpose of a Matrix – Symmetric and Skew-symmetric Matrices – Complex Matrix  
– Conjugate of a Matrix – Determinant of a Matrix – Typical Square Matrices – Adjoint and Inverse of a Matrix – Singular and Non-singular Matrices – Adjoint of a Square Matrix – Properties of Adjoint of a Matrix – Properties of Inverse of a Matrix.

**Unit – V: GRAPH****10 Hours**

Introduction – Graph and Basic Terminologies – Types of Graphs – Sub Graph and Isomorphic Graph – Operations on Graphs – Representation of Graph.

**Text Book:**

DISCRETE MATHEMATICS, Swapan Kumar Chakraborty and Bikash Kanti Sarkar, OXFORD University Press.

**Reference Books:**

1. DISCRETE MATHEMATICS, Third Edition, Seymour Lipschutz and Marc Lars Lipson, TataMcGraw Hill Education Private Limited.
2. Discrete Mathematical Structures with Applications to Computer Science by J.P.Tremblay,R.Manohar TMH edition
3. [https://www.tutorialspoint.com > discrete\\_mathematics](https://www.tutorialspoint.com/discrete_mathematics)

**LOCF MAPPING**

<b>Course code and title : DISCRETE MATHEMATICS</b>											
CO/PO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	% of co's
CO1	3	2	2	2	2	3	3	2	2	2	2.3
CO2	2	3	2	2	2	2	3	2	3	3	2.2
CO3	2	2	3	2	2	2	2	3	3	3	2.4
CO4	2	3	2	3	3	2	2	3	3	3	2.6
CO5	2	3	3	3	3	2	2	2	3	3	2.5
Average of CO's = 2.4(high)											

**Strongly correlated -3 Moderately correlated -2 weakly correlated-1 No correlation -0**



**MODEL QUESTION**  
**B.Sc (CBCS) DEGREE EXAMINATION**  
**Discrete Mathematics**  
**Semester: I**

TIME: Three hours

Maximum:75 Marks

PART A-(10X1=10 Marks)

Answer all Questions

Choose the correct answer

1. A relation R on A is said to be reflexive if for each  $a, b \in R$ , then  
(a)  $b R a$             (b)  $a R b$             (c)  $a R a$             (d) none
2. Let  $R = \{(a,a),(a,b),(b,c),(c,a)\}$  be a relation on  $A=\{a,b,c\}$ . The reflexive Closure of R is  
(a)  $\{(a,a),(a,b),(b,c),(c,a),(b,b),(c,c)\}$     (b)  $\{(a,a),(a,b),(b,c),(c,a),(b,a),(c,b)\}$   
(c)  $\{(a,a),(a,b),(b,c),(c,a),(b,b),(c,b)\}$     (d) none
3. In one-to-one function if  $f(a_1) = f(a_2)$ , then  
(a)  $a_1 = a_2$             (b)  $a_1 = a_1$             (c)  $a_2 = a_2$             (d) none
4. Onto function is also called \_\_\_\_\_.  
(a) Injection            (b) Bijection            (c) Surjection            (d) None
5. If  $P = T$  and  $Q = F$  then  $P \rightarrow Q$  is  
(a) T                        (b) F                        (c) T or F                (d) None
6. Let  $p$  : Priya is tall and  $q$  : Priya is beautiful. The Symbolic form of the statement 'It is false that Priya is short or beautiful' is \_\_\_\_\_.  
(a)  $p \vee q$                 (b)  $p \wedge q$                 (c)  $\sim (\sim p \vee q)$             (d)  $\sim p \wedge q$
7. In unit matrix diagonal elements are \_\_\_\_\_.  
(a) 0                        (b) 1                        (c) 2                        (d) 3
8. A matrix A is said to be a Singular matrix if \_\_\_\_\_.  
(a)  $|A| = 0$                 (b)  $|A^2| = 0$                 (c)  $|A| \neq 0$                 (d)  $A^2 = I$
9. Any vertex having degree \_\_\_\_\_ is called pendant vertex.  
(a) 0                        (b) 1                        (c) 2                        (d) 3
10. The degree of every vertex in a complete graph with n vertices is \_\_\_\_\_.  
(a) n                        (b) n - 1                        (c) 2n                        (d) n + 1

**PART B(5X5=25 Marks)**

**Answer all Questions, choosing either (a) or (b)**

**Each answer should not exceed 250 words**

11. (a) Let  $Z$  denote the set of integers and the relation  $R$  in  $Z$  be defined by  $a R b$  iff  $a - b$  is an even integer. Show that  $R$  is an equivalence relation. (OR)
- (b) If a relation  $R$  is transitive, then prove that its inverse relation  $R^{-1}$  is also transitive.
12. (a) Let  $f: R \rightarrow R$  be defined by  $f(x) = 3x - 4$ . Find a formula for  $f^{-1}$ . (OR)
- (b) If  $f: A \rightarrow B$ ,  $g: B \rightarrow C$  and  $h: C \rightarrow D$ , then Prove that  $h \circ (g \circ f) = (h \circ g) \circ f$ .
13. (a) Show that the proposition  $p \vee \sim (p \wedge q)$  is a tautology. (OR)
- (b) State De Morgan's laws. Using truth table prove them.
14. (a) Show that the matrix  $A = \begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix}$  satisfies the equation  $A^2 - 4A + I = 0$  and hence find  $A^{-1}$ . (OR)
- (b) Show that the matrix  $\begin{bmatrix} \cos \theta & 0 & \sin \theta \\ 0 & 1 & 0 \\ -\sin \theta & 0 & \cos \theta \end{bmatrix}$  is Orthogonal. Find the value of  $|A|$ .
15. (a) Show that the maximum number of edges in a simple undirected graph with  $n$  vertices is  $n(n-1)/2$ . (OR)
- (b) State and prove The Handshaking Theorem.

**PART C -(5X8=40Marks)**

**Answer all Questions, choosing either (a) or (b)**

**Each answer should not exceed 600 words**

16. (a) Let  $R = \{(1,2),(2,3),(3,1)\}$  be a relation on  $A = \{1,2,3\}$ . Find the reflexive, Symmetric and Transitive Closure of  $R$ . (OR)
- (b) Discuss the several types of relations.
17. (a) Let  $X = \{a,b,c\}$ . Define  $f: X \rightarrow X$  such that  $f = \{(a,b),(b,a),(c,c)\}$ . Determine
- (i)  $f^1$       (ii)  $f^2$       (iii)  $f^3$       (iv)  $f^4$  (OR)
- (b) Let  $f: X \rightarrow Y$ ,  $g: Y \rightarrow Z$  be two functions. Then prove that

- (i) If  $f$  and  $g$  are one-to-one, then  $g \circ f$  is 1-1  
(ii) If  $f$  and  $g$  are onto, then  $g \circ f$  is onto
18. (a) Using the laws of propositions prove the following.  
 $\sim(p \vee q) \vee (\sim p \wedge q) \equiv \sim p$  (OR)
- (b) Find the dnf of  $p \rightarrow ((p \rightarrow q) \wedge \sim(\sim q \vee \sim p))$
19. (a) Explain the different types of matrices.  
(OR)
- (b) Find the inverse of the matrix
- $$A = \begin{bmatrix} 1 & 1 & 3 \\ 1 & 3 & -3 \\ -2 & -4 & -4 \end{bmatrix}$$
20. (a) Explain the different Operations on Graphs with examples. (OR)
- (b) Explain the different types of graphs with examples

## INTRODUCTION TO COMPUTERS

(For the Institutions with B.Sc. (Maths) Programme not opting Physics / Chemistry as Allied Subjects with effect from 2021-22 and onwards for Semesters - I & II and also for Semesters III & IV of the 2017-18 batch )

LT P C  
4 0 2 4

### ***COURSE OUTCOMES***

**On** Successful completion of the course, the student will be able to

CO1: To gain fundamental knowledge in computer

CO2: To characteristic, parts and applications of computers

CO3: To know the various devices and familiarize with their functions To know the usage of internet

CO4: To discuss the emerging trends in computer Science

CO5: To explain the concepts of Internet

### **UNIT I:**

**12 Hours**

Computer Basics: Introduction, Characteristics of Computers - Generation of Computers, Classification of Computers: Micro computers, Mini Computers, Mainframe, Super Computer, Careers in IT industry. Data representation in Computer: Types of number system, Conversion between Number bases. Coding Schemes: ASCII, EBCDIC, and Unicode.

### **UNIT II:**

**14 Hours**

Computer Memory and Storage: Introduction, memory hierarchy, Random Access memory (RAM), Read only memory (ROM), RAM, ROM and CPU interaction. Types of Secondary storage devices, Magnetic tape, magnetic disk, types of magnetic disk, optical disk, type of optical disks, USB drives.

### **UNIT III:**

**10 Hours**

Multimedia Essentials: Introduction, Definition, Building blocks of Multimedia, multimedia system, multimedia applications, Virtual reality, Multimedia and the internet.

**UNIT IV:****10 Hours**

Operating system: Introduction, definition, Evolution of Operating System, Types of Operating System, Functions of Operating system. Computer software: definition, categories of Software, Software Piracy.

**UNIT V:****14 Hours**

The Internet: Introduction, Evolution of Internet – Basic Internet terms – Getting connected to Internet – Internet Applications – Data over Internet. Emerging trends in IT: Introduction, E-Commerce – Electronic Data Interchange – Mobile Communication – Bluetooth – Global Positioning System – Infrared Communication – SmartCard – Imminent Technologies.

**Text Book**

Introduction to Computers and Information Technology, Dr. D.Glory Ratna Mary, Mrs. S.Selvanayahi, Dr. V. Joseph Peter, Jupiter Publications

**Reference Book**

Introduction to Computer Science, Second Edition, ITL Education Solutions Ltd, Pearson Education

Introduction to Computers, Peter Norton, 7th Edition, Tata McGraw Hill Education  
Fundamentals of Computers, V.Rajaram, 5th Edition, PHI

**LOCF MAPPING**

<b>Course code and title : INTRODUCTION TO COMPUTERS</b>												
CO/PO	PO					PSO						
	1	2	3	4	5	1	2	3	4	5	% of co's	
CO1	3	2	2	2	2	3	3	2	2	2	2.3	
CO2	2	3	2	2	2	2	3	2	3	3	2.2	
CO3	2	2	3	2	2	2	2	3	3	3	2.4	
CO4	2	3	2	3	3	2	2	3	3	3	2.6	
CO5	2	3	3	3	3	2	2	2	3	3	2.5	
Average of CO's = 2.4(high)												

**Strongly correlated -3 Moderately correlated -2 weakly correlated -1 No correlation -0**

**MODEL QUESTION**

**B.Sc (CBCS) DEGREE EXAMINATION**

**Introduction to Computers**

**Semester: I**

**TIME: Three hours**

**Maximum:75 Mark**

**PART A-(10X1=10 Marks)**

**Answer all Questions**

**Choose the correct answer**

1. The devices that perform both input and output are ----- devices.  
a. input    b. output software    c. storage    d. Communication
2. The IBM compatible keyboards have \_\_\_\_\_ functional keys.  
a. 12            b. 13            c. 14            d. 15
3. In \_\_\_\_\_ displays phosphorescent film is placed between two  
a. PAPER- WHITE            b. ELD            c. plasma            d. gas
4. \_\_\_\_\_ stores data even when the power is turned off.  
a. RAM            b. ROM            c. register            d. flash memory
5. Access time is measured in terms of \_\_\_\_\_ seconds.  
a. milli            b. micro            c. nano            d. all the above
6. \_\_\_\_\_ Multitasking assigns a priority to each program in the list.  
a. co- operative            b. preemptive  
c. non preemptive            d. all the above
7. The difference between highest & lowest frequencies of transmission channel is  
a. frequency            b. wavelength  
c. bandwidth            d. UTP
8. In token ring the transmission rate is \_\_\_\_\_ megabytes.  
a. 80            b. 100            c. 120            d. 150
9. PRI provides \_\_\_\_\_ data channels.  
a. 20            b. 21            c. 30            d. 31
10. Credit card information is stored in  
a. e-cash    b. e-wallet    c. e-mail    d. all the above

**PART B(5X5=25 Marks)**

**Answer all Questions, choosing either (a) or (b)**

**Each answer should not exceed 250 words**

11(a). Briefly explain about mainframe computers.

(Or)

- (b). Explain optical input devices.
- 12(a). What are the factors determined while evaluating printer. (Or)  
(b). Briefly explain the bus type.
- 13(a). Explain any two types of information system. (Or)  
(b). Explain command line interface in detail.
- 14(a). Write short notes on Win 2000 operating system. (Or)  
(b). Write short note on enterprise software .
- 15(a). Explain addressing scheme of a internet. (Or)  
(b). Explain the functions of FTP.

**PART C (5x8 = 40 marks)**

**Answer all Questions, choosing either (a) or (b)  
Each answer should not exceed 600 words**

- 16(a). Explain handheld devices. (Or)  
(b). Explain in detail the flat panel monitors.
- 17(a). Explain in detail the intel processors. (Or)  
(b). Explain in detail the magnetic Disk.
- 18(a). Explain working & construction of hard disks in detail. (Or)  
(b). Explain GUI in detail.
- 19(a). Explain WIN NT operating system in detail. (Or)  
(b). Explain advantages of network in detail
- 20(a). Explain features of Internet in detail. (Or)  
(b). Explain applications of multimedia in detail.

**MSU/ 2021-22/ UG-Colleges /Part-III (B.Sc. Computer Science) / Semester – I /  
Allied Practical –I  
MS OFFICE- LIST OF PRACTICAL**

**(For the Institutions with B.Sc. (Maths) Programme not opting Physics / Chemistry as Allied Subjects with effect from 2020-21 and onwards for Semesters - I & II)**

***COURSE OUTCOMES***

CO1: To be able to create, edit , documentation in Office .

CO2: To implement Word functions

CO3: To design worksheet and do editing

CO4: To make use of database and apply the calculation

CO5: To create presentation with various functions

1.Text Editing with Different Styles(Invitation Card Design)

2.Table Creation and Editing(Calendar or Timetable)

3.Cut,Paste,Find and Replace Usage

4.Mathematical Symbols, suffix, and super fix, equation creation and editing

5.Worksheet for Payroll

6.Worksheet for EB Billing

7.Use any spreadsheet to plot a chart for marks obtained by the students(out of 5) vs Frequency(Total number of students in class is 50)

8.Database creation for Library Books 9.Database creation for Employee details

10.Presentation in a Seminar with dynamic provisions.

**LOCF MAPPING**

<b>Course code and title : MS OFFICE</b>											
CO/PO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	% of co's
CO1	2	2	2	3	3	2	3	2	3	3	2.5
CO2	2	3	2	3	3	2	3	2	3	3	2.6
CO3	2	2	3	3	3	2	2	3	3	3	2.6
CO4	2	3	2	3	2	2	2	3	3	3	2.5
CO5	2	3	3	3	3	2	2	2	3	3	2.6
Average of CO's = 2.56(high)											

**Strongly correlated -3 Moderately correlated -2 weakly correlated-1 No correlation -0**



## PROGRAMMING IN C++

### *COURSE OUTCOMES*

**On** Successful completion of the course, the student will be able to

- CO1: To define the basic knowledge of object oriented programming concepts
- CO2: To relate the idea of classes and objects
- CO3: To analyze and develop constructors and destructors
- CO4: To design C++ streams, Inheritance, Overloading of operators, functions, constructors, File Handling and templates concepts of C++ programming.
- CO5: To develop the knowledge about how to work on files

### **Unit – I: Principles of Object Oriented Programming                      12 Hours**

Basic Concepts of Object Oriented Programming. **Classes and Objects:** Introduction – Specifying a Class – Defining Member Functions – Making an Outside Function Inline – Nesting of Member Functions - Private Member Functions – Static Data Members – Static Member Functions – Arrays of Objects – Objects as function arguments – Friendly Functions – Returning Objects .

### **Unit – II: Constructors and Destructors    12 Hours**

Introduction – Constructors – Parameterized Constructors – Multiple Constructors in a class – Constructors with Default Arguments – Dynamic Initialization of Objects – Copy Constructors – Dynamic Constructors – const objects - Destructors.

### **Unit – III: Operator Overloading, Type Conversions and Inheritance      14 Hours**

Defining Operator Overloading – Overloading Unary Operators – Overloading Binary Operators – Overloading Binary Operators using Friends – Rules for Overloading Operators – Type Conversions. **Inheritance (Extending Classes):** Introduction – Defining Derived Class – Single Inheritance - Making a Private Member Inheritable – Multilevel Inheritance – Multiple Inheritance – Hierarchical Inheritance – Hybrid Inheritance – Virtual Base Classes - Abstract Classes.

**Unit – IV: Pointers, Virtual Functions and Polymorphism****12 Hours**

Pointers - Pointers to Objects – this Pointer – Pointers to Derived Classes – Virtual Functions - Pure Virtual Functions. **Managing Console I/O Operations:** Introduction – C++ Streams – C++Stream Classes – Unformatted I/O operations – Managing Output with Manipulators.

**Unit – V: Files and Templates****10 Hours**

**Working with Files:** Introduction – Classes for File Stream Operations – Opening and Closing a file – Detecting end-of-file – File Modes – Sequential Input and Output Operations. **Templates:** Introduction - Class Templates – Function Templates.

**Text Book:**

Object Oriented Programming with C++, Sixth Edition by E. Balagurusamy, Tata McGraw HillPublishing Company Limited.

**Reference Book:**

1. Programming with ANSI C++, Bhushan Trivedi, 2010, Oxford University Press
2. The Complete Reference C++, Fourth/ Fifth Edition  
Herbert Schildt, Tata McGraw Hill Publishing Company  
Limited.
3. Programming With C++ Third Edition by D. Ravichandran, Tata McGraw Hill  
Education, 2011.
4. Programming in C++ Second Edition by Ashok N. Kamthane, Pearson Education
5. C++ Introduction - W3Schools
6. [https://www.w3schools.com > cpp > cpp\\_intro](https://www.w3schools.com/cpp/cpp_intro)

### LOCF MAPPING

Course code and title : OBJECT ORIENTED PROGRAMMING IN C++											
CO/PO	PO					PSO					% of
	1	2	3	4	5	1	2	3	4	5	co's
CO1	3	2	2	2	2	3	3	2	2	2	2.3
CO2	2	3	2	2	2	2	3	2	3	2	2.2
CO3	2	2	3	2	2	2	2	3	3	3	2.4
CO4	2	3	2	3	3	2	2	3	2	3	2.5
CO5	2	3	3	3	3	2	2	2	3	3	2.6
Average of CO's = 2.4(high)											

Strongly correlated -3 Moderately correlated -2 weakly correlated-1 No correlation -0

MODEL QUESTION:  
B.Sc (CBCS) DEGREE EXAMINATION  
Programming in C++  
Semester: II

TIME: Three hours

Maximum:75 Mark

PART A-(10X1=10 Marks)

Answer all Questions

Choose the correct answer

1. The \_\_\_\_\_ keyword is used to prevent direct access to member variables or function by the user.  
(a) Private (b) Public (c) void (d) none
2. When the class is declared inside the function, it is called as  
(a) local class (b) global class  
(c) friend function (d) Private class
3. Constructor is executed when  
(a) object is declared (b) object is destroyed  
(c) both (a) & (b) (d) none
4. Constructor that accepts parameters is called \_\_\_\_\_ Constructor.  
(a) Default (b) Overload  
(c) Parameterized (d) Implicit
5. Which one of the following operator cannot be overloaded  
(a) - (b) + (c) & (d) --
6. When a single base class is used for derivation of two or more classes, it is called \_\_\_\_\_ inheritance.  
(a) multiple (b) hierarchial (c) hybrid (d) multipath
7. In pointer declaration, \* is known as \_\_\_\_\_.  
(a) indirection operator (b) deference operator  
(c) address operator (d) (a) or (b)
8. The pointer becomes wild pointer due to \_\_\_\_\_.  
(a) Pointer declared but not initialized (b) Pointer alteration  
(c) Accessing destroyed data (d) All the above
9. ostream class controls \_\_\_\_\_ functions.  
(a) input (b) output (c) library (d) file

10. \_\_\_\_\_ invokes the filebuf function to perform the extraction of the streams.  
(a) istream (b) ostream (c) ios (d) none

**PART B(5X5=25 Marks)**

**Answer all Questions, choosing either (a) or (b)**

**Each answer should not exceed 250 words**

11. (a) What is class in C++ ? Explain with an example and the syntax of class declaration. Or  
(b) Explain Data Hiding or Encapsulation with an example program.
12. (a) Describe the characteristics of Constructors and Destructors. Or  
(b) Write a C++ program to define conditional constructor and destructor.
13. (a) Explain the keyword **operator** with an example program. Or  
(b) Write a program to overload unary operator using friend function.
14. (a) Explain **this** pointer with an example program. Or  
(b) List the rules for virtual functions
15. (a) What are File Stream classes? Explain. Or  
(b) Explain the need for Templates.

**PART C -(5X8=40Marks)**

**Answer all Questions, choosing either (a) or (b)**

**Each answer should not exceed 600 words**

16. (a) Explain static member variables and functions with suitable examples. Or  
(b) Explain the use of friend function with an example program.
17. (a) Explain Constructors with arguments and with default arguments. Give examples. Or  
(b) Describe the use of Copy and Private constructors with examples.
18. (a) Write about Type Conversion. Or  
(b) Explain the types of Inheritance.
19. (a) What are pointers? Explain pointer declaration with the features of pointers Or  
(b) Explain pointer to Derived Classes and Base Classes with an example program.
20. (a) Explain the steps of file operations. Or  
(b) Describe file pointers and manipulators.

**Major Practical - II**

**PROGRAMMING IN C++**

**LTPC**

**0 0 4 2**

***COURSE OUTCOMES***

**On** Successful completion of the course, the student will be able to

- To define object oriented programming concepts using class and member functions.
- To develop overloading operators
- To analyze friend function
- To gain the knowledge about the importance of constructor
- To design C++ virtual functions

**Each exercise should be completed within three hours.**

**It is compulsory to complete all the exercises given in the list in the stipulated time.**

1. Program with a Class and Member Functions.
2. Program to Overload Function.(minimum three geometric figures)
3. Program to implement Parameterized Constructor.
4. Program to implement Friend Function (minimum two classes)
5. Program to Overload Unary Minus Operator.
6. Program to Overload Binary Plus Operator.
7. Program to implement Multiple Inheritance for Family Details.
8. Program to implement Multilevel Inheritance for Bank Customer Details.
9. Program to implement Hierarchical Inheritance for Students Details.
10. Program to implement Virtual Function.

**LOCF MAPPING**

Course code and title : PROGRAMMING IN C++											
CO/PO	PO					PSO					% of co's
	1	2	3	4	5	1	2	3	4	5	
CO1	3	2	2	3	3	3	3	2	3	3	2.7
CO2	2	3	2	3	3	2	3	2	3	3	2.6
CO3	2	2	3	2	2	2	2	3	3	3	2.4
CO4	2	3	2	3	3	2	2	3	3	3	2.6
CO5	2	3	3	3	3	2	2	2	3	3	2.6
Average of CO's = 2.6(high)											

**Strongly correlated -3 Moderately correlated -2 weakly correlated-1 No correlation -0**

**MSU/ 2021-22 / UG-Colleges /Part-III (B.Sc. Computer Science) / Semester – II /  
Allied Practical - II  
LINUX**

**L T P C  
0 0 4 2**

***COURSE OUTCOMES***

**On** Successful completion of the course, the student will be able to

- CO1: To find various Linux commands
- CO2: To interpret and make effective use of Linux utilities
- CO3: To construct Shell scripting language to solve problems.
- CO4: To list shell scripting conditions
- CO5: To develop Linux communication oriented commands

**Each exercise should be completed within three hours.**

**It is compulsory to complete all the exercises given in the list in the stipulated time.**

1. Use any text editor in linux(say vi) to enter a C program to find the largest of three numbers, compile using gcc and display the output.
2. Use any text editor in linux(say vi) to enter a C program to find the factorial of a given number, compile using gcc and display the output.
3. Linux commands ls, mkdir, rmdir, cd, pwd, find, du(Directory oriented) cat, cp, rm, mv, wc (File oriented) ps, kill, batch, grep(Process oriented) write, mail, wall (Communication oriented) Linux commands date, who, who am i, man, cal, echo, bc(General purpose)Pipe, Filter
4. Write a shell script to display date in the mm/dd/yy format, time, username and current directory.
5. Write a shell script to find the sum of digits of a given number.
6. Write a program to generate Fibonacci series.
7. Write a program to check whether given string is palindrome or not.
8. Write a shell script to find factorial of a given integer.
9. Write a shell script to generate mark sheet of a student. Take 3 subjects, calculate and display total marks, percentage and Class obtained by the student.

