SRI S. RAMASAMY NAIDU MEMORIAL COLLEGE, SATTUR - 626 203

(An Autonomous, Co-educational and Linguistic Minority Institution Affiliated to Madurai Kamaraj University)
(Re-Accredited with Grade 'A' by NAAC)

Programme: B.Sc. Computer Science

Programme Code: UCS

Regulations (OBE) 2019

(For I to VI Semester)
Outcome Based Education
Under
Choice Based Credit System (CBCS)
(Those who joined in 2019-2020 and after)

Vision

      To renovate the rural students into high quality Software Professionals & Technologists by affording practical training as well as ethical and moral values.

Mission

- To offer strong theoretical foundation harmonized with extensive practical training.
- To revamp the rural students into innovative, competent and high quality Computer professionals.
- To enrich the talents of students to keep pace with the current industrial trends.
- To provide the students with best job opportunities and environment for quality education, professional competencies and life skills.
- To support students for their career development, professional growth and to sustain in lifelong learning.

Programme Educational Objectives (PEOs)

PEO1: Professionalism Accomplish their Professional Career by applying the knowledge of Computing and Technical Skills.

PEO2: Continuous Personal Development   Participate in life-long learning through the successful completion of advanced degrees, continuing education, certifications and/or other professional developments.

Programme Outcomes (POs)

Upon completion of the programme, the graduate is expected to be a / an

PO1: Critical Thinker with Disciplinary Knowledge

Ability to apply critical thinking and problem-solving skills by demonstrating comprehensive knowledge understanding the major concepts and theoretical principles in their disciplines and other related fields of study.

PO2: Skilled Communicator

Ability to transmit complex technical information relating to their disciplines in a clear and concise manner orally and in writing.

PO3: Team Player/Worker

Work effectively in diverse teams in classrooms, laboratories, industries and field-based situations.

PO4: Digital Literate

Use computers and appropriate software for analysis of data and employing modern library search tools to locate, retrieve, and evaluate the information.

PO5: Ethically Upright Citizen

Ability to designate moral situations and dilemmas; critically analyse, evaluate and additionally change one's own moral esteems; and to look up the effects of one's own attitude in the lives of others.

PO6: Lifelong learner

Enhance social inclusion, active citizenship and personal development, as well as competitiveness and employability by voluntary and self-motivated pursuit of knowledge.

Programme Specific Outcomes (PSOs)

PSO1: Acquire a firm foundation in the software fundamentals and applications of algorithms in software project development.

PSO2: Develop skills in problem solving, critical thinking and analytical reasoning as applied to Computational and Societal Problems.

PSO3: Develop Programming and Designing skills with innovate new ideas and solutions to existing problems using latest technologies.

PSO4: Acquire professional and intellectual integrity, professional code of conduct and an understanding of responsibility to contribute to the community for sustainable development of society.

Eligibility for admission

        Students who have passed the +2 examination conducted by the Board of Higher Secondary Education, Govt. of Tamil Nadu with Mathematics as one of the subjects or any other examination accepted by the Syndicate of the Madurai Kamaraj University as equivalent there to are eligible to join this programme.

Duration of the programme

        Three academic years with six semesters.

Courses of Study

        The main courses of study for Computer Science Degree programme consist of the following course pattern (Refer Table 1)

Part I　:	Tamil	---	4
Part II :	English	---	4

Part III

	1. Core Courses	---	14 (8 T & 6 P)
	2. Electives	---	4 (2 T & 2 P)
	3. Allied Courses	---	6 (4 T & 2 P)

Part IV

	1. Non Major Elective Courses	---	2
	2. Skill based Courses	---	6 (4 T & 2 P)
	3. Environmental Studies	---	1
	4. Value Education	---	1

Part V

             Extension Activities

        A candidate shall be awarded a maximum of 1 Credit for Compulsory Extension Service. This should be carried outside the class hours. All the students shall have to enroll for NSS /NCC/ Sports & Games or any other service organizations in the college and shall have to earn minimum hours of attendance to be prescribed by the college.

Credits

        The term "credit" refers to the weightage given to a course, usually in relation to the instructional hours assigned to it. The total credits required for completing a B.Sc. (Computer Science) degree programme is 140. The particulars of credits for individual components and courses are presented in Table 1.

Extra Credits Course

1. This course is optional. Students may or may not select this course. If he/she selects this course and if he/she passes the course, then 2 extra credits will be added in his/her total credit to the degree, even otherwise, it won't affect the completion of degree.
2. The course is common to all UG Programmes.
3. The title of this course is "Model Paper for Competitive Examinations"
4. Examination for this course will be held at the end of the 6th semester examinations.
5. There is no internal examination and only external examination for this course.
6. Maximum marks for this course is 100.
7. There is no contact hours for this paper.

Scheme of Examination

        100 questions (multiple choice) - one mark for each.
        Passing minimum is 50 marks.
        Duration of the Examination is two hours.

Question Paper Pattern for Part III

Theory

    Part A $10 \times 1 = 10$ marks

Ten Multiple Choice Questions (No Choice)

Two Questions from each Unit

    Part B $5 \times 7 = 35$ marks

Five Questions (either or type - One question from each Unit)

    Part C $3 \times 10 = 30$ marks

Three Questions out of five (One Question from each unit)

    Total   **75 Marks**

    Evaluation

	Internal	External	Total
Theory	25	75	**100**
Practical	40	60	**100**

Question Paper Pattern for Part IV

Theory

    Part A

Three Questions (either or type) $3 \times 10 = 30$ Marks

    Part B

Three Questions out of five $3 \times 15 = 45$ Marks

    Total   **75 Marks**

Internal Assessment

Average of two tests	15 marks	
Assignment	5 marks	
Seminar	5 marks	
Total	**25 marks**	

    A candidate shall be declared as passed the program if he/she scores a minimum of 40% marks inclusive of both internal and external.

    For each Theory course, the minimum marks required in the External examination is 27.

    For each Practical/Project course, the minimum marks required is 23.

For Project Work (VI Semester)

    The combined project shall be undertaken by the students as a team of two.

    Total Marks: 100 (Internal: 40 marks, External: 60 Marks)

Parameters

For Internal Marks: Two review meetings   : $2 \times 10 = 20$ Marks

                          Overall Performance   : $= 20$ Marks

For External Marks: Project Report   : $= 15$ Marks

                          Project demo & Presentation   : $= 30$ Marks

                          Viva-Voce   : $= 15$ Marks

From the Academic Year 2021-2022

Evaluation

The performance of a student is evaluated in terms of percentage of marks with a provision for conversion to grade points. Evaluation for each course is done by three Continuous Internal Assessment (CIA) tests by the concerned course teacher and by an End Semester written examination and will be consolidated at the end of the programme. The ratio of the marks to be allotted to Continuous Internal Assessment (CIA) and to End Semester Examination is 25 : 75 and for the Practical examinations the ratio is 40 : 60.

The components for Continuous Internal Assessment (CIA) are

Average of three written tests	20.0 marks
Seminar / Group Discussion / Quiz	2.5 marks
Assignment	2.5 marks
Total	**25.0 marks**

Assignment / Seminar marks will be awarded only to the candidates who have appeared for minimum two CIA tests. A candidate absenting for all the three CIA tests of a course cannot appear for the End Semester Examination even though he / she has required attendance / paid fee.

End Semester Exam Question Pattern for Part I and III

The question paper may have 3 parts.

Duration of the End Semester Examination is 3 hours.

Part A (No Choice)   10 x 1 = 10 marks

Ten questions (Objective type with 4 alternatives)

(Two questions from each unit)

Part B   5 x 7 = 35 marks

Five questions (either or type)

(One question from each unit)

(Answers not exceeding two pages

Part C   3 x 10 = 30 marks

Three questions out of five

(One question from each unit)

Total   **75 marks**

Practical Examinations

Practical examinations will be conducted at the end of even semesters only.

Practical Record Note Book / Internal   10 + 30 = 40 marks

External Examination   60 marks

Total   **100 marks**

Question Paper Pattern (for Part IV)

Duration of the external examination is 2 hours

Part – A

THREE Questions (either or type)   3 X 10 = 30 marks

(One Question from each unit)

Part – B

THREE questions out of FIVE   3 X 15 = 45 marks

(At least one question or at most two questions from each unit)

Total   **75 marks**

B.Sc. COMPUTER SCIENCE
Table 1: Course pattern

Study Component	I Sem.	II Sem.	III Sem.	IV Sem.	V Sem.	VI Sem.	Total Hrs	Total Credit	No of Course	Total Marks
Part – I Tamil	6(3)	6(3)	6(3)	6(3)	-	-	24	12	4	400
Part – II English	6(3)	6(3)	6(3)	6(3)	-	-	24	12	4	400
Part- III										
Core (T)	4(4)	4(4)	4(4)	4(4)	6(5) 6(5)	6(5) 6(5)	40	36	8	800
Core (P)	6(4)	6(4)	6(4)	6(4)	6(4)	6(5)	36	25	6	600
Elective (T)	-	-	-	-	4(4)	4(4)	8	8	2	200
Elective (P)	-	-	-	-	4(4)	4(4)	8	8	2	200
Allied (T)	4(4)	4(4)	4(4)	4(4)	-	-	16	16	4	400
Allied (P)	2(2)	2(2)	-	-	-	-	4	4	2	200
Part- IV										
Non Major Electives	-	-	2(2)	2(2)	-	-	4	4	2	200
Skill Based (T)	2(2)	2(2)	2(2)	2(2)	-	-	8	8	4	400
Skill Based (P)	-	-	-	-	2(1)	2(1)	4	2	2	200
Environmental Studies	-	-	-	-	2(2)	-	2	2	1	100
Value Education	-	-	-	-	-	2(2)	2	2	1	100
Part- V										
Extension Activities	-	-	-	(1)	-	-	-	1	-	-
Total	30(22)	30(22)	30(22)	30(23)	30(25)	30(26)	180	140	42	4200
Extra Credits								2		
Grand Total								142		

Course Structure - B.Sc. Computer Science

Semester	Core/Elective/ Skill Based	Title of the Course	Course Code	Contact Hrs.			Credits	Exam Hrs.	Marks		
				L	T	P			Int.	Ext.	Total
I	Part - I	Tamil I	U19LAT11	6	-	-	3	3	25	75	100
	Part - II	English I	U19LAE11	6	-	-	3	3	25	75	100
	Core - I (T)	Programming in C	U19CSC11	4	-	-	4	3	25	75	100
	Core - II (P)	Programming in C Lab	U19CSC1P1	-	-	6	4	3	40	60	100
	Allied - I (T)	Mathematical Foundations for Computer Science	U19CSA11	4	-	-	4	3	25	75	100
	Allied – II (P)	Web Design Lab	U19CSA1P1	-	-	2	2	3	40	60	100
	Skill Based- I (T)	Introduction to Computers and HTML	U19CSS11	2	-	-	2	2	25	75	100
	Total			**22**	**-**	**8**	**22**	**-**	**-**	**-**	**700**
II	Part – I	Tamil - II	U19LAT21	6	-	-	3	3	25	75	100
	Part – II	English - II	U19LAE21	6	-	-	3	3	25	75	100
	Core - III (T)	C++ and Data Structures	U19CSC21	4	-	-	4	3	25	75	100
	Core –IV (P)	C++ and Data Structures Lab – II	U19CSC2P1	-	-	6	4	3	40	60	100
	Allied - III (T)	Digital Fundamentals and Computer Architecture	U19CSA21	4	-	-	4	3	25	75	100
	Allied –IV (P)	PHP Lab	U19CSA2P1	-	-	2	2	3	40	60	100
	Skill Based - II (T)	Introduction to PHP	U19CSS21	2	-	-	2	2	25	75	100
	Total			**22**	**-**	**8**	**22**	**-**	**-**	**-**	**700**
III	Part – I	Tamil – III	U19LAT31	6	-	-	3	3	25	75	100
	Part – II	English – III	U19LAE31	6	-	-	3	3	25	75	100
	Core - V (T)	Object Oriented Programming with Java	U19CSC31	4	-	-	4	3	25	75	100
	Core – VI (P)	Java Programming Lab	U19CSC3P1	-	-	6	4	3	40	60	100
	Allied - V (T)	Numerical Methods	U19CSA31	4	-	-	4	3	25	75	100
	Skill Based- III (T)	E-Commerce	U19CSS31	2	-	-	2	2	25	75	100
	NME - I	Office Automation Lab	U19CSN3P1	-	-	2	2	3	40	60	100
	Total			**22**	**-**	**8**	**22**	**-**	**-**	**-**	**700**

L - Lecture Hours   **T-** Tutorial Hours   **P -** Practical Hours

Semester	Core/Elective/ Skill Based	Title of the Course	Course Code	Contact Hrs.			Credits	Exam Hrs.	Marks		
				L	T	P			Int.	Ext.	Total
IV	Part – I	Tamil – IV	U19LAT41	6	-	-	3	3	25	75	100
	Part – II	English – IV	U19LAE41	6	-	-	3	3	25	75	100
	Core - VII (T)	Relational Database Management Systems	U19CSC41	4	-	-	4	3	25	75	100
	Core - VIII (P)	Practical – IV DBMS Lab	U19CSC4P1	-	-	6	4	3	40	60	100
	Allied - VI (T)	Optimization Techniques	U19CSA41	4	-	-	4	3	25	75	100
	Skill Based - IV (T)	Software Engineering	U19CSS41	2	-	-	2	2	25	75	100
	NME - II	DTP Lab	U19CSN4P1	-	-	2	2	3	40	60	100
	Extension Activities			-	-	-	1	-	-	-	-
		Total		**24**	**-**	**8**	**23**	**-**	**-**	**-**	**700**
V	Core – VIII (T)	Data Mining and Data Warehousing	U19CSC51	6	-	-	5	3	25	75	100
	Core –IX (T)	Operating System Concepts	U19CSC52	6	-	-	5	3	25	75	100
	Core –X (P)	Practical – V Data Mining Lab	U19CSC5P1	-	-	6	4	3	40	60	100
	Elective – I (T)	a) Visual Programming	U19CSE51	4	-	-	4	3	25	75	100
		b) Android Programming	U19CSE52								
		c) Embedded Systems	U19CSE53								
	Elective - II (P)	a) Visual Programming Lab	U19CSE5P1	-	-	4	4	3	40	60	100
		b) Android Programming Lab	U19CSE5P2								
		c) Embedded Systems Lab	U19CSE5P3								
	Skill Based -V(P)	Linux Programming Lab	U19CSS5P1	-	-	2	1	3	40	60	100
	Environmental Studies		U19CNE51	2	-	-	2	2	25	75	100
		Total		**18**	**-**	**12**	**25**	**-**	**-**	**-**	**700**
VI	Core – XIII (T)	Introduction to Computer Graphics and Image Processing	U19CSC61	6	-	-	5	3	25	75	100
	Core –XIV(T)	Computer Networks and Security	U19CSC62	6	-	-	5	3	25	75	100
	Core –XV (P)	Practical – VI Project Viva-Voce	U19CSPT61	-	-	6	5	3	40	60	100
	Elective -III (T)	a) Web Technologies	U19CSE61	4	-	-	4	3	25	75	100
		b) Internet of Things	U19CSE62								
		c) Data Analytics Using R	U19CSE63								
	Elective– IV (P)	a) Web Technologies Lab	U19CSE6P1	-	-	4	4	3	40	60	100
		b) Internet of Things Lab	U19CSE6P2								
		c) R Programming Lab	U19CSE6P3								
	Skill Based–VI (P)	MATLAB Lab	U19CSS6P1	-	-	2	1	3	40	60	100
		Value Education	U19CNV61	2	-	-	2	2	25	75	100
		Total		**18**	**-**	**12**	**26**	**-**	**-**	**-**	**700**
	Extra Credit Paper	Model Course for Competitive Examination	U19CNX61	-	-	-	2	2	-	-	**100**

L - Lecture Hours   **T-** Tutorial Hours   **P -** Practical Hours

Department of Computer Science (Syllabus for those who joined in 2019 – 2020 and after)   7

Core Course I (T) - Programming in C

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	I	U19CSC11	4	4

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Classify algorithms and flowchart and develop C programs using operators.	**K2**
CLO2	Develop programs using control statements.	**K3**
CLO3	Identify code reusability with the help of user defined functions.	**K3**
CLO4	Apply and analyze memory access problems by using pointers.	**K3**
CLO5	Develop programs using structure, union and file handling mechanism.	**K3**

K2 – Understanding   **K3 – Applying**

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	3		3		
CLO2	3	3		3		
CLO3	3	3	2	3		
CLO4	3	3		3		
CLO5	3	3		3		

Strong – 3   **Medium – 2**   **Weak - 1**

Unit I

Introduction to problem solving: Algorithm design – Flowchart-Five generation of programming language. **Overview of C:** Introduction – Character set – C tokens – Keywords – Identifiers – Constants – Variables – structure of C program -Data types in C– storage class declaration – assignment operators – Arithmetic conversion and typecasting – declaring variable as constant & volatile – symbolic constant. **Operators and Expressions:** Introduction – Types of operators – Mathematical functions.