**Reference Books:**

Linux: A practical approach, B. Mohamed Ibrahim, Firewall Media

Comdex Linux and Open Office course kit revised and upgraded, Gupta, Wiley

India.

A practical guide to Linux command, editors, and shell programming

2/e; Mark G Sobell, PrenticeHall.

Linux Lab - Open source Technology : Ambavade – Dreamtech

### LOCF MAPPING

Course code and title : LINUX											
CO/PO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	% of co's
CO1	3	2	2	3	3	2	2	2	3	3	2.5
CO2	2	3	2	3	3	2	3	2	3	3	2.6
CO3	2	2	3	3	3	2	2	3	3	3	2.6
CO4	2	3	2	3	3	2	2	3	3	3	2.6
CO5	2	3	3	3	3	2	2	2	3	3	2.6
Average of CO's = 2.58(high)											

Strongly correlated -3 Moderately correlated -2 weakly correlated-1 No correlation -0



## PROGRAMMING IN C

(For the Institutions with B.Sc. (Maths) Programme not opting Physics / Chemistry  
as Allied Subjects with effect from 2020-21 and onwards for Semesters - I & II )

LTPC  
4 0 2 4

### **COURSE OUTCOMES**

On Successful completion of the course, the student will be able to

- CO1:To obtain knowledge about the structure of the programming language C
- CO2:To develop the program writing and logical thinking skill.
- CO3:To summarize statements and arrays
- CO4:To make use of defined functions
- CO5:To explain pointers and files

### **Unit – I: INTRODUCTION**

**14 Hours**

C Declarations:- Character Set – C tokens – Keywords and Identifiers – Identifiers – Constants – Variables – Data types – Declaration of Variables – Declaration of Storage Class – Assigning Values to Variables – Defining Symbolic Constants – Declaring Variable as Constant. Operators and Expressions:- Introduction – Arithmetic Operators – Relational Operators – Logical Operators – Assignment Operators - Increment and Decrement Operators – Conditional Operator – Bitwise Operators – Special Operators - Arithmetic Expressions – Evaluation of Expressions – Precedence of Arithmetic Expressions. Managing Input and Output Operations:- getchar() – putchar() – scanf() – printf().

### **Unit – II: CONTROL STRUCTURES**

**10 Hours**

Decision Making and Branching:- Decision Making with IF Statement – Simple IF statement – The IF...Else Statement – Nesting of IF...Else Statements – The ELSE IF ladder – The Switch Statement – The ?: Operator – The GOTO statement. Decision Making and Looping:- The WHILE Statement – The DO Statement – The FOR statement.

**Unit – III: ARRAYS****10 Hours**

One-dimensional arrays – Declaration of One-dimensional arrays – Initialization of One- dimensional arrays - Two-dimensional arrays – Initialization of Two-dimensional arrays – Multi- dimensional arrays. Character Arrays and Strings:- Declaring and Initializing String Variables – Reading Strings from Terminal – Writing Strings to Screen – String Handling Functions.

**Unit – IV: FUNCTIONS****14 Hours**

User-Defined functions:- Need for User-defined functions – Definition of functions – Return Values and their Types – Function Calls – Function Declaration – Category of functions – No Arguments and No return values – Arguments but No return Values – Arguments with return values – No arguments but a return a value – Recursion – Passing Arrays to functions – Passing Strings to functions – The Scope, Visibility and lifetime of a variables. Structures and Unions:- Defining a Structure – Declaring Structure Variables – Accessing Structure Members – Structure Initialization – Arrays of structures – Unions.

**Unit – V: POINTERS AND FILES****12 Hours**

Pointers:- Understanding pointers – Accessing the Address of a Variable – Declaring Pointer Variables – Accessing a variable through its pointer – Pointer Expressions – Pointers as function arguments. File Management in C:- Defining and Opening a file – Closing a File – Input/output Operations on files – Error Handling during I/O Operations.

**Text Book :**

Programming in ANSI C – 6<sup>th</sup> Edition by E Balagurusamy – Tata McGraw Hill Publishing Company Limited.

**Reference Books:**

1. Computer System and Programming in C by Manish Varhney, Naha Singh – CBS Publishers and Distributors Pvt Ltd.
2. Introduction to Computer Science, IITL Education Solutions Limited, Second Edition, Pearson Education Computer Basics and C Programming by V. Rajaraman – PHI Learning Private Limited Programming with C, Third Edition, Byron S Gottfried,

Tata McGraw Hill Education Private Limited.

3. The Art of C Programming | Robin Jones | Springer <https://www.springer.com> > book

ISBN 978-1-4613-8685-8 · Digitally watermarked, DRM-free

4. C Programming Tutorial PDF <https://www.unf.edu> > ~wkloster > ppts > cprogra...

**LOCF MAPPING**

<b>Course code and title : PROGRAMMING IN C</b>											
CO/PO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	% of co's
CO1	2	2	2	2	2	2	3	2	2	3	2.2
CO2	2	3	2	3	3	2	3	2	3	3	2.6
CO3	2	2	3	3	3	2	2	3	3	3	2.6
CO4	2	3	2	3	2	2	2	3	3	3	2.5
CO5	2	3	3	3	3	2	2	2	3	3	2.6
Average of CO's = 2.5(high)											

**Strongly correlated -3 Moderately correlated -2 weakly correlated -1 No correlation -0**

MODEL QUESTION  
B.Sc (CBCS) DEGREE EXAMINATION  
**Programming in C**  
Semester: I

TIME: Three hours

Maximum:75 Marks

PART A-(10X1=10 Marks)

Answer all Questions

Choose the correct answer

1. \_\_\_\_\_ constant contains single character enclosed in single quotes.  
a. Character constant      b. String constant      c. integer constant
2. Value which does not vary during the execution of program  
a. variable      b. constant  
c. data      d.. none
3. Which operator returns remainder  
a. /\*      b. \*/      c. %      d. +
4. In C language && is a \_\_\_\_\_ operator  
a. assignment      b. logical      c. relational      d. none
5. ----- statement used to jump out of a program  
a. break.      b. continue      c. go to      d. none
6. int digits[10]={1,2,3,4,5,6,7,8,9,10}; which element is in the position digits[5]  
a. 5      b. 6      c. 8      d. 7
7. \_\_\_\_\_ is a indirection operator  
a. &      b. \*      c. %      d. none
8. Return statement can be used to \_\_\_\_\_.  
a. return the control to the called function      b. call the function  
c. return the value if any to the calling function      d. none
9. Select the keyword among the following.  
a. member      b. Input      c. union      d. none
- 10.----- function is used to write a set value to a file..  
a. fprintf      b. gets      c. puts      d. fscanf

PART B-(5X5=25 Marks)

Answer all Questions, choosing either (a) or (b)

Each answer should not exceed 250 words

- 11a. What is meant by C Character set. Give an example. Or  
b. What are constants and variables. Give an example..
- 12a. Write about I/O statements in C with examples. Or  
b. Write a C program to reverse the given number.
- 13a. Explain two dimensional array with initialization. Or  
b. Write a C program to exchange the variables x & y.
- 14a. Write about function declaration with example. Or  
b. Explain how to define structure.
- 15a. Write about the various operations on files. Or  
b. Write a C program to find the sum of all elements in the array using pointer.

PART C -(5X8=40Marks)

Answer all Questions, choosing either (a) or (b)

Each answer should not exceed 600 words.

- 16a. Explain the data types available in C Or  
b. Explain various types of operators in C.
- 17a. Describe about decision making and branching statements in C Or  
b. Write a program to calculate and print the Fibonacci numbers.
- 18a. Describe about pointer declaration with example. Or  
b. Write a program to find the product of two matrices.
- 19a. Write a program to sort numbers using function. Or  
b. Explain how to use structures within a structure?. Give an example.
- 20a. Write a program to prepare a student mark sheet using Structure. Or  
b. Discuss how to read and write data file

### C PROGRAMMING - LIST OF PRACTICALS

(For the Institutions with B.Sc. (Maths) Programme not opting Physics /  
Chemistry as Allied Subjects with effect from 2021-22 and onwards )

#### *COURSE OUTCOMES*

On Successful completion of the course, the student will be able to

- CO1: To define the features of C by applying sample problems
- CO2: To explore skills in implementing algorithms through the programming Language C
- CO3: To develop array of elements
- CO4: To evaluate matrices
- CO5: To develop the programs using pointers and functions

#### List of practicals

1. Write a program to convert the temperature from Fahrenheit to Celsius.
2. Write a program to test whether the given year is leap year or not.
3. Write a program to read two integers m and n and print the prime numbers in between them.
4. Write a program to evaluate the series  $e^x = 1 + x/1! + x^2/2! + \dots$
5. Write a program to arrange the given set of numbers in ascending order.
6. Write a program to read two matrices and to find the sum and product of the matrices.
7. Write a program to check whether a given string is Palindrome or not.
8. Write a program to find Factorial value, Fibonacci, GCD value-Recursion.

## LOCF MAPPING

<b>Course code and title : C PROGRAMMING LAB</b>											
CO/PO	PO					PSO					%
	1	2	3	4	5	1	2	3	4	5	of co's
CO1	2	2	2	2	2	2	3	2	2	3	2.2
CO2	2	3	2	3	3	2	3	2	3	3	2.6
CO3	2	2	3	3	3	2	2	3	3	3	2.6
CO4	2	3	2	3	2	2	2	3	3	3	2.5
CO5	2	3	3	3	3	2	2	2	3	3	2.6
Average of CO's = 2.5(high)											

**Strongly correlated -3 Moderately correlated -2 weakly correlated-1 No correlation -0**

**SEMESTER III**  
**MSU/ 2021-22/ UG-Colleges /Part - III (B.Sc. Computer Science) / Semester – III**  
**/Core**

**JAVA PROGRAMMING**

**LTPC**  
**4 0 0 4**

***COURSE OUTCOMES***

**On** Successful completion of the course, the student will be able to

- CO1: To recall the basic concepts of Object Oriented Programming
- CO2: To apply the tools of Object – Oriented Paradigm in Java programming
- CO3: To understand the fundamentals of applet, event – driven programming
- CO4: To analyze the ability to develop Applet programs with tools of Java
- CO5: To design the skills to develop software

**UNIT I**

**Class, Objects, Inheritances, Arrays, Strings:** **12 Hours**

Classes, Objects and methods: Defining A Class – Fields Declaration – Methods Declaration – Creating Objects – Accessing Class Members – Constructors – Methods Overloading – Static Members – Nesting Of Methods. Extending a Class – Overriding Methods – Final – Variables, Methods And Classes – Finalize Methods.

**UNIT II**

**Arrays, Strings, Interfaces and Packages:** **12 Hours**

One-Dimensional Arrays – Creating An Array – Two-Dimensional Arrays – Strings. Interfaces: Defining Interfaces – Extending Interfaces – Implementing Interfaces – Accessing Interface Variables. Java API Packages – Using System Packages – Naming Conventions – Creating Packages - Accessing A Package – Using A Package – Adding Classes To A Package – Hiding Classes – Static Import. (12L)

**UNIT III**

**Multithreading and Exceptions:** **12 Hours**

Creating Threads – Extending Thread Class – Stopping And Blocking A Thread – Life Cycle Of A Thread – Using Thread Methods – Thread Exceptions – Thread Priority – Synchronization – Implementing Runnable Interface. Managing Errors and Exceptions: Types Of Errors – Exceptions – Syntax Of



Exception Handling Code – Multiple Catch Statements – Finally Statement – Throwing Our Own Exceptions – Using Exceptions For Debugging

**UNIT IV**

**12 Hours**

**Applet Programming**

Applet Programming: How Applets Differ From Applications? – Preparing Applets – Building Applet Code – Applet Life Cycle – Creating An Executable Applet – Designing A Web Page – Applet Tag – Adding Applet To HTML File – Running Applet - More About Applet Tag - Passing Parameters To Applets – Aligning The Display – Displaying Numerical Values

**UNIT V**

**Event Handling and Graphics Programming**

**12 Hours**

Getting Input from User – Event Handling. The Graphics Class – Drawing Lines, Rectangles, Circles, Ellipses, Arcs, Polygons – Line Graphs – Using Control Loops in Applets – Drawing Bar Charts - Introducing to AWT Package. (12L).

**TEXT BOOK:**

Programming with Java A Primer – E.Balagurusamy, McGraw Hill- Fourth Edition

**REFERENCE BOOKS:**

Java2 – Complete Reference – Herbert Schildt, McGraw Hill Publications

**LOCF Mapping**

<b>Course code and title : JAVA PROGRAMMING</b>											
CO/PO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	% of co's
CO1	3	3	2	2	2	3	3	2	2	2	2.4
CO2	3	3	3	2	2	3	3	2	3	3	2.7
CO3	2	3	3	2	2	2	3	3	3	2	2.5
CO4	2	3	3	3	2	2	2	3	3	3	2.6
CO5	2	3	3	3	3	2	2	3	3	3	2.7
Average of CO's = 2.58(high)											

Strongly correlated -3 Moderately correlated -2 weakly correlated-1 No correlation -0

B.Sc (CBCS) DEGREE EXAMINATION

JAVA Programming

Semester: III

TIME: Three hours

Maximum:75 Marks

PART A-(10X1=10 Marks)

Answer all Questions

Choose the correct answer

1. Java uses \_\_\_\_ to represent characters.  
a. byte code                      b. Unicode                      c. ASCII                      d. none
2. \_\_\_\_\_ defines a scope of variable  
a. braces                      b. blocks                      c. code                      d. all the above
3. Classes in the java program is encapsulated by  
a. method overloading                      b. method overriding                      c. main()                      d. none
4. \_\_\_\_\_ operator dynamically allocate the memory for an object  
a. this                      b. throw                      c. new                      d. all the above
5. \_\_\_\_\_ can be used to overriding  
a. inheritance                      b. interface                      c. final                      d. none
6. Partial implementation of class in interface is declared as  
a. abstract                      b. interface                      c. final                      d. none
7. \_\_\_\_\_ defines a path of execution  
a. abstract                      b. interface                      c. final                      d. thread
8. The Applet class contained in  
a. java.awt                      b. applet viewer                      c. java.applet                      d. none
9. All events are encapsulated in  
a. AWT                      b. event object                      c. applet                      d. all above
10. AWT classes are contained in \_\_\_\_\_.  
a. java.awt                      b. java. Event                      c. java.applet                      d. none

PART B-(5X5=25 Marks)

Answer all Questions, choosing either (a) or (b)

Each answer should not exceed 250 words.

- 11 a. Explain automatic type promotion in java. Or  
b. Define scope of variable. Give an example.
- 12 a. Define Method overriding. Give an example. Or

- b. Define command line argument. Give an example
- 13 a. Explain CLASSPATH Or
- b. Define exception handling. Give an example.
- 14 a. Explain Applet Display methods
- b. Explain delegation event models. Or
- 15a. Explain how to create frame window using Applet. Or
- b. Explain how to create Choice controls

PART C -(5X8=40Marks)

Answer all Questions, choosing either (a) or (b)

Each answer should not exceed 600 words.

- 16a. Explain elementary data types in java Or
- b. Explain how to declare objects. Give an example
- 17a. Explain Overloading constructors with example Or
- b. Explain how to create multiple inheritance. Give an example.
- 18a. Explain how to import packages. Give an example. Or
- b. Explain how to create multiple thread. Give an example.
- 19a. How to create Applet Skeleton. Discuss Applet methods . Or
- b. Explain Event Listener Interface
- 20a. Explain any two graphical function with example Or
- a. Explain how to create menu. Give an example

**MSU/ 2021-22/ UG-Colleges /Part - III (B.Sc. Computer Science) / Semester – III  
/Major Practical-III**

**JAVA PROGRAMMING LAB**

**LTPC  
0 0 3 2**

***COURSE OUTCOMES***

**On** Successful completion of the course, the student will be able to

CO1: Illustrate and make effective use of Java Programming to develop software

CO2: Develop Java application programs using OOP principles..

CO3: Apply Constructors and Overriding methods

CO4: Develop Multithreaded programs

CO5: To implement error handling techniques using exception handling.

1. Write a JAVA program using Multiple Constructors
2. Write a JAVA program using different types of inheritance
3. Write a JAVA program using Overriding Methods.
4. Write a JAVA program using one-dimensional arrays
5. Write a JAVA program using Two-dimensional arrays
6. Write a JAVA program implementing interface(s)
7. Write a JAVA program to create and import package
8. Write a JAVA program to create and deal multiple threads
9. Write a JAVA program with throwing your own exception
10. Write a JAVA program using Applet to Design a Web Page.
11. Write a JAVA program for handling mouse events
12. Write a JAVA program for handling keyboard events.

**LOCF MAPPING**

<b>Course code and title : JAVA PROGRAMMING LAB</b>											
CO/PO	PO					PSO					% of co's
	1	2	3	4	5	1	2	3	4	5	
CO1	3	2	2	3	3	2	3	2	2	3	2.5
CO2	2	3	2	3	3	2	3	2	3	3	2.6
CO3	2	2	3	3	3	2	2	3	3	3	2.6
CO4	2	3	2	3	2	2	2	3	3	3	2.5
CO5	2	3	3	3	3	2	2	2	3	3	2.6
Average of CO's = 2.5(high)											

**Strongly correlated -3 Moderately correlated -2 weakly correlated-1 No correlation -0**

**SCRIPTING LANGUAGES**

**LTPC  
3 0 0 3**

***COURSE OUTCOMES***

**On** Successful completion of the course, the student will be able to

- CO1: To understand the basic concepts of HTML and web programming.
- CO2: To Demonstrate the concepts of scripting languages for developing web-based projects
- CO3: Ability to compare the differences between Scripting languages and programming languages
- CO4: To understand CSS files HTML Multimedia.
- CO5: Ability to develop projects using HTML and Web pages.

**Unit I:**

**Introduction to Web programming and HTML** **12 Hours**

**Examining the Pieces of Web Programming:** Creating a Simple Web Page - Creating a Dynamic Web Page - Storing Content

**The Basics of HTML5:** Diving into Document Structure - Looking at the Basic HTML5 Elements - Marking Your Text - Working with Characters - Making a List - Building Tables

**Unit II:**

**CSS and HTML Forms** **12 Hours**

**The Basics of CSS3:** Understanding Styles - Styling Text - Working with the Box Model - Styling Tables

- Positioning Elements

**HTML5 Forms:** Understanding HTML5 Forms - Using Input Fields - Adding a Text Area - Using Drop- Down Lists - Enhancing HTML5 Forms - Using HTML5 Data Validation

**Unit III: Advanced CSS and HTML Multimedia****12 Hours**

**Advanced CSS3:** Rounding Your Corners - Using Border Images - Looking at the CSS3 Colors - Adding Shadows. **HTML5 and Multimedia:** Working with Images - Playing Audio - Watching Videos

**Unit IV:****JavaScript****12 Hours**

**JAVASCRIPT:** Knowing Why You Should Use JavaScript - Seeing Where to Put Your JavaScript Code

- The Basics of JavaScript - Controlling Program Flow - Working with Functions.

**Advanced JavaScript Coding:** Understanding the Document Object Model - Finding Your Elements

**Unit V:****Introduction to jQuery****12 Hours**

**Using jQuery:** Using jQuery Functions - Finding Elements - Replacing Data - Changing Styles

**Reacting to Events with JavaScript and jQuery:** Understanding Events - Focusing on JavaScript and Events - Looking at jQuery and Events

**Text Book:**

1. PHP, MySQL & Javascript for dummies - Richard Blum, Wiley Publishing – 2018 (Book:Chapter - 1:1, 2:1, 2:2, 2:3, 2:4, 2:5, 3:1, 3:2, 3:3, 3:4)

**Reference Books:**

1. MASTERING HTML, CSS & JavaScript Web Publishing – Laura Lemay, Rafe Coburn and Jennifer Kyrnin – BPB publishing – 2016

2. Beginning HTML, XHTML, CSS and Java script - Jon Duckett - Wiley Publishing

3. Web Technologies for Beginners - Ashwin Mehta - Shroff Publishers & Distributors Pvt. Ltd.

## LOCF MAPPINGS

Course code and title : <b>SCRIPTING LANGUAGES</b>											
CO/PO	PO					PSO					% of co's
	1	2	3	4	5	1	2	3	4	5	
CO1	3	3	2	2	2	3	3	2	3	2	2.5
CO2	2	3	2	3	3	2	3	2	3	3	2.6
CO3	2	2	3	2	2	2	2	3	3	3	2.4
CO4	2	3	2	3	3	2	2	3	3	3	2.6
CO5	2	3	3	3	3	2	2	2	3	3	2.6
Average of CO's = 2.54(high)											

**Strongly correlated -3 Moderately correlated -2 weakly correlated-1 No correlation -0**

**MODEL QUESTION**  
**B.Sc. (CBCS) DEGREE EXAMINATION,**

Third Semester Computer Science — Allied SCRIPTING LANGUAGES  
(For those who joined in July 2020 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answers :

1. \_\_\_\_\_ converts the connection into a secure tunnel for sending data in HTTP client request.  
a. CONNECT                      (b) DELETE      (c) GET      (d) HEAD
2. Unvisited links appears underlined in \_\_\_\_\_color.  
a) green                              (b) blue                      (c) red                      (d) yellow
3. A \_\_\_\_\_ applies the defined styles to elements that is in a specific state on the webpage.  
(a) abstract-class                      (b) pseudo-class      (c) empty-class                      (d) base-class
4. The \_\_\_\_\_ element provides a larger interface for entering text.  
(a) text                              (b) text area  
(c) anchor                              (d) headings
5. \_\_\_\_\_ specifies the amount the image extends beyond the normal border box area.  
(a) border-image-source              b) border-image-slice  
(b) c) border-image-outset      d) border-image-repeat
6. The \_\_\_\_\_ function to define the direction of the fade and the transition colors.  
(a) radial-gradient( )              (b) linear-gradient( )  
(c) parallel-gradient              (d) vertical-gradient
7. JavaScript allows storing multiple values in a single variable. These variables are called \_\_\_\_\_.  
(a) constant                              (b) operator  
(c) arrays                              (d) function
8. \_\_\_\_\_ returns the DOM object for the html element of the web page.  
(a) documentElement              (b) documentMode  
(c) characterSet                      (d) embeds



9. \_\_\_\_\_ functions to find elements in the webpage.
- (a) getElementBysearch( )                      b) getElementBywrite( )  
 c) getElementByread ( )                      d) getElementByTagName( )
10. \_\_\_\_\_ triggers when the browser's history changes.
- a) Onpageshow                                      (b) Onpopstate  
 (c) Onpagehide                                      (d) Onstorage

**PART B — (5 × 5 = 25 marks)**

**Answer ALL questions, choosing either (a) or (b) Each answer should not exceed 250 words.**

11. (a) What is meant by styling? Explain. (OR)  
 (b) Discuss about formatting text with example.
12. (a) Explain about cascading style rules. . (OR)  
 (b) How will you using drop-sown list in HTML5? Give an example.
13. (a) Explain about rounding your corners. (OR)  
 b) Describe looking at digital video formats.
14. (a) Elucidate about embedding JavaScript withan example. . (OR)  
 (b) Discuss about switch statements with suitableexample.
15. a) Illustrate about mouse events with anexample. (OR)  
 (b) Discuss about clicking the button withsuitable example.

**PART C — (5 × 8 = 40 marks)**

**Answer ALL questions, choosing either (a) or (b) Each answer should not exceed 600 words.**

16. (a) Elucidate about client-side programming. (OR)  
 (b) Discuss about working with characters.
17. (a) Explain playing with color in CSS. . (OR)  
 (b) Illustrate textboxes and file upload withsuitable example.
18. (a) Explain adding shadows in detail. (OR)  
 (b) Describe briefly about working with imagemap.
19. (a) Analyze the different types of looping statement in JavaScript. (OR)  
 (b) Discuss about finding your element.
20. (a) Explain about working with text. (OR)  
 (b) Discuss about the JQuery event handler indetail.

**MSU/ 2021-22/ UG-Colleges /Part - III (B.Sc. Computer Science)/ Semester – III /  
Allied Practical-II**

**SCRIPTING LANGUAGES LAB**

**LTPC  
0 0 2 2**

***COURSE OUTCOMES***

**On** Successful completion of the course, the student will be able to

- CO1: To develop knowledge in web-based projects
- CO2: To demonstrate programming skills in scripting languages.
- CO3: To construct the skill of designing GUI in scripting languages
- CO4: To categorize CSS files
- CO5: To design JavaScript programs

**List of practicals**

1. Create a web page with HTML5 media elements.
2. Use CSS script to display different background-color for different tags including header, footer, nav etc. in a form. Use HTML5 data validation.
3. Develop a HTML Form, which accepts any Mathematical expression. Write JavaScript code to Evaluates the expression and Displays the result.
4. Write a JavaScript code to find the sum of N natural Numbers. (Use user-defined function)
5. Create a web page using two image files, which switch between one another as the mouse pointer moves over the image. Use the on Mouse Over and on Mouse Out event handlers.
6. Create a form having number of elements (Textboxes, Radio buttons, Checkboxes, and so on). Write JavaScript code to count the number of elements in a form.
7. Create a HTML form that has number of Textboxes. When the form runs in the Browser fill the textboxes with data. Write JavaScript code that verifies that all textboxes has been filled. If a textboxes has been left empty, popup an alert indicating which textbox has been left empty.
8. Create a form for Student information. Write JavaScript code to find Total, Average, Result and Grade.

## LOCF MAPPING

<b>Course code and title : SCRIPTING LANGUAGES LAB</b>											
CO/PO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	% of co's
CO1	2	2	3	3	2	2	3	3	3	2	2.5
CO2	2	3	3	2	2	3	3	3	3	2	2.6
CO3	2	3	3	2	2	2	3	3	3	3	2.6
CO4	2	3	3	3	3	2	2	3	3	3	2.7
CO5	2	3	3	3	3	2	2	3	3	2	2.6
Average of CO's = 2.6(high)											

**Strongly correlated -3 Moderately correlated -2 weakly correlated-1 No correlation -0**

**MSU/ 2021-22/ UG-Colleges /Part - III (B.Sc. Computer Science) / Semester – III**  
**/Skill Based Core I**  
**DIGITAL DESIGN**

**LTPC**

**4 0 0 4**

***COURSE OUTCOMES***

**On** Successful completion of the course, the student will be able to

CO1: To recall the concept of digital systems, to operate on various number systems and

simplify Boolean functions and to distinguish logical and combinational circuits.

CO2: Illustrate the concept of digital and binary systems

CO3: Be able to develop combinational logic circuits.

CO4: Be able to design and analyze sequential logic circuits.

CO5: Construct and implementation of digital circuits and systems.

**Unit I**

**12 Hours**

**Number Systems** :Codes and Digital Logic Binary Number System –Binary to Decimal Conversion – Decimal to Binary Conversion –Octal Numbers – Hexadecimal Numbers –The ASCII Code –The Excess- 3 Code –The Gray Code. Digital Logic:The Basic gates NOT, OR , AND –Universal Logic Gates NOR,NAND –AND-OR Invert Gates.

**Unit II**

**12 Hours**

**Combinational Logic**: Circuits Boolean Laws and Theorems –Sum of Products Method–Truth Table to Karnaugh Map –Pairs, Quads and Octets –Karnaugh Simplifications –Don't Care Conditions –Product of Sums Method –Product of Sums Simplification.

**Unit III**

**14 Hours**

**Data Processing and Arithmetic circuits** :Multiplexers –De-multiplexers –1-of-16-Decoders –BCD- to-Decimal Decoders –Seven-Segment decoders –Encoders – Exclusive-OR gates. Arithmetic Circuits:Binary Addition –Binary Subtraction – Unsigned Binary Numbers –Sign-Magnitude Numbers – 2's Complement Representation –2's Complement Arithmetic.

**Unit IV:****10 Hours**

**Flip-Flops:**RS Flip Flops –Edge Triggered RS Flip Flops -Edge Triggered D Flip Flops -Edge Triggered JK Flip Flops –JK Master Slave Flip Flops.

**Unit V:****12 Hours**

**Registers :**Types of Registers –Serial in serial out –serial in parallel out –parallel in serial out –parallel in parallel out–Universal Shift Register.

**Text Book:**

Digital Principles and Applications, by Albert Paul Malvino & Donald P. Leach, Seventh Edition, McGraw Hill Education Private Limited

**Reference Books:**

1. Fundamentals of Digital Circuits, A. Anand Kumar, Second Edition, PHI Learning Private Limited
2. Digital design, M. Morris Mano, Third Edition, Pearson Education

**LOCF MAPPING**

<b>Course code and title : DIGITAL DESIGN</b>											
CO/PO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	% of co's
CO1	3	3	3	2	2	3	3	2	2	2	2.5
CO2	3	3	3	2	2	3	3	3	3	2	2.7
CO3	2	3	3	2	2	2	3	3	3	2	2.5
CO4	2	3	3	3	2	2	2	3	3	3	2.6
CO5	2	3	3	3	3	2	2	3	3	3	2.7
Average of CO's = 2.6(high)											

**Strongly correlated -3 Moderately correlated -2 weakly correlated -1 No correlation -0**

**B.Sc (CBCS) DEGREE EXAMINATION**  
**DIGITAL DESIGN**  
**Semester: III**

TIME: Three hours

Maximum: 75 Marks

PART A-(10X1=10 Marks)

Answer all Questions

Choose the correct answer

1. Data selector is a ----- circuit.  
a) Multiplexer    b) Demultiplexer    c) Encoder    d) Decoder
2. -----circuit identify odd number of inputs.  
a) AND                      b) OR                                      c) NOT    d) EX-OR
3. A flip flop is constructed from ----- gate  
a) NOR                      b) NAND                                      c) NOR and NAND    d) None of the above
4. Feed back is in ---- flip flop  
a) JK                      b) RS                                      c) D                                      d) ALL the above
5. Serial in Serial out register is constructed from  
a) JK                      b) RS                                      c) D                                      d) ALL the above
6. NAND gate is equal to  
a. bubbled AND gate    b. bubbled OR gate    c. bubbled NOT gate    d. none
7.  $(A+B)(A+B')$  is equal to  
a. A                      b. B                                      c. A+B                                      d. none
8. In Half adder the equation for sum is equal to output of two input  
a. AND gate    b. NAND gate    c. NOR gate    d. XOR gate
9. 2's complement is used to represent  
a. +ve number    b. -ve number    c. Both +ve and -ve number    d. none
10. Data is shifted in during ---- transition of serial in serial out register  
a. positive    b. negative    c. positive and negative    d. none of the above

PART B(5X5=25 Marks)

Answer all Questions, choosing either (a) or (b)

Each answer should not exceed 250 words.

- 11(a). With suitable diagram explain construction and working of Multiplexer.    Or  
(b). Explain the working principle of 1 to 16 decoder.
- 12(a). With neat diagram explain the function EX-OR gate.    Or

- b). Describe the working of seven segment display.
- 13.a. Explain Gray code in detail. Or
- b. Explain bubbled AND and Bubbled OR gates.
- 14.a. Simplify  $F(A,B,C,D) = \Sigma(3,5,12,13,15)$  Or
- b. Explain excess 3 code.
- 15.a. Add using two's complement
- Find i.  $-97+37$  ii.  $-43$  and  $-27$  Or
- b. Explain universal shift register.

PART C -(5X8=40Marks)

Answer all Questions, choosing either (a) or (b)

Each answer should not exceed 600 words.

- 16(a). Explain the working of JK flip flop. Or
- (b) Explain the function of RS flip flop.
- 17(a). Explain the working principle of serial in serial out registers Or
- (b) Describe the circuit for serial in parallel out registers.
- 18(a). Explain in detail the Encoders Or
- (b). Explain in detail the parity generators and checkers with suitable waveforms.
- 19.a. Implement all the logic gates using NAND gates. Or
- b. Describe sum of product and product of sum with example.
- 20.a. Implement two variables, three variables and four variables karnaugh map. Also explain overlapping and rolling the map with example. Or
- b. i. Simplify and draw the logic circuits.
- i.  $F(A,B,C) = \Sigma(3,5,6,7)$
- ii. prove that  $A(A'+C) + (A'B+C)(A'BC+C') = 0$

**MSU/ 2021-22/ UG-Colleges /Part - III (B.Sc. Computer Science) / Semester – III**  
**/Non-Major Elective**

L T P C

2 0 0 2

**1. FUNDAMENTALS OF INTERNET AND EMERGING TECHNOLOGIES**

***COURSE OUTCOMES***

**On** Successful completion of the course, the student will be able to

CO1: To recall the background, drivers and history in the invention of computers so that the student gains a big picture of the subject.

CO2: To provide a high level understanding various branches of Computer Science so that students can detect their interest and specialization

CO3: To identify the computational models such as cloud computing and make students choose one for their use

CO4: To Understand the Artificial Intelligence technologies, Networks and Cyber security and its impact on human life in future

CO5: Elaborate Computer Ethics and help the society retain human values while technology is developing.

**Unit I**

6 Hours

Man and Machines - Human Capability of five senses to see, hear, smell, speak and act - Basic Structure of a Computer - Data - Characteristics of a Computer-History of Computers - - Classification of Computers

**Unit II**

6 Hours

Application Software and Programming Languages - Application Software - Packaged Software Products (Off-the-Shelf Products) - Office Automation - Core Banking System - Enterprise Software Products – SAP - Sales Force – Oracle - CRM and ERP - Early High Level Programming Languages - Translators (Compilers and Interpreters) – FORTRAN – BASIC – COBOL – PASCAL - C Language - Web Programming Languages – HTML - Java Script - Objected Oriented Programming with C++ - C++ Language - C# Language - Java Programming - Modern Programming Language – Python - GO Language - Swift Language - Kotlin Language - R Language - Artificial Intelligence Languages - Database Management Software



**Unit III**

6 Hours

Digital Transformation - Data (High Value Commodity) - Digital Transformation in Business - Features of Digital Transformation - Banking and Financial Services Industry (BFSI) - Human Resource Management – Healthcare - Big Data Analytics in Healthcare - Virtual Reality Wearable medical devices

- Retail Industry and CPG -Computer Networks - Basic Networking Terminologies
- Node / Host - Client / Server - MAC Address - IP Address - Unicast, Multicast and Broadcast - Half Duplex and Full Duplex – Encapsulation - Network Protocols - Open System Interconnection (OSI) Model - TCP/IP Protocol Suite - Transfer Control Protocol (TCP) - User Datagram Protocol (UDP) – Ethernet - Hardware Used for Networking - Hubs and Switches – Routers - Networking Cables - Coaxial Cable - Twisted Pair Cable - Fiber Optics Cable - Network Topology - Ring Topology - Star Topology (Hub and Spoke Topology) - Bus Topology - More Topologies - Wireless Networks - Radio Waves - Micro Waves
- Bluetooth – WiFi - Types of Networks - Personal Area Network (PAN) - Local Area Network (LAN)
- MAN and WAN

**Unit IV**

6 Hours

Cyber Security - IT Assets - Risk and Vulnerabilities - Computer Security Types - Fundamental Principles of Security - Physical Safety and Security - Access Control - Biometric Access Control - Network Security - AAA Server – Firewall – Malware – Spyware – Adware – Spamware – Virus

- Ransomware – Worms - Trojan Horse - Computer Virus - Types of Computer Viruses - Antivirus Protection - Digital Signature - Cyber Crime – Hacking – Phishing - Spam e-mails -
- Attack using Malware - ATM Skimming – Ransomware - Fake News - Deep fake – Cyberbullying -
- Cyber Law (IT Law) -Cloud Computing and Virtualization - Own Versus Hire - Benefits and Challenges of Cloud Computing
- Virtualization –Hypervisor - Data Center - Hardware Platform Infrastructure - Infrastructure as a Service (IaaS) - Software as a Service (SaaS) - Platform as a

Service (PaaS) - Application as a Service (AaaS) - Functions as a Service (FaaS) -  
Cloud Deployment Models - Private Cloud - Community Cloud  
- Public Cloud - Hybrid Cloud

**Unit V**

6 Hours

Artificial Intelligence - Machine Learning - Training Data - Machine Learning  
Models - Deep Learning and Neural Networks - Robotics Process Automation  
(RPA) - Speech Recognition - Natural Language Processing – Bots - Natural  
Language Generation - Computer Vision – Biometrics - Sentiment Analysis  
- Artificial Intelligence Applications - Banking and Financial Fraud Detection -  
Medical Diagnostics - Retail Business - Autonomous Car / Driverless Car  
Professional Ethics in Computer - Ethics and Law - Ethical Behaviors - Professional  
Ethics Frameworks  
- Utilitarian Ethics - Deontological Ethics - Virtue Ethics, Communitarian Ethics -  
Ethical Issue in Computer Science - Intellectual Property Rights (IPR) - Data  
Protection Law - Information Security and Privacy - Software License - Open-  
Source Software - Freeware - Unethical Content Filtering - Technology Impact on  
Society

**Textbook**

Fundamentals of Internet and Emerging Technologies (2021) , C. Xavier, New Age  
International Publishers Ltd., New Delhi., Chapters 1, 2, 3 and 9 to 16 only.

**Reference Book**

1. Introduction to Computer Science, Second Edition, IITL Education Solutions  
Ltd, Pearson Education
2. Introduction to Computers, Peter Norton, 7th Edition, McGraw Hill Education
3. Fundamentals of Computers, V.Rajaram, 5th Edition, PHI

**LOCF MAPPING**

<b>Course code and title : FUNDAMENTALS OF INTERNET AND EMERGING TECHNOLOGIES</b>											
CO/PO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	% of CO's
CO1	3	2	3	2	2	2	3	3	3	2	2.5
CO2	3	3	3	2	2	3	3	3	2	2	2.6
CO3	2	3	3	2	2	2	2	3	2	2	2.3
CO4	2	2	2	3	3	2	2	3	3	3	2.5
CO5	2	2	3	3	3	2	2	3	3	2	2.5
Average of CO's = 2.48(high)											

**Strongly correlated -3 Moderately correlated -2 weakly correlated-1 No correlation -0**

**B.Sc (CBCS) DEGREE EXAMINATION**  
**Fundamentals of Internet & Emerging Technologies**  
Semester: III

TIME: Three hours

Maximum:75 Marks

**PART A-(10X1=10 Marks)**

**Answer all Questions**

**Choose the correct answer**

1. A large number of several computer networks spreading across the world is -----.  
a. Internet                      b. www                      c. wide area network                      d. node
2. IRC is -----.  
a. Internet Relay Chat                      b. Internal Relay Chat  
c. Internet Relay Chat                      d. none
3. Devices are required to access the internet through television sets  
a. internet television translator                      b. set-top boxes c. both a & b d. none
4. ----- is a set of rules that enable the exchange of information between computers.  
a. protocols                      b. band width                      c. interface                      d. none
5. The first page of a web site is -----.  
a. front page                      b. home page                      c. web site                      d. none
6. Webalizer is an example of-----.  
a. statics analyzer package                      b. accounting package  
c. database                      d. none
7. \_\_\_ is transaction between the customer and seller.  
a. B2C                      b. B2B                      c. C2B                      d. none
8. WAP stands for  
a. Wireless Application Protocol                      b. Wired application Protocol  
c. Wireless Application Procedure                      d. none
9. Blog sites are hosted by -----.  
a. service provider                      b. protocols                      c. ISDN                      d. none
10. IDS stands for  
a. Intrusion Detection System                      b. Integrated digital System  
c. Integrated digital Software

PART B-(5X5=25 Marks)

Answer all Questions, choosing either (a) or (b)

Each answer should not exceed 250 words

11. a. Explain any two network technologies. Or  
b. Write short notes on E-mail.
12. a. List the advantages of E-mail. Or  
b. Write about URL.
13. a. Write short note on Front page. Or  
b. How to analyze Visitor statics on the internet.
14. a. Write about M-Commerce. Or  
b. Explain issues of E-commerce
- !5. a. Describe the advantages of Blogs Or  
b. Write note on cyber squaffing .

PART C -(5X8=40Marks)

Answer all Questions, choosing either (a) or (b)

Each answer should not exceed 600 words.

16. a. Explain architecture of the internet Or  
b. Write notes on  
i IRC ii News groups
17. a. Explain DNS Or  
b. Write short note on  
i Mail transfer protocol  
ii Internet explorer
18. a. Explain website promoting methods. Or  
b. Write about structure of websites.
19. a. What is the business relationship in the internet. Or  
b. Explain marketing strategies on the web.
20. a. Explain how to host a blog. Or  
b. Discuss about viruses and worms

## 2. BASIC PROGRAMMING DESIGN

### ***COURSE OUTCOMES***

**On** Successful completion of the course, the student will be able to

- CO1: Define the basic design in programming
- CO2: Summarize various techniques in program testing
- CO3: To develop and evaluate Programming Languages
- CO4: To analyze computer hardware and software programs
- CO5: To evaluate the Internet Applications

### **Unit-I**

6 Hours

**Computer Program:** Introduction – Developing a program – Algorithm – Flowchart – Decision Tables.(6L)

### **Unit-II**

6 Hours

Program Testing and Debugging – Program Documentation – Program Paradigms: Unstructured programming, Structured programming and Object Oriented Programming – Characteristics of a Good Programming.

### **Unit-III**

6 Hours

**Computer Languages:** Evolution Programming Languages – Classification of Programming Languages

– Generation of Programming Languages – Features of Good Programming language.

### **Unit-IV**

6 Hours

**Computer Software:** Software Definition – Relationship between Software and Hardware - Software Categories : System Software and Application Software – Terminology Software Firmware, Liveware, Freeware, Public Domain Software, Shareware, Commercial Software and Proprietary Software.

### **Unit V**

6 Hours

Evolution of Internet - Internet Basics: Basic Internet Terms – Getting connected to Internet -Internet Applications – E-mail – Searching the Web – Internet and

Viruses.

**Text Book:**

Introduction to Computer Science, IITL Education Solutions Limited, 2/e, Pearson

**Reference Books:**

1. Fundamentals of Computers, V.Rajaram, 5th Edition, PHI
2. Introduction to Computers, Peter Norton, 7/e, TMH.

**LOCF MAPPING**

<b>Course code and title : BASIC PROGRAMMING DESIGN</b>											
CO/PO	PO					PSO					% of co's
	1	2	3	4	5	1	2	3	4	5	
CO1	3	2	3	2	2	2	3	3	3	2	2.5
CO2	3	3	3	2	2	3	3	3	3	2	2.7
CO3	2	3	3	2	2	2	3	3	2	2	2.4
CO4	2	2	2	3	3	2	2	3	3	3	2.5
CO5	2	2	3	3	3	2	2	3	3	2	2.5
Average of CO's = 2.52(high)											

**Strongly correlated -3 Moderately correlated -2 weakly correlated -1 No correlation -0**

**B.Sc (CBCS) DEGREE EXAMINATION**  
**Basic Programming Design**  
Semester: III

TIME: Three hours

Maximum:75 Marks

**PART A-(10X1=10 Marks)**

Answer all Questions

Choose the correct answer

1. The number system computers operate
  - a. Decimal
  - b. Octal
  - c. Binary
  - d. Hexadecimal
2. The gate known as inverter
  - a. AND
  - b. OR
  - c. NOT
  - d. NAND
3. The basic component of fourth generation computers
  - a. Vacuum Tube
  - b. Transistor
  - c. IC
  - d. Microprocessor
4. Administrative section of a computer system
  - a. input unit
  - b. output unit
  - c. Memory unit
  - d. central processing unit
5. Mouse, track ball and joystick are examples of \_\_\_\_\_
  - a. Scanning devices
  - b. Pointing devices
  - c. Storing devices
  - d. Multimedia devices
6. Device used to generate data on magnetic media other than paper
  - a. Computer Output Microfilm
  - b. printer
  - c. plotter
  - d. monitor
7. Memory that has the highest cost per bit of storage
  - a. RAM
  - b. Cache memory
  - c. ROM
  - d. Hard disk
8. CDROM is a
  - a. Optical Disk
  - b. Magnetic Disk
  - c. Magneto- Optical Disk
  - d. none
9. Set of rules that coordinates the exchange of information
  - a. Message
  - b. Protocol
  - c. Gateway
  - d. Router
10. URL stands for.
  - a. Uniform Resource Locator
  - b. Universal Resource Locator
  - c. Uniform Resource Location
  - d. Universal Resource Location

**PART B-(5X5=25 Marks)**

Answer all Questions, choosing either (a) or (b)

Each answer should not exceed 250 words.

11. a. Convert decimal 36 and 671 into its binary equivalent Or  
b. Write a note on NAND gate.
12. a. Discuss the characteristics of computers. Or



- b. List out the various applications of computers.
13. a. Write a note on Web Cam . Or  
b. Describe Projectors.
14. a. Explain memory hierarchy. Or  
b. Describe pen drive.
15. a. Describe data communication components. Or  
b. Explain Video Conferencing.

PART C -(5X8=40Marks)

Answer all Questions, choosing either (a) or (b)

Each answer should not exceed 600 words.

16. a. Briefly explain the types of Number System. Or  
b. Explain the basic logic gates with truth table and diagrams
17. a. Explain the generations of computers Or  
b. Describe the classification of computers according to functionality.
18. a. Explain Pointing devices Or  
b. Explain the different types of printers.
19. a. Describe the types of ROM Or  
b. Explain the storage organization of magnetic disks
20. a. Explain the different Data Transmission Mode. Or  
b. Describe email in detail.

## SEMESTER IV

MSU/ 2021-22/ UG-Colleges /Part - III (B.Sc. Computer Science) / Semester – IV  
/Core -4

### DATA STRUCTURES

**LTPC**  
**4004**

#### *COURSE OUTCOMES*

**On** Successful completion of the course, the student will be able to

CO1: To understand the concepts of basic data structures.

O2: To acquire the knowledge about stack, Queues and Linked list.

CO3: To have general understanding of the network structures through trees and graph.

CO4: To make the students to understand the basic algorithms for sorting.

CO5: Define data structure Algorithms

#### **Unit I**

12 Hours

**Basic Concepts:-** Algorithm specification – Data Abstraction – Performance Analysis. **Arrays and Structures:-** Arrays: Abstract data type – Polynomials – Sparse Matrices – Representation of Multidimensional Arrays. (12L)

#### **Unit II**

12 Hours

**Stacks and Queues:-** Stacks – Queues – Evaluation of Expressions. **Linked Lists:-** Singly Linked Lists and Chains – Linked Stacks and Queues – Polynomials: Polynomial Representation – Adding Polynomials. Sparse Matrices: Sparse Matrix Representation. – Doubly Linked Lists.

#### **Unit III**

12 Hours

**Trees:-** Introduction – Binary Trees – Binary Tree Traversals: Inorder Traversal – Preorder Traversal – Postorder Traversal. Heaps – Binary Search Trees Forests: Transforming a Forest into a Binary Tree.

#### **Unit IV**

12 Hours

**Graphs:** - The Graph Abstract Data Type-Elementary Graph Operations – Minimum Cost Spanning Trees: Kruskal's Algorithm – Prim's Algorithm. – Sollin's algorithm Shortest Paths and Transitive Closure: Single Source/ All Destination: Nonnegative Edge Costs - All Pairs Shortest Paths.

**Unit V**

12 Hours

**Sorting:-** Motivation – Insertion Sort – Quick Sort – Merge Sort: Recursive Merge Sort. – Heap Sort – External Sorting: Introduction – k-way Merging..**Hashing:-** Static Hashing: Hash Tables, Hash functions.