Unit II

Input/output functions: Introduction – Character I/O – Formatted I/O – I/O of string type data – Address operator. **Control statements:** Introduction – control structures – conditional statement – loops– jump statements.

Unit III

Arrays: Introduction – one dimensional array: declaration / initialization of one dimensional array-inputting array elements – accessing array elements – two dimensional arrays: declaration / initialization of two dimensional array – inputting array elements – accessing array elements – limitations of array. **Functions:** Introduction – structure of C functions – Defining and using Functions: – Functions prototype – Function definition: Eliminating the prototype – calling functions Types of functions – Nesting of functions – Recursion – storage class in C.

Unit IV

 Strings: Introduction- Declaration/Initialization of strings-Reading and writing strings- Standard string handling functions. **Pointers:** Introduction – Pointer Data type – Declaring and initializing a pointer – Accessing a variable using pointer-pointer Expressions-pointers and functions- -array of pointers-pointers and strings-command line arguments.

Unit V

 Structures and Unions: Defining a Structure- Referencing Structure elements-Structure assignments- nested structure-user defined structure type- arrays of structure- pointers to structures-Unions. **File Handling:** Introduction – File handling in C – Opening & closing a data file – Input/Output Operations on Files– Formatted Input and Output with Files.

Text Book:

 J.B.Dixit (2011), Programming in C (3rd Edition), Fire wall Media.

Reference Books:

1. E.Balagurusamy (2008), Programming in C (4th Edition), Tata McGraw Hill Publications.
2. Byron Gottfried (2001), Programming with C (2nd Edition), Tata McGraw Hill Publications.

Core Course II (P) - Programming in C Lab

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	I	U19CSC1P1	6	4

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Identify Basic Procedure Oriented programming concepts.	K3
CLO2	Apply the concepts of control statements.	K3
CLO3	Develop Programs with pointers and arrays, perform pointer arithmetic and graphics concepts.	K3

K3 – Applying

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	2	3	3		3
CLO2	3	2	3	3		3
CLO3	3		3	3		3

Strong – 3   Medium – 2   Weak - 1

Write a C program

1. To do temperature conversion.
2. To check whether the given number is odd or even using conditional operator.
3. To find whether the given year is leap year or not.
4. To prepare student performance using if elseif ladder.
5. To check whether the given number is prime or not.
6. To find the sum of digits of a given number using while loop.
7. To find whether the given number is palindrome or not using do – while loop.
8. To solve the quadratic equation using Switch statement.
9. To check whether the given number is Armstrong or not.
10. To generate a Fibonacci series.
11. To find the transpose of a given matrix.
12. To add two given matrices.
13. To multiply two given matrices.
14. To check whether the given string is palindrome or not using string functions.
15. To find sum of series 1+1/2+1/3+1/4+…1/n using function.
16. To find the smallest of three numbers using function.
17. To find factorial value of a number using recursion.
18. To prepare Student mark sheet using structure.
19. To prepare EB bill using array of structure.
20. To swap two values using call by reference function.
21. To find the largest of three numbers using function returning pointer.
22. To sort the given array of numbers using pointers.
23. To create a sequential file using Student information File.
24. To identify the odd and even numbers in a file and write the results in different files.

Write a C Graphics Program

25. To draw a House.
26. To draw a moving Car.

Allied Course I (T) - Mathematical Foundations for Computer Science

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	I	U19CSA11	4	4

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Apply the acquired knowledge of algebraic equation.	K3
CLO2	Analyse the various operations on Matrices and apply the acquired knowledge in solving Eigen Values and Eigen Vectors problem.	K2
CLO3	Solve the various problems on Determinants.	K2
CLO4	Calculate probabilities and apply selected probability distributions to solve problems.	K2
CLO5	Utilize statistical analysis in multi variable distributions and apply problem-solving techniques to solve real-world events.	K3

K2 – Understanding   **K3 – Applying**

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	2	2				2
CLO2	2	2				2
CLO3	2					2
CLO4	3	2				
CLO5	3	2				2

Strong – 3   **Medium – 2**   **Weak – 1**

Unit I

     Theory of equations – Linear equations – Simultaneous equations – Quadratic equations - sequence of numbers – Arithmetic Progression – Geometric Progression.

Unit II

     Matrix Algebra: Introduction – Matrices – Types of Matrices – Algebra of Matrices. Simultaneous Linear Equations - Eigen Values and Eigen Vectors.

Unit III

     Determinants – Properties of determinants – Solution of Simultaneous Equations using determinants (Cramer's Rule) – Determinant of Product of Two Square Matrices – Minors and Co-factors – Singular and Non-Singular Matrices – Adjoint of a square Matrix – Inverse of a Square Matrix – Miscellaneous Problems.

Unit IV

     Arithmetic mean – partition value – mode - **Measures of dispersion – Introduction -** Measures of dispersion.

Unit V

  Probability: Probability and conditional probability-Baye's theorem (statement only).

<u>**Text Books:**</u>   **(No theorems, only solved problems)**
1. G.K Ranganath, C.S. Sampangiram, Y.Rajaram (2006), A Text Book of Business Mathematics,
   Himalaya Publishing House.
2. Dr.M.K.Venkatraman, Dr.N.Chandrasekaran, Dr. N.Sridharan (2000), Discrete Mathematics,
   National Publishing Company.
3. Dr. S. Arumugam and A. Thangapandi Issac (2009), Statistics, New Gamma Publishing House

<u>**Reference Books:**</u>
1. Prof. V. Sundaresan, K. S. Ganapathysubramanian and K.Ganesan (2000), Discrete Mathematics,
   A.R. Publications.
2. S. C. Gupta and V. K. Kapoor (2007), Fundamentals of Mathematical Statistics, Sultan Chand and sons,
   New Delhi.
3. S.C. Gupta, V.K. Kapoor (2001), Elements of Mathematical Statistics (3rd Edition), Sultan Chand and Sons.

Allied Course II (P) - Web Design Lab

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	I	U19CSA1P1	2	2

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Demonstrate Interactive HTML Documents with different Formats and Designing.	**K2**
CLO2	Develop Web Application with Different Type of Tags and Hyperlinks.	**K3**
CLO3	Demonstrate Web Pages for Real time Applications.	**K2**
CLO4	Apply the Designing skills with images and Animations.	**K3**
CLO5	Develop Dynamic Websites Effectively	**K3**

K2 – Understanding   **K3 – Applying**

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3		2	3		2
CLO2	3		2	3		2
CLO3	3		3	3	2	2
CLO4	3		2	3		2
CLO5	3		2	3		2

Strong – 3   **Medium – 2**   **Weak - 1**

List of Programs:

1. Develop a HTML document for your profile. Design the page with background color, text color, and suitable headings in different formats.
2. Develop a HTML document for our college course details. Design the page with nested ordered and unordered lists.
3. Develop a webpage to display an image or a map with clickable regions (region is in a hyperlink).
4. Design your Department timetable using table tags.
5. Design a webpage to demonstrate how to create links in an HTML document.
6. Develop a HTML document for your Department with the list of items shown in a frame. When you click an item, the details of the item must appear in another frame.
7. Design a web page to show your bio – data in a colorful form with suitable links by using set of frames.
8. Develop a HTML document for our College application form. Design the page using form tags.
9. Develop a HTML document using form attributes.
10. Design our College website.

Skill Based Course I (T) - Introduction to Computer and HTML

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	I	U19CSS11	2	2

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Comprehend the characteristics of computers and software.	**K2**
CLO2	Develop web pages using HTML.	**K3**
CLO3	Construct websites using important HTML tags.	**K4**

K2 – Understanding   K3 – Applying   K4 - Analysing

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3					2
CLO2	3	2				3
CLO3	3	2		3	3	3

Strong – 3   Medium – 2   Weak - 1

Unit I

Introduction to Computers: Introduction – Importance of Computers -- Characteristics of Computers -- Classification of computers - Five Generations of modern computers – Anatomy of a Digital computer - Introduction to computer software-Internet Basics-Internet protocols-TCP/IP-FTP-HTTP-Internet Addressing-World wide web.

Unit II

Basic concepts of HTML -The <H> tag-The Basic tags-The text attributes-The images.

Unit III

The list tag-The links-**The tables**: Introduction to Tables -The table-The rows-The columns-The <th> and </th>-The <td> and </td>-The table border-vertical headers of Table-Cellspacing(Ex)-Cellpadding(Ex)-Alignment of table -**The Frames** : Introduction to frames-Frames with column arrangement-column size for frames-Distributing frame columns evenly-Row arrangement-Row size-Distributing frame rows evenly-Frame spacing(Ex)-Frame border.

Text Books:

1. Alexis Leon, Mathews Leon (2010), Fundamentals of Information Technology (2nd Edition), Vikas Publishing.
2. Firuza Aibara (2010), HTML for beginners (2nd Edition), Shrott Publishers and Distributors Pvt. Ltd.

Reference Books:

1. V. Rajaraman (2010), Fundamentals of Computers (5th Edition), PHI.
2. I. Bayross (2000), Web Enabled Commercial Application Development Using HTML, DHTML, JavaScript, Perl CGI, BPB Publications.
3. C. Xavier (2009), Web Technology & Design, New Age International publishers.

Core Course III (T) - C++ and Data Structures

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	II	U19CSC21	4	4

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Explain the OOP concepts used for programming	**K3**
CLO2	Demonstrate the use of Function overloading, Inheritance, Operator overloading and Virtual functions with the help of programs.	**K2**
CLO3	Summarise linear and non-linear data structures using C++.	**K2**
CLO4	Demonstrate sorting techniques with real time applications.	**K2**
CLO5	Solve problems using the trees and graphs data structures.	**K3**

K2 – Understanding   **K3 – Applying**

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	2			3		2
CLO2	3	2		2		2
CLO3	3	2		3		3
CLO4	3	3				3
CLO5	3	3		3		3

Strong – 3   Medium – 2   Weak - 1

Unit I

Procedure-Oriented Programming – Object-Oriented Programming Paradigm – Basic concepts of Objected Oriented Programming -Structure of C++ program –Operators in C++ – Scope Resolution Operator – Member Dereferencing Operators – Memory Management Operators – Manipulators – Inline functions – Default Arguments - Function Overloading. Specifying a class – Defining member function – Nesting of member function – Static data members - Static member functions - friendly function.

Unit II

Constructors – Parameterized constructor – Copy constructor– Destructors. Defining operator overloading – Overloading unary operator – Overloading binary operator – Rules for operator overloading. Inheritance: Introduction - Single inheritance – Multilevel inheritance – Multiple inheritance – Hierarchical inheritance – Hybrid inheritance - Virtual Base Class.

Unit III

Pointers, Virtual Functions and Polymorphism : Introduction - Pointers - Pointers to objects – this pointer – Virtual functions – Pure virtual functions.

Data Structure: Introduction to Data structure –Analysis of algorithm-Classification of Data structure - Stack: Introduction - Implementation of Stack –Applications of Stack.

Unit IV

Queue: Introduction - Implementation of Queue –Applications of Queue – Linked list: Representation of Linked list – Singly linked list- Sorting: Bubble sort - Selection sort - Quick sort - Merge sort.

Unit V

Trees: Basic terminology- Binary tree – Representation - Traversing Binary tree. Graphs: Basic terminology – Representation - Depth First Search - Breadth First Search - Minimum spanning tree: Prims algorithm – Krushkal algorithm.

<u>**Text Book:**</u>
1. E. Balagurusamy (2011), Object Oriented Programming with C++ (5th Edition), Tata McGraw Hill Education Private Ltd, New Delhi.
2. Fundamentals of Data Structures, Curriculum Development Cell, Sri S.R.N.M. College, Sattur.

<u>**Reference Books:**</u>
1. Herbert Schildt **(2011), The Complete Reference C++ (4th Edition),** Tata McGraw Hill
   Education Private Ltd, New Delhi.
2. Poornachandra Sarang **(2009), Object Oriented Programming with C++ (2nd Edition)**, PHI
   Learning Private Limited, New Delhi.
3. Vinu V.Das **(2006), Principles of data structures using C and C++ (1st Edition),** New Age
    International (P) Ltd.
4. Seymour Lipzchutz (2006), **Data Structures (1st Edition),** Tata McGraw Hill.

Core Course IV (P) - C++ and Data Structures Lab

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	II	U19CSC2P1	6	4

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Develop programs using basic concepts of OOPs.	**K3**
CLO2	Evolve the operations of Stack, Queue and Linked List in C++ platform.	**K3**
CLO3	Demonstrate Tree Traversals and Graph Traversals.	**K3**

K3 – Applying

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	2	3		3		3
CLO2	2	3		3		3
CLO3	2	3		3		3

Strong – 3   **Medium – 2**   **Weak - 1**

Write a C++ program

1. To find Sum of Digits of a given number.

2. To perform area calculation using Function Overloading.

3. To swap two values between two class objects using friend function.

4. To overload Unary minus operator to change the sign of a given vector.

5. To overload Binary plus operator to add two complex numbers.

6. To prepare mark list using multiple inheritance.

7. To process employee details using hierarchical inheritance.

8. To implement stack operations using array.

9. To implement queue operations using array.

10. To implement singly linked list.

11. To sort the given set of numbers using Bubble sort technique.

12. To sort the given set of numbers using Merge sort technique.

13. To sort the given set of numbers using Quick sort technique.

14. To implement binary tree traversal.

15. To traverse a graph using Breadth First Search.

Allied Course III (T) - Digital Fundamentals and Computer Architecture

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	II	U19CSA21	4	4

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Comprehend the digital logic circuits and their designs.	K2
CLO2	Demonstrate combinational logic design and discriminate with sequential circuits.	K2
CLO3	Summarise the basic structure of computers, operations and instructions.	K2
CLO4	Identify computer buses, I/O peripherals and instruction execution.	K3
CLO5	Categorise various memory systems and I/O communication.	K2

K2 – Understanding   **K3 – Applying**

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	3				3
CLO2	3	2				
CLO3	3					
CLO4	3					2
CLO5	3	2				2

Strong – 3   **Medium – 2**   **Weak - 1**

Unit I

     Data Representation: Data Types – Complements – Fixed Point Representation – Floating Point Representation – Other Binary Codes. **Digital Logic Circuits:** Logic Gates – Combinational Circuits.

Unit II

     Flip Flops – **Digital Components:** Decoders – Multiplexers – Registers – Shift Registers – Binary Counters.