**Text Book:**

Fundamentals of Data Structures in C by Ellis Horowitz, Sartaj Sahni, Susan Anderson- Freed – Second Edition – Universities Press (India) Private Limited(2019).

**Reference Books:**

1. Data Structures Using C, Second Edition by Reema Thareja – Oxford University Press
2. Data Structures by Dr N Jeya Prakash – Anuradha Publications

**LOCF MAPPING**

Course code and title : <b>DATA STRUCTURES</b>											
CO/PO	PO					PSO					% of co's
	1	2	3	4	5	1	2	3	4	5	
CO1	3	2	3	2	2	2	3	3	2	2	2.4
CO2	3	3	3	2	2	3	3	3	2	2	2.6
CO3	2	3	3	2	2	2	3	3	2	2	2.4
CO4	2	2	2	3	3	2	2	2	3	3	2.4
CO5	2	2	3	3	3	2	2	3	3	2	2.5
Average of CO's = 2.46(high)											

**Strongly correlated -3 Moderately correlated -2 weakly correlated -1 No correlation -0**

**B.Sc (CBCS) DEGREE EXAMINATION  
DATA STRUCTURES  
Semester: IV**

TIME: Three hours

Maximum:75 Marks

PART A-(10X1=10 Marks)

Answer all Questions

Choose the correct answer

1. Programmer's own data type  
a) Information    b) Data    c) Abstract data type    d) Object
2. Matrix where majority of elements have null value  
a) Null matrix    b) square matrix    c) Value matrix    d) Sparse matrix
3. In a linked list a node contains information on  
a) data    b) link    c) data and link    d) none
4. A linked list where the last node of the list points to the first node  
a) single linked list    b) circular linked list    c) double linked list    d) none
5. Postfix form of expression  $(A+B)^C-(D*E)/F$   
a)  $AB+C^DE*F/-$     b)  $AB+C^DEF*/-$     c)  $AB+C^DEF/-*$     d)  $AB+CDEF/-*^$
6. \_\_\_\_\_ inserts an element at the rear of the queue  
a) enqueue    b) dequeue    c) queue rear    d) queue data node
7. The out degree of a leaf is  
a) 0    b) 1    c) 2    d) any number
8. In any binary tree, the maximum number of nodes on level  $l$  is  
a)  $2l$     b)  $l$     c)  $2l+1$     d)  $2^l$
9. Algorithm for Single source shortest path problem  
a) Warshall    b) Floyd    c) Dijkstra    d) none
10. Average run time of Quick sort algorithm  
a)  $O(1)$     b)  $O(\log_2 n)$     c)  $O(n)$     d)  $O(n \log_2 n)$

**PART B-(5X5=25 Marks)**

**Answer all Questions, choosing either (a) or (b)**

**Each answer should not exceed 250 words.**

- 11(a). Describe the concept of data structures. OR  
(b). Explain Jagged table.
- 12(a). Write the algorithm for searching an element in a single linked list. OR  
(b). Explain Fixed block storage.. OR

14.a. Prove that the height of a complete binary tree with  $n$  number of nodes is  $\log_2(n+1)$  OR

b. How will you insert a node in a heap tree?

15.a. Explain adjacency matrix with example. OR

b. Explain adjacency list with example.

PART C -(5X8=40Marks)

Answer all Questions, choosing either (a) or (b)

Each answer should not exceed 600 words.

16(a). Explain collision resolution techniques. OR

(b) Describe the different operations on arrays with relevant algorithms.

17(a). Describe how to insert a node in a single linked list with relevant algorithms. OR

(b) Explain any one application of linked lists.

18(a). Explain the evaluation of expression using stacks OR

(b). Describe the various queue structures.

19.a. Explain binary tree traversal . OR

b. Describe the procedure to insert and delete an item in a binary search tree.

20.a. Describe Quick sort.. OR

b. Explain depth first and breadth first search in a graph with example.

**DATA STRUCTURE L A B**

**LTPC**  
**0 0 5 2**

***COURSE OUTCOMES***

**On** Successful completion of the course, the student will be able to

CO1: To develop skills in implementing sort and search data structure algorithms

CO2: To implement queue and stack techniques

CO3: To design tree traversals

CO4: To implement binary search tree

CO5: To Compile sorting algorithms

**List of Practicals**

1. Search an element in a list using Binary Search.
2. Implementation of Stack- Push and Pop.
3. Implementation of Queue – Enqueue and Dequeue
4. Implementation of Binary Tree Traversals using recursion.
  - a) Pre-order b) In-order c) Post-Order
5. Implementation of Breadth First Search algorithm.
6. Implementation of Depth First Search algorithm.
7. Implementation of Merge Sort
8. Implementation of Quick Sort

## LOCF MAPPING

<b>Course code and title : DATA STRUCTURES LAB</b>											
CO/PO	PO					PSO					% of co's
	1	2	3	4	5	1	2	3	4	5	
CO1	3	2	2	3	3	2	3	2	2	3	2.5
CO2	2	3	2	3	3	2	3	2	3	3	2.6
CO3	2	2	3	3	3	2	2	3	3	3	2.6
CO4	2	3	2	3	2	2	2	3	3	3	2.5
CO5	2	3	3	3	3	2	2	2	3	3	2.6
Average of CO's = 2.5(high)											

**Strongly correlated -3 Moderately correlated -2 weakly correlated-1 No correlation -0**

**MACHINE LEARNING TECHNIQUES**

L T P C  
3 0 0 3

***COURSE OUTCOMES***

On Successful completion of the course, the student will be able to

CO1: To introduce students to the basic concepts of Machine Learning.

CO2: To acquire various techniques in Machine learning.

CO3: To have a thorough understanding of the Supervised and Unsupervised learning techniques

CO4: To study the probability based learning techniques

CO5: To understand graphical models of machine learning algorithms

**UNIT I**

**12 Hours**

**INTRODUCTION :** Introduction to analytics and Machine Learning – Why Machine Learning – Framework for Developing Machine Learning Models – Why Python - Python Stack for Data Science. **DESCRIPTIVE ANALYTICS:** Working with Data Frames in Python – Handling Missing values – Exploration of Data using Visualization- Exercises.

**UNIT II**

**12 Hours**

**LINEAR REGRESSION:** Simple Linear Regression – Steps in Building a Regression Model - Building Simple Linear Regression Model – Model Diagnostics – Multiple Linear Regression - Exercises. **CLASSIFICATION PROBLEM:** Classification – Binary Logistic Regression – Credit Classification - Decision Tree - Exercises

**UNIT III**

**12 Hours**

**ADVANCED MACHINE LEARNING:** Overview – Gradient Descent Algorithm – Scikit- Learn Library for Machine Learning – Advanced Regression Model – Advanced Machine Learning Algorithm – Exercises.

**UNIT IV**

**12 Hours**

**CLUSTERING:** Overview – How does Clustering work – K-Means clustering - Creating Product Segments Using Clustering – Hierarchical Clustering. **RECOMMENDER SYSTEMS:** Datasets – Association Rules – Collaborative Filtering – Matrix Factorization – Exercises.



**UNIT V****12 Hours**

**TEXT ANALYTICS:** Overview - Sentiment Classification – Naïve-Bayes Model for Sentiment Classification - Using Tf-IDF Vectorizer – Challenges – Exercises.

**TEXT BOOK**

Machine Learning using Python by Manaranjan Pradhan and U.Dinesh Kumar Wiley publications.

**REFERENCES:**

Tom M. Mitchell, —Machine Learning, McGraw-Hill Education (India) Private Limited, 2013.

**LOCF MAPPING**

<b>Course code and title : MACHINE LEARNING TEQUINIQUES</b>											
CO/PO	PO					PSO					% of co's
	1	2	3	4	5	1	2	3	4	5	
CO1	3	2	3	2	2	2	3	3	3	2	2.5
CO2	3	3	3	2	2	3	3	3	2	2	2.6
CO3	2	3	3	2	2	2	3	3	2	2	2.4
CO4	2	2	2	3	3	2	2	2	3	3	2.4
CO5	2	2	3	3	3	2	2	3	3	2	2.5
Average of CO's = 2.48(high)											

**Strongly correlated -3 Moderately correlated -2 weakly correlated-1 No correlation -0**

**MODEL QUESTION**  
**B.Sc (CBCS) DEGREE EXAMINATION**  
**Machine Learning Techniques**  
**Semester: IV**

TIME: Three hours

Maximum: 75 Mark

**Section-A(10X1=10)**  
**Answer all Questions**  
**Choose the best answer**

1. What is true about Machine Learning?
  - A. Machine Learning (ML) is that field of computer science
  - B. ML is a type of artificial intelligence that extract patterns out of raw data by using an algorithm or method.
  - C. The main focus of ML is to allow computer systems learn from experience without being explicitly programmed or human intervention.
  - D. All of the above
2. ML is a field of AI consisting of learning algorithms that?
  - A. Improve their performance
  - B. At executing some task
  - C. Over time with experience
  - D. All of the above
3.  $p \rightarrow 0q$  is not a?
  - A. hack clause
  - B. horn clause
  - C. structural clause
  - D. system clause
4. The action \_\_\_\_\_ of a robot arm specify to Place block A on block B.
  - A. STACK(A,B)
  - B. LIST(A,B)
  - C. QUEUE(A,B)
  - D. ARRAY(A,B)
5. A \_\_\_\_\_ begins by hypothesizing a sentence (the symbol S) and successively predicting lower level constituents until individual preterminal symbols are written.
  - A. bottom-up parser
  - B. top parser
  - C. top-down parser
  - D. bottom parser
6. A model of language consists of the categories which does not include \_\_\_\_\_.
  - A. System Unit
  - B. structural units.
  - C. data units
  - D. empirical units
7. Different learning methods does not include?
  - A. Introduction
  - B. Analogy
  - C. Deduction
  - D. Memorization
8. The model will be trained with data in one single batch is known as ?
  - A. Batch learning
  - B. Offline learning
  - C. Both A and B
  - D. None of the above

9. Which of the following are ML methods?

- A. based on human supervision                      B. supervised Learning  
C. semi-reinforcement Learning                      D. All of the above

10. In Model based learning methods, an iterative process takes place on the ML models that are built based on various model parameters, called ?

- A. mini-batches    B. optimized parameters  
C. hyperparameters                                      D. superparameters

**PART B(5X5=25 Marks)**

**Answer all Questions, choosing either (a) or (b)**

**Each answer should not exceed 250 words**

- 11 a. Explain Regression with Example    Or  
    b. Difference between supervised and unsupervised learning  
12a, Explain feature selection method and feature extraction method.                      Or  
    b. Discuss about two approaches used in subset selection.  
13a. Define Hypothesis space & Version space    Or  
    b. Explain the concept of correct learning  
14a. What is Perceptron? Explain its working    Or  
    b. Discuss about issues in decision tree.  
15a. What is revolution problem? How it is solve    Or  
    b. Compare K Means Clustering with hierarchical clustering

**PART C -(5X8=40Marks)**

**Answer all Questions, choosing either (a) or (b)**

**Each answer should not exceed 600 words**

- 16a. Explain how svm can be use for classification problem    Or  
    b. Explain Hidden Markov Model  
17a. Explain K Means Clustering algorithm    Or  
    b. Describe the concept on density based clustering  
18a. Describe the random forest algorithm    Or  
    b. Explain Bootstrapping techniques in detail  
19a. Explain Association rules with example    Or  
    b. Explain sentiment classification in text mining  
20a. Explain AR model    Or  
    b. Explain collaborative filtering

**MSU/ 2021-22 / UG-Colleges /Part-III (B.Sc. Computer Science) / Semester – IV /Allied  
Practical  
PYTHON**

**L T P C**

0 0 2 2

***COURSE OUTCOMES***

**On** Successful completion of the course, the student will be able to

- CO1: To understand the basic concepts in python
- CO2: To understand the concepts and develop python programs
- CO3: To acquire the knowledge about menu driven programs
- CO4: To improve the knowledge in CSV files
- CO5: To understand the functions of python

1. Write a menu driven program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.
2. Write a menu-driven program, using user-defined functions to find the area of rectangle, square, circle and triangle by accepting suitable input parameters from user.
3. Write a program (WAP) to display the first n terms of Fibonacci series.
4. WAP to find factorial of the given number.
5. WAP to find sum of the following series for n terms:  $1 - 2/2! + 3/3! - \dots - n/n!$
6. WAP to calculate the sum and product of two compatible matrices.
7. WAP to explore String functions.
8. WAP to create and read a CSV file and display the file contents.
9. WAP to write the text "hello python" in an existing file.
10. WAP to set background color and draw a circle using turtle module

## LOCF MAPPING

Course code and title : PYTHON LAB											
CO/PO	PO					PSO					% of co's
	1	2	3	4	5	1	2	3	4	5	
CO1	2	2	3	2	3	2	2	3	3	3	2.4
CO2	2	3	3	2	2	2	3	3	3	2	2.5
CO3	2	2	3	2	3	2	3	3	2	2	2.4
CO4	2	2	2	3	3	2	2	3	3	3	2.5
CO5	2	2	3	3	3	2	2	3	3	2	2.5
Average of CO's = 2.52(high)											

Strongly correlated -3 Moderately correlated -2 weakly correlated -1 No correlation -0

MSU/ 2021-22/ UG-Colleges /Part - III (B.Sc. Computer Science) / Semester – IV  
/Skill based Core II

### COMPUTER ARCHITECTURE

**LTPC**  
**4004**

#### ***COURSE OUTCOMES***

**On** Successful completion of the course, the student will be able to

- CO1: Understand the basics of Computers and its Organization
- CO2: Know the various Technologies behind the Computer Architecture
- CO3: An ability to apply knowledge about hardware implementation and algorithms
- CO4: To evaluate various input output organisations
- CO5: To develop the architecture using various memories

**UNIT I****12 Hours**

**Basic Computer Organization And Design :** Instruction codes – Computer Registers - Computer Instructions - Timing and Control - Instruction Cycle - Control Memory-Address Sequencing

**UNIT II****12 Hours**

**Central Processing Unit :** General Register Organization – Stack Organization – Instruction Formats – Addressing Modes – Data transfer and manipulation – Program Control.

**UNIT III****12 Hours**

**Computer Arithmetic :** Hardware Implementation and Algorithm for Addition, Subtraction, Multiplication, Division-Booth Multiplication Algorithm-Floating Point Arithmetic.

**UNIT IV****12 Hours**

**Input Output Organization :** Input – Output Interface – Asynchronous data transfer – Modes of transfer – Priority Interrupt – Direct Memory Access (DMA).

**UNIT V****12Hours**

**Memory Organisation:** Memory Hierarchy - Main memory - Auxillary memory - Associative memory - Cache memory - Virtual memory.

**Text Book:**

Computer system Architecture - by Morris Mano, Third Edition. P.H.I Private Limited.

**Reference Books:**

1. “Computer System Architecture”, John. P. Hayes.
2. “Computer Organization, C. Hamacher, Z. Vranesic, S.Zaky.
3. “Computer Architecture and parallel Processing “, Hwang K. Briggs.

4. “Computer Organization and Architecture, William Stallings , Sixth Edition, Pearson Education, 2003.

**LOCF MAPPING**

Course code and title : <b>COMPUTER ARCHITECTURE</b>											
CO/PO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	% of co's
CO1	3	2	3	2	2	2	3	3	3	2	2.5
CO2	3	3	3	2	2	3	3	3	2	2	2.6
CO3	2	3	3	2	2	2	3	3	2	2	2.4
CO4	2	2	2	3	3	2	2	3	3	3	2.5
CO5	2	2	3	3	3	2	2	3	3	2	2.5
Average of CO's = 2.5(high)											

**Strongly correlated -3 Moderately correlated -2 weakly correlated-1 No correlation -0**

B.Sc (CBCS) DEGREE EXAMINATION  
COMPUTER ARCHITECTURE

Semester: IV

TIME: Three hours

Maximum:75 Marks

PART A-(10X1=10 Marks

Answer all Questions

Choose the correct answer

1. ----- addressing mode the second part of an instruction code specifies the address of An operand  
a. immediate                      b. direct                      c. indirect                      d. index
2. In the ----- organization the control logic is implemented with flip flops and gates.  
a. micro programmed              b. hardwired              c. software                      d. none
3. The sequence of micro instructions constitutes a-----  
a. micro operation              b. micro program  
c. control instruction              d. conditional instruction
4. In----- mode the operand is specified in the instruction itself.  
a. register                      b. immediate                      c. direct                      d. indirect
5. In division algorithm if partial remainder is smaller than the division then the quotient bit is  
a. 0                                      b. 1                                      c. shift right                      d. none
6. In multiplication algorithm low order bit of ----- is tested.  
a. multiplier                      b. Multiplicand                      c. both a & b                      d. none
7. The agreement between two independent units is referred to as-----  
a. strobe                      b. handshaking                      c. Asynchronous                      d. none
8. A polling procedure is used to identify the highest priority source by ----- means.  
a. software                      b. hardware                      c. DMA                      d. parallel
9. The memory unit that communicates directly with the CPU is called  
a. Auxiliary memory              b. Secondary memory              c. Main memory              d. none
10. Virtual memory is  
a. ROM                                      b. RAM                                      c. Concept                      d. Associative



PART B-(5X5=25 Marks)

Answer all Questions, choosing either (a) or (b)

Each answer should not exceed 250 words.

- 11a. Explain briefly about the stored program organization. Or  
b. Write short notes about control unit.
- 12a. Explain any six addressing modes in detail. Or  
b. Explain program control in detail.
- 13 a. Explain for adding and subtracting number in signed 2's complement representation. or  
b. Discuss booth multiplication algorithm in detail
- 14a. Write short note about Asynchronous Data transfer Or  
b. Explain the operation of "Daisy chaining priority".
- 15a. Briefly write about cache memory Or  
b. Explain about memory hierarchy with neat diagram

PART C -(5X8=40Marks)

Answer all Questions, choosing either (a) or (b)

Each answer should not exceed 600 words.

- 16 a. Explain with neat diagram of common bus system. Or  
b. Explain instruction cycle in detail.
- 17a. Explain about the stack organization in detail.
- 18 a. Explain division algorithm in detail. Or  
b. What is meant by array multiplier? Explain 4 bit by 3 bit array multiplier through its Block diagram?
- 19 a. Explain direct memory access in detail Or  
b. Describe modes of transfer in detail.
- 20.a. What is associative memory? Explain. Or  
b. What is virtual memory? Explain the mapping process

## 1. HTML

### ***COURSE OUTCOMES***

**On** Successful completion of the course, the student will be able to

CO1: To recall the basic concepts of Web design using HTML.

CO2: To learn the various tags used in HTML

CO3:To make use of Dynamic HTML

CO4:To compare the lists in HTML

CO5:To build Frames

### **Unit I:**

6 Hours

Introduction to HTML: Designing a Home page – History of HTML – HTML generations- HTML Documents-Anchor tag –Hyper links –Sample HTML documents.

### **Unit II :**

6 Hours

Head and Body section: Header Section –Title-Prologue-Links-Colorful web page –Comments lines Designing the body: Heading printing –Aligning the headings- Horizontal rule- paragraph-Tab settings-Image and pictures-Embedding PNG format Images

### **Unit III:**

6 Hours

Ordered and unordered lists: List-Unordered lists- headings in a list – ordered lists- Nested lists. Table handling: Tables- table creation in HTML- Width of the Tables and cells-Cells spanning multiple rows/Columns- Coloring cells – Column specification

### **Unit IV:**

6 Hours

Frames: Frame set - Definition – Frame definition –Nested Frames Web Page Design Project : Frameset Definition – Animals – Birds – Fish Forms: Action attributes –Method attributes –Enctype attribute – Drop down list- sample forms

**Unit V:**

6 Hours

DHTML and Style sheets: Defining styles –Elements of styles- Linking a style sheet to an HTML document –Inline styles –Internal & External style sheets –Multiple styles(6L)

**Text Book:**

World Wide Web Design with HTML, C. Xavier, TMH, 2001

**Reference Book:**

Internet & World Wide Web, H.M.Deital, P.J.Deital & A.B.Goldberg, Pearson Education

Fundamentals of information technology, Mathew's lenon and Alxis leon,

Vijay Nicole privatelimited, Chennai.

**LOCF MAPPING**

<b>Course code and title : HTML</b>											
CO/PO	PO					PSO					% of co's
	1	2	3	4	5	1	2	3	4	5	
CO1	3	2	2	2	2	2	3	2	2	2	2.2
CO2	2	3	2	3	3	2	3	2	2	2	2.4
CO3	2	2	3	3	3	2	2	3	3	3	2.6
CO4	2	3	2	3	2	2	2	3	3	3	2.5
CO5	2	2	2	3	3	2	2	2	3	3	2.4
Average of CO's = 2.42(high)											

**Strongly correlated -3 Moderately correlated -2 weakly correlated-1**

**No correlation -0**

B.Sc (CBCS) DEGREE EXAMINATION

HTML

Semester: IV

TIME: Three hours

Maximum:75 Marks

**PART A-(10X1=10 Marks**

**Answer all Questions**

**Choose the correct answer**

- 1.The first page of a web page is called as \_\_\_\_\_.  
a. Home page            b. main page            c. web page            d. none
2. HTML is a \_\_\_\_\_  
a. high level language            b. Programming language  
c. documentation language            d. none
3. \_\_\_\_\_ tag has the facility to include comment lines for the reference to the programmer  
a.<!>            b.<br>            c.<H>            d .none
- 4.Which tag is used for smallest heading  
a.<H1>            b.<H6>            c.<H5>            d.<H4>
- 5.<OL> tag indicates  
a. Numbered list            b. Bulleted list            c Diamonded list            d .None
6. The unordered list-items style is changed by using \_\_\_\_\_ attribute.  
a. TYPE            b. VALUE            c .STYLE            d .STARY
7. One <frame set> tag contains another inside its body is called as \_\_\_\_\_.  
a. Nested framesets            b Contained            c. Container            d. Inclusion
8. The \_\_\_\_\_ tag controls the number of rows and columns to be displayed on the screen and it accepts as many characters as the user wants to enter.  
a.<TEXT AREA>            b.<ADDRESS>            c.<PRE>            d <BLOCK QUOTE>
9. . The \_\_\_\_\_ tag is used to create different types of pop up and scrolling menus.  
a.<SELECT>            b.<OPTION>            c.<INPUT>            d.<CREATE>
- 10 ----- attribute assign a name for a variable  
a. Name            b. size            c. multiple            d . none

**PART B-(5X5=25 Marks)**

**Answer all Questions, choosing either (a) or (b)**

**Each answer should not exceed 250 words.**

- 11a. What are the sections in HTML document            Or  
b.What is anchor tag? Give example.
- 12a. What are the attributes of colorful webpage.            Or  
b.What are the purposes of Links.

13a. Distinguish between Head and title tag. Or

b. What is binding space?

14a. Describe attributes of frame set. Or

b. Explain Action attribute.

15a. Describe about <hr> tag and tab settings with example. Or

b. What are the elements of styles? Discuss with example.

PART C -(5X8=40Marks)

Answer all Questions, choosing either (a) or (b)

Each answer should not exceed 600 words.

16a. Create a web page of your own using anchor tag Or

a. Explain how to create document in html.

17a. Write HTML code for TAB setting Or

b. Explain how to create colorful web page? Give example.

18a. Briefly discuss about ordered list with suitable HTML program example. Or

b. Explain how to create table? Give example.

19a. Describe in detail HTML forms. Or

b. Explain how to create frames? Give example.

20a. With suitable example, discuss about inline styles in detail. Or

b. Write notes on multiple styles

## 2. PROGRAMMING IN C

### ***COURSE OUTCOMES***

**On** Successful completion of the course, the student will be able to

CO1: To define the structure of the programming language C

CO2: To explain the program writing and logical thinking skill.

CO3: An ability to incorporate exception handling in OOP

CO4: An ability to develop overloading operators

CO5: To compare the difference between function overloading and function overriding

### **UNIT I**

**6 Hours**

C Declarations –Introduction-Character Set-C tokens-Keywords and Identifiers- Constants-Variables- Data types- Declaration of Variables- Initializing Variables- Dynamic Initialization- Type Modifiers- Type Conversion- Constant And Volatile Variables

**Operators and Expressions:-** Introduction – Arithmetic Operators – Relational Operators – Logical Operators – Assignment Operators – Increment and Decrement Operators – Conditional Operator – Bitwise Operators – Special Operators – Arithmetic Expressions – Evaluation of Expressions – Operator Precedence.

### **UNIT II**

**6 Hours**

**Input and Output in C:** Introduction – Formatted Functions – Flags, widths and Precision with Format String – Unformatted Functions – Commonly used Library functions. **Decision Statements :** Introduction – Simple IF statement – The IF...Else Statement – Nesting of IF...Else Statements – The ELSE IF ladder – The Break Statement – The Continue Statement - The Goto Statement – The Switch Statement.

### **Unit III**

**12 Hours**

**Loop Control:-** Introduction –The WHILE Statement – The DO Statement – The FOR statement – Nested FOR Loops. **Arrays :-** Introduction – One-dimensional arrays

Declaration of One-dimensional arrays – Initialization of One-dimensional arrays –Array terminology -Two-dimensional arrays – Initialization of Two-

dimensional arrays.

**Unit IV**

6 Hours

**Strings and Standard functions:-** Introduction – Declaring and Initializing String Variables – Display of strings in different formats – String Standard functions – String Conversion Functions.

**Unit V**

6 Hours

**Functions:-** Introduction – Basics of a function - Function definition – The Return statement Types of functions – Call by Value and Reference – Function as an argument – Function with operators – function and decision statements – function and loop statements – functions with arrays.

**Text Book:**

Programming in ANSI C – 8<sup>th</sup> Edition by E Balagurusamy – McGraw Hill Publishing Company Limited.

**Reference Book:**

Programming in C – 3<sup>th</sup> Edition by Ashok Kamthane – Pearson Education Computer Basics and C Programming by V. Rajaraman – PHI Learning Private Limited Programming with C, Third Edition, Byron S Gottfried, McGraw Hill Education Private Limited.

**LOCF MAPPING**

Course code and title : <b>PROGRAMMING IN C</b>											
CO/PO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	% of co's
CO1	3	2	3	2	2	2	3	3	2	2	2.4
CO2	3	3	3	2	2	3	3	3	2	2	2.6
CO3	2	3	3	2	2	2	3	3	2	2	2.4
CO4	2	2	2	3	3	2	2	3	3	3	2.5
CO5	2	2	3	3	3	2	2	3	3	2	2.5
Average of CO's = 2.48(high)											

**Strongly correlated -3 Moderately correlated -2 weakly correlated -1 No correlation -0**

B.Sc (CBCS) DEGREE EXAMINATION

**Programming in C**

Semester: IV

TIME: Three hours

Maximum:75 Marks

PART A-(10X1=10 Marks)

Answer all Questions

Choose the correct answer

1. Which of the Following operators takes only integer operands?  
a.\*                      b. /                      c. %                      d. +
2. == is \_\_\_\_\_ operator.  
a. assignment      b. relational.              c. logical              d. bitwise.
3. If x=5; y=10 A=x+y\*(2+x) the what is the value a?  
a. 90                      b. 60                      c. 75                      d.70
4. The number of elements in a 2-d array of size 3\*3 is \_\_\_\_\_.  
a. 6                      b. 3                      c. 9                      d. none
5. In while and do loops \_\_\_\_\_ statement causes the control to go directly to the test condition.  
a. break.              b. continue              c. go to              d. none
6. int digits[10]={1,2,3,4,5,6,7,8,9,10}; which element is in the position digits[5]  
a. 5                      b 6                      c. 8                      d. 7
7. \_\_\_\_\_ is a indirection operator  
a. &                      b. \*                      c.%                      d. none
8. Return statement can be used to \_\_\_\_\_.  
a. return the control to the called function                      b. call the function  
c. return the value if any to the calling function                      d. none
9. Select the keyword among the following.  
a. member              b. Input              c. union              d. none
10. The scope of the \_\_\_\_\_ variable is the whole program in which it is declared..  
a. static              b. register              c. external              d. auto

PART B-(5X5=25 Marks)

Answer all Questions, choosing either (a) or (b)

Each answer should not exceed 250 words

- 11a. What is variable? How will you declare a variable? Or  
b. Discuss the difference between While & Do While statements with example.



- 12a. Explain if else statement with example. Or  
b. Discuss the difference between break & continue statements with example.
- 13a. Write a C program to convert Fahrenheit temperature to Celsius. Or  
b. Write a C program to exchange the variables x & y.
- 14a. Explain how to initialize 2-dimensional arrays? Give an example. Or  
b. Explain how to define structure.
- 15a. Define recursion?. Give an example. Or  
b. Write a C program to find the sum of all elements in the array using pointer.

**PART C -(5X8=40Marks)**

**Answer all Questions, choosing either (a) or (b)**

**Each answer should not exceed 600 words.**

- 16a. Explain different data types in C Or  
b. Explain various types of input output functions in C.
- 17a. Explain different types of for loop with example. Or  
b. Write a program to calculate and print the Fibonacci numbers.
- 18a. Explain how define looping structure in function. Give an example. Or  
b. Write a program to find the product of two matrices.
- 19a. Write a program to sort numbers using function. Or  
b. Explain how to use structures with in structure?. Give an example.
- 20a. Explain various types of storage classes with example. Or  
b. Discuss how to read and write data file

## SEMESTER V

MSU/ 2021-22 / UG-Colleges /Part-III (B.Sc. Computer Science) / Semester – V

/Core 5

### RELATIONAL DATABASE MANAGEMENT SYSTEM

LTOC  
5 0 0 4

#### **COURSE OUTCOMES**

**On** Successful completion of the course, the student will be able to

- CO1: To outline relational database concepts
- CO2: To relate transaction management concepts in database system.
- CO3: To utilize Normalizations techniques.
- CO4: To write SQL programs that use: procedure, function, package, cursor and Exceptions.
- CO5: To Use current techniques and tools necessary for complex computing practices.

#### **UNIT I**

12 Hours

**Introduction:** Database - system applications-Purpose of Database Systems - View of Data- Database languages -Relational Databases - Database Design - Data Storage and Querying - Transaction

Management - Database Architecture - Data Mining and Information Retrieval-Specialty Databases - Database Users and Administrators.

#### **UNIT II**

12 Hours

**Introduction to the Relational Model and Introduction to SQL: Structure of Relational Databases**

-Database Schema-Keys-Schema Diagrams- Relational Query Languages- Relational Operations- Overview of the SQL Query Language -SQL Data Definition-Basic Structure of SQL Queries

#### **UNIT III**

12 Hours

**SQL operations and Intermediate SQL :** Additional Basic Operations-Set Operations-Null values- Aggregate functions- Nested Sub queries- Views - Integrity Constraints - SQL Data Types and Schemas

#### **UNIT IV :**

12 Hours

**Database Design using E-R Model & Relational Database Design:** Overview – E-R Model – Complex attributes – Mapping Cardinalities – Primary key – Removing redundant attributes – Reducing E-R diagrams to schema –Extended E-R features –Features of good Relational design – Decomposition – Normal forms – Functional Dependency – Decomposition Functional & Multi value Dependencies – More Normal Forms.

**UNIT V**

12 Hours

**Implementation using Oracle:** Creating Table-Modifying Table-Creating SEQUENCE- Creating a Views - PL/SQL- Stored procedures and Functions.

**Text Books:**

1. Database System Concepts – Abraham Silberschatz, Henry F.Horth and S.Sudarashan, McGraw- Hill International Seventh Edition.
2. Oracle8i Jose A.Ramalho BPB Publications

**Reference Books:**

1. Database Management Systems, R.Panneerselvam, PHI Learning Private Limited
2. Database Management Systems, Ramakrishnan and Gehrke, Mc Graw Hill Publications
3. Relational Database Management Systems,P. Simon Navis, Ave Maria Publications

**LOCF MAPPING**

<b>Course code and title : RELATIONAL DATABASE MANAGEMENT SYSTEM</b>											
CO/PO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	% of co's
CO1	3	2	3	2	2	2	3	3	2	2	2.4
CO2	3	3	2	2	2	3	3	3	2	2	2.5
CO3	2	3	3	2	2	2	3	3	2	2	2.4
CO4	2	2	2	3	3	2	2	3	3	3	2.5
CO5	2	2	3	3	3	2	2	3	3	2	2.5
Average of CO's = 2.46(high)											

Strongly correlated -3 Moderately correlated -2 weakly correlated-1 No correlation -0

**B.Sc (CBCS) DEGREE EXAMINATION**  
**Relational Database Management System**  
Semester: V

TIME: Three hours

Maximum:75 Marks

PART A-(10X1=10 Marks)

Answer all Questions

Choose the correct answer

1. \_\_\_\_\_ is a collection of data.  
a. E\_R diagram    b. schema    c. database    d. none
2. \_\_\_\_\_ level of abstraction describes what data are stored in the database.  
a. physical    b. logical    c. view    d. none
3. \_\_\_\_\_ Manages the allocation of space on a disk  
a. File manager    b. buffer manager    c. transaction manager    d. none
4. Conceptual tool for describing data  
a. data model    b. data abstraction    c. data views    d. none
5. \_\_\_\_\_ function is used to suppress duplicate values  
a. SELECT    b. DISTINCT    c. BETWEEN    d. none
6. Tree structure model of database  
a. hierarchical    b. network    c. relational    d. all above
7. NLS support  
a. Single byte of data    b. Multiple byte of data    c. none
8. The objects in the specification section of a package are  
a. private module    b. Hidden module    c. Private objects    d. none
9. Request information from the database  
a. DML    b. DPL    c. DDL    d. query
10. Which SQL statement is used to modify data in a database  
a. CKPT    b. MODIFY    c. PMON    d. UPDATE

PART B-(5X5=25 Marks)

Answer all Questions, choosing either (a) or (b)

Each answer should not exceed 250 words.

- 11a. Explain role of a DBA in detail. (Or)
- b. Differentiate strong and weak entity sets.

12a. Discuss about referential integrity . Give an example. (Or)

b. Explain Data manipulation language in detail

13a. Discuss the purpose of Normalization. (Or)

b. Explain Query processing.

14a. Briefly explain the features of SQL (Or)

b. Explain the distinctions among primary key, candidate key and super key.

15a. What is request function in data replication. (Or)

b. Distinguish centralized and distributed databases.

PART C -(5X8=40Marks)

Answer all Questions, choosing either (a) or (b)

Each answer should not exceed 600 words.

16a. Advantages & disadvantages database management systems. (Or)

b. Explain any two data models with example.

17a. Explain how to decompose functional dependencies. (Or)

b. Explain the features of 4NF and BCNF.

18a. Explain relational algebra operations with examples (Or)

b. Explain join operation with example.

19a. Explain backup techniques in detail. (Or)

b. Explain Roles with example.

20a. Explain how to implement basic primary copy model in data replication. (Or)

b. Explain how to achieve ACID properties using two phase commit.

**DATA COMMUNICATION AND COMPUTER NETWORKS**

**LTPC  
4 0 0 4**

***COURSE OUTCOMES***

**On** Successful completion of the course, the student will be able to

- CO1:To define the concepts in Computer Network and Data Communication
- CO2:To outline the various protocols used in network
- CO3:To compare OSI Layers in Computer networks
- CO4:To list about Switching Techniques
- CO5: To discuss wireless LAN's

**Unit-I**

12 Hours

**Introduction** - Data communication – Networks-the Internet –Protocols and Standards.

**Network Models** –Layered tasks –OSI model- layers in OSI model-TCP/IP protocol Suit-Addressing.

**Unit II**

12 Hours

Physical layer – Analog and digital – Transmission Impairment –Data rate limits- Performance- Transmission mode -Bandwidth Utilization- Multiplexing. Transmission media – Guided and Unguided media.

**Unit III**

12 Hours

Switching – Circuit Switched Network-Datagram Network – Virtual Circuit Network. Using telephone and cable networks – Telephone Network- Dial-Up Modem–Digital Subscriber line – Cable TV Network - Cable TV for Data transfer.

**Unit IV**

12 Hours

Data Link Layer :Error Detection and Correction- Introduction- Checksum. Data link control-Framing-Flow and Error Control-Protocols-Noiseless Channels- Noisy Channels. Wired LANs-IEEE standards-Standard Ethernet- Changes in the Standard – Fast Ethernet-Gigabit Ethernet.

**Unit V**

12 Hours

Wireless LANs: IEEE 802.11-Blue tooth. Connecting LANs - Connecting devices. Wireless WANs: Cellular Telephony, Satellite Networks. Network Layer- IPv4 Address-IPv6 Address-Internetworking. Transport Layer- Process to Process delivery –UDP-TCP. Application Layer- Name space-DNS.

**Text Book**

Data Communication and Networking –“BEHROUZ A FOROUZAN “,The McGraw- Hill- 4th edition.

**References**

1. Data Communication and Computer Networks – “ PrakashC.Gupta
2. Computer Networks Protocols,Standards and Interfaces- “ Uyles Black
3. Data Communications and Computer Networks – Brijendra Singh

**LOCF MAPPING**

<b>Course code and title : DATA COMMUNICATION AND COMPUTER NETWORKS</b>											
CO/PO	PO					PSO					% of co's
	1	2	3	4	5	1	2	3	4	5	
CO1	3	2	3	2	2	3	3	3	2	2	2.5
CO2	3	3	2	2	2	3	3	3	3	2	2.6
CO3	2	3	3	2	2	2	3	3	2	2	2.4
CO4	2	2	2	3	3	2	2	3	3	3	2.5
CO5	2	2	3	3	3	2	2	2	3	2	2.4
Average of CO's = 2.48(high)											

**Strongly correlated -3 Moderately correlated -2 weakly correlated-1 No correlation -0**

**B.Sc (CBCS) DEGREE EXAMINATION**  
**DATA COMMUNICATION AND COMPUTER NETWORKS**  
Semester: V

TIME: Three hours

Maximum: 75 Marks

**PART A-(10X1=10 Marks**

Answer all Questions

Choose the correct answer

1. ----- is a set of rules that govern data communication  
a. Jitter      b. Protocol      c. Program      d. Forum
2. The ----- layer is responsible for moving frames from one node to the next node.  
a. physical      b. data link      c. network      d. session
3. Serial transmission need ----- communication channel.  
a. one      b. two      c. three      d. n
4. WDM is an analog multiplexing technique to combine ----- signals  
a. voltage      b. electromagnetic      c. optical      d. radio
5. Circuit switching takes place at the -----.  
a. physical layer      b. network layer  
c. presentation layer      d. application layer
6. The expansion for LATA is  
a. Local Access Transmission Areas      b. Local Amplitude Transfer Areas  
c. Local Access Transport Areas      d. none
7. CRC stands for  
a. Code Repeat Check      b. Code Redundancy Check  
c. Cyclic Repeat Check      d. Cyclic Redundancy check
8. In the Go-Back-N Protocol, the sequence numbers are modulo  $2^m$   
a. 2      b.  $2^m$       c.  $2^{m+1}$       d.  $2^{m-1}$
9. A BSS without an AP is called an -----network.  
a. LAN      b. WAN      c. MAN      d. ad hoc
10. ----- means a user can have access to communication or can be reached where there is coverage.  
a. Handoff      b. Roaming      c. Transmitting      d. Receiving



**PART B-(5X5=25 Marks)**

**Answer all Questions, choosing either (a) or (b)**

**Each answer should not exceed 250 words**

- 11.a. Write short notes on network criteria. Or  
b. Discuss about mesh topology and bus topology.
- 12.a. Write short notes on Analog and Digital signals. Or  
b. Briefly write about transmission modes.
- 13.a. Briefly write about virtual circuit network. Or  
b. How the cable TV network can be used for data transfer? Distinguish between CM and CMTS.
- 14.a. Write short notes on the type of errors. Or  
b. Briefly write about bit-oriented protocols.
- 15.a. What are the connecting devices used in a network? Explain. Or  
b. Briefly write about Domain Name space.

**PART C - (5X8=40 Marks)**

**Answer all Questions, choosing either (a) or (b)**

**Each answer should not exceed 600 words.**

- 16.a. Describe protocols and standards in detail. Or  
b. Explain about the various layers of the OSI model.
- 17.a. Discuss in detail about Frequency Division multiplexing. Or  
b..Explain about the twisted pair cables.
- 18.a. Describe circuit switching in detail. Or  
b. Explain about components and the services provided by the telephone network.
- 19.a. Describe stop and wait protocol in detail. Or  
b. Explain about Fast Ethernet in detail.
- 20.a Describe Bluetooth technology in detail. Or  
b. Explain about cellular telephony in wireless WANS.

**COURSE OUTCOMES**

On Successful completion of the course, the student will be able to

- CO1: To define and use open source database management system MySQL
- CO2: To explain dynamic web pages and websites.
- CO3: To identify web pages with database.
- CO4: To compare the concepts of open sources
- CO5: To assess the knowledge about Arrays

**UNIT-I**

12 Hours

Introduction: Introduction- Open source PHP – PHP history- features-variables-statements operators conditional statements-if-switch-nesting conditions-merging forms with conditional statements-loops- while-do-for – loop iteration with break and continue.

**UNIT – II**

12 Hours

Arrays and Functions: Arrays: Creating an array- modifying array-processing array-grouping form with arrays- using array functions- creating user defined functions- using files- sessions- cookies- executing external programs- Creating sample applications using PHP.

**UNIT –III**

12 Hours

File Handling Opening files using fopen - looping over a files content with feof-reading text from a file using fgets - closing a file- reading character with fgets-reading whole file with file\_get contents reading a fle into into an array with file-checking if a file exists-fscanf-parse\_ini\_file- Getting file information with stat-fseek- copying files with copy- deleting files-writing to a file-reading and writing binary files –locking files

## UNIT-IV

12 Hours

MySQL: Effectiveness of MySQL -MySQL Tools-Prerequisites for MySQL connection-Databases and tables- MySQL data types-Creating and manipulating tables-Insertion-updation and deletion of rows in tables -Retrieving data- Sorting and filtering retrieved data -Advanced data filteringData manipulation functions-Aggregate functions -Grouping data- Sub queries- Joining Tables- Set operators-Full text searching.

## UNIT-V

12 Hours

PHP with MySQL: Working MySQL with PHP-database connectivity- usage of MYSQLcommands in PHPprocessing result sets of queries- handling errors-debugging and diagnostic functionsvalidating user input through Database layer and Application layer- formatting query output with Character- Numeric- Date and time –sample database applications.

### Text Books:

1. VIKRAM VASWANI- “PHP and MySQL”- McGraw-Hill- 2005
2. BEN FORTA - ”MySQL Crash course “ SAMS- 2006.
- 3 . Steven Holzner , The Complete reference PHP, Tata McGraw Hill,2008

### Reference Books:

Tim Converse- Joyce Park and Clark Morgan- ”PHP 5 and MySQL” -Wiley India reprint - 2008.

Robert Sheldon- Geoff Moes- ”Beginning MySQL”-Wrox- 2005

## LOCF MAPPING

Course code and title : PHP and mySQL											
CO/PO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	% of co's
CO1	3	2	3	2	2	2	3	3	3	2	2.5
CO2	3	3	2	2	2	3	3	3	2	2	2.5
CO3	2	3	3	2	2	2	3	3	2	2	2.4
CO4	2	2	2	3	3	2	2	2	3	3	2.4
CO5	2	2	3	3	3	2	2	3	3	2	2.5
Average of CO's = 2.46(high)											

Strongly correlated -3 Moderately correlated -2 weakly correlated-1 No correlation -0

B.Sc (CBCS) DEGREE EXAMINATION

PHP & My SQL

Semester: V

TIME: Three hours

Maximum:75 Marks

PART A-(10X1=10 Marks)

Answer all Questions

Choose the correct answer

1. PHP stands for
  - a. Pre Hypertext Processor
  - b. Hypertext Pre Processor
  - c. Post Hypertext Processor
  - d. Hypertext Post Processor
2. PHP statements ends with
  - a. semicolon
  - b. full stop
  - c. colon
  - d. no punctuation
3. Associative array uses.
  - a. indices
  - b. enumeration
  - c. keys
  - d. none
4. How are functions in external files imported in PHP?
  - a. import
  - b. include
  - c. extern
  - d. none
5. Text-mode translation flag used in windows.
  - a. n
  - b. r
  - c. w
  - d. t
6. Function used to delete a file in PHP
  - a. unlink
  - b. delete
  - c. del
  - d. link
7. \_\_\_\_\_ displays status and version information about the connected server and client
  - a. catalogs
  - b. service control
  - c. server information
  - d. user administration
8. Which of the following is not an SQL aggregate function?
  - a. AVG
  - b. SUM
  - c. MEAN
  - d. MAX
9. PHP connects to databases using
  - a. Connection objects
  - b. Session objects
  - c. database objects
  - d. HTML objects
10. Function used to display large numbers with comma and decimal separators.
  - a. sprintf()
  - b. number\_format()
  - c. printf()
  - d. num()

**PART B-(5X5=25 Marks)**

**Answer all Questions, choosing either (a) or (b)**

**Each answer should not exceed 250 words**

11. (a) Explain the IF statement in PHP. **Or**  
(b) Describe how to merge forms with conditional statements.
12. (a) Explain how to modify an array in PHP. **Or**  
(b) With suitable example explain foreach() loop in PHP.
13. (a) Discuss how to read text from a file using fgets. **Or**  
(b) Explain how to check if a file exists.
14. (a) Explain the prerequisites for MySQL connection **Or**  
(b) Describe the set operators in MySQL.
15. (a) Describe error handling in PHP with MySQL . **Or**  
(b) Explain the different formats in date and time function of MySQL.

**PART C-(5X8=40 Marks)**

**Answer all Questions, choosing either (a) or (b)**

**Each answer should not exceed 600 words**

- 16 (a) Explain in detail the use of variables in PHP. **Or**  
(b) Describe how actions are repeated using loops.
- 17 (a) Explain in detail reading and writing files with example. **Or**  
(b) Explain Cookies in detail with example.
- 18 (a) Discuss reading and writing binary files with example. **Or**  
(b) Explain in detail the locking of files.
- 19 (a) Discuss manipulation of tables in MySQL. **Or**  
(b) Describe how to join tables.
- 20 (a) Explain processing result sets when querying with a MySQL database. **Or**  
(b) Describe validating user input at the Application layer

**PHP**

**LTPC**  
**0 0 4 2**

***COURSE OUTCOMES***

**On** Successful completion of the course, the student will be able to

- CO1: To develop knowledge about basic PHP Programs.
  - CO2: To evaluate PHP scripts and functions
  - CO3: To develop arrays in PHP
  - CO4: To design loops in PHP
  - CO5: To compare the scripts and functions in PHP
1. Create a simple HTML form and accept the user name and display the name through PHP echo statement.
  2. Write a PHP script to redirect a user to a different page.
  3. Write a PHP function to test whether a number is greater than 30, 20 or 10 using ternary operator
  4. Create a PHP script which display the capital and country name from the given array. Sort the list by the name of the country
  5. Write a PHP script to calculate and display average temperature, five lowest and highest temperatures.
  6. Create a script using a for loop to add all the integers between 0 and 30 and display the total.
  7. Write a PHP script using nested for loop that creates a chess board.
  8. Write a PHP function that checks if a string is all lower case.
  9. Write a PHP script to calculate the difference between two dates. 10. Write a PHP script to display time in a specified time zone

## LOCF MAPPING

Course code and title : PHP Lab											
CO/PO	PO					PSO					% of
	1	2	3	4	5	1	2	3	4	5	co's
CO1	3	2	3	2	2	2	3	3	3	2	2.5
CO2	3	3	2	2	2	3	3	2	2	2	2.4
CO3	2	3	3	2	2	2	3	3	2	2	2.4
CO4	2	2	2	3	3	2	2	3	3	3	2.5
CO5	2	2	3	3	3	2	2	2	3	3	2.5
Average of CO's = 2.46(high)											

**Strongly correlated -3      Moderately correlated**

**-2 weakly correlated-1 No correlation -0**



### Machine learning lab

LTPC  
0 0 4 2

On Successful completion of the course, the student will be able to

CO1: Apply the concepts and practical knowledge in analysis, design and Development of computing systems

CO2: To make use of applications to multidisciplinary problems.