Unit III

     Basic Computer Organization and Design: Instruction Codes – Computer Registers – Computer Instructions – Timing and Control – Instruction Cycle – Memory Reference Instruction – Input-Output and Interrupt.

Unit IV

     Microprogrammed Control: Control Memory – Address Sequencing. **Central Processing Unit**: Stack Organization – Instruction Formats – Addressing Modes – Data Transfer and Manipulation – Program Control.

Unit V

     Input–Output Organization: Peripheral Devices – Input-Output Interface – Asynchronous Data Transfer (Strobe Control and Handshaking) – Direct Memory Access. **Memory Organization:** Memory Hierarchy – Main Memory – Cache Memory – Virtual Memory.

Text Book:

M. Morris Mano (2013), Computer System Architecture, 3rd Edition, Pearson Education.

Reference Books:

1. V. Rajaraman, T. Radhakrishnan (2011), **Digital logic and Computer Organization,** PHI Learning Pvt.Ltd.

2. Donald P.Leach, Albert Paul Malvino, Goutam Saha (2011) **Digital Principles and Applications,** 7th Edition, Tata McGraw-Hill Education Pvt. Ltd.

3. Carl Hamacher, Zvonko Vransesic, Safwat Zakv (2011), **Computer Organization,** 5th Edition, Tata McGraw-Hill Education Pvt. Ltd.

Allied Course IV (P) - PHP Lab

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	II	U19CSA2P1	2	2

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Create the simple forms using PHP.	**K3**
CLO2	Develop webpage to manage file operations in PHP.	**K3**
CLO3	Utilize PHP script to create dynamic webpages.	**K4**

K3 – Applying   **K4 - Analysing**

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3					3
CLO2	3	2			3	3
CLO3	3	3			3	3

Strong – 3   **Medium – 2**   **Weak - 1**

`Write a PHP script

1. To find whether the given number is a prime or not.
2. To find the sum of digits of a given number.
3. To find the factorial of a given number.
4. To display the Fibonacci series.
5. To create a chess board.
6. To design a simple calculator using PHP.
7. Using built-in string function like strstr(), strops(), substr,count(), etc.
8. To transform a string to uppercase, lowercase letters, make a string's first character uppercase.
9. Using a function to display the entered string in reverse.
10. To sort a set of numerical values in ascending/descending order.
11. To create the Fibonacci sequence with recursive function.
12. To create a HTML form using GET, POST methods.
13. To create a student mark statement.
14. To create a simple webpage using PHP.
15. To create a file, write data into file and display the file's data.
16. Design an authentication web page in PHP with MySQL to check username and password.
17. Write a PHP program to maintain student mark list using MYSQL database.

Skill Based Course II (T) - Introduction to PHP

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	II	U19CSS21	2	2

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Develop Interactive webpage(s) using HTML and PHP.	K2
CLO2	Construct Dynamic web site using server side PHP Programming.	K3
CLO3	Describe different Web Extensions and Web Services.	K2

K2 – Understanding   K3 – Applying

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3					3
CLO2	3	3		2		
CLO3	3					3

Strong – 3   Medium – 2   Weak - 1

Unit I

The Basics of PHP Scripts **-The Building Blocks of PHP:** Variables-Data Types-Operators and Expressions- Constants. **Flow Control Functions in PHP:** Switching Flow-Loops-Code Blocks and Browser Output.

Unit II

Working With Functions: What is a Function?-Calling Functions-Defining a Function-Returning Values from User -Defined Functions-Variable Scope-Saving State between Function Calls with the static Statement-More About Arguments-Testing for the Existence of a Function. **Working with arrays:** what are Arrays?-Creating Arrays-Some Array- Related Functions. **Working with objects:** Creating an Object-Object Inheritance. **Working with Strings,Dates,and time:** Formatting Strings with PHP-Investigating Strings in PHP-Manipulating Strings with PHP-Using Date and Time Functions in PHP-Other String, Date and Time Functions.

Unit III

Working with Forms: Creating a Simple Input Form-Accessing Form Input with User-Defined Arrays-Combining HTML and PHP Code on a Single Page-Using Hidden Fields to Save State-Redirecting the User-Sending Mail on Form Submission-Working with File Uploads. **Working with Cookies and User Sessions:** Introducing Cookies-Setting a Cookie with PHP-Deleting a Cookie with PHP-Session Function Overview-Starting a Session-Working with Session Variables-Passing Session IDs in the Query String-Destroying Sessions and Unsetting Variables-Using sessions in an Environment with Registered Users. **Working with Files and Directories:** Including Files with

include()-Validating Files-Creating and Deleting Files-Opening a File for Writing, Reading, or Appending - Reading from Files- Writing or Appending to a File-Working with Directories-Opening Pipes to and from Processes Using popen()-Running Commands with exec()-Running Commands with system() or passthru().

Interaction with MySQL Using PHP: MySQL Versus MySQLi Functions- Connecting to MySQL with PHP-Working with MySQL Data.

Text Book:

Mysql and Apache, Julie C.Meloni (2009), PHP (4ᵗʰ Edition), Pearson Education.

Reference Books:

1. Steven Holzner (2008), The PHP Complete Reference, Mc Graw Hill Education.
2. Vikram Vaswani (2008), PHP: A Beginner's Guide, McGraw Hill Education.

Core Course V (T) - Object Oriented Programming with JAVA

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	III	U19CSC31	4	4

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Develop and test simple Java programs.	**K3**
CLO2	Create simple application programs with the use of decision making statements and loops.	**K3**
CLO3	Demonstrate on achieving reusability using inheritance and interfaces.	**K2**
CLO4	Solve Problems by using Packages, Exceptions and Threads.	**K3**
CLO5	Develop GUI in Java using Applet & AWT along with response to events.	**K3**

K2 – Understanding   **K3 - Applying**

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	2			3		3
CLO2	2	2		2		3
CLO3	3	3		3		3
CLO4	3	3				3
CLO5	2	2		2		3

Strong – 3   **Medium – 2**   **Weak - 1**

Unit I

Overview of Java Language: Introduction– Simple Java Program– Java Program Structure – Java Tokens – Java Statements – Implementing a Java Program – Java Virtual Machine. Constants, Variables ,Data types: Constants – Variables – Data types – Declaration of Variables – Giving Values to variables – Scope of Variables– Symbolic Constants. Operators: Arithmetic Operators – Relational Operators – Logical Operators – Assignment Operators – Increment and Decrement Operators – Conditional Operators – Bitwise Operators – Special Operators.

Unit II

Decision Making and Branching: Decision Making with If statement – Simple If Statement – If else Statement – Nesting If Else Statement – the Else If Ladder – The switch Statement – The ?: operator. Decision Making and Looping: The while statement – The do statement – The For statement – Jumps in Loops– Return statement– Labeled Loops.

Unit III

Classes, Objects and Methods: Defining a Class – Fields Declaration – Methods Declaration – Creating Objects – Accessing class members – Constructors – Methods Overloading – Static Members – Nesting of Methods – Inheritance: Extending a class – Overriding Methods – Final Variables and Methods – Final Classes – Finalizer Methods – Abstract Methods and Classes. Arrays, Strings: One – dimensional Arrays – creating an Array – Two dimensional Arrays – Strings Enumerated Types. Interfaces: Multiple Inheritance: Defining Interfaces – Extending Interfaces – Implementing Interfaces – Accessing Interface Variables.

Unit IV

Packages: Java API Packages – Using system Packages – Naming Conventions-Creating Packages – Accessing a Package – Using a Package – Adding a Class to a Package – Hiding Classes – Static Import. Multithreaded Programming: Creating Threads – Extending the Thread Class – Stopping and Blocking a Thread – Life Cycle of a Thread – Using Thread Methods – Thread Exceptions – Thread Priority– Implementing the 'Runnable' Interface. Managing Errors and Exceptions: Types of Errors – Exceptions – Syntax of Exception Handling Code – Multiple Catch Statements – Using Finally Statement – Throwing our own Exceptions.

Unit V

Applet Programming: How Applets differ from Applications – Preparing to write Applets – Building Applet Code – Applet Life Cycle – Creating an executable Applet – Designing a Webpage – Applet Tag – Adding Applet to HTML file – Running the Applet. Graphics Programming using AWT, Swing and Layout Manager: Introduction to AWT Package –Window fundamentals – Closing an AWT window or frame – Working with Applets-Working with fonts – Layout managers– Handling events on AWT components.

Text Book:

E.Balagurusamy (2019), Programming with Java, A primer, 6th Edition, Tata McGraw Hill.

Reference Books:
1. Debasish Jana (Reprint July 2014), Java and Object-Oriented Programming Paradigm, Prentice Hall of India Private Limited, New Delhi.
2. Herbert Schildt (2018), The Complete Reference, Java2, 11th Edition, Tata McGraw Hill.
3. K.Somasundaram (2016), Introduction to Java Programming, Jaico Publications.

Core Course VI (P) - Java Programming Lab

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	III	U19CSC3P1	6	4

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Comprehend basic Object Oriented programming concepts.	K3
CLO2	Develop programs using user defined packages, interfaces, Exception handling and Threading concept	K3
CLO3	Make use of Events using AWT components for real time applications	K3

K2 – Understanding   K3 - Applying

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3			3		3
CLO2	3	2		3		3
CLO3	3	3		3		3

Strong – 3   Medium – 2   Weak - 1

Write a Java program

1. To find the Sum of Digits, reverse, Armstrong number checking and Palindrome checking of a given number.
2. To perform addition of two complex numbers.
3. To perform multiplication of matrices with compatibility checking.
4. To implement method overloading concept.
5. To demonstrate various String functions (use switch case statement for choice selection).
6. To implement multilevel inheritance concept to calculate student mark's total, average and grade.
7. To implement multiple inheritance concept using interfaces to process payroll of the employees.
8. To create a package called **"Arithmetic"** that contains methods to deal with all arithmetic operations. Also, write a program to use this package.
9. To create two threads such that one thread should print even no's and another to print odd no's up to a given range.
10. To create student mark sheet & raise an user defined exception **"Marks out of bound"** if the mark is not in the range 0 to 100.
11. To create a list with set of names and copy them into another list in reverse order. If any name contains numeric value, throw an exception "Invalid Name".
12. To draw a Human Face using Applet.
13. To illustrate the sequence of events in an applet.
14. To display flash news in an applet.
15. To receive three Numeric values as input from the user and to display the largest of these on the screen.
16. To design a simple calculator using AWT.
17. To illustrate the menu options and display the same using popup menus.

Allied Course V (T) - Numerical Methods

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	III	U19CSA31	4	4

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Solve Algebraic and Transcendental Equations.	**K3**
CLO2	Solve Gauss Elimination, Gauss Jordan and Gauss iteration methods for finding the solution for simultaneous Equations.	**K3**
CLO3	Develop the Interpolation concept and through various interpolation formulae.	**K3**
CLO4	Solve the Numerical differentiation by using Newton's difference formulae.	**K3**
CLO5	Solve Numerical integration formulae and Differential equation.	**K3**

K2 – Understanding   K3 - Applying

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	2	2				
CLO2	3	2				
CLO3	3	2				
CLO4	3	2				
CLO5	3	2				

Strong – 3   Medium – 2   Weak - 1

Unit I

Algebraic and Transcendental Equations - Introduction - Errors in Numeric Computation -   Iteration method - Aitken's Method– Bisection method – Regula Falsi method – Newton Raphson method.

Unit II

Simultaneous Equations: Gauss Elimination method –Gauss Jordan Method – Inverse of a matrix – Gauss Jacobi iteration Method - Gauss Seidel iteration methods.

Unit III

Interpolation: Newton's interpolation formulae – Central difference interpolation formulae – Lagrange's interpolation formula – Divided Difference Formula - Inverse interpolation.

Unit IV

Numerical differentiation: Newton's Forward and Backward difference formulae – Newton's central difference formula – Maxima and Minima of the Interpolation formula.

Unit V

Numerical Integration: Newton's cote's Quadrature formula – Trapezoidal rule – Simpson's rule – Wedley's rule – Numerical solution of Differential Equation: Taylor's series method – Picard's method.

Text Book:

Dr. S. Arumugam, A. Thangapandi Issac Dr. A. Somasundaram (2007), Numerical Analysis with programming in C, New Gamma Publications.

Reference Book:

T. Veerarajan and T.Ramachandran (2006), Numerical Methods, 2nd Edition, Tata McGraw Hill.

Skill Based III (T) - E-Commerce

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	III	U19CSS31	2	2

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Demonstrate an understanding of the foundations and importance of E-commerce.	**K2**
CLO2	Analyze the impact of E-commerce and M-commerce on business.	**K3**
CLO3	Assess Electronic Payment Systems (EPS) in real time.	**K2**

K2 – Understanding   K3 - Applying

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	2	2		2		2
CLO2	2	2				2
CLO3	2	2		2		2

Strong – 3   Medium – 2   Weak - 1

Unit I

E-Commerce Introduction: Definition of Electronic Commerce – Evaluation of E-Commerce - E-Commerce technologies - E-Commerce from different perspective - E-Commerce Applications – Incentives for Engaging in E-Commerce - Needs of E-Commerce – Drivers of E-Commerce - Advantages of E-Commerce – Disadvantages of E-Commerce - **Architecture to Models:** Architecture of E-Commerce - E-Commerce Models.

Unit II

Architecture to Models: Inter Organizational E-Commerce – Impacts of E-Commerce on Business - Impacts of E-Commerce on Organizations – Success Factors of E-Commerce–**Mobile Commerce:** What is M-Commerce – Feature of M-Commerce – Industries Affected by M-Commerce – History of M-Commerce – Mobile Computing Applications-Mobile Computing Devices

Unit III

   Electronic Payment System (EPS): Introduction – Need for EPS – Conventional vs. Electronic System – Process of Electronic Payment System – Electronic Payment Protection Protocols – Payment Gateway – Certificates – Digital Tokens – Types of Electronic Payment System – Critical Success Factors of E-Commerce Payment System – Risks and Security – Disadvantages of Electronic Currency Payment Systems – Comparison of Electronic Payment Systems – On-line Banking.

Text Book:

S.K.Mourya, Shalu Gupta (2015), E-Commerce, Narosa Publishing House Pvt Ltd, New Delhi.

Reference Books:

1. David Whiteley (2017), E-Commerce, Strategy, Technologies and Applications, Indian Edition,
   Tata McGraw Hill Education.
2. P.T. Joseph (2019), E-Commerce an Indian Perspective, 6th Edition, PHI Learning Pvt Ltd.

NME Course I - Office Automation Lab

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	III	U19CSN3P1	2	2

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Demonstrate the basic features of Word to create and format a document with various features.	K2
CLO2	Develop Tables and illustrate mail merge.	K3
CLO3	Develop excel sheet and work with formulas and functions. Perform statistical calculations and illustrate various types of charts.	K3
CLO4	Create a new presentation with SmartArt graphics and animations.	K3

K2 – Understanding   **K3 - Applying**

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	3		3		3
CLO2	2	3		3		2
CLO3	2	3		3		2
CLO4	2	3		3		2

Strong – 3   **Medium – 2**   **Weak - 1**

MS – WORD

1. Open a word document to prepare your Resume by performing the following operations.
2. Formatting the Text – Alignment & Font style
3. Page setup (margin alignment, page height & width)
4. Create a word document to prepare an application form (College)
5. Create a word document to prepare a student mark sheet.
6. Design an invitation using different fonts, font sizes, bullets and Word Art / Clip Art
7. Mail Merge Concept
8. Prepare an invitation and sent to specific addresses in the data source.

MS – EXCEL

9. Create a student mark sheet with necessary information and use Data sort to display results. Also use Data Filters to answer at least five different criteria.
10. Create a student mark sheet with necessary information and make out a suitable chart showing gridlines, legends and titles for axes.
11. Prepare a salary bill in a worksheet showing Basic Pay, DA, HRA, Gross salary, PF, Tax and Net salary using suitable Excel Function.