CO3: To discuss the knowledge about various algorithms

CO4: To interpret the knowledge about various datasets

CO5: Develop data frames in Machine Learning

#### Exercises

1. Find the standard deviation for speed of a cars using numpy
2. Find the percentile of a marks of students
3. Draw the histogram for Normal Distribution
4. Draw the scatter Plot
5. Polynomial Regression
6. Draw the decision tree.
7. Create Table and insert values using Python MySQL
8. Construct the query for retrieving relevant information from the table Python MySQL
9. Delete the records from the table.
10. Update the values from the table.

**LOCF MAPPING****Course code and title : Machine learning LAB**

CO/PO	PO					PSO					% of co's
	1	2	3	4	5	1	2	3	4	5	
CO1	3	2	3	2	2	2	3	3	3	2	2.5
CO2	3	3	2	2	2	3	3	3	2	2	2.5
CO3	2	3	3	2	2	2	3	3	2	2	2.4
CO4	2	2	2	3	3	2	2	3	3	3	2.5
CO5	2	2	3	3	3	2	2	3	3	3	2.6
Average of CO's = 2.5(high)											

**Strongly correlated -3 Moderately correlated -2 weakly correlated-1 No correlation -0**

## Green foot Lab

### ***COURSE OUTCOMES***

**On** Successful completion of the course, the student will be able to

CO1:.To know about the various Applications of Multimedia.

CO2: To develop two- dimensional graphical applications

CO3: To design multimedia animations

CO4:. To know the knowledge about video works in multimedia applications

CO5:. To implement interactive games.

### **Write the following program using Greenfoot :**

1. To change the behaviour of an object.
2. For changing images
3. To make your own scenarios.
4. To create a new world subclass and compile the scenario
5. To add an Actor subclass instance to the scenario
6. To set up the scenario for gameplay
7. Program keyboard interaction
8. Using the playSound() method
9. To record sounds in Greenfoot
10. To changing the image of an instance summarized
11. To viewing the images stored in the scenario
12. To set an image using the image file name

## LOCF MAPPING

Course code and title : GREEN FOOT LAB											
CO/PO	PO					PSO					% of co's
	1	2	3	4	5	1	2	3	4	5	
CO1	3	2	2	2	2	2	3	2	2	2	2.2
CO2	2	3	2	3	3	2	3	2	3	3	2.6
CO3	2	2	3	3	3	2	2	3	3	3	2.6
CO4	2	3	2	3	2	2	2	3	3	3	2.5
CO5	2	3	3	3	3	2	2	2	3	3	2.6
Average of CO's = 2.5(high)											

Strongly correlated -3 Moderately correlated -2 weakly correlated -1 No correlation -0

MSU/ 2021-22 / UG-Colleges /Part-III (B.Sc. Computer Science) / Semester –  
V/Major Elective- I

LTPC  
4 0 0 4

### MOBILE APPLICATION DEVELOPMENT

#### Objective:

CO1: To recall the basics, field of computing sciences and Multidisciplinary of Mobile Applications

CO2: To build interactive applications

CO3: To develop multiple activities and indent in mobile applications

CO4: To understand Fragments of mobile application development

CO5: To develop mobile application development using Sqlite Database

#### Unit-I:

12 Hours

**Getting Started: Diving in** - Welcome to Android ville - The Android platform - Install Android Studio - How to build the app - Activities and layouts - first Android

app - a complete folder structure - Useful files in your project - Edit code with the Android Studio editors - Run the app in the Android emulator -Creating an Android Virtual Device - Run the app in the emulator - watch progress in the console - What's in the layout? - activity\_main.xml has two elements - Update the text displayed in the layout.

**Building Interactive Apps:** Apps that do something: building a Beer Adviser app - Create the project - a default activity and layout - A closer look at the design editor - Add a button using the design editor - activity\_find\_beer.xml has a new button - A closer look at the layout code - the app, test drive - Hardcoding text makes localization hard - Create the String resource - Use the String resource in your layout - The code for activity\_find\_beer.xml - Add values to the spinner - Add the string-array to strings.xml - Test drive the spinner - We need to make the button do something - Make the button call a method - The activity code - Add an onClickFindBeer() method to the activity - onClickFindBeer() needs to do something - Once you have a View, you can access its methods - Update the activity code - The first version of the activity - What the code does - Build the custom Java class.

## UNIT-II:

12 Hours

**Multiple Activities and Intents:** State your intent - More than one activity in an app - the app structure - create the project - Update the layout - Create the second activity and layout - Android manifest file - An intent - What happens when you run the app - Pass text to a second activity - Update the text view properties - putExtra() method - Update the CreateMessageActivity code - Get ReceiveMessageActivity to use the information in the intent - What happens when the user clicks the Send Message button - send messages to other people How Android apps work - Create an intent that specifies an action - Change the intent to use an action - the intent filter - if users ALWAYS want to choose an activity - when createChooser() method is called - Change the code to create a chooser.

**The Activity Lifecycle:** Being an activity - How do activities really work? - The Stopwatch app - Add String resources - How the activity code will work - Add code for the buttons - The runTimer() method -The full runTimer() code - The full StopwatchActivity code - Rotating the screen changes the device configuration - The states of an activity - The activity lifecycle: from create to destroy - The updated StopwatchActivity code - What happens when you run the app - There's

more to an activity's life than create and destroy - The updated StopwatchActivity code - when the app is run - when an app is only partially visible - The activity lifecycle: the foreground lifetime - Stop the stopwatch if the activity's paused - Implement the onPause() and onResume() methods - The complete StopwatchActivity code - Your handy guide to the lifecycle methods.

### **UNIT-III:**

12 Hours

**Views and View Groups:** Enjoy the view - Your user interface is made up of layouts and GUI components - LinearLayout displays - Add a dimension resource file - Using margins - change a basic linear layout - adding weight to a view - Values you can use with the android:gravity attribute - The full linear layout code - Frame layouts stack their views - Add an image to your project - The full code to nest a layout - FrameLayout: a summary - Playing with views - Editable text view - Toggle button - Switch - Checkboxes - Radio buttons - Spinner - Image view - Adding images to buttons - Scroll views - Toasts.

**Constraint Layouts:** Put things in their place - Nested layouts can be inefficient - the Constraint Layout the Constraint Layout Library - Add the String resources to strings.xml - Use the blueprint tool - Position views using constraints - Add a vertical constraint - Changes to the blueprint are reflected in the XML - center views - Adjust a view's position by updating its bias - change a view's size - align views - build a real layout.

### **UNIT-IV:**

12 Hours

**List views and Adapters:** Getting organized - Every app starts with ideas - Use list views to navigate to data - The drink detail activity - The Starbuzz app structure - The Drink class - The top-level layout contains an image and a list - The full top-level layout code - Get list views to respond to clicks with a

listener - Set the listener to the list view - A category activity displays the data for a single category - Update activity\_drink\_category.xml - For nonstatic data, use an adapter - Connect list views to arrays with an array adapter - Add the array adapter to DrinkCategoryActivity - App review - How clicks are handled in TopLevelActivity - The full DrinkCategoryActivity code - Update the views with the data - The DrinkActivity code - when the app is run.

**Fragments:** Make it modular - Your app needs to look great on ALL devices -

Your app may need to behave differently too - Fragments allow you to reuse code - The phone version of the app - Create the project and activities - Add a button to MainActivity's layout - How to add a fragment to your project - The fragment's onCreateView() method - Add a fragment to an activity's layout - Get the fragment and activity to interact - The Workout class - Pass the workout ID to the fragment - Get the activity to set the workout ID - The fragment lifecycle - Set the view's values in the fragment's onStart() method - How to create a list fragment - The updated WorkoutListFragment code - The code for activity\_main.xml - Connect the list to the detail - The code for WorkoutListFragment.java - MainActivity needs to implement the interface - DetailActivity needs to pass the ID to WorkoutDetailFragment.

#### UNIT-V:

12 Hours

**SQLite Databases:** Fire up the database - Back to Starbuzz - Android uses SQLite databases to persist data - SQLite classes - The current Starbuzz app structure - change the app to use a database - The SQLite helper manages database - Create the SQLite helper - Inside a SQLite database - create tables using Structured Query Language (SQL) - Insert data using the insert() method - Insert multiple records - The StarbuzzDatabaseHelper code - What the SQLite helper code does - What if changes to the database is needed? - SQLite databases have a version number - when the version number is changed - Upgrade your database with onUpgrade() - Downgrade your database with onDowngrade() - upgrade the database - Upgrade an existing database - Update records with the update() method - Apply conditions to multiple columns - Change the database structure - Delete tables by dropping them - The full SQLite helper code.

**Basic cursors:** Getting data out - The new Starbuzz app structure - change DrinkActivity to use the Starbuzz database - The current DrinkActivity code - Get a reference to the database - Get data from the database with a cursor - Return all the records from a table - Return records in a particular order - Return selected records - The DrinkActivity code so far - To read a record from a cursor, you first need to navigate to it - Navigate cursors - Get cursor values - The DrinkActivity code - The current

DrinkCategoryActivity code - Get a reference to the Starbuzz database - replace the

array data in the list view - A simple cursor adapter maps cursor data to views - use a simple cursor adapter - Close the cursor and database - The DrinkCategoryActivity code.

**Text Book:**

1. Head First Android Development (Nov 2019) - Dawn Griffiths & David Griffiths, O'Reilly Media/Shroff Publishers & Distributors Pvt. Ltd.- ISBN: 9789352136063 (Chapters 1-7, 9, 15, 16)

**Reference Books:**

1. Beginning Android Programming with Android Studio (Wrox Beginning Guides) 4e, 2016 - J. F. DiMarzio - Wiley
2. Android Developer Fundamentals Course: 2017  
<https://google-developer-training.github.io/android-developer-fundamentals-course-concepts/en/android-developer-fundamentals-course-concepts-en.pdf>
3. Android Programming Unleashed, 1e, 2013 - B.W.Harwani – Pearson

**LOCF MAPPING**

<b>Course code and title : MOBILE APPLICATION DEVELOPMENT</b>											
CO/PO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	% of co's
CO1	3	2	3	2	2	2	3	3	3	2	2.5
CO2	3	3	3	2	2	3	3	3	3	2	2.7
CO3	2	3	3	2	2	2	3	3	2	2	2.4
CO4	2	2	2	3	3	2	2	3	3	3	2.5
CO5	2	2	3	3	3	2	2	3	3	2	2.5
Average of CO's = 2.52(high)											

**Strongly correlated -3 Moderately correlated -2 weakly correlated-1 No correlation -0**



**B.Sc (CBCS) DEGREE EXAMINATION**  
**MOBILE APPLICATION DEVELOPMENT**  
Semester: V

TIME: Three hours

Maximum:75 Marks

**PART A-(10X1=10 Marks**

**Answer all Question**

**Choose the Correct Answer**

1. Choose the correct option related to Android.  
a.Android is a web browser    b.Android is an Operating System  
c.Android is a web server    d.None
2. What is an activity in android?  
a.android class            b.android package  
c.A single screen in an application with supporting java code  
d.None of the above
3. Among the following options choose the one for which Android is based on  
a.Linux.            b.Networking            c.Portability    d.Security
4. Among the below virtual machines choose the one which is used by the Android a.operating system  
b.Dalvik operating system    c.JVM            d.Simple virtual machine
5. Identify the language on which Android is based upon.  
a.Python            b. C++            c. java            d. None
6. All layout classes are the subclasses of  
a. android.widget    b. android.view.View  
c. android.view.ViewGroup    d. None
7. The full form of APK is  
a. Android Page Kit            b. Android Phone Kit  
c. Android Package Kit        d. Android Photo Kit
8. What is manifest XML in android?  
a. it has information about layout in an application  
b. It has all the information about an application  
c. It has the information about activities in an application    d. None

9. What is the use of a content provider in Android?
- For sharing the data between applications
  - For storing the data in the database
  - For sending the data from an application to another application
  - None of the above
10. While developing android application developers can test their apps on
- Emulators in Android SDK
  - Android Phone
  - Third-Party Emulator
  - All the above

**PART B-(5X5=25 Marks)**

**Answer all Questions, choosing either (a) or (b)  
Each answer should not exceed 250 words**

- 11a. List out Android SDK features Or
- What is the use of String XML
- 12a. What is the purpose of toggle buttons Or
- Differentiate fragment and activity
- 13a. Explain intent filter Or
- What is broadcast receiver?
- 14a. Define persistent storage. Explain Or
- What are the use of shared preferences?
- 15a. Explain download manager in Android. Or
- Explain Callback methods in detail

**PART B-(5X5=25 Marks)**

**Answer all Questions, choosing either (a) or (b)  
Each answer should not exceed 600 words**

- 16a. How to create AVD Or
- Discuss in detail about android application components
- 17a. How to use spinners in android? Or
- Explain fragments life cycle.
- 18a. Explain about notifications in android Or
- Discuss in detail about content providers
- 19a. Explain the challenges when we use the location based services Or
- Describe the procedure to connect our device to internet resources
- 20a. Explain about time picker. Give its uses.
- Develop an alarm application that rings every Sunday 5am

## 2.INTRODUCTION TO SECURITY IN COMPUTING

### *COURSE OUTCOMES*

**On** Successful completion of the course, the student will be able to

- CO1: To relate the concepts of basic concepts in security in computing
- CO2: To explain about the various encryption and decryption security algorithms
- CO3: To enquire Number theory and key algorithms
- CO4: To list the authentication
- CO5: To identify the intruder of security in computing

### **UNIT-I**

12 Hours

Model of network security – Security attacks, services and attacks – OSI security architecture – Classical encryption techniques – SDES – Block cipher PrinciplesDES  
– Strength of DES – Block cipher design principles – Block cipher mode of operation  
– Evaluation criteria for AES – RC4 - Differential and linear cryptanalysis – Placement of encryption function – traffic confidentiality.

### **UNIT-II**

12 Hours

Number Theory – Prime number – Modular arithmetic – Euclid's algorithm - Fermet's Euler's theorem – Primality – Chinese remainder theorem – Discrete logarithm –Public key cryptography and RSA – Key distribution – Key management – Diffie Hellman key exchange – Elliptic curve cryptography.

### **UNIT-III**

12 Hours

Authentication requirement – Authentication function – MAC – Hash function – Security of hash function and MAC – SHA - HMAC – CMAC - Digital signature and authentication protocols – DSS.

**UNIT-IV**

12 Hours

Authentication applications – Kerberos – X.509 Authentication services - E- mail security – IP security - Web security

**UNIT-V**

12 Hours

Intruder – Intrusion detection system – Virus and related threats – Countermeasures – Firewalls design principles – Trusted systems – Practical implementation of cryptography and security

**Text Book:**

1. William Stallings, “Cryptography & Network Security”, Pearson Education, Fourth Edition 2010.

**Reference Books:**

1. Charlie Kaufman, Radia Perlman, Mike Speciner, “Network Security, Private communication in public world”, PHI Second Edition, 2002.
2. Bruce Schneier, Neils Ferguson, “Practical Cryptography”, Wiley Dreamtech India Pvt Ltd, First Edition, 2003.
3. Douglas R Simson “Cryptography – Theory and practice”, CRC Press, First Edition, 1995.

**LOCF MAPPING**

<b>Course code and title : INTRODUCTION TO SECURITY IN COMPUTING</b>											
CO/PO	PO					PSO					% of co's
	1	2	3	4	5	1	2	3	4	5	
CO1	3	2	3	2	2	2	3	3	3	2	2.5
CO2	3	3	3	2	2	3	3	3	2	2	2.6
CO3	2	3	3	2	2	2	3	3	2	2	2.4
CO4	2	2	2	3	3	2	2	3	3	3	2.5
CO5	2	2	3	3	3	2	2	3	3	3	2.6
Average of CO's = 2.52(high)											

**Strongly correlated -3 Moderately correlated -2 weakly correlated -1 No correlation -0**

**B.Sc (CBCS) DEGREE EXAMINATION**  
**Introduction to security in Computing**  
Semester: V

TIME: Three hours

Maximum:75 Marks

PART A-(10X1=10 Marks)

Answer all Questions

Choose the correct answer

- 1)\_\_\_\_\_ computing has network architecture in which each computer has  
a equivalent capabilities And responsibilities  
a) cloud            b) personal    c) peer-to-peer    d) All the above
- 2) In cloud computing \_\_\_\_\_ doesn't need a CD or DVD drive  
a) peer-to-peer    b) client            c) personal computer    d)workstation
- 3)\_\_\_\_\_ place your E-mail inbox in the cloud  
a) Gmail    b) hotmail    c) yahoo mail    d) All the above
- 4) Enterprise level budgeting application is \_\_\_\_\_  
a) Google spreadsheet    b) consolidated spread sheet    c) host    budget  
d) All the above
- 5) Event management works on \_\_\_\_\_ database  
a) single            b) double    c) triple    d) multiple
- 6) In conference.com the function of email manager is to ---- emails  
a) broadcast    b) receive    c) send        d) all the above
- 7) Online groupware has  
a) web calendar    b) project manager  
c) message boards    d) all the above
- 8) A blog is  
a) private    b) public    c) linked    d) customized
- 9) Microsoft office live workspace keeps -- documents  
a) office    b) pictures    c) videos    d) Text
- 10) Web based desktop gives --- computing environment  
a) personalized    b) networked    c) client server    d) peer to peer

PART B-(5X5=25 Marks)

Answer all Questions, choosing either (a) or (b)

Each answer should not exceed 250 words

- 11(a). Explain information security breach. Or  
(b). Describe various access control threats in information.
- 12(a). Give the impact of virus attack. Or  
(b). State and explain the qualities of good backup.
- 13.a. Write short note on digital signature. Or  
b. Explain the benefits of risk management.
- 14.a. Give the rules and regulations of password policy Or  
b. What is IDS? Explain any one type of IDS.
- 15.a. Define honey pots. Explain any one type present. Or  
b. Give the role of auditor in a security system.

PART C -(5X8=40Marks)

Answer all Questions, choosing either (a) or (b)

Each answer should not exceed 600 words.

- 16(a). Explain the goals of information security. Or  
(b) Give an account of various types of threats to information security.
- 17(a). Give an account of virus threat. Or  
(b) Describe various types of cryptography.
- 18(a). Explain in detail biometric authentication methods. Or  
(b). Explain in detail challenges in risk management.
- 19.a. State and explain the components of security policy. Or  
b. Give an account of the key security policy.
- 20.a. Explain various types of intrusion in the information. Or  
b. Give an account of firewalls.

### 3.CLOUD COMPUTING

#### ***COURSE OUTCOMES***

**On** Successful completion of the course, the student will be able to

CO1:To understand the History of cloud computing

CO2: To know in detail about the various Cloud Computing concepts

CO3: To enquire cloud computing Architecture

CO4: To understand SOA components

CO5:To know about cloud security and privacy

#### **UNIT I:**

12 Hours

Introduction to cloud computing- History of cloud computing. Fundamentals of the cloud computing ecosystem. Cloud computing characteristics. Technical characteristics of cloud computing Basic characteristics of cloud computing- Advantages and disadvantages of cloud computing. Comparison of traditional and cloud computing paradigms. Cluster computing- Grid computing.. Cloud computing- Evaluating the cloud's business impact and economics Business drivers of cloud computing adoption. Future of the cloud (FoC).

Cloud Services and Deployment Models. Objectives. Cloud deployment models. Public (external) cloud. Private/Internal/Corporate cloud. Hybrid cloud. Cloud Service Models- Infrastructure-as-a- Service (IaaS) Platform-as-a-Service (PaaS). Software as a-Service (SaaS) Cloud infrastructure mechanisms Logical network perimeter (LNP) Virtual server. Cloud storage devices (CSD) Cloud usage monitor -Resource replication. Ready-made environment. Cloud service management.

#### **UNIT II:**

12 Hours

Cloud Computing Architecture.. Objectives. Cloud computing architecture design principles.. Cloud computing life cycle (CCLC). Phase 1- Architect. Phase 2- Engage Phase 3- Operate.. Phase 4- Refresh .Cloud computing reference architecture Load balancing approach Mobile cloud computing (MCC). Mobile computing features.. Challenges.. Mobile cloud computing architecture.

Virtualization Technology. Objectives. Understanding virtualization Adopting virtualization. Techniques of virtualization. How virtualization works? XEN- Kernel-based virtual machine (KVM). VMware. Virtual Box –Citrix.Types of Virtualization Data virtualization-Desktop virtualization -CPU virtualization

Network virtualization. Storage virtualization -Server virtualization. Virtualization in Cloud

**UNIT III:**

12 Hours

Service oriented Architecture Objectives SOA foundation.. Web Services and SOA .SOA communication. SOA components. SOA Infrastructure. Need of SOA. Business Process Management (BPM).Business Process Management Platform as a Service - BPM PaaS Business Process as a Service-BPaaS. Cloud Security and Privacy... Objectives. Cloud security - Cloud CIA security model.. Data confidentiality Data integrity.. Data availability., Cloud computing security architecture Service provider security issues. Security issues in virtualization. Cloud legal issues . Performance monitoring and management of cloud services Legal issues in cloud computing Data security in cloud .The cloud risk management framework. Risk management process for cloud consumers- Requirement for risk management in ISO/IEC 27001- Data privacy risks in the cloud. Availability risks. Service provisioning risks .

**UNIT IV:**

12 Hours

Business continuity and disaster recovery Disaster recovery requirements... Mechanisms for cloud disaster recovery. Disaster recovery as a service. The cloud disaster recovery architecture. Challenges of the cloud disaster recovery. Threats in cloud. Security techniques for threats protection. Cloud service level agreements (SLA) practices Components of a cloud SLA. Types of SLAS. Cloud vendors. Issues of Quality of Cloud Services. Techniques for providing QoS to the cloud applications. Migration of a local server into cloud.. Preliminary checklist/planning for migration. Migration steps. Types of migration for cloud-enabled applications.. Trust management. Trust management evaluation attributes. Cloud trust management techniques Cloud Computing Applications.. Objectives. Introducing cloud computing applications Google App Engine. Google Apps. Gmail. Google Docs.. Google Calendar Google Drive. Google Cloud Data store. Drop box Cloud. Apple iCloud Microsoft Windows Azure Cloud. Amazon Web Services (AWS) Amazon Elastic Compute Cloud (Amazon EC2) Amazon Simple Storage Service (S3).



**UNIT V:**

12 Hours

Cloud Computing Technologies, Platforms and Services. Objectives. High-performance computing with cloud technologies. Message Passing Interface (MPI).. Map Reduce programming model. Dryad and DryadLINQ.. Eucalyptus cloud platform. Components of Eucalyptus OpenNebula cloud platform. Layers of OpenNebula Features of OpenNebula. OpenStack cloud platform.. OpenStack components Benefits of Open Stack.. Nimbus Cloud Computing Platform Features of Nimbus. The Apache Hadoop ecosystem

Architecture of Hadoop Major components of Hadoop. Hadoop and cloud. Adoption of Cloud Computing. Objectives. Adoption of cloud computing in the current era Factors affecting cloud computing adoption. Technological factors. Organizational factors Environmental factors.. Cloud computing existing areas of application.. Cloud computing in education. Cloud computing in healthcare. Cloud computing in politics. Cloud computing in business. Cloud computing in agriculture. Case studies Cloud computing adoption in Sub-Saharan Africa. Cloud computing adoption in India. Cloud computing certifications Google Cloud Certifications.. IBM Cloud Certifications.. Amazon Web Services (AWS) Cloud Certifications.

**Text Book:**

Cloud Computing, Kamal Kant Hiran,Ruchi Dosai, Temitayo Fagbola,Mehul Mahrishi, BPB publication, First edition 2019.

**Reference Book:**

1. Cloud Computing, V. K. Pachghare, PHI Learning Pvt Ltd, 2016
2. 2 Cloud Computing, Anthony T.Velte, Toby J.Velte, Robert Elsenpeter, TMH, 2010
3. Cloud Computing Bible, Barrie Sosinsky, Wiley Publishing, Inc.