MS-POWER POINT

12. Create a power point presentation to explain various aspects of your college using Auto play.
13. Create a power point presentation to explain various aspects of ABC company using Auto play.

Core Course VII (T) - Relational Database Management System

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	IV	U19CSC41	4	4

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Identify the elementary features of RDBMS and Develop Entity Relationship model.	**K3**
CLO2	Develop Database Schema using Normalization and understand the concepts of Data Integrity.	**K3**
CLO3	Summarize the concepts of Transaction management, Concurrency Control and Database security.	**K2**
CLO4	Construct SQL Queries to access Database.	**K3**
CLO5	Summarise PL/SQL Programming Concepts.	**K2**

K2 – Understanding   **K3 - Applying**

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	2	2				
CLO2	2	2				
CLO3	2	2				2
CLO4	2	2		2		2
CLO5	2	2		2		2

Strong – 3   **Medium – 2**   **Weak - 1**

Unit I

Introduction to RDBMS – RDBMS Terminology – The Relational Data Structure – Relational Data Integrity – Relational Data Manipulation – Codd's Rules – **Entity–Relationship Modeling** – E – R model – Components of an E – R model - E – R Diagram conventions – Relationships.

Unit II

Data Normalization – Keys – Relationships – First NF – Second NF – Third NF – Boyce – Codd's NF – Fourth NF – Fifth NF – Domain Key NF – Denormalization - **Data Integrity** – Introduction – Types of Integrity Constraints – Restrictions on Integrity Constraints.

Unit III

Transaction Management and Concurrency Control – Introduction – Transactions – Transaction properties – Database Structure – Transaction states – Concurrency control – Serializability – Recoverability - Transaction Management in SQL – Transactions and Recovery – User defined Transactions – The COMMIT command – The ROLLBACK command – The SAVEPOINT command - **Database Security** – Protecting the Data within the Database- Granting and Revoking Privileges and Roles.

Unit IV

   Introduction to SQL - SQL data types and Literals – Types of SQL Commands – SQL operators – Tables – Views – Indexes – Insert, Update and Delete Operations - Aggregate Functions - Queries and Sub queries.

Unit V

   PL/SQL : A Programming Language – Fundamentals of PL/SQL – PL/SQL Block Structure – Comments – Data types - Variable Declaration - Anchored Declaration- Assignment Operation-Bind Variables- Substitution variable in PL/SQL – Printing in PL/SQL- Arithmetic Operators - **PL/SQL Cursors and Exceptions –** Cursors –Implicit Cursors-Explicit Cursors - Explicit Cursor Attributes - Implicit Cursor Attributes-Cursor FOR Loops-SELECT…..FOR UPDATE Cursor - WHERE CURRENT OF Clause-Cursor with Parameters-Cursor Variables: An Introduction – Exceptions - Types of Exceptions-**PL/SQL Named Blocks:** Procedures-Functions-Packages-Triggers.

Text Books:

1. Alexis Leon & Mathews Leon (2008), Database Management Systems, Paperback Edition, Vikas Publishing.
2. Nilesh Shah (2005), Database Systems using Oracle A simplified Guide to SQL and PL/SQL, 2nd Edition, PHI.

Reference Books:

1. Raghu Ramakrishnan & Johannes Gehrke (2003), Database Management Systems, 3rd Edition,
   Tata McGraw Hill International Edition.
2. Abraham Silberschatz, Henry F. Korth, S. Sudarshan, (2006), Database System Concepts,
   Tata McGraw Hill International Edition.

Core Course VIII (P) - RDBMS Lab

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	IV	U19CSC4P1	6	4

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Apply DDL and DML commands to create tables.	K3
CLO2	Construct Different types of subqueries	K3
CLO3	Develop PL/SQL programs with cursor, Exception & Triggers	K3

K3 - Applying

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	2		3		2
CLO2	3	3		3		2
CLO3	3	3		3		2

Strong – 3   **Medium – 2**   **Weak - 1**

1. **Create table "Book" with the following fields:**
   ID, TITLE, AUTHOR, PUBLISHER, YEAR, PRICE
   a) Display the distinct publisher's name .
   b) Display the title, author and publisher of the books whose publishing year is 1999 and the price of the book is not less than 300.
   c) Display the details of books published in the year 1999 and 2000
   d) Find the author whose name contains the character 's'.
   e) Display the publisher name, average price as avgp, maximum price as maxp and minimum price as minp of the books published by the publisher having the count of books greater than or equal to 2.
   f) Display the details of books published by dell books in descending order.
   g) Display all the fields in the book table whose price is not less than 400 and greater than 600

2. **Create a table "Employee" with the following fields:**

   EMPNO, NAME, DOJ, DOB, DESIGNATION, DEPTNAME, BASICPAY, SEX
   a) Display the details of the youngest service employee
   b) Display the name of the employees in alphabetical order.
   c) Display the employee details whose basic pay is greater than Rs.10,000/-
   d) Display the name in upper case and pad the designation with * symbol.
   e) Decode f as female

3. **Create a table "Customer" with the following fields**
   ID, NAME, AGE, CITY, SALES
   a) Display id, name and sales of all customers
   b) Display id, name, and sales of the customer who belongs to "Sivakasi" and sales >20000
   c) Display the details of the customers whose sales is greater than 20000 and age is less than 26 years.
   d) Display the name of the customer in the alphabetical order.

e) Display id, name, and sales from the customer table for the customer whose name is 'karthick'.

4. Create a "Store" table with the following fields

STORE NO, STORENAME, SALES IN DOLLAR, SALESDATE

a) Display the details of all stores whose sales is above $1000
b) Display the details of all the stores in descending order of sales.
c) Find the number of distinct store names
d) Display the details of stores date wise whose sales is greater than $275
e) Display the sales details between January 6, 1999 and January 10, 1999
f) Select all records for the Losangels and the San Diego stores
g) Find the store which name contains 'AN'
h) Display the sales of each store between 1st Jan 2015 to 1st Feb 2015.
i) Get the store name which has highest sales
j) Find the total sales of each store

5. Create "Catalog" and "Publisher" tables with the following fields

(BOOK ID, TITLE, AUTHOR ID, PUBLISHER ID, CATEGORY ID, YEAR, PRICE) (PUBLISHER ID, NAME, CITY, COUNTRY)

a) Increase the price of all the books which are published before 1997 by 20%.
b) Get the details of the titles whose price is greater than the average price and whose year of publishing is greater than the average year of publishing
c) Get the names of all publishers who have more than two books in the catalog.
d) Get the titles of books whose publishers are from India.
e) Get the title, author_id, publisher_id from catalog table where the year is 1999 and price is less than Rs.500/-
f) Select the title of all the books whose publisher is from 'CANADA'
g) Get the details of the publisher who have 2 or more books in the catalog and the price of the   books is greater than the average price of the books in the catalog and the year of publication of the books is after 1995
h) Get the title and publisher name of all the books in the catalog table
i) Get the title of all the books from the catalog whose price is greater the average price

6. Create "Member" and "Order Summary" table with the following fields

(MEMBER ID, NAME, CITY, COUNTRY) (ORDER NO, MEMBER ID, ORDER DATE,   AMOUNT, STATUS)

a) Display the details of the members who have ordered the books.
b) Display the details of the order in the ascending order of order amount.
c) Display the name of the member in alphabetical order.
d) Find the member whose name contains 'R'.
e) Display the Order summary details whose amount is greater than 10000 and status is **"dispatched".**

7. To implement views.

PL/SQL :
1. Prime number checking.
2. Odd or Even Number Checking.
3. Reverse the given number.
4. Reverse the given String.
5. Multiplication Table.
6. Fibonacci series.
7. Palindrome Number checking.
8. Factorial of a given number using Function.
9. To raise a Pre-defined Exception.
10. To raise an User-defined Exception.
11. To create Triggers.
12. To implement Package.
13. To implement Cursor.

Allied Course VI (T) - Optimization Techniques

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	IV	U19CSA41	4	4

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Apply the skills and techniques to solve Linear Programming Problems.	K3
CLO2	Solve Linear Programming Problem using Artificial Variables.	K3
CLO3	Workout Assignment Problems.	K3
CLO4	Resolve transportation problems.	K3
CLO5	Solve the problems related to Network Routing.	K3

K3 - Applying

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	2	2		2		
CLO2	2	2		2		2
CLO3	2	2		2		2
CLO4	3	3		3		3
CLO5	3	2		2		2

Strong – 3   **Medium – 2**   **Weak - 1**

Unit I

Linear Programming Problem – Graphical Solution Method – Some Exceptional cases – General Linear Programming Problem – Canonical and Standard Forms of LPP - **Linear Programming Problem – Simplex Method :** Introduction – Fundamental Properties of Solutions - The Computational Procedure

Unit II

Use of Artificial Variables – Degeneracy in Linear Programming – Duality and Simplex Method.

Unit III

Transportation Problems: LP Formulation of the Transportation Problem – Existence of Solution in T.P - The transportation Table – Loops in Transportation Table – Solution of a Transportation Problem - Finding an Initial Basic Feasible Solution – Test for Optimality – Degeneracy in Transportation Problem – Transportation Algorithm(MODI Method)

Unit IV

Assignment Problems: Mathematical Formulation of the Problem – Solution Methods of Assignment Problem – Special Cases in Assignment Problems – The Travelling Salesman Problem.

Unit V

Network Routing Problems : Introduction – Network Flow Problems – Minimal Spanning Tree Problem – Shortest Route Problems.

Text Book : **(Only solved problems)**

Kanti Swarup, P.K.Gupta, Man Mohan (2010), Operation Research, 15th Throughly Revised Edition,
Sultan Chand & Sons.

Reference Books:

1. S.D. Sharma (2004), Operation Research, Kedar Nath Ram Nath & Co.

2. Dr S. Arumugam, A Thangapandi Isaac (2010), Linear Programming, New Gamma Publication.

Skill Based IV (T) - Software Engineering

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	IV	U19CSS41	2	2

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Summarize the concepts of software engineering process models and requirement techniques.	**K2**
CLO2	Demonstrate and analyze various design concepts and testing techniques.	**K2**
CLO3	Summarise Software quality concepts and configuration management.	**K1**

K1 – Remembering   **K2 – Understanding**

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3			2		2
CLO2	3	2		2		3
CLO3	3			2		2

Strong – 3   **Medium – 2**   **Weak - 1**

Unit I

Introduction to Software Engineering: Software Engineering-The Software Process-**Process Models:** A Generic Process Model-Process Assessment and Improvement-Prescriptive Process Models-Specialized Process Models- **Understanding Requirements:** Requirements Engineering-Establishing the Group work-Eliciting Requirements.

Unit II

Design Concepts: Design within context of Software Engineering –The design Process-Design Concepts-The design model.

Software Testing Strategies-A Strategies approach to software testing-Strategies issues-Test Strategies for conventional software-Test strategies-for object oriented software-Test strategies for WebApps -Validation Testing-System testing.

Testing Conventional Applications: Software Testing Fundamentals-Internal and External Views of Testing-White box testing-Basis Path Testing-Control Structure Testing-Black-Box Testing.

Unit III

Software Quality Assurance: Elements of Software Quality Assurance-SQA Tasks, Goals and Metrics-Formal approach to SQA-Statistical software Quality Assurance-Software Reliability-The ISO 9000 Quality Standards-The SQA Plan.

Software Configuration Management: Software Configuration Management-The SCM Repository-The SSM Process-Configuration Management for WebApps.

Text Book:

Roger Pressman (2010), Software Engineering – A Practitioner's Approach, 7th Edition, Tata McGraw Hill.

Reference Books:

1. Rajib Mall (2010), Fundamentals of Software Engineering, 4th Edition, Tata McGraw Hill.

2. Pankaj Jalote (1991), An Integrated Approach to Software Engineering, 3rd Edition, Narosa Publication.

NME Course II – DTP Lab

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	IV	U19CSN4P1	2	2

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Develop layouts for web pages, Paper Adverts, Brouchers, CD Covers, Package Designing.	**K3**
CLO2	Utilize various colour corrections using adjustment layers and convert B/W photo to color.	**K3**
CLO3	Use basic Photoshop skills and concepts to develop effective graphics for both web and print media.	**K4**

K3 – Applying   **K4 - Analysing**

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	2	2		3		2
CLO2	3	2		3		2
CLO3	3	2		3		2

Strong – 3   **Medium – 2**   **Weak - 1**

Photoshop Lab

1) To create text in various styles in Photoshop.

2) Design an Identity card.

3) Display an image using marquee tool.

4) Display an image using Lasso tool.

5) Display an image using different selection tools.

6) Implement different types of filters in an image

7) Merge two images.

8) Design a greeting card.

9) Convert black & white image into a color image.

10) Design a clone image using clone stamp tool.

11) Design an image using pattern stamp tool.

12) Crop an image and perform various transformations in Photoshop.

Core Course VIII (T) – Data Mining and Data Warehousing

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	V	U19CSC51	6	5

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Summarize Data Mining Principles and Data preprocessing.	K2
CLO2	Implement the association rules for mining.	K3
CLO3	Identify appropriate classification techniques for real life problems	K3
CLO4	Learn to cluster the high dimensional data for better organization of the data.	K3
CLO5	Inculcate knowledge on Data Warehousing fundamentals, OLAP Operations and the concepts of Complex Types of data.	K2

K2 – Understanding **K3 – Applying**

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	2			2		3
CLO2	3	2		2		3
CLO3	3	2		2		2
CLO4	2					2
CLO5	3	2		2		3

Strong – 3 **Medium – 2** **Weak - 1**

UNIT I

Data Mining: Introduction to Data Mining - Architecture of Data Mining - Kind of data - Data Mining Functionalities - Classification of Data Mining System - Data Mining Techniques - Major Issues - In Data Mining.

Data Preprocessing: Data preprocessing - Data Cleaning - Data Integration - Data Transformation - Data Reduction - Data Discretization and Concept Hierarchy Generation - Data Mining Primitives - Data Mining Query Language - Designing the GUI based on DMQL- Architecture of Data Mining System.

UNIT II

Association Rules Mining: Introduction – Basics – The Task and Naïve Algorithm – The Apriori Algorithm – Improving the Efficiency of the Apriori Algorithm – Mining Frequent Patterns without Candidate Generation.

UINT III

Classification: Introduction – Decision Tree – Building a Decision Tree – The Tree Induction Algorithm – Split Algorithm Based on Information Theory – Split Algorithm Based on Gini Index – Decision Tree Rules – Naïve Bayes Method – Improving Accuracy of Classification Accuracy – Other Evaluation Criteria for Classification Methods.

UNIT IV

Cluster Analysis: Introduction – Desired Features of Cluster Analysis – Types of Data – Computing Distance – Types of Cluster Analysis Methods – Partitional Methods – Hierarchical Methods - Density-Based Methods – Dealing with Large Databases.

UNIT V

      Data Warehousing and OLAP Technology and Data Mining: Introduction – data warehouse Components – Multidimensional Data Model – data Warehouse Architecture – data Warehouse Implementation – From Data Warehousing to Data Mining – On-Line Analytical Processing (OLAP). **Mining Complex Types of Data:** Multidimensional Analysis and Descriptive Mining of Complex of Data Objects – Spatial Data Mining – Multimedia Data Mining – Mining Time-Series Data – Mining Text Databases – Mining The World-Wide Web.

Text Books:
1. B.S.Charulatha, (2017), Data Mining and Data Warehousing, Charulatha Publication.
2. G.K.Gupta, (2011), Introduction to Data Mining with Case Studies, PHI Learning Publication.

Reference Books:
1. Arun K.Pujari, (2013), Data Mining Techniques, University Press (India) Private Limited. Third Edition.
2. K.P.Soman, Shyam Diwakar and V.Ajay , (2006), Insight into Data Mining Theroy and Practice, PHI Learning Publication.

Core Course IX (T) Operating System Concepts

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	V	U19CSC52	6	5

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Generalize the structure and functions of operating system.	**K2**
CLO2	Demonstrate the concept of CPU Scheduling and Processes.	**K2**
CLO3	Summarise the Process Synchronization and Deadlocks.	**K3**
CLO4	Describe the techniques of Memory Management.	**K2**
CLO5	Summarize the basic concepts of Linux Programming.	**K3**

K2 – Understanding   K3 – Applying

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	2		3		
CLO2	3	2		3		
CLO3	3	2		3		
CLO4	3	2		3		
CLO5	3			3		2

Strong – 3   Medium – 2   Weak - 1

Unit I

        Overview : Introduction - What Operating Systems Do – Computer System Organization – Computer System Architecture – Operating System Operations - Resource Management - Security and Protection - Distributed Systems - Kernel Data Structures. **Operating System Structures** – Operating System Services - User and Operating - System Interface - System Calls - System Services - Linkers and Loaders. Operating-System Design and Implementation - Operating-System Structure - Building and Booting an Operating System - Operating-System Debugging

Unit II

        Process Management: Processes – Process – Concept – Process Scheduling – Operation on Processes – Inter process Communication – IPC in Shared memory systems- IPC in Message Passing Systems – **CPU Scheduling** - Basic Concepts - Scheduling Criteria - Scheduling Algorithms - **Process Synchronization**-**Synchronization Tools-**The Critical-Section Problem - Peterson's Solution - Hardware Support for Synchronization - Mutex Locks - Semaphores.

Unit III

        Deadlocks - System Model -Applications - Deadlock Characterization - Methods for Handling Deadlocks - Deadlock Prevention - Deadlock Avoidance - Deadlock Detection - Recovery from Deadlock. **Memory Management: Main Memory** - Background - Contiguous Memory Allocation - Paging - Structure of the Page Table–Swapping.

Unit IV

      Virtual Memory - Background - Demand Paging - Copy-on-Write - Page Replacement - Allocation of Frame – **Storage Management: Mass Storage Structure** – overview of Mass Storage Structure – HDD Scheduling. **File system: File System Implementation** – File System structure – File System Operations – Directory Implementation – Allocation Methods – Free Space management.

Unit V

      The Linux System - Design Principles- Process Management - Scheduling – Memory Management - File Systems - Input and Output – **Linux Commands** – Directory oriented Commands – File Oriented Commands – File access Permissions – General Purpose Commands – **Pipes and Filters** - Pipe – Redirection – Filters – Sort – grep –uniq - Shell Programming

Text Books:

1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne (2018),Operating System Concepts,10th Edition,Wiley Publishing Inc.,
2. B.Mohamed Ibrahim (2008), Linux A Practical Approach, First Edition, Firewall Media.

Reference Books:

1. A.S.Tanenbaum(2004), Modern Operating Systems, Third Edition, Prentice Hall of India.
2. Matthew. N, Stones. R, and Cox. A (2011), Beginning Linux Programming, Fourth Edition, Wiley Publishing Inc.,

Core Course X(P) – Data Mining Lab

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	V	U19CSC5P1	6	4

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Compare and evaluate different data mining techniques like prediction, clustering and association rule mining.	**K3**
CLO2	Design algorithms for real life problems.	**K4**
CLO3	Interpret the data sets for Linear Regression algorithm.	**K4**

K3 – Applying   **K4 - Analysing**

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	2		3	2	
CLO2	3	2		2	2	3
CLO3	2			2	2	3

Strong – 3   **Medium – 2**   **Weak - 1**

1. Create data-set in .arff file format and perform preprocessing.
2. Implementation of Varying Arrays.
3. Implementation of Nested Tables.
4. Demonstration of Association rule process on data-set contact lenses.arff /supermarket (or any other data set) using apriori algorithm.
5. Demonstration of classification rule process using Decision Tree algorithm.
6. Demonstration of classification rule process using j48 algorithm.
7. Demonstration of classification rule process using Naive Bayes algorithm.
8. Demonstration of clustering rule process on data-set iris.arff using simple k-means
9. Find out the correctly classified instances, root mean squared error, kappa statistics, and mean absolute error for weather data set.
10. To perform the cluster analysis by k-means method
11. To perform the cluster analysis by K-Medoids method
12. To perform the Agglomerative hierarchical clustering
13. To perform the Divisive hierarchical clustering.
14. Execute and analyze Linear Regression algorithm.
15. Create a dataset for Mobile Users and analyze the data.

Elective Course I (a) (T) – Visual Programming

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	V	U19CSE51	4	4

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Demonstrate the basic components of Visual Basic.	**K2**
CLO2	Develop the programs using Looping statements, Arrays and Strings.	**K2**
CLO3	Generalize the concept of functions and procedure.	**K3**
CLO4	Develop programs using controls in Visual Basic.	**K3**
CLO5	Create an application using database.	**K3**

K2 – Understanding   **K3 – Applying**

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	2		3		2
CLO2	3	2		3		2
CLO3	3			3		2
CLO4	3			3		2
CLO5	3	2		3		2

Strong – 3   **Medium – 2**   **Weak - 1**

UNIT-1

      Customizing a form and writing simple programs: Starting a new project-The properties window-common form properties-scale properties-color properties - making a form responsive. B**uilding the user interface:** The toolbox-creating controls-The name property-properties of command buttons-simple event procedures for command Buttons-Access Keys-Image Controls-Text Boxes - Labels-Navigating between Controls-Message boxes-The Grid.

UNIT-2

      First steps in programming: Visual basic editing tools-statements in visual basic-variables-setting properties with Code-Data Types-Working with Variables-More on Strings-More on numbers. **Controlling program flow:** Determinates Loops-Indeterminate Loops-Making Decisions-Select Case-Nested if-Then-The Goto.

UNIT-3

      Functions and procedures: Function procedures-Sub Procedures-Advanced uses of procedures and functions. **Organising information via code:** Lists one dimensional array-The new array based String - Sorting and Searching-Records-With Statement- Enum.

UNIT-4

      Built-in-functions: String function- **Organising information via controls:** Control arrays-list and combo box-The flex grid control. **Finishing the interface:** The toolbox revisited-common dialogue Boxes-Image List Control-List view controls-progress bar control-slider control, status bar control-toolbar control. **Displaying Information:** Picture boxes-rich textboxes.

UNIT-5

Menus - MDI Forms. **File system controls and file system objects:**File system controls.**A Survey of database development using Visual Basic:**Using the data control –structured query language basics-An introduction to programming with database Object-Other useful methods and event for the data Control-Monitoring changes to the database-The data form wizard.

Text Book:

Gary Cornell (2008),Visual Basic 6 from the Groundup,Tata McGraw Hill.

Reference Books:

1. NoelJerke (1999),VisualBasic 6(The Complete Reference),Tata McGraw Hill
2. Steve Brown(1998), Visual Basic 6 in Record Time, BPB Publications.

Elective Course I (b) (T) Android Programming

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	V	U19CSE52	4	4

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Launch Android Application in SDK, debug and publish the application.	K2
CLO2	Create an activity by applying styles and themes and to program an user interface.	K2
CLO3	Design an interface with different types of views and menus.	K3
CLO4	Create and use database based programming in Android.	K3
CLO5	Create an Android application to send messages and Email.	K3

K2 – Understanding **K3 – Applying**

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3		2	3		2
CLO2	3		2	3		2
CLO3	3	2	2	3		2
CLO4	3	2	2	3		2
CLO5	3		2	3		2

Strong – 3 **Medium – 2** **Weak - 1**

Unit I

Android – Android versions- Features of Android – Architecture of Android – Android devices in the market – Android studio- Android SDK – creating Android virtual devices – Launching Android application – Exploring the IDE – using code completion – debugging the application –publishing the application

Unit II

Activities, Fragments and Intents – Applying styles and themes to an Activity – Hiding the Activity title – Displaying a dialog window – displaying a progress dialog –linking activities using Intents –Fragments – Displaying notifications

Unit III

Getting to know the Android user interface -understanding the components of a screen- Adapting to display orientation – Managing changes to screen orientation – utilizing the action bar – creating the user interface programmatically – Listening for UI Notifications.

Unit IV

Designing user interface with views – using basic views – using picker views – using List views to display long lists – understanding specialized Fragments – using image views to display pictures – using menus with views – using web view

Unit V

Data Persistence-saving and loading user interfaces-persisting data to files-creating and using databases – Sharing Data in Android – using a content provider – creating content providers-SMS messaging – sending Email

<u>**Text Books:**</u>
J.F.DiMarzio(2017), Beginning Android Programming with Android Studio, Fourth Editon, Wrox Publications (Wiley Brand).

<u>**Reference Books:**</u>
1. WeiMeng Lee (2012), Beginning Android Application Development, Wrox Publications (John Wiley, New York).
2. Ed Burnette (2010), Hello Android: Introducing Google's Mobile Development Platform, 3rd Edition, The Pragmatic Publishers, North Carolina USA.
3. Reto Meier (2012), Professional Android 4 Application Development, Wrox Publications (John Wiley, New York).

Elective Course I (c) (T) Embedded Systems

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	V	U19CSE53	4	4

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Comprehend the basics of an embedded system.	**K2**
CLO2	Identify the typical components of an embedded system.	**K2**
CLO3	Accomplish depth knowledge about the Firmware, Characteristics and Attributes of embedded System	**K3**
CLO4	Analyse the Design of the Basic Micro Controller.	**K2**
CLO5	Develop code for embedded system using Arduino.	**K3**

K2 – Understanding **K3 – Applying**

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	2	2				2
CLO2	2	2				
CLO3	3	3		2		2
CLO4	2	2		2		2
CLO5	3	3		2	2	3

Strong – 3 **Medium – 2** **Weak - 1**

Unit – I

Introduction to Embedded Systems: Introduction – Embedded System – Embedded Systems vs General Computing Systems - History of Embedded Systems - Classification of Embedded Systems based on Generation and Complexity and Performance - Application areas of Embedded System- Purpose of embedded systems. Typical Embedded System: Introduction – Core of the embedded system-Application Specific Integrated Circuits (ASICs) – Programmable Logic Devices – Commercial off-the-shelf Components(COTs) –Memory – Program Storage Memory (ROM) – Read-Write Memory (RAM) - Memory according to the Type of Interface - Memory Shadowing - Memory Selection for Embedded Systems.

Unit – II

Sensors – Actuators – I/O Sub System – Communication Interface - Onboard communication interfaces- Inter Integrated Circuit (I2C) Bus - Serial Peripheral Interface (SPI) Bus - Universal Asynchronous Receiver Transmitter (USRT) - External communication interfaces-RS 232 C and RS 485, Universal Serial Bus – IEEE 1394 (Firewire) - infrared – Bluetooth - Wi-Fi - ZigBee, GPRS - GSM.

Unit – III

Embedded Firmware - Design and Development – other System Components – Reset Circuit – Brown-out Protection Circuit – Oscillator Circuit – Real-Time Clock – Watchdog Timer – PCB and Passive Components.
Characteristics and Quality Attributes of Embedded Systems: Characteristics – Application and Domain Specific – Reactive and Real Time – Operates in harsh Environments – Distributed – Small Size and Weight – Power Concerns – Quality Attributes – Operational Quality Attributes – Non- Operational Quality Attributes.
Embedded System-Application-and Domain-Specific: Washing Machine – Automotive – Inner workings – Automotive Communication Buses – key Players of the Automotive Embedded Market.

Unit – IV
Designing Embedded Systems with 8-bit Microcontroller-8051: Factors – Feature Set – Speed of Operation – Code Memory Space – Data Memory Space – Development Support – Availability – Power Consumption – Cost - Microcontroller – Designing with 8051 – Architecture – The Memory Organization – Registers – Oscillator Circuit – Port.

Unit – V
This is Arduino: Introduction – Microcontrollers – A Tour of an Arduino Boards – The Origins of Arduino – The Arduino Family – Arduino Clones and Variants. **Getting Started:** Powering Up – Installing the Software – Uploading first Sketch – The Arduino Application. **Input and Output:** Digital Outputs – Digital Inputs – Analog Outputs – Analog Inputs. **The Standard Arduino Library:** Random Numbers – Math Functions – Bit Manipulation – Advanced I/O – Interrupts.

Text Books:
1. K.V. Shibu, (2017) Introduction to Embedded Systems, Mc Graw Hill Education.
2. Simon Monk, (2012) Programming Arduino Getting Started with Sketches, Mc Graw Hill Company.

Reference Books:
1. Lyla b das, (2012) Embedded Systems- An integrated approach, Pearson education.
2. Raj Kamal (2008) Embedded Systems: Architecture, Programming and Design, Mc Graw Hill Publications.
3. Massimo Banzi, (2011) Getting Started with Arduino, O'REILLY Media Inc

Elective Course II (a) (P) Visual Programming Lab

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	V	U19CSE5P1	4	4

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Design simple Visual Basic applications.	**K3**
CLO2	Develop Front-End applications using various basic controls of Visual Basic.	**K3**
CLO5	Generate applications with database for real life examples.	**K4**

K3 – Applying **K4 - Analysing**

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	2		2		2
CLO2	3	3		3		2
CLO3	3	2		3		2

Strong – 3 **Medium – 2** **Weak - 1**

Write a visual basic program to
1. Calculate the marks of the students using textbox, label box, command button.
2. Prepare the Electricity bill.
3. Design of a Colour Mixer using scroll bar.
4. Animate a picture using timer.
5. Find the sum of numbers from 1 to select the value (use scroll bar to set the maximum value).
6. Convert the temperature in Celsius into Fahrenheit and vice-versa (use function)
7. Implement handling String functions (use combo box)
8. Design a calculator using control arrays
9. Perform Matrix Addition using Flex Grid Control.
10. Create an application using File controls to load a picture and use two option buttons to show and hide a picture in the picture box.
11. Create an Editor with File and Edit menus.
12. Create an MDI application with tile and cascade child forms.
13. Create a mailing address database in Access and view the records using Data Control.
14. Design an application to implement remote data control and date grid control.
15. Design an application using ADO Control.
16. Create a database application using Visual Data Manager to Navigate the records, add a new record, update the record and delete a record.
17. Create an application to develop on online MCQ test using timer.
18. Generate a report for Employee pay bill.