## LOCF MAPPING

<b>Course code and title : CLOUD COMPUTING</b>											
CO/PO	PO					PSO					% of
	1	2	3	4	5	1	2	3	4	5	co's
CO1	3	2	3	2	2	2	3	3	2	2	2.4
CO2	3	3	3	2	2	3	3	2	2	2	2.5
CO3	2	3	3	2	2	2	3	3	3	2	2.5
CO4	2	2	2	3	3	2	2	2	3	3	2.4
CO5	2	2	2	3	3	2	2	3	3	2	2.4
Average of CO's = 2.44(high)											

**Strongly correlated -3 Moderately correlated -2 weakly correlated-1 No correlation -0**

MODEL QUESTION  
B.Sc (CBCS) DEGREE EXAMINATION  
**Cloud Computing**  
Semester: V

TIME: Three hours

Maximum: 75 Marks

PART A-(10X1=10 Marks)

Answer all Questions

Choose the correct answer

- 1) \_\_\_\_\_ computing has network architecture in which each computer has a equivalent capabilities And responsibilities
  - a) cloud
  - b) personal
  - c) peer-to-peer
  - d) All the above
- 2) In cloud computing \_\_\_\_\_ doesn't need a CD or DVD drive
  - a) peer-to-peer
  - b) client
  - c) personal computer
  - d) workstation
- 3) \_\_\_\_\_ place your E-mail inbox in the cloud
  - a) Gmail
  - b) hotmail
  - c) yahoo mail
  - d) All the above
- 4) Enterprise level budgeting application is \_\_\_\_\_
  - a) Google spreadsheet
  - b) consolidated spread sheet
  - c) host budget
  - d) All the above
- 5) Event management works on \_\_\_\_\_ database
  - a) single
  - b) double
  - c) triple
  - d) multiple
- 6) In conference.com the function of email manager is to ---- emails
  - a) broadcast
  - b) receive
  - c) send
  - d) all the above
- 7) Online groupware has
  - a) web calendar
  - b) project manager
  - c) message boards
  - d) all the above
- 8) A blog is
  - a) private
  - b) public
  - c) linked
  - d) customized
- 9) Microsoft office live workspace keeps -- documents
  - a) office
  - b) pictures
  - c) videos
  - d) Text
- 10) Web based desktop gives --- computing environment
  - a) personalized
  - b) networked
  - c) client server
  - d) peer to peer

**PART B-(5X5=25 Marks)**

**Answer all Questions, choosing either (a) or (b)**

**Each answer should not exceed 250 words**

- 11(a). Explain the key properties of cloud computing. OR  
(b). State the role of cloud computing in a community.
- 12(a). Give an account of various schedules in cloud computing. OR  
(b). How will you collaborate reports in cloud computing.
- 13(a). How will you collaborate events in cloud computing. OR  
(b). Explain project and its management in cloud computing.
- 14(a). Give the advantages of using web based word OR  
(b). Give the presentation using cloud computing.
- 15(a). Explain about online databases. OR  
(b). Discuss about online photo editing application.

**PART C -(5X8=40Marks)**

**Answer all Questions, choosing either (a) or (b)**

**Each answer should not exceed 600 words.**

- 16(a). Define cloud computing. Explain the architecture of the same. OR  
(b) Explain in detail the pros and cons of cloud computing.
- 17(a). Give an account of web calendars. OR  
(b) Describe about CRM and its applications.
- 18(a). Explain the role of word in cloud services OR  
(b). Give a detailed study of online content.
- 19(a). Discuss about web based desktops OR  
(b). Describe the web based communication tools.
- 20(a). Give the role of cloud computing in social groups OR  
(b). Discuss about blogs and wikis.

**SEMESTER-VI**  
**MSU/ 2021-22 / UG-Colleges /Part-III (B.Sc. Computer Science) / Semester – VI /Core 8**

**OPERATING SYSTEM**

**L T P C**

**4 0 0 4**

***COURSE OUTCOMES***

**On** Successful completion of the course, the student will be able to

- CO1: To acquire the fundamental knowledge of the operating system architecture and components and to know the various operations performed by the operating system.
- CO2: Understand the basic working process of an operating system.
- CO3: Understand the importance of process and scheduling.
- CO4: To explain the issues in synchronization and memory management.
- CO5: To discuss about mass storage structures

**UNIT I**

12 Hours

**Introduction:** What Operating system do? – Computer System Organization – Computer System Architecture – Operating System Structures- Operating System Operation. **System Structures:** Operating System Services – System Calls – System Programs – Operating System Design and Implementation- Operation System Generation- System Boot.

**UNIT II**

12 Hours

**Process Concept:** Process Concept- Process Scheduling –Operation on Processes- Inter Process Communication- Example of IPC System – Communication in Client – Server system. **Process Scheduling :** Basic concept- Scheduling criteria- Scheduling algorithm-Thread scheduling- Multiple Processor Scheduling-Real Time CPU Scheduling-Operating system example- Algorithm evaluation.

**UNIT III**

12 Hours

**Synchronization:** Background - The Critical section problem-Peterson’s solution - Semaphores – Classic problems of Synchronization. **DeadLocks:** System model-Deadlock Characterization- Methods for handling deadlocks- Deadlock Prevention-Deadlock Avoidance-Deadlock detection - Recovery from deadlock.

**UNIT IV**

12 Hours

**Memory Management:** Background – Swapping - Contiguous Memory allocation – Segmentation – paging. **Virtual Memory Management :** Background - Demand paging - Copy and Write-page replacement-Allocation of Frames - Thrashing.

**UNIT V**

12 Hours

**File System :** File Concept-Access Method-Directory and Disk Structure--File Sharing- Protection. **Implementing File System:** File System Structure - File System implementation- Directory implementation-Allocation Methods - Free Space Management. **Mass Storage Structure:** Overview of Mass Storage Structure-Disk Structure - Disk Scheduling - Disk Management.

**TEXT BOOK:**

Operating System Concepts – Abraham Silberscartz, Peter Baer Galvin, and Greg Gange. Addison Wesley Publishing Company – Ninth Edition.

**REFERENCE BOOKS:**

1. Operating System: Internal and Design Principles – Fifth Edition, William Stalling ,PHI Learning Private Limited.
2. Understanding Operating Systems: Ida M.Flynn ,Ann McIverMcHoes.

**LOCF MAPPING**

<b>Course code and title : OPERATING SYSTEM</b>											
CO/PO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	% of co's
CO1	3	2	3	2	2	2	3	3	2	2	2.5
CO2	3	3	2	2	2	3	3	3	3	2	2.6
CO3	2	3	3	2	2	2	3	3	2	2	2.4
CO4	2	2	2	3	3	2	2	3	3	3	2.5
CO5	2	2	3	3	2	2	2	3	3	2	2.4
Average of CO's = 2.48(high)											

**Strongly correlated -3 Moderately correlated -2 weakly correlated -1 No correlation -0**

**B.Sc (CBCS) DEGREE EXAMINATION  
OPERATING SYSTEM  
Semester: VI**

TIME: Three hours

Maximum:75 Mark

**PART A-(10X1=10 Marks)**

**Answer all Questions**

**Choose the correct answer**

1. -----system guarantees that critical tasks be completed in time
  - a. soft real time
  - b. Hard real time
  - c. hand held
  - d. Job consult Language
2. \_\_\_\_\_ maintains a list of authorized users.
  - a. System administrator
  - b) programs
  - c. DTP operator
  - d. Manager
3. \_\_\_\_\_ is a collection of processors
  - a. time sharing
  - b. distributed system
  - c. interactive system
  - d. none
4. The protocols that can be used to communicate web server & web browser
  - a. FTP
  - b. HTTP
  - c. NFS
  - d. none
5. The advantage of multikernal approach is
  - a. ease of extending the OS
  - b. ease of accessing
  - c. flexibility
  - d. none
6. A ready queue header contain \_\_\_\_\_ to the first & last PCB<sub>s</sub> in the list.
  - a. buffer
  - b. pointer
  - c. register
  - d. none
7. Free BSD is an example of
  - a. multiprogramming
  - b. time sharing
  - c. multitasking
  - d. none
8. \_\_\_\_\_ is the number of processes completed per unit time.
  - a. CPU utilization
  - b. threads
  - c. throughput
  - d. none
9. If the time quantum is very small , then the RR approach is called as
  - a. multitasking
  - b. processor sharing
  - c. time sharing
  - d. none
10. \_\_\_\_\_ Scheduling allows process to move between queues.
  - a. multilevel queue scheduling
  - b. multilevel feedback queue scheduling
  - c. multiple processor scheduling
  - d. none

**PART B(5X5=25 Marks)**

**Answer all Questions, choosing either (a) or (b)**

**Each answer should not exceed 250 words.**

- 11(a). Explain about operating system components (Or)
- (b). List the advantages of multiprocessor system.

- 12(a). Explain OS services in detail. (Or)  
(b). Explain categories system program in detail.
- 13(a). Explain state process in detail. (Or)  
(b). Explain PCB and its functions in detail.
- 14(a). Explain about deadlocks and starvation. (Or)  
(b). Explain binary semaphores in detail.
- 15(a). Explain multiple processor scheduling . (Or)  
(b). Explain in detail the memory hierarchy.

**PART C -(5X8=40Marks)**

**Answer all Questions, choosing either (a) or (b)**

**Each answer should not exceed 600 words**

- 16(a). Explain various system components and its functions. (Or)  
(b). Explain layered approach to system design.
- 17(a). Explain virtual machines in detail. (Or)  
(b). Explain System calls in detail.
- 18(a). Explain Cooperating process in detail. (Or)  
(b). Explain interprocess communication in detail.
- 19(a). Explain about single contiguous allocations. (Or)  
(b). Give an account of page replacement methods.
- 20(a). Explain in detail the paged memory management (Or)  
(b). Explain various file allocation methods.



MSU/ 2021-22 / UG-Colleges /Part-III (B.Sc. Computer Science) / Semester  
– VI /Core 9 SOFTWARE ENGINEERING AND TESTING

L T P C  
4 0 0 4

**COURSE OUTCOMES**

**On** Successful completion of the course, the student will be able to

- CO1: To define the fundamental knowledge of Software Engineering
- CO2: To classify the various testing methods.
- CO3: To analyze various software life cycle models
- CO4: To interpret User Interface design
- CO5: To select software project managements

**UNIT-I**

12 Hours

**Introduction:-** Evolution – From an Art form on Engineering Discipline: Evolution of an Art into an Engineering Discipline. – Software Development of Projects: Program versus Product - Emergence of Software Engineering: Early Computer Programming – High Level Language

Programming – Control Flow-based Design – Data Structure Oriented Design – Object Oriented Design. **Software Life Cycle Models:-** A few Basic Concepts – Waterfall Model and its Extension: Classical Waterfall Model – Iterative Waterfall Model – Prototyping Model – Evolutionary Model. – Rapid Application Development (RAD): Working of RAD. –Spiral Model.

**UNIT-II**

12 Hours

**Software Project Management:-** Responsibilities of a Software Project Manager- Project Planning- Project Estimation Techniques-Risk Management. **Requirements Analysis and Specification:-** Requirements Gathering and Analysis – Software Requirements Specifications (SRS):Users of SRS Document – Characteristics of a Good SRS Document – Important Categories of Customer Requirements – Functional Requirements – How to Identify the Functional Requirements? – Organisation of the SRS Document.

**UNIT-III**

12 Hours

**Software Design:-** Overview of the Design Process: Outcome of the Design Process

– Classification of Design Activities. – How to Characterize a good Software Design?  
**Function-Oriented Software Design:-** Overview of SA/SD Methodology – Structured Analysis – Developing the DFD Model of a System: Context Diagram – Structured Design – Detailed Design.

#### **UNIT-IV**

12 Hours

**User Interface Design:-** Characteristics of a good User Interface - Basic Concepts – Types of User Interfaces – Fundamentals of Components based GUI Development: Window System. **Coding and Testing:-** Coding – Software Documentation – Testing: Basic Concepts and Terminologies – Testing Activities. – Unit Testing – Black-box Testing: Equivalence Class Partitioning – Boundary Value Analysis- White-box Testing.

#### **UNIT-V**

12 Hours

**Software Reliability and Quality Management:-** Software Reliability: Hardware versus Software Reliability. – Software Quality – Software Quality Management System – ISO 9000: What is ISO 9000 Certification? – ISO 9000 for Software Industry – Shortcomings of ISO 9000 Certification. – SEI Capability Maturity Model: Level 1 to Level 5. **Software Maintenance:-** Characteristics of Software Maintenance: Characteristics of Software Evolution – Software Reverse Engineering.

#### **Text Book**

Fundamentals of Software Engineering Fifth Edition by Rajib Mall – PHI Learning Private Limited 2018.

#### **Reference Books**

1. Software Engineering 2<sup>nd</sup> Edition by K L James PHI.
2. Software Engineering 9<sup>th</sup> Edition by Ian Sommerville - Pearson Education Asia.

### LOCF MAPPING

<b>Course code and title : SOFTWARE ENGINEERING AND TESTING</b>											
CO/PO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	% of co's
CO1	3	2	3	2	2	2	3	3	3	2	2.5
CO2	3	3	2	2	2	3	3	2	2	2	2.4
CO3	2	3	2	2	2	2	3	3	2	2	2.3
CO4	2	2	2	3	3	2	2	3	3	3	2.5
CO5	2	2	3	3	3	2	2	3	3	2	2.5
Average of CO's = 2.34(high)											

**Strongly correlated -3 Moderately correlated -2 weakly correlated-1 No correlation -0**

**B.Sc (CBCS) DEGREE EXAMINATION**  
**Software Engineering and Testing**  
**Semester: VI**

TIME: Three hours

Maximum: 75 Mark

PART A-(10X1=10 Marks)

Answer all Questions

Choose the correct answer

1. Customers are known as \_\_\_\_\_.  
(a) Users                      (b) Clients      (c) Developers (d) Managers
2. A \_\_\_\_\_ is a place where we can put the data.  
(a) variable                      (b) object      (c) attribute      (d) association
3. \_\_\_\_\_ is an effective way to gather information from a group of people.  
(a) Observation                      (b) Interviewing  
(c) Brainstorming      (d) Informal Use Case Analysis
4. The \_\_\_\_\_ rule is called the Pareto principle.  
(a) 50-50                      (b) 60-40      (c) 70-30      (d) 80-20
5. A \_\_\_\_\_ diagram shows the sequence of messages exchanged by the set of objects performing a certain task.  
(a) Sequence                      (b) Class      (c) State      (d) Collaboration
6. A \_\_\_\_\_ diagram is another way of expressing dynamic information about a system.  
(a) Sequence                      (b) Class      (c) State      (d) Collaboration
7. \_\_\_\_\_ design is the design of computational mechanisms.  
(a) Class                      (b) Database      (c) Algorithm      (d) Protocol
8. The \_\_\_\_\_ principle is an extension of the divide and conquer principle.  
(a) Cohesion                      (b) Portability      (c) Testability      (d) Abstraction
9. A \_\_\_\_\_ is a situation where two or more threads are stopped waiting for each other to do something  
(a) Deadlock                      (b) live lock      (c) critical race (d) none
10. \_\_\_\_\_ is the process of deciding in sequence a set of activities will be performed, as well as when they should start and be completed.  
(a) Scheduling                      (b) Tracking      (c) Designing      (d) Testing

**PART B(5X5=25 Marks)**

**Answer all Questions, choosing either (a) or (b)**

**Each answer should not exceed 250 words**

11. (a) What are most important attributes of software quality? Explain. Or  
(b) Explain difficulties and risks in Software Engineering as a whole.
12. (a) Write notes on the starting point for software projects. Or  
(b) How will you manage changing requirements? Explain.
13. (a) Describe Associations and Multiplicity. Or  
(b) Explain the Activity diagrams.
14. (a) What are techniques for making good design decisions? Explain. Or  
(b) How to write a good design document?
15. (a) Write notes on deadlock and livelock. Or  
(b) What is project management? What are the specific activities often done by a project manager?

**PART C -(5X8=40Marks)**

**Answer all Questions, choosing either (a) or (b)**

**Each answer should not exceed 600 words**

16. (a) List and explain the activities common to software projects. Or  
(b) Explain in detail about example of classes representing geometric points.
17. (a) What are the two major types of requirements? Explain. Or  
(b) Explain the various techniques for gathering and analyzing requirements.
18. (a) Explain detailed example of a class diagram genealogy. Or  
(b) What are the two types of UML interaction diagrams? Explain.
19. (a) Explain Software architectures for high level design. Or  
(b) List and explain the design principles leading to a good design.
20. (a) Explain Quality Assurance in general. Or  
(b) Explain Project Scheduling and Tracking.

**COURSE OUTCOMES**

**On** Successful completion of the course, the student will be able to

- CO1: To understand the overview of the graphics visualization
- CO2: To acquire the fundamental knowledge of Computer Graphics and Visualization.
- CO3: To understand the Algorithms in Computer Graphics
- CO4: To acquire the transformation technique in Graphics
- CO5: To understand the Interactive methods easily

**Unit I**

12 Hours

**Overview of Graphics System:** Video Display Devices – Input Devices - Hard Copy Devices – Graphics Software. **Output Primitives:** Points and Lines –Line drawing algorithms – DDA algorithm- Bresenham’s line algorithm- Circle drawing algorithms: properties of circles – Midpoint Circle algorithm – Filled Area primitives.

**Unit II**

12 Hours

**Attributes of Output Primitives:** Line attributes – Curve attributes – Character attributes. **Two- Dimensional Geometric Transformation:** Basic Transformations – Matrix Representations and homogenous coordinates – Composite and other Transformations.

**Unit III**

12 Hours

**Two-Dimensional Viewing:** The viewing pipeline, Viewing co-ordinate reference frame – Window to view port co-ordinate transformation – Two-dimensional viewing function. **Clipping Operations:** Point clipping – Line clipping (only Cohen-Sutherland line clipping) – Polygon Clipping (only Sutherland-Hodgeman polygon clipping).

#### **Unit-IV**

12 Hours

**Interactive Input Methods:** Input of graphical data – Input functions – Three dimensional display methods.

**Three Dimensional Geometric and Modeling Transformations:** Translation - Rotation - Scaling

#### **Unit-V**

12 Hours

**Three Dimensional Viewing:** Viewing Pipeline, Projections. **Visible-surface deduction methods:** Back-face Detection - Depth buffer method. **Color Models and Color**

**Applications** – RGB color model – YIQ color model – CMY color model – HSV color model.

#### **Text Book:**

Computer Graphics C version, Second Edition, Donald Hearn, M.Pauline Baker, Pearson Publications

#### **Reference Books**

1. Computer Graphics, Multimedia and Animation - Malay K. Pakhira – PHI.
2. Computer Graphics - Udit Agarwal - S. K. Kataria & Sons, 2009.
3. Express Learning - Computer Graphics and Multimedia-ITL Education Solution Ltd.
4. Computer Graphics-A programming Approach 2/e-Steven Harrington-Mc Graw

Hill Education Private Limited.

**LOCF MAPPING**

<b>Course code and title : COMPUTER GRAPHICS AND VISUALIZATION</b>											
<b>CO/PO</b>	<b>PO</b>					<b>PSO</b>					
	1	2	3	4	5	1	2	3	4	5	% of co's
CO1	3	2	3	2	2	2	3	3	2	2	2.4
CO2	3	3	2	2	2	3	3	3	2	2	2.5
CO3	2	3	3	2	2	2	3	3	2	2	2.4
CO4	2	2	2	3	3	2	2	3	3	3	2.5
CO5	2	2	2	3	3	2	2	3	3	2	2.4
Average of CO's = 2.44(high)											

**Strongly correlated -3 Moderately correlated -2 weakly correlated-1 No correlation -0**



**B.Sc (CBCS) DEGREE EXAMINATION**  
**Computer Graphics and Visualization**  
**Semester: VI**

TIME: Three hours

Maximum: 75 Mark

PART A-(10X1=10 Marks)

Answer all Questions

Choose the correct answer

1. In Raster-Scan Display Picture Definition is stored in memory area called  
(a) Frame Buffer (b) CRT (c) DVST (d) Plasma Panel
2. ----- is a device that can provide six degrees of freedom.  
(a) Mouse (b) Joystick (c) Trackball (d) Spaceball
3. ----- are correctly clipped by Sutherland Hodgeman algorithm.  
(a) curves (b) convex polygons (c) concave polygons (d) circles
4. A world coordinate area selected for display is called  
(a) viewport (b) clipping (c) window (d) viewport position
5. A device for specifying scalar values is  
(a) VALUATOR (b) CHOICE (c) STROKE (d) LOCATOR
6. Scenes displayed using \_\_\_\_\_ projections appear more realistic.  
(a) Parallel (b) Perspective (c) Diagonal (d) none
7. ----- is the most common form of packaging multimedia products.  
(a) floppy disk (b) hard disk (c) RAM (d) CD-ROM
8. A Picture stored as a set of pixels that correspond to the grid of dots on a Computer screen is  
(a) Clip art (b) Digitized Pictures (c) Bitmap (d) Hyper Pictures.
9. The sound waves have a recurring pattern called \_\_\_\_\_ wave pattern.  
(a) analog (b) digital (c) multiple (d) none
10. MIDI stands for  
(a) Musical Instrument Digital Interface  
(b) Musical Instrument Device Interface  
(c) Musical Interface Digital Instrument  
(d) Musical Instant Digital Interface

**PART B(5X5=25 Marks)**

**Answer all Questions, choosing either (a) or (b)**

**Each answer should not exceed 250 words**

11. (a) Explain the operation of Refresh Cathode-Ray Tubes. Or  
(b) Explain briefly about graphics functions and different co-ordinate representations used in graphics..
12. (a) Describe the Color and Grayscale Levels. Or  
(c) Explain the window-To-Viewport Coordinate Transformation.
13. (a) Explain about the following devices.  
(i) Locator Devices.  
(ii) Stroke Devices.  
(iii) String Devices.  
(iv) Valuator Devices. Or  
(c) Explain the Back-Face Detection Method.
14. (a) Explain about the CD – ROM. Or  
(c) Explain about the Text in multimedia.
15. (a) Discuss about audio file formats in multimedia Or  
(c) Explain the steps involved in animating an image.

**PART C -(5X8=40Marks)**

**Answer all Questions, choosing either (a) or (b)**

**Each answer should not exceed 600 words**

16. (a) Discuss about the graphics Software. Or  
(c) Explain the DDA Algorithm in detail.
17. (a) Discuss the Line Attributes. Or  
(c) Explain the Cohen-Sutherland Line Clipping procedure in detail.
18. (a) Explain the Graphical Input Functions in detail. Or  
(c) Explain the Depth Buffer Method.
19. (a) What is Multimedia? Explain the Hardware components. Or  
(c) Explain the Graphics in Multimedia Elements.
20. (a) Discuss digitized video in multimedia Or  
(b) Explain the Issues and Trends in Multimedia

**MSU/2021-22/UG-Colleges/Part – III (B.Sc. Computer Science)/Semester – VI /  
Major Practical VIII**

**COMPUTER GRAPHICS LAB**

L T P C  
0 0 4 2

***COURSE OUTCOMES***

**On** Successful completion of the course, the student will be able to

CO1: To illustrate skills in programming computer graphics

CO2: To apply multimedia concepts

CO3: To compile the algorithms to draw line, circle etc

CO4: To develop image using Scaling, Rotating and translation technique

CO5: To demonstrate the image using random and bouncing balls

**Each exercise should be completed within two hours.**

**It is compulsory to complete all the exercises given in the list in the stipulated time.**

1. Write a program to draw a line using DDA algorithm
2. Write a program to draw a circle using Bresenham's algorithm.
3. Write a program to draw a line using Bresenham's algorithm.
4. Write a program to scale an image.
5. Write a program to rotate an image.
6. Write a program to translate an image.
7. Write a program for bouncing a ball and moving with sound effect.
8. Write a program to display as many balls in the frame in random position.
9. Write a program to display an image as tiled and cascaded according to the user's option.
10. Write a program so that it should first display the image as the size of applet then it should be reduced and again it should reduced and so on and finally the image should disappear

## LOCF MAPPING

Course code and title : COMPUTER GRAPHICS LAB											
CO/PO	PO					PSO					% of co's
	1	2	3	4	5	1	2	3	4	5	
CO1	3	2	3	2	3	2	3	3	3	2	2.6
CO2	3	3	3	2	2	3	2	2	3	3	2.6
CO3	2	3	3	2	3	2	3	3	2	2	2.5
CO4	2	2	2	3	3	2	2	3	3	3	2.5
CO5	2	2	3	3	3	2	2	3	3	3	2.6
Average of CO's = 2.56(high)											

Strongly correlated -3 Moderately correlated -2 weakly correlated-1 No correlation -0

MSU/ 2021-2022/ UG-Colleges /Part-III (B.Sc. Computer Science) / Semester – VI/Practical IX

MySQL Lab

LTPC  
0 0 4 2

### *COURSE OUTCOMES*

On Successful completion of the course, the student will be able to

- CO1: To illustrate skills in database
  - CO2: To apply database concepts
  - CO3: To create database and operate update, remove etc
  - CO4: To develop various query functions
  - CO5: To demonstrate the security by setting password and its privileges.
1. Create a college database with tables Course, Staff and Student details. Insert records into the tables using MySQL.
  2. Write MySQL queries to Update, Remove and Delete records in a stock table.  
(Item no. , Item name, quantity, price, total)
  3. Write MySQL queries to retrieve relevant information from a Employee table.
  4. Create a Student marks table using MySQL and apply aggregate functions.
  5. Write MySQL queries to join two tables. (Inner Join, Outer Join)
  6. Write MySQL statement to create a new user and set a password and privileges for an existing database .