Elective Course II(b) (P) Android Programming Lab

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	V	U19CSE5P2	4	4

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Design a mobile application with GUI components and Fragments.	**K2**
CLO2	Develop an interactive activity in Android programming.	**K3**
CLO3	Develop an interactive Android application that sends and receives messages.	**K4**

K2 – Understanding **K3 – Applying** **K4 - Analysing**

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3		2	3		3
CLO2	3		2	3		3
CLO3	3		2	3		3

Strong – 3 **Medium – 2** **Weak - 1**

1. Develop an application with Fragments and pass data to an activity

2. Develop an application that uses different types of layouts and Notifications

3. Develop an application with user interface and Listeners

4. Design an application with different types of views including Time pickers.

5. Develop an application that makes use of List fragments

6. Implement an application that uses image switchers

7. Develop an application that uses menus with views

8. Develop an application that demonstrates the use of progress dialog and Async task.

9. Code a mobile application that uses alarm clock application

10. Implement an application that creates an alert upon receiving a message

11. Code a mobile application that sends and receives messages.

12. Code a mobile application that uses GPS location information.

13. Implement an application that writes data to the SD card.

14. Code a mobile application that implements multithreading.

15. Design a mobile application that uses database application.

16. Design a mobile application to understand the use of HTTP client and host

Elective Course II(c) (P) Embedded Systems Lab

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	V	U19CSE5P3	4	4

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Develop the hardware for embedded system application based on the processors.	K2
CLO2	Design simple applications using microcontrollers and provide apt solutions for any embedded application.	K3
CLO3	Incorporate suitable microcontroller along with appropriate interfacing circuits and implement the same for an application with software programs.	K4

K2 – Understanding   **K3 – Applying**   **K4 - Analysing**

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	2		2	3		3
CLO2	3	3	3			2
CLO3	3	2	3	2		3

Strong – 3   **Medium – 2**   **Weak - 1**

1. Write a program to toggle all the led to port and with some time delay
2. Write a program to interface LCD
3. Write a program to interface 4*4 matrix keypad
4. Write a program for interfacing LED and PWM and to verify the output.
5. Write a program for interfacing of DC motor
6. Write a Program realization of low pass, high pass and band pass filters and their characteristics
7. Write a program to implement Analog to Digital conversion
8. Write a program to implement Digital to Analog conversion
9. Digital function implementation using digital blocks
    A. Counter for blinking LED.
    B. PWW Digital buffer and Digital inverter.
10. Write a program for Temperature measurements.
11. Write a program for pressure measurements.
12. Write a program to monitor heartbeat.
13. Write a program to implement digital lock.
14. Write a program to implement Counter.
15. Write a program to implement Timer.
16. Write a random number generation function using assembly language. Call this function from a C program to produce a series of random numbers and save them in the memory

Skill Based Course V(P) Linux Programming Lab

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	V	U19CSS5P1	2	1

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Utilize the linux utilities to create and manage simple file processing operations	K2
CLO2	Apply the security features on file access permissions by restricting the ownership using advance linux commands.	K3
CLO3	Develop shell scripts to perform more complex tasks in shell programming environment.	K3

K2 – Understanding   **K3 – Applying**

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3			2		
CLO2	3	2		2		
CLO3	3			2		2

Strong – 3   **Medium – 2**   **Weak - 1**

1. Write a Shell programming, which accepts the name of the file from the standard Input and then perform the following operations:
   i) Enter 5 names in a File
   ii) Sort the names in Existing File
   iii) List unsorted and sorted File
2. Write a Menu driven Shell Programming to Copy, Edit, Rename and Delete a File.
3. Write Menu Driven Shell Programming to perform the following tasks
   i) Enter the sentence in File
   ii) Search a Given word in an existing file
   iii) Quit
4. Write a Shell Programming to prepare the Electricity bill based on the following rules
   i) For first 100 units - Rs. 1.00 / unit
   ii) For next 100 units - Rs. 2.00 / unit
   iii) Above 200 units   - Rs. 3.00 / unit
5. Write a Shell Programming to Sum up the following series

$$\frac{1}{1!} + \frac{2}{2!} + \frac{3}{3!} + \ldots$$

6. Write a Shell Programming to display the result "PASS" or "FAIL" using the information given below: Student name, Register Number, Mark 1, Mark 2, Mark 3. The Minimum pass mark is 50.
7. Write a Menu driven shell script to convert the characters from upper case to lower case.
8. Merge the contents of three given files, Sort them and display the sorted output.
9. Write a Shell Programming to check whether the user is Eligible for vote or not.
10. Write a Shell Programming to check whether a given string is Palindrome or not.
11. Write a shell Programming to delete all lines containing a specified word.
12. Write a shell Programming to find the factorial of given integer.

Environmental Studies

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	V	U19CNE51	2	2

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO 1	Explain the structure of the earth and its resources	K2
CLO 2	Outline the concepts related to echo systems	K2
CLO 3	Summarize the significance of biodiversity and disaster management.	K2

K2 – Understanding

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3					3
CLO2	3					2
CLO3	3					3

Strong – 3   **Medium – 2**   **Weak - 1**

UNIT – I: Earth and its Environment (10 hours)

1. Structure of earth and its components.
2. Atmosphere, Hydrosphere Lithosphere and Biosphere.
3. Resources-Renewable and Non-renewable resources.

UNIT – II: Ecology and Ecosystem Concepts (10 hours)

a) **Ecology**: Definition- Ecosystem: Definition- Structure and function –Food chain and food web- one example for an ecosystem.

b) Pollution and Global Issues:
   Definition, causes, effects and control measures of Air, Water, Soil and Nuclear Pollution.

c) **Global issues**: Global warming, Green-house effect and ozone layer depletion.

UNIT – III: Biodiversity and Disaster Management (10 hours)

1. Introduction- Definition –Value of Biodiversity.
2. Biodiversity of India –Hot spots of Biodiversity.
3. **Disaster Management**- Flood and drought –Earthquake and Tsunami-cyclones and Hurricanes-precautions, warnings, rescue and rehabilitation.

 Text Book:
A Text Book of Environmental Sciences, Curriculum Development Cell, Sri SRNM College, Sattur

Reference Books:

1. Odum, E.P. (1985). Fundamentals of Ecology. W.B. Publishers, Philadelphia.
2. Erach Bharucha. Textbook of Environmental studies for under graduate course
3. P.D. Sharma (2006). Environmental Biology Rastogi Publishers Ganapathi Shivaji Road, Meerut - 250 002.
4. J. Dharmaraj (2015) Environmental Studies. Tensy Publications, Sivakasi.

Core Course XIII (T)
Introduction to Computer Graphics and Image Processing

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	VI	U19CSC61	6	5

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Demonstrate the working principles of Computer Graphics System.	**K2**
CLO2	Generalize the attributes of output primitives and 2D Transformations.	**K2**
CLO3	Apply viewing and Clipping techniques for the given image.	**K3**
CLO4	Describe the Digital Image Processing fundamentals.	**K2**
CLO5	Utilize image compression and segmentation Techniques for real time problems	**K3**

K2 – Understanding   **K3 – Applying**

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	2			3		2
CLO2	2			3		2
CLO3	3			3		
CLO4	2			3		3
CLO5	3			3		3

Strong – 3   **Medium – 2**   **Weak - 1**

Unit I

Overview of Graphics Systems: Video Display Devices – Raster Scan Systems – Random scan systems – Output Primitives: Points and Lines – Line Drawing Algorithms – Circle Generating Algorithms – Ellipse Generating Algorithms – Filled Area Primitives.

Unit II

Attributes of output Primitives: Line attributes - Area Fill attributes - Two – Dimensional Geometric Transformations: Basic Transformations – Matrix Representations and Homogeneous Coordinates – Composite Transformations – Other Transformations.

Unit III

Two – Dimensional Viewing: The Viewing Pipeline – Viewing Coordinate Reference Frame – Windows – to – Viewpoint Coordinate Transformation - Clipping : Clipping Operations – Point Clipping – Line Clipping (Cohen Sutherland Line Clipping only) – Polygon Clipping – Curve Clipping – Text Clipping – Exterior Clipping – Graphical User Interfaces and Interactive input methods - Interactive picture construction Techniques.

Unit IV

Introduction to Image Processing: Digital Image Representation - Types of Images - Digital Image Processing Operations- Fundamental Steps in Image Processing - Digital Imaging System. Digital Imaging System: Sampling and Quantization - Image Storage and File Formats- Color Image Processing: Introduction - Color Image Storage and Processing- Color Models.

Unit V

Digital Image Processing Operations: - Classification of Image Processing Operations - Arithmetic Operations - Logical operations -Geometrical Operations. Image Compression: Image Compression Model - Compression Algorithm and its types - Run-length coding - Huffman Coding - Image - Segmentation: Introduction - Classification of Image Segmentation Algorithms - Deduction of Discontinuities - Edge Detection - Stages in Edge Detection - Types of Edge Detectors.

Text Books:

1. Donald Hearn and M. Pauline Baker (2009), Computer Graphics (C Version), Second Edition, Pearson Education.
2. S.Sridhar (2011), Digital Image Processing, OXFORD University Press.

Reference Books:

1. Angel and Edward (2011), Interactive Computer Graphics, Sixth Edition, Addison-Wesley Longman.
2. Donald Hearn, M. Pauline Baker and Warren Carithers (2010), Computer Graphics with Open GL, Fourth Edition, Pearson Education.
3. Rafel C. Gonzalez and Richard E. Woods (2017), Digital Image Processing, Fourth Edition, Pearson Education.
4. Rafael C.Gonzalez (2014), Digital Image Processing Using MATLAB, McGraw Hill Education(India) Private Limited.

Core Course XIV (T) – Computer Networks and Security

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	VI	U19CSC62	6	5

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Describe the basics of data communications and networking.	**K2**
CLO2	Identify various transmission media and the features of multiplexing concepts.	**K2**
CLO3	Describe the methods of Error Detection and Correction schemes.	**K3**
CLO4	Apply various Routing algorithms, Congestion control and Security fundamentals.	**K3**
CLO5	Utilize Data Encryption algorithms for securing the applications.	**K2**

K2 – Understanding   **K3 – Applying**

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	2	2		2		2
CLO2	3	3		2		3
CLO3	3	3		3		3
CLO4	3	3		2		2
CLO5	3	2		3		3

Strong – 3   **Medium – 2**   **Weak - 1**

Unit I:

   Introduction : Data Communication - Networks. **Basic Concepts :** Line Configuration – Topology - Transmission Mode- Categories of Networks– Internetworks . **The OSI Model:** The Model- Functions of the Layers- TCP/IP Protocol Suite-**Transmission of Digital Data & Interfaces and Modems :** Digital Data Transmission.

Unit II:

   Transmission Media : Guided Media- Twisted Pair Cable-Coaxial Cable- Optical Fiber - Unguided Media-Radio Frequency Allocation – Propagation of Radio Waves – Terrestrial Microwave – Satellite Communication – Cellular Telephony. Multiplexing- Many to one / One to Many - Frequency Division Multiplexing (FDM) - Wave-Division Multiplexing (WDM) - Time-Division Multiplexing (TDM).

 Unit III:

   Error Detection and Correction: Types of Errors- Detection- Redundancy – Vertical Redundancy Check (VRC) – Longitudinal Redundancy Check (LRC) – Cyclic Redundancy Check (CRC) – Checksum – Error Correction. **Data Link Control**: Line Discipline – Flow Control-Stop and Wait – Sliding Window- Error Control – Automatic Repeat Request(ARQ)-Stop-and-Wait ARQ- Sliding Window ARQ.

Unit IV:

Routing Algorithms - Distance Vector Routing-Link State Routing. **Frame Relay:** Congestion Control - Leaky Bucket algorithm.

Introduction: Security Goals – Attacks – Services and Mechanism – Techniques. **Traditional Symmetric-Key Ciphers**: Introduction – Substitution Ciphers – Transposition Ciphers – Stream and Block Ciphers.

Unit V:

Data Encryption Standard (DES): Introduction – DES Structure – DES Analysis – Multiple DES – Security of DES. Asymmetric Key Cryptography : Introduction – RSA crypto System.

Text Books:

1. Behrouz A Forouzan (2006), Data Communications and Networking, 2nd Edition, Tata McGraw Hill Publishing Company Limited, New Delhi.
2. Behrouz A. Forouzan, Debdeep Mukhopadhyay (2007), Cryptography and Network Security, 2nd Edition, Tata McGraw Hill.

Reference Books:

1. Andrew S. Tanenbaum (2006), Computer Networks, 4th Edition, Prentice Hall of India.
2. William Stallings (2007), Data and Computer Communications, Prentice Hall of India.
3. William Stallings (2008), Cryptography and Network Security, Prentice Hall of India.

Core – Course XV(P) – Project Viva-Voce

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	VI	U19CSPT61	6	5

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Design Software Solutions from multiple Perspectives.	K4
CLO2	Develop the knowledege of Testing Strategies to be applied in Projects.	K4
CLO3	Develop Softwares for Global needs.	K4

K4 – Analysis

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	2		3	3	3
CLO2	3	2		3	3	3
CLO3	3	2		3	3	3

Strong – 3   **Medium – 2**   **Weak - 1**

1. Implement optimization techniques.

2. Implement numerical methods.

3. Implement Network concepts

4. Implement Image Processing algorithms

5. Implement Data Mining applications

6. College administration system.

7. Student information system

8. Employee pay roll system

9. Inventory control system

10. Website creation.

11. Implement Embedded System

12. Implement IoT applications.

13. Data Analysis applications.

A project shall be undertaken by the students as a team of two or three.

Total Marks: 100 (Internal: 40 marks, External: 60 Marks)

Parameters

For Internal Marks : Two review meetings (2 X 10) : 20 Marks

                              Overall Performance : 20 Marks

                                      Total **: 40**

For External Marks: Project Report : 15 Marks

                              Project Demo & Presentation : 30 Marks

                              Viva – Voce : 15 Marks

                                  Total **: 60**

Elective Course III(a) (T) Web Technologies

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	VI	U19CSE61	4	4

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Comprehend the fundamental concepts of web and Internet technologies.	**K2**
CLO2	Design and develop a dynamic WebPages using Javascript.	**K3**
CLO3	Design interactive web pages with validation techniques.	**K4**
CLO4	Program the web pages with Document Object Model and Represent web data using XML.	**K3**
CLO5	Design web applications by using JSP, Servlet and database connection.	**K3**

K2 – Understanding   **K3 – Applying**   **K4 - Analysing**

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	2	2		2		3
CLO2	3	2		2		3
CLO3	3	2		2		2
CLO4	3	2		3		3
CLO5	3	2		2		3

Strong – 3   **Medium – 2**   **Weak - 1**

Unit I

Web Essentials: Clients, Servers, and Communication - The Internet-Basic Internet Protocols -The World Wide Web-HTTP Request Message- HTTP Response Message-Web Clients - Web Servers. Style Sheets: CSS-Introduction to Cascading Style Sheets- CSS Features-Core Syntax-Style Sheets and HTML.

Unit II

Java Script: An introduction to JavaScript - Introduction- Displaying a Line of Text with JavaScript in a Web Page - Obtaining User Input with prompt Dialogs Memory Concepts- Arithmetic - Decision Making: Equality and Relational Operators - JavaScript: Control Statements- if Selection Statement - if...Else Selection Statement - while Repetition Statement -Assignment Operators - Increment and Decrement Operators - for Repetition Statement - switch Multiple-Selection Statement - do...while Repetition Statement - break and continue Statements - Logical Operators

Unit III

JavaScript: Functions - Introduction - Program modules in javascript – Function definitions- Scope rules – Javascript Global functions –Recursion- Recursion vs. Iteration- JavaScript Arrays - Declaring and Allocating Arrays - Examples Using Arrays - Passing Arrays to Functions - Multidimensional Arrays - JavaScript: Objects -

Math Object - String Object - Date Object - Boolean and Number Objects - document Object - JavaScript Event Handling - the load Event - Event mousemove and the event Object - Rollovers with mouseover and mouseout - Form Processing with focus and blur - More Form Processing with submit and reset - Event Bubbling - More Events .

Unit IV

Host Objects : Browsers and the DOM-Introduction to the Document Object Model DOM History and Levels-Intrinsic Event Handling-Modifying Element Style-The Document Tree-DOM Event Handling-Accommodating Noncompliant Browsers - Properties of window. . Representing Web Data: XML-Documents and Vocabularies-Versions and Declaration-Namespaces- DOM based XML processing Event-oriented Parsing: SAX-Transforming XML Documents-Selecting XML Data: XPATH-Template based Transformations: XSLT-Displaying XML Documents in Browsers.

Unit V

Server-Side Programming: Java Servlets : Servlet Architecture Overview – simple Servlet code - Servlets Generating Dynamic Content - Servlet Life Cycle - Parameter Data - Sessions - Cookies - URL Rewriting - Other Servlet Capabilities - Data Storage- Servlets and Concurrency - Introduction to JavaServer Pages (JSP) - JSP and Servlets - Running JSP Applications- Basic JSP- **Databases and Java Servlets -** JDBC Drivers - JDBC Database Access.

Text Books:
1. Jeffrey and C. Jackson (2006), Web Technologies–A Computer Science Perspective, Pearson Education.
2. Deitel and Nieto (2011), Internet and World Wide Web - How to Program, 5th Edition, Prentice Hall.

Reference Books:
1. Gopalan N.P. and Akilandeswari J. (2011) ―Web Technology, Prentice Hall of India,
2. Herbert Schildt (2011), Java-The Complete Reference, 8th Edition, McGraw Hill Professional.
3. Chris Bates (2009), Web Programming – Building Intranet Applications, 3rd Edition, Wiley Publications.

Elective Course III (b) (T) Internet of Things

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	VI	U19CSE62	4	4

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Explain the fundamentals of Internet of Things (IoT)	**K2**
CLO2	Describe various M2M and IoT architectures	**K2**
CLO3	Describe the Web Communication protocols.	**K2**
CLO4	Demonstrate the design issues in IoT applications and Raspberry PI.	**K2**
CLO5	Apply the concept of Internet of Things in the real world application.	**K3**

K2 – Understanding   **K3 – Applying**

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	2		3		2
CLO2	3	2		3		2
CLO3	3	2		3		3
CLO4	3	3		3		3
CLO5	3	3		3		3

Strong – 3   **Medium – 2**   **Weak - 1**

Unit I

Introduction to Internet of Tings-Introduction-Characteristics of IoT-Application of IoT-IoT Categories-IoT Enablers and Connectivity Layers-Baseline Technologies-Sensors-Actuators-IoT Components and Implementation-Challenges for IoT.

Physical design of IoT-Logical design of IoT- Functional blocks of IoT-Communication models & APIs.

Unit II

Internet of Things Architectural - Conceptual Framework, Architectural view, technology behind IoT, Sources of the IoT, M2M Communication, IoTExamples.

Design Principles for Connected Devices -IoT/M2M systems layers and design standardization, communication technologies, data enrichment and consolidation, ease of designing and affordability.

Unit III

Design Principles for Web Connectivity-Introduction-Web Communication Protocols for Connected Devices-Message Communication Protocols for Connected Devices-Web Connectivity for Connected-Devices Network using Gateway.

Internet Connectivity Principles-Introduction-Internet Connectivity-Internet-Based Communication-IP Addressing in the IoT-Media Access Control-Application Layer Protocols.

Unit IV

IoT PLATFORMS -IoT Device -Building blocks of an IoT Device-Raspberry Pi -Board - Raspberry Pi Interfaces-Other IoT Devices: pcDuino, BeagleBoneBlack ,CubieBoard.

Raspberry Pi and Arduino-Raspberry Pi's GPIO in Review-Arduino Rescue-Using Arduino-A Brief Introduction to the Arduino Language.

Unit V

        Domain specific applications of IoT-Home automation, Industry applications, Surveillance applications, Other IoT applications.

Text Books:
1. Vijay Madisetti and ArshdeepBahga (2014), "Internet of Things Hands-on Approach)",1st Edition, VPT.
2. Jeeva Jose (2018), "Internet of Things", Khanna Publishing House, Delhi.
3. Raj Kamal (2017), "Internet of Things: Architecture and Design", McGraw Hill.

Reference Books:
1. Adrian McEwen (2014), "Designing the Internet of Things", Wiley
2. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle (2014),"From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence",1st Edition, Academic Press.

Elective Course III(c) (T) Data Analytics Using R

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	VI	U19CSE63	4	4

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Interpret the fundamentals of R programming with basic problems	**K2**
CLO2	Elaborate on reading data from .csv files and data frames.	**K2**
CLO3	Summarize the concept of Linear Regression and Logistic Regression.	**K2**
CLO4	Analyze the data using various data visualization methods.	**K4**
CLO5	Apply the concept of Clustering and Association Rules to real life examples.	**K3**

K2 – Understanding   **K3 – Applying**

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	2		3		3
CLO2	3	2		2		3
CLO3	3	2				2
CLO4	3	2				3
CLO5	3	2				3

Strong – 3   **Medium – 2**   **Weak - 1**

UNIT I

Introduction to R: Need for R-Advantages of R - Working with Directory - getwd() Command- setwd() Command - dir() Function- Data Types in R - IDEs and Text Editors - R Studio-Eclipse with StatET -Handling Packages in R - Commands for Data Exploration.

Challenges of Analytical Data Processing- Expression, Variables and Functions- Missing Values Treatment in R- Using the 'as' Operator to Change the Structure of Data-   Vectors-   Matrices   -   Matrix Access - Factors -Creating Factors –List

UNIT II

Simple Analysis Using R- Methods for Reading Data: CSV and Spreadsheets- Reading Data from Packages.

Data Frames- R Functions for Understanding Data in Data Frames- Load Data Frames- Exploring Data- Data Summary- Finding the Missing Values- Invalid Values and Outliers - Descriptive Statistics - Spotting Problems in Data with Visualization.

UNIT III

Linear Regression using R - Introduction - Linear Regression - Assumptions of Linear Regression - Validating Linear Assumption - Logistic Regression- Introduction to Generalized Linear Models - Logistic Regression.

UNIT IV

Decision Tree – Introduction - Decision Tree Representation in R - Appropriate Problems for Decision Tree Learning - Basic Decision Tree Learning Algorithm - Measuring Features. Time Series in R: Introduction - Basic R Commands for Data Visualization - Basic R Commands for Data Manipulation - Reading Time Series Data - Plotting Time series Data.

UNIT V

Clustering - Introduction - Basic Concepts in Clustering - Hierarchical Clustering - k-means Algorithm.
Association Rules: Introduction-Frequent Itemset - Data Structure Overview- Mining algorithm Interfaces.

Text Book:
Seema Acharya, (2018) Data analytics using R, McGraw Hill Education (India) Private Limited Chennai.

Reference Books:
1. Hadley Wickham, Garrett Grolemund (2017), R for Data Science: Import, Tidy, Transform, Visualize and Model Data, O′Reilly.
2. K G Srinivasa, G M Siddesh, Chetan Shetty, B J Sowmya (2017), Statistical Programming in R, Oxford University Press.

Elective Course IV (a) (P) Web Technologies Lab

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	VI	U19CSE6P1	4	4

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Perform string operation and Date operations	K2
CLO2	Analyze a web page and identify its elements and attributes	K2
CLO3	Develop interactive webpages using script languages and validation techniques	K3

K2 – Understanding   K3 - Applying

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3			3		
CLO2	3	3	3	3	2	3
CLO3	3	3	3	3	2	3

Strong – 3   Medium – 2   Weak - 1

Write a JavaScript to

1. Design a webpage for entering student bio-data.
2. Create a webpage with all types of Cascading style sheets.
3. Design a Webpage using Date Object.
4. Find the minimum of three given numbers.
5. Calculate the age by reading DOB (Date of Birth).
6. Design a page using Array Object.
7. Demonstrate the String In-Built functions.
8. Design a simple Calculator.
9. Design an application form.
10. Design a webpage to calculate Income Tax.
11. Validate the Login Form.
12. Display the calendar by reading the year from the user.
13. Design a simple Servlet.
14. Design a page with all mouse events.
15. Design a page for Feedback system.

Elective Course IV (b) (P) Internet of Things Lab

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	VI	U19CSE6P2	4	4

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Design simple IoT Applications for real life examples.	K4
CLO2	Develop an application to monitor the environmental parameters such as temperature and humidity using sensors.	K3

K3 – Applying   **K4 - Analysing**

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	3		3		2
CLO2	3	3		3		3

Strong – 3   **Medium – 2**   **Weak - 1**

1. Familiarization with Arduino/Raspberry Pi and perform necessary software installation.

2. To interface LED/Buzzer with Arduino/Raspberry Pi and write a program to turn ON LED for 1 sec after every 2 seconds.

3. To interface Push button/Digital sensor (IR/LDR) with Arduino/Raspberry Pi and write a program to turn ON LED when push button is pressed or at sensor detection.

4. To interface DHT11 sensor with Arduino/Raspberry Pi and write a program to print temperature and humidity readings.

5. To interface motor using relay with Arduino/Raspberry Pi and write a program to turn ON motor when push button is pressed.

6. To interface OLED with Arduino/Raspberry Pi and write a program to print temperature and humidity readings on it.

7. To interface Bluetooth with Arduino/Raspberry Pi and write a program to send sensor data to smartphone using Bluetooth.

8. To interface Bluetooth with Arduino/Raspberry Pi and write a program to turn LED ON/OFF when '1'/'0' is received from smartphone using Bluetooth.

9. Write a program on Arduino/Raspberry Pi to upload temperature and humidity data to thingspeak cloud.

10. Write a program on Arduino/Raspberry Pi to retrieve temperature and humidity data from thingspeak cloud.

11. To install MySQL database on Raspberry Pi and perform basic SQL queries.

12. Write a program on Arduino/Raspberry Pi to publish temperature data to MQTT broker.

13. Write a program on Arduino/Raspberry Pi to subscribe to MQTT broker for temperature data and print it.

14. Write a program to create TCP server on Arduino/Raspberry Pi and respond with humidity data to TCP client when requested.

15. Write a program to create UDP server on Arduino/Raspberry Pi and respond with humidity data to UDP client when requested.

Elective Course IV (c) (P) R Programming Lab

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	VI	U19CSE6P3	4	4

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Apply the basic concepts of R programming from Statistical perspective.	**K2**
CLO2	Develop application using Classification and Regression Models.	**K3**

K2 – Understanding   **K3 – Applying**

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	3		3		2
CLO2	3	3		3		2

Strong – 3   **Medium – 2**   **Weak - 1**

Write a R program
1. To take input from the user (name and age) and display the values. Also print the version of R installation.
2. To create a sequence of numbers from 20 to 50 and find the mean of numbers from 20 to 60 and sum of numbers from 51 to 91.
3. To create a vector which contains 10 random integer values between -50 and +50.
4. To get the first 10 Fibonacci numbers.
5. To get all prime numbers up to a given.
6. To find the factors of a given number.
7. To create a list of heterogeneous data, which include character, numeric and logical vectors. Print the lists.
8. To create three vectors a,b,c with 3 integers. Combine the three vectors to become a 3×3 matrix where each column represents a vector. Print the content of the matrix and perform various matrix operations.
9. To read the .csv file and display the content.
10. To create a simple bar plot of five subject's marks.
11. To create a Data Frames which contain details of the employees and display summary of the data.
12. To create a simple pie chart of various ways for travelling to office such as walking, car, bus, cycle and train and analyse the data.
13. To read the .csv file contains the student mark information and display the details who has the maximum total.
14. Create your own excel file with the details of 20 students from your class with different fields –Reg No, Name, Subjects enrolled, Scores of 2 subjects and name it as student.xlsx. And display the maximum and minimum scores obtained by the students in both the subjects using any two functions.
15. Write the commands in R console to illustrate the linear model.
16. Implement a model for decision tree construction.
17. Implement a model to demonstrate clustering concepts.

Skill Based Course VI(P) MATLAB Lab

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	VI	U19CSS6P1	2	1

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Develop simple application to Process images using techniques of histogram processing and filtering	**K2**
CLO2	Apply Image Compression and Segmentation Techniques for real Life Image Samples.	**K3**

K2 – Understanding   **K3 – Applying**

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3			3		3
CLO2	3			3		

Strong – 3   **Medium – 2**   **Weak - 1**

Write a MATAB code to

1. Read and Display Images
2. Perform Arithmetic operations on images
3. Perform Logical operations on images
4. Perform Geometrical operations on images
5. Image Clipping
6. Image Sampling and Image Quantization
7. Histogram Processing
8. Image Thresholding
9. Image compression
10. Digital image color conversion
11. Digital image conversion from RGB to gray, gray to binary
12. Image Segmentation
13. Edge Detection algorithm

Value Education

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	VI	U19CNV61	2	2

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Develop their personality by teaching values	**K3**
CLO2	Facilitate the understanding of the national and global development	**K3**
CLO3	Construct values in the young minds	**K3**

K3 – Applying

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	2					
CLO2					3	
CLO3	3					

Strong – 3   **Medium – 2**   **Weak - 1**

Unit 1: Value Education for Personal Development

Value Education - Introduction, Objectives, Importance & Types of Human Values

Personality Development - Determinants, Significance. Five Factors Model

Personality Development for Life Success – Soft skills, Emotional Intelligence, Self-Image Management, Time Management and Goal Setting, Communication Skills, Etiquette and Good Manners

Unit 2: Value Education for National and Global Development

Constitutional Values: Democracy, Secularism, Socialism

National Values: Justice, Liberty, Equality, Fraternity

Social Values: Pity, Probity, Self- Control, Universal Brotherhood

Professional Values: Accountability, Sincerity, Regularity and punctuality, Honesty means truthfulness.

Religious Values: Tolerance, Broad mindedness, Simplicity, Welfare of mankind, Pursuit of truth, Holy life, Simple living, Purity, Prayer.

Moral Values: Faith, Nonviolence, Obedience

Aesthetic Values: Love and Appreciation of Literature and Fine Arts

National Integration and International Understanding

Unit 3: Measures taken to inculcate Values in the Young Minds

Values inculcated through examples of Great and Noble Persons

Values inculcated through stories

Text Book:

Value Education, Curriculum Development Cell, Sri SRNM College, Sattur.

References:

1. Bharadwaj, Tilak Raj. Education of Human Values. New Delhi: Mittal Publication.1999.

2. Bhanver, Jagmohan S. Pichai: The Future of Google. Hachette India, 2016.

3. Duling, Kaityln. Malala Yousafzai (In the Spotlight). Bullfrog Books, 2018.

4. Larsen, Kristine. Stephen Hawking: A Biography. Jaico Publishing House, 2012.

5. Tiwari, Arun. A.P.J. Abdul Kalam: A Life. HarperCollins India, 2015.

6. Vedanta Pr, The Life of Swami Vivekananda. 7th edition, 10th reprint Vedanta Press, 1980.

7. **https://www.momjunction.com/articles/moral-stories-for-kids_00369197/**

Extra Credit Course Model Paper for Competitive Examinations

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Computer Science	UCS	VI	U19CNX61	-	2

Course Learning Outcomes (CLOs)

Upon completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Prepare themselves for various competitive examinations.	**K4**

K4 - Analysing

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	**3**			**3**	**3**	**3**

Strong – 3   Medium – 2   Weak - 1

UNIT-I: GENERAL SCIENCE
  (i)   Scientific Knowledge and Scientific temper - Power of Reasoning - Rote Learning Vs Conceptual Learning - Science as a tool to understand the past, present and future.
  (ii)   Nature of Universe - General Scientific Laws – Mechanics - Properties of Matter, Force,Motion and Energy.
  (iii)   Main concepts of Life Science, Classification of Living Organisms, Evolution, Genetics, Physiology, Nutrition, Health and Hygiene, Human diseases.
  (iv)   Environment and Ecology.

UNIT-II: CURRENT EVENTS
  (i)   History - Latest diary of events - National symbols - Profile of States - Eminent personalitiesand places in news – Sports - Books and authors.
  (ii)   Science - Latest inventions in Science and Technology.

UNIT III: HISTORY AND CULTURE OF INDIA AND TAMIL NADU

  (i)   Indus valley civilization-Guptas, Delhi Sultans, Mughals and Marathas-Age of Vijayanagaram and the bahmanis-South Indian history.
  (ii)   Culture and Heritage of Tamil people-India since independence-Characteristics of Indian culture-Unity in diversity –race, colour, language, custom-India-as secular state-Growth of rationalist. Dravidian movement in TN-Political parties and populist schemes.

UNIT IV: INDIAN POLITY
  (i)   Constitution of India - Preamble to the Constitution - Salient features of the Constitution -Union, State and Union Territory.
  (ii)   Citizenship, Fundamental rights, Fundamental duties, Directive Principles of State Policy.
  (iii)   Corruption in public life – Anti-corruption measures –Right to Information - Empowermentof women - Consumer protection forums.