7. Write MySQL statement to get name of the students containing exactly four characters and determine the age of each of the students .
8. Write MySQL statements for rollback, commit and save option

**LOCF MAPPING**

<b>Course code and title : My SQL LAB</b>											
CO/PO	PO					PSO					% of co's
	1	2	3	4	5	1	2	3	4	5	
CO1	3	2	3	2	3	2	3	3	3	2	2.6
CO2	3	3	3	2	2	3	2	2	3	3	2.6
CO3	2	3	3	2	3	2	3	3	2	2	2.5
CO4	2	2	2	3	3	2	2	3	3	3	2.5
CO5	2	2	3	3	3	2	2	3	3	3	2.6
Average of CO's = 2.56(high)											

**Strongly correlated -3 Moderately correlated -2 weakly correlated-1 No correlation -0**

1. INTERNET OF THINGS

LTPC  
4 0 0 4

**COURSE OUTCOMES**

On Successful completion of the course, the student will be able to

- CO1: To define the fundamentals of IOT
- CO2: To outline about IOT working
- CO3: To discuss the Architecture of IOT
- CO4: To outline how IOT is used in Education and Agricultural level
- CO5 : To explain security in IOT

**UNIT I:**

**12 Hours**

Fundamentals of Internet of Things: Introduction – Characteristics of IoT – The Physical Design of IoT – Iot Architecture an Components – Logical design of IoT – Communication Models – IoT Communication API – IoT Architecture and Protocols – Introduction –Fog based Architecture of IoT – Near Field Communication – Wireless Sensor Networks – IoT Network protocol stack – IoT technology stack – Blue tooth – Zig Bee – and 6LowPAN.

**UNITII:**

12 Hours

Programming Framework for IoT: Interoperability – Programming Paradigm – Assembly – Introduction to Arduino Programming – Introduction to Python Programming – Introduction to Raspberry Pi . Virtualization: Introduction – Types – Virtualization and IoT – Embedded Virtualization.

**UNIT III:**

12 Hours

IoT Application Area: Introduction – Homes – Health care – Agriculture – Military applications – Politics – Constructions – Other application areas . Cloud an IoT : Introduction – Cloud – IoT – Difference between cloud and IoT – Cloud IoT architecture –challenges.

**UNIT IV:**

12 Hours

Smart City using IoT: Introduction – Concept – The emergence – Dimensions and Components – Design strategies – Factors affecting automation – IoT applications in smart cities – Education – E- governance – Industry . IoT Use Cases: Industrial IoT

Use Case – IoT and smart energy – Smart transportation – Smart health – Smart home – Smart Education system – Governance use case – Smart cities.

**UNIT V:**

12 Hours

Network Security for IoT and M2M communications: Introduction – Network Technologies for IoT and M2M – Security for IoT and M2M Technologies – Securities in IETF M2M network Technologies – Security in ETSI M2M Network Technologies – Other M2M standard Efforts.

**Text Books:**

1. Internet of Things – Principles, Paradigms and Applications of IoT by Dr.Kamlesh Lakhwani, Dr.Hemant Kumar Gianey, Joseph Kofi Wireko, Kamal Kant Hiran (BPB publication First Edition 2020)
2. Internet of Things(IoT) Systems and Applications By Jamil Y . Khan & Mehmet R.Yuce Jenny Stanford Publishing.

**Reference Book**

- 1.Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, “From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence”, 1st Edition, Academic Press, 2014

**LOCF MAPPING**

<b>Course code and title : . INTERNET OF THINGS</b>											
CO/PO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	% of co's
CO1	3	2	3	2	2	2	3	3	2	2	2.4
CO2	3	3	3	2	2	3	3	3	2	2	2.6
CO3	2	3	3	2	2	2	3	3	2	2	2.4
CO4	2	2	2	3	3	2	2	3	3	3	2.5
CO5	2	2	3	3	3	2	2	3	3	2	2.5
Average of CO's = 2.48(high)											

**Strongly correlated -3 Moderately correlated -2 weakly correlated-1 No correlation -0**

B.Sc (CBCS) DEGREE EXAMINATION

**Internet of Things**

Semester: VI

TIME: Three hours

Maximum:75 Marks

PART A-(10X1=10 Marks

Answer all Questions

1. What is the full form of IoT?
  - a) Internet of Technology
  - b) Incorporate of Things
  - c) Internet of Things
  - d) Incorporate of Technology
2. What is IoT?
  - a) network of physical objects embedded with sensors
  - b) network of virtual objects
  - c) network of objects in the ring structure
  - d) network of sensors
3. Who coined the term “Internet of Things”?
  - a) Kevin Aston
  - b) John Wright
  - c) Edward Jameson
  - d) George Garton
4. When was the actual term “Internet of Things” coined?
  - a) 1998
  - b) 1999
  - c) 2000
  - d) 2002
5. Which of the following is not an IoT device?
  - a) Table
  - b) Laptop
  - c) Arduino
  - d) Tablet
6. Which of the following is false about IoT devices?
  - a) IoT devices use the internet for collecting and sharing data
  - b) IoT devices need microcontrollers
  - c) IoT devices use wireless technology
  - d) IoT devices are completely safe
7. Which of the following is not an IoT platform?
  - a) Amazon Web Services
  - b) Microsoft Azure
  - c) Salesforce
  - d) Flipkart
8. Which of the following is not an application of IoT?
  - a) BMP280
  - b) Smart home
  - c) Smart city
  - d) Self-driven cars
9. Which of the following is not a fundamental component of an IoT system?
  - a) Sensors
  - b) Connectivity and data processing
  - c) User interface
  - d) Transformer
10. What is the full form of IIOT?
  - a) Index Internet of Things
  - b) Incorporate Internet of Things
  - c) Industrial Internet of Things
  - d) Intense Internet of Things



**PART B-(5X5=25 Marks)**

**Answer all Questions, choosing either (a) or (b)**

**Each answer should not exceed 250 words**

- 11A. Write a summary of cellular M2M market situation Or  
B. Explain the various emerging IoT applications
- 12A. Explain various trend in Information and communication technologies and its impact on IoT. Or  
B. Compare the main characteristics of M2M and IoT.
- 13A. Explain the IoT industrial structure Or  
B. Describe how a solution is designed for a particular problem by making use applied architecture in M2M/IoT.
- 14A. Discuss the design objectives of IoT architecture needed to target a horizontal system of real-world services Or  
B. Explain the functional layers and capabilities of an IoT solution with a neat diagram.
- 15A. Identify the key characteristics of M2M data. Also, explain the data generation, data acquisition, data validation steps in M2M data management. Or  
B. Explain data storage, data processing, data analysis steps in M2M data management

**PART C -(5X8=40Marks)**

**Answer all Questions, choosing either (a) or (b)**

**Each answer should not exceed 600 words.**

- 16 A. Explain ETSI M2M Functional architecture with a neat diagram Or  
B. Discuss various standards and technologies that enables Adhoc connectivity between devices that forms the basis of IoT
- 17 A . Explain how cloud of things acts as an enabler for new value added services and applications with a neat diagram. Or  
B. Illustrate ETSI M2M High Level architecture with a neat diagram.
- 18 A. Explain ETSI M2M service capabilities in detail with a neat diagram. Or  
B. Discuss IETF Working Groups and Specifications Scope.
- 19 A. Explain OGC functional architecture and interactions with a neat diagram. Or  
B. Describe the information flow process when utilizing the IoT service resolution FC with a neat diagram.
- 20 A. Explain the flow of information through a context enrichment process in IoT Or  
B. Explain the deployment and operational view, resources, services, virtual entities, users in an IoT system by considering a Parking lot example.

## 2. INTRODUCTION TO DIGITAL IMAGE PROCESSING

LTPC  
4004

### ***COURSE OUTCOMES***

On Successful completion of the course, the student will be able to

- CO1: To define the fundamental knowledge of introduction to Digital Image Processing.
- CO2: To explain the features present in Digital Image Processing.
- CO3: To outline the enhancement of spatial domain
- CO4: To analyze the color Image processing
- CO5: To interpret the image using compression

### **Unit – I**

12 Hours

**Introduction & Fundamentals** : Definition of Image and Digital Image Processing - Examples of Digital Image Processing - Fundamental Steps in Digital Image Processing - Components of an Image Processing System - Visual Perception - Image Acquisition - A Simple Image Model - Zooming and Shrinking of Digital Image

### **Unit – II**

12 Hours

**Image Enhancement in Spatial Domain** : Introduction - Mathematical Analysis of Enhancement in Spatial Domain - Basic Gray Level Transformation - Histogram Processing - Histogram Equalization - Histogram Matching - Image Enhancement using Arithmetic and Logical Operation - Basic Transformations - Basics of Spatial Filtering

**Image Enhancement in Frequency Domain** : One Dimensional Fourier Transform and its Inverse - Two Dimensional Fourier Transform and its Inverse - Basics of Filtering in Frequency Domain - Basic Frequency Domain Filters - Homomorphic Filtering.

### **Unit – III**

12 Hours

**Color Image Processing** : Introduction - Advantages of Color Image Processing - Categories of Color Image Processing - Color Fundamentals - Primary Colors - Secondary Color - Primary and Secondary Colors for Pigments - Characteristics that are Used for Differentiating Different Colors - Color Models - Conversions between

Color Models - Pseudo Color Image Processing - Color Transformation - Color Image Smoothing and Sharpening - Color Segmentation

**Unit – IV**

12 Hours

**Image Compression** : Introduction - Mathematical Analysis - Types of Data Redundancies - Image Compression Model - Compression Strategies.

**Morphological Image Processing** : Introduction - Basic Concept of Set Theory - Logic Operations Involving Binary Images - Dilation and Erosion - Opening and Closing

**Unit – V**

12 Hours

**Features and Image Segmentation** - Introduction - Classification of Features - Features of an Image - Attributes of Features - Process of Feature Extraction - Image Segmentation - Thresholding - Region Based Segmentation

**Text Book:**

Digital Image Processing - Abhishak Yadav and Poonam Yadav - University Science Press

**Reference Books:**

1. Digital Image Processing, S Jayaraman, S Esakkirajan, T Veerakumar, McGraw-Hill Education Pvt. Ltd., 2e, 2020
2. Digital Image Processing, 4e, Rafael C Gonzalez, Richard E Woods, Pearson, 2018
3. Digital Image Processing – Sridhar S – 2e – Oxford University Press, 2016

## LOCF MAPPING

Course code and title : INTRODUCTION TO DIGITAL IMAGE PROCESSING												
CO/PO	PO					PSO						
	1	2	3	4	5	1	2	3	4	5	% of co's	
CO1	3	2	3	2	2	3	3	2	2	2	2.4	
CO2	3	3	2	2	2	3	3	3	2	2	2.5	
CO3	2	3	3	2	2	2	3	3	2	2	2.4	
CO4	2	2	2	3	3	2	2	3	3	2	2.4	
CO5	2	2	3	3	3	2	2	3	3	2	2.5	
Average of CO's = 2.44(high)												

**Strongly correlated -3 Moderately correlated -2 weakly correlated-1 No correlation -0**

### MODEL QUESTION

B.Sc (CBCS) DEGREE EXAMINATION  
**Introduction to Digital Image Processing**  
Semester: VI

TIME: Three hours

Maximum:75 Marks

PART A-(10X1=10 Marks

Answer all Question

Choose the Correct Answer

1. What is Digital Image Processing?
  - a) It's an application that alters digital videos
  - b) It's a software that allows altering digital pictures
  - c) It's a system that manipulates digital medias
  - d) It's a machine that allows altering digital images
2. Which of the following process helps in Image enhancement?
  - a) Digital Image Processing
  - b) Analog Image Processing
  - c) Both a and b
  - d) None of the above
3. Among the following, functions that can be performed by digital image processing is?
  - a) Fast image storage and retrieval
  - b) Controlled viewing
  - c) Image reformatting
  - d) All of the above
4. Which of the following is an example of Digital Image Processing?
  - a) Computer Graphics
  - b) Pixels
  - c) Camera Mechanism
  - d) All of the mentioned
5. What are the categories of digital image processing?
  - a) Image Enhancement
  - b) Image Classification and Analysis
  - c) Image Transformation
  - d) None

6. How does picture formation in the eye vary from image formation in a camera?
  - a) Fixed focal length    b) Varying distance between lens and imaging plane
  - c) No difference        d) Variable focal length
7. What are the names of the various colour image processing categories?
  - a) Pseudo-color and Multi-color processing
  - b) Half-color and pseudo-color processing
  - c) Full-color and pseudo-color processing
  - d) Half-color and full-color processing
8. Which characteristics are taken together in chromaticity?
  - a) Hue and Saturation                      b) Hue and Brightness
  - c) Saturation, Hue, and Brightness    d) Saturation and Brightness
9. Which of the following statement describe the term pixel depth?
  - a) It is the number of units used to represent each pixel in RGB space
  - b) It is the number of mm used to represent each pixel in RGB space
  - c) It is the number of bytes used to represent each pixel in RGB space
  - d) It is the number of bits used to represent each pixel in RGB space
10. Which of the following image processing approaches is the fastest, most accurate, and flexible?
  - a) Photographic                      b) Electronic    c) Digital        d) Optical

**PART B-(5X5=25 Marks)**

**Answer all Questions, choosing either (a) or (b)**

**Each answer should not exceed 250 words**

- 11    a. Describe the elements of Digital Image Processing                      Or  
       b. Write note on Sampling and Quantization
- 12    a. Discuss the salient features of Discrete Cosine transform            Or  
       b. Write note on image sensing and acquisition
- 13    a. Explain the components of image processing system                      Or  
       b. Explain various applications of digital image processing
- 14    a. Explain low pass spatial filtering    Or  
       b. What is image enhancement, Give an example.
- 15    a. Explain the process of image smoothing                                        Or  
       b. Explain discrete histogram equalization technique

**PART C-(5X8=40 Marks)**

**Answer all Questions, choosing either (a) or (b)**

**Each answer should not exceed 600 words**

- |    |  |    |
|----|--|----|
| 16 | a. Explain Huffman coding with an example.<br>b. Discuss the image resoration process in linear algebraic approach | Or |
| 17 | a. Draw and explain a general compression system model.<br>b. Draw the relevant diagram for source encoder decoder | Or |
| 18 | a. Explain various noice models in detail.<br>b. Explain the image compression standards                           | Or |
| 19 | a, Explain the principle of pseudo colour image processing<br>b. Explain the color conversion method in detail     | Or |
| 20 | a. Explain Segmentation in detail<br>b. Explain dialation and erosion operation in morphological operation.        | Or |

### 3. NEURAL NETWORKS

**L T P C**  
**4 0 0 4**

#### ***COURSE OUTCOMES***

**On** Successful completion of the course, the student will be able to

- CO1: To recall the Historical Development of Neural Networks.
- CO2: To compare Basic neuron models: McCulloch-Pitts model and the generalized one, distance or similarity based neuron model, radial basis function model, etc
- CO3: To discuss Basic neural network models: multilayer perception, distance or similarity based neural networks, associative memory and self-organizing feature map, radial basis function based multilayer perception, neural network decision trees, etc.
- CO4: To evaluate Basic learning algorithms: the delta learning rule, the back propagation algorithm, self-organization learning
- CO5: To discuss the Applications: pattern recognition, function approximation, information visualization, etc.

#### **UNIT I**

12 Hours

Introduction to Neural networks: Neural processing- Neural networks- an overview  
– the raise of neuro computing – introduction to artificial neural networks :

introduction- artificial neural networks – historical development of neural networks – biological neural networks – comparison between the brain and the computer – artificial and biological neural networks – basic building blocks of artificial neural networks – artificial neural network terminologies.

## **UNIT II**

12 Hours

Fundamental models of artificial neural networks: McCulloch-Pits neuron Model-Learning rules. Perceptron networks: Introduction –single layer perceptron –brief introduction to multi layer perceptron networks.

## **UNIT III**

12 Hours

Feedback networks: Introduction- discrete Hopfield net-continuous Hopfield net-relation between BAM and Hopfield nets. Feed forward networks: introduction-back propagation networks.

## **UNIT IV**

**12 Hours**

Kohonen self - organizing feature maps - counter propagation network: introduction-Full counter propagation network-Forward only propagation network.

## **UNIT V**

12 Hours

Applications of Neural Networks: Applications of neural networks in Arts-Bioinformatics - Knowledge Extraction – Forecasting - Bankruptcy forecasting-Healthcare-Intrusion - Detection.

## **TEXT BOOK**

Introduction to Neural Networks using MATLAB 6.0., S N Sivanandam S Sumathi S N Deepa , McGraw Hill, 2006.

## **REFERENCE BOOKS**

1. Artificial neural Networks B.Yegnanarayana, Prentice Hall India, 2005.
2. Neural Networks Alogorithms, Applications and programming Techniques, James A Freeman David M Skapura, Pearson Education.
3. Neural Networks for Pattern Recognition, Christopher M. Bishop, Indian Edition, OXFORD University Press.

### LOCF MAPPING

<b>Course code and title : NEURAL NETWORKS</b>											
CO/PO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	% of co's
CO1	3	2	3	2	2	2	3	3	3	2	2.5
CO2	3	3	3	2	2	3	3	3	3	2	2.7
CO3	2	3	3	2	2	2	3	3	2	2	2.4
CO4	2	2	2	3	3	2	2	3	3	3	2.5
CO5	2	2	3	3	3	2	2	3	3	2	2.5
Average of CO's = 2.52(high)											

**Strongly correlated -3 Moderately correlated -2 weakly correlated-1 No correlation -0**

#### B.Sc (CBCS) DEGREE EXAMINATION

#### NEURAL NETWORKS

Semester: VI

TIME: Three hours

Maximum:75 Marks

#### PART A-(10X1=10 Marks

**Answer all Questions**

**Choose the correct answer**

1. For what purpose Feedback neural networks are primarily used?
 

a) classification	b) feature mapping
c) pattern mapping	d) none of the mentioned
  
2. Presence of false minima will have what effect on probability of error in recall?
 

a) directly	b) inversely
c) no effect	d) directly or inversely
  
3. How is effect false minima reduced
 

a) deterministic update of weights
b) stochastic update of weights
c) deterministic or stochastic update of weights
d) none of the mentioned
  
4. Is Boltzman law practical for implementation?
 

a) yes	b) no
--------	-------
  
5. For practical implementation what type of approximation is used on boltzman law?



- a) max field approximation      b) min field approximation  
 c) hopfield approximation      d) none of the mentioned
6. What happens when we use mean field approximation with boltzman learning?  
 a) it slows down      b) it get speeded up  
 c) nothing happens      d) may speedup or speed down
7. Approximately how much times the boltzman learning get speeded up using mean field approximation?  
 a) 5-10      b) 10-30      c) 30-50      d) 50-70
8. False minima can be reduced by deterministic updates?  
 a) yes      b) no
9. In boltzman learning which algorithm can be used to arrive at equilibrium?  
 a) hopfield      b) mean field  
 c) hebb      d) none of the mentioned
10. Boltzman learning is a?  
 a) fast process      b) steady process  
 c) slow process      d) none of the mentioned

**PART B-(5X5=25 Marks)**

**Answer all Questions, choosing either (a) or (b)**

**Each answer should not exceed 250 words**

- 11**    a. What are Neural Networks? What are the types of Neural networks?      Or  
       b. Why use Artificial Neural Networks? What are its advantages?
- 12**    a. How are Artificial Neural Networks different from Normal Computers? Or  
       b. How human brain works?
- 13**    a. What is simple Artificial Neuron?      Or  
       b. How Artificial Neurons learns?
- 14**    a. List some commercial practical applications of Artificial Neural Networks.      Or  
       b. What are the disadvantages of Artificial Neural Networks?
- 15**    a. What I Hebbian Learning Rule      Or  
       b. Explain Learning Factors

PART C -(5X8=40Marks)

Answer all Questions, choosing either (a) or (b)

Each answer should not exceed 600 words.

- 16 a. Differentiate Biological Neurons and Artificial Neural Networks Or  
b. Explain different learning rules in ANN.
- 17 a. Explain single layer continuous preceptor learning Algorithm Or  
b. Explain Delta learning rule
- 18 a. What is a Self Organizing Network? Explain it Or  
b. Explain Recall mode for Self Organizing network
- 19 a. Explain separation limitation of unsupervised learning Or  
b. Explain the different Architecture for Hopfield network in detail
- 20 a. Explain linear separable classification with suitable example Or  
b. Explain Error back propagation training in detail

**MSU/ 2021-22 / UG-Colleges /Part-III (B.Sc. Computer Science) / Semester – VI  
/Project  
DIGITAL IMAGE PROCESSING USING SCILAB**

**L T P C  
0 0 6 6**

***COURSE OUTCOMES***

**On** Successful completion of the course, the student will be able to

- CO1: To get knowledge about the basic programs on Digital Image Processing
- CO2: To acquire the knowledge from Thresholding Technique
- CO3: To read the colour image and separate the planes
- CO4: To perform the brightness of the image
- CO5: To manipulate the contrast image.

- 1) Perform 2D Linear Convolution, Circular Convolution between two 2D matrices.
- 2) Perform Discrete Fourier Transform(DFT), Discrete Cosine Transform(DCT) of 4x4 gray scale image.
- 3) Perform Brightness enhancement, Contrast Manipulation, Image negative of an image.

- 4) Perform threshold operation on an image.
- 5) Perform Edge detection using different edge detectors.
- 6) Perform Dilation and Erosion operation.
- 7) Perform Opening and closing operations
- 8) Read a colour image and separate the image into red, blue and green planes.

**Reference:**

Scilab Textbook Companion for Digital Image Processing, S. Jayaraman, S. Esakkirajan And T. Veerakumar, 2016 ([https://scilab.in/textbook\\_companion/generate\\_book/125](https://scilab.in/textbook_companion/generate_book/125))

**LOCF MAPPING**

<b>Course code and title : DIGITAL IMAGE PROCESSING USING SCILAB</b>											
CO/PO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	% of CO's
CO1	3	2	3	2	2	2	3	3	3	2	2.5
CO2	3	3	3	2	2	3	3	3	2	2	2.6
CO3	2	3	3	2	3	2	3	3	2	2	2.5
CO4	2	2	2	3	3	2	2	3	3	3	2.5
CO5	2	2	3	3	3	2	2	3	3	3	2.6
Average of CO's = 2.54(high)											

**Strongly correlated -3 Moderately correlated -2 weakly correlated-1 No correlation -0**