UNIT V: APTITUDE AND MENTAL ABILITY

(i)   Simplification – Percentage - Highest Common Factor (HCF) - Lowest Common Multiple (LCM).

(ii)   Ratio and Proportion.

(iii)   Simple interest - Compound interest - Area - Volume - Time and Work.

(iv)   Logical Reasoning - Puzzles-Dice - Visual Reasoning - Alpha numeric Reasoning – NumberSeries.

Reference Books:

1. VVK Subburaj (2019) TNPSC Group 2 and 2A CCSE-II Preliminary All-In-One Exam Books, Sura's Publications.
2. VVK Subburaj (2019), TNPSC CCSE IV Group 4 cum VAO Q-Bank with Explanatory Answers
3. S. Sambasivan A.Basheer Ahamed (2018) Tnpsc Group Iv(4) & Vao Exam Book,Sakthi Publishing House,India
4. R S Aggarwal (2017) Quantitative Aptitude For Competitive Examinations, S Chand Publishing.
5. Tnpsc Group II Preliminary (2018), Sakthi Publishing House,India
6. Dr.S.Avani Madasamy (2020),Way To Success, Avvai Publications; 2nd Edition, India
7. M. Laxmikanth, Indian Polity for Civil Services and Other State Examinations, 6th Edition, Mc Graw Hill.

Allied-I (T) - Introduction to Information Technology

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Nutrition and Dietetics	UND	I	U19NDA11	4	4

Course Learning Outcomes (CLOs)
Upon Completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Explain various Components of Computer.	**K2**
CLO2	Outline process of CPU, Input and Output Devices.	**K2**
CLO3	Describe basic concepts of Windows Environment.	**K2**
CLO4	Explore fundaments concepts of Internet	**K2**
CLO5	Make use of computer in different applications.	**K2**

K2 – Understanding

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1		3		3		3
CLO2		3		3		3
CLO3		3		3		3
CLO4	2	3		3	2	3
CLO5	2	3		3	2	2

Strong – 3   Medium – 2   Weak - 1

UNIT I

Introduction to Computers: Introduction – Importance of Computers – Characteristics of Computers – Five Generations of Modern Computers – History of Computing – Classification of Digital Computer system – Anatomy of a Digital Computer.

UNIT II

Central Processing Unit & Memory: Introduction – CPU – Memory – Memory Organization – RAM – ROM – Registers – Input Devices – Output Devices – Operating System: Introduction – Function of an Operating System.

UNIT III

Windows 7: What's where in Windows 7? – Starting up – Leaving Your Computer – Starting a Program – Accessing Your Document –Mouse and Keyboard maneuvers – Files, Folders and Libraries – Searching a Specific Location – Accessing Everything – Switching among open Windows – Managing Windows. Computer Networks: Introduction – Overview of a Network – Communication Process – Communication Media – Types of Networks – Network Topology.

UNIT IV

Internet & World Wide Web: Introduction – What is Special about the internet? – Internet Access – Internet Basics – World Wide Web – Web pages and HTML – Web browsers – Searching the Web. Overview of Electronic Mail: Introduction – How E–mail Works? – Why Use E–mail? – E–mail Names and Addresses – Mailing Basics.

UNIT V

Computers at Home: Introduction– Household Business – Business Applications at Home – Smartcards – Communication, Education and Information – Home Entertainment Redefined – Creativity and Leisure. Computers in Education and Training: Introduction – Computers in School – Computers in Entertainment – Computers in Medicine – Computers in Science – Computers in Engineering.

Text Books:
1. Alexis Leon, Mathews Leon, Fundamentals of Information Technology, (2nd Edition), Leon Vikas.
2. Jerry Joyce, Marianne Moon, (2010), Windows 7 Plain and Simple, PHI Learning Pvt. Ltd.

Reference Books:
1. V.Rajaraman, (2004), Fundamentals of Computers, (4th Edition), PHI Publication.
2. Dr. N.Krishnan, Computer Fundamentals and Windows with Internet Technology, Scitech Publication Pvt Ltd.

Allied-I (T) - Office Automation

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Nutrition and Dietetics	UND	II	U19NDA21	4	4

Course Learning Outcomes (CLOs)
Upon Completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Explain various editing features in Word.	**K2**
CLO2	Implement various operations on Table and Mail Merge.	**K3**
CLO3	Apply different types of functions in Excel.	**K3**
CLO4	Describe Manipulation of Chart.	**K2**
CLO5	Outline PowerPoint for simple presentation	**K2**

K2 – Understanding   **K3 - Applying**

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	2	3		3		3
CLO2	2	3		3		3
CLO3		3		3		2
CLO4	2	3		3		2
CLO5		3		3		3

Strong – 3   Medium – 2   Weak - 1

UNIT I

Getting comfortable in Word 2013: Exploring the Word 2013 user interface-Modifying your document view-Changing other view options. **Editing and Composing Documents:** Inserting symbols, international characters, and other special characters- inserting special characters-Using AutoCorrect-Composing documents faster by using building blocks. **Formatting documents:** Formatting documents more efficiently-Setting default document formatting for your documents-Setting section formatting-Using styles for paragraph and character formats-Exploring other paragraph formats- Exploring other Character formats- Changing case.

UNIT II

Presenting Information: Formatting simple lists by using bullets and numbering-Creating tabbed lists-Inserting tables-Enhancing tables-Finalizing documents: Correcting proofing errors-Printing documents. **Work with Mail merge** : Preparing data sources – Preparing main documents – Merging main documents and data sources

UNIT III

Getting comfortable in Excel 2013: Starting Excel 2013 – **Creating and editing worksheets** :Entering and organizing data-Changing column widths- Using formatting to alter the appearance of data – Extending a series with auto fill –Introducing flash fill- Selecting and naming cell ranges – Using column headers to define names – Moving and copying rows and columns copying one or more cells to many **Manipulating numbers and**

text : Creating, editing and copying formulas – Using functions-Using the AutoSum button and built-in function-Inserting functions-Using relative, fixed and mixed cell references-Using names in formulas and validating cell entries-Looking at useful functions.

UNIT IV

Formatting worksheets : Apply number formatting – Formatting with styles – Formatting in cells – Working with custom number formats – Working with percentage formats – Working with fraction formats – Working with date formats. **Manipulating workbooks and worksheets**: Inserting rows and columns – Inserting and deleting cells. **Creating charts and graphics**: Creating and modifying a chart – Adding a Slicer to a pivot chart-Manipulating chart elements.

UNIT V

Getting comfortable in PowerPoint 2013: Getting started working with PowerPoint 2013– Exploring the PowerPoint 2013 tools. **Designing and Creating Presentations:** Creating a new presentation based on a theme or template – Applying a theme to an existing presentation – Customizing your file with colors, fonts & effects -Theme fonts-Theme colors– Applying theme effects to your presentation-Applying background styles to your presentation-Formatting placeholder on the slide master–Creating a custom Slide layout – **Adding animation and Multimedia**: Adding animation to text and shapes.– Editing video and applying transitions.

Text Book:

Beth Melton, Mark dodges Echo Swinford & ber M.Scherr (2014), Step by step Microsoft office
Home & Student 2013, Microsoft Press.

Reference Books:

1. C. Nellai Kannan, (2011), MS Office, Nels Publications.
2. Dinesh Maidasani, (2005), Learning Computers Fundamentals and MS Office and Internet & Web Technology, (1st Edition), Firewall Media.

Allied-I (P) - Introduction to Information Technology & Office Automation Lab

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Nutrition and Dietetics	UND	II	U19NDA2P1	2	2

Course Learning Outcomes (CLOs)
Upon Completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Create Folder in Windows Environment	K3
CLO2	Create E-Mail Id in various domain	K3
CLO3	Implement Online chatting.	K3
CLO4	Implement various editing and formatting features in Word.	K3
CLO5	Prepare data sheet for various application.	K4
CLO6	Design a simple power point presentation using image, tables and charts	K3

K3 - Applying

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1		3		3		3
CLO2	2	3		3	2	3
CLO3		3		3	2	3
CLO4	3	3		3		3
CLO5	3	3		3		3
CLO6	2	3		3		3

Strong – 3   Medium – 2   Weak - 1

List of Programs:
1) To Create a New Folder and save the file and Rename the folder.
2) To download your subject materials, images and save the file in your Folder.
3) Create an Email–id in Yahoo mail.
4) Create an Email–id in Gmail Account.
5) To send a Message and attach your file with CC to your friends.
6) Create a Group id of your class & send a message.
7) Chatting with your friends through email-id.
8) Submit online application for any company.
9) To view Results in Your College Website.
10) Video chatting through mail.

MS – WORD
1. Open a word document to prepare your Resume by performing the following operations.
   a. Formatting the Text – Alignment & Font style
   b. Page setup (margin alignment, page height & width)
2. Create a word document to prepare a student mark sheet using table and functions.

3. Design an invitation using different fonts, font sizes, bullets and Word Art / Clip Art.
4. Mail Merge Concept a) prepare an invitation and sent to specific addresses in the data source.

MS – EXCEL

5. Create a student mark sheet with necessary information and use Data sort to display results using suitable excel function. Also use Data Filters to answer at least five different criteria.
6. Create a student mark sheet with necessary information and make out a suitable chart showing gridlines, legends and titles for axes.

MS–POWER POINT

7. Create a Power point presentation to explain various aspects of your college using Auto play.
8. Create a Power point presentation to explain the sales performance of your company over a period of five years using table and chart

Allied Course II(T)- Web Designing

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Nutrition and Dietetics	UND	III	U19NDA31	4	4

Course Learning Outcomes (CLOs)

Upon Completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Explain basic tags in HTML.	K2
CLO2	Outline a web page formatting using header, paragraph and image tags.	K2
CLO3	Design a Web Page using various list and Table tags.	K3
CLO4	Describe concept of frameset for a web page.	K2
CLO5	Make use of Forms for various applications.	K2

K2 – Understanding   **K3 - Applying**

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1		3		3		3
CLO2	2	3		3		3
CLO3	2	3		3	2	3
CLO4	2	3		3	2	3
CLO5	2	3		3	2	3

Strong – 3   **Medium – 2**   **Weak - 1**

Unit- I

Introduction to HTML: History of HTML- HTML Generations- HTML Documents-Anchor Tag - Hyper Links – Head and Body Sections: Header Section- Title – Links - Colorful Web Page - Comment Lines.

Unit-II

Designing the body section: Heading Printing - Aligning the headings - Horizontal Rule – Paragraph - Tab setting - Images and pictures.

Unit-III

Ordered and Unordered Lists: Lists - Unordered lists - Headings in a List- Ordered lists - Nested lists.

Table Handling: Tables - Table Creation in HTML -Width of the Table and Cells- Cells Spanning Multiple Rows/Columns-Coloring Cells - Column Specification.

Unit – IV

Frames: Frameset Definition-Frame definition - Nested Framesets. A Web Page Design Project: Frameset definition – Animals – Birds – Fish.

Unit – V

Forms: Action Attribute- Method Attribute- Enctype Attribute - Drop Down List- Sample Forms.

Text Book:

C. Xavier (2000), World Wide Web Design with TML Hill Education Pvt.

Reference Books:

1. Teodoru Gugoiu (2009), HTML, XHTML, CSS AND XML by Examples Fire Wall Media.

2. C. Xavier (2009), Web Technology and Design New Age International (P) Limited Publishers, New Delhi.

Allied Course II(T)- PHP Programming

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Nutrition and Dietetics	UND	IV	U19NDA41	4	4

Course Learning Outcomes (CLOs)

Upon Completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Explain basic concepts of PHP.	**K2**
CLO2	Describe Various Functions	**K2**
CLO3	Outline Arrays and various Built-in Functions	**K2**
CLO4	Apply Forms, Cookies and Sessions in a web page	**K3**
CLO5	Demonstrate file and directory operations	**K2**

K2 – Understanding   K3 - Applying

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1		3		3		3
CLO2		3		3		3
CLO3		3		3		3
CLO4	2	3		3	2	3
CLO5	2	3		3		3

Strong – 3   Medium – 2   Weak - 1

Unit I

The Basics of PHP Scripts**-The Building Blocks of PHP:** Variables-Data Types-Operators and Expressions- Constants.

Unit II

Flow Control Functions in PHP: Switching-Flow-Loops-Code Blocks and Browser Output. **Working With Functions:** What is a Function?-Calling Functions-Defining a Function-Returning Values from User - Defined Functions-Variable Scope-Saving State between Function Calls with the static Statement-More About Arguments-Testing for the Existence of a Function.

Unit III

Working with arrays: what are Arrays? - Creating Arrays-Some Array- Related Functions. **Working with objects:** Creating an Object-Object Inheritance. **Working with Strings, Dates, and time:** Formatting Strings with PHP-Investigating Strings in PHP-Manipulating Strings with PHP-Using Date and Time Functions in PHP-Other String, Date and Time Functions.

Unit IV

Working with Forms: Creating a Simple Input Form-Accessing Form Input with User-Defined Arrays-Combining HTML and PHP Code on a Single Page-Using Hidden Fields to Save State-Redirecting the User-Sending Mail on Form Submission-Working with File Uploads. **Working with Cookies and User Sessions:** Introducing Cookies-Setting a Cookie with PHP-Deleting a Cookie with PHP-Session Function Overview-Starting a Session-Working with Session Variables-Passing Session IDs in the Query String-Destroying Sessions and Unsetting Variables-Using sessions in an Environment with Registered Users.

Unit V

       Working with Files and Directories: Including Files with include ()-Validating Files-Creating and Deleting Files-Opening a File for Writing, Reading, or Appending -Reading from Files- Writing or Appending to a File-Working with Directories-Opening Pipes to and from Processes Using popen ()-Running Commands with exec()-Running Commands with system() or passthru ().

Text Book:
Julie C.Meloni (2009), PHP, MySQL and Apache, 4th Edition, Pearson Education.
Reference Books:
  1. Steven Holzner (2008), The PHP Complete Reference, McGraw Hill Education.
  2. VikramVaswani (2008), PHP: A Beginner's Guide, McGraw Hill Education.

Allied Course II(P)- Web Designing Using HTML and PHP Lab

Programme	Programme Code	Semester	Course Code	Hours	Credits
B.Sc. Nutrition and Dietetics	UND	IV	U19NDA4P1	2	2

Course Learning Outcomes (CLOs)

Upon Completion of this course the students will be able to

No.	Course Learning Outcomes	Levels
CLO1	Design a static web page using various HTML tags.	**K4**
CLO2	Create an interactive web page using PHP Script	**K4**

K4 - Analyzing

Mapping of CLOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	2	3		3	2	3
CLO2	2	3		3	2	3

Strong – 3   Medium – 2   Weak - 1

HTML

1. To design a web page using HTML to prepare the Invitation for your department function
2. Design a web page describing yourself. Assign a suitable background design, background color and text color.
3. Design a Time Table for Your Department in Html.
4. Design a web page for Your Department using various colors
5. To Design a webpage for Diabetics Patients.
6. To Design a webpage for Vegetables.
7. To Design a webpage for Fruits.
8. To Design a webpage for Indian Dishes

PHP

1. To find the sum of digits of a given number.
2. To find the factorial of a given number.
3. To design a simple calculator using PHP.
4. Using built-in string function like strstr(), strops(), substr, count(), etc...
5. Using a function to display the entered string in reverse.
6. To create a HTML form using GET, POST methods.
7. To create a student mark statement.
8. To create a simple webpage using PHP.
9. To create a file, write data into file and display the file's data.

(Dr K. Krishnaveni)   **(Dr D.K. Nathan)**

   Chairman   **Dean – Academic Affairs**