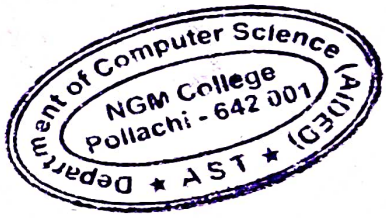
DEPARTMENT OF COMPUTER SCIENCE

Nallamuthu Gounder Mahalingam College
(Autonomous)
(An ISO 9001:2015 Certified Institution)
Re-Accredited by NAAC
Pollachi-642001



SYLLABUS

B. Sc. COMPUTER SCIENCE
BATCH 2020-2023

NGM COLLEGE

Vision

Our dream is to make the College an institution of excellence at the national level by imparting quality education of global standards to make students academically superior, socially committed, ethically strong, spiritually evolved and culturally rich citizens to contribute to the holistic development of the self and society.

Mission

Training students to become role models in academic arena by strengthening infrastructure, upgrading curriculum, developing faculty, augmenting extension services and imparting quality education through an enlightened management and committed faculty who ensure knowledge transfer, instil research aptitude and infuse ethical and cultural values to transform students into disciplined citizens in order to improve quality of life.

DEPARTMENT OF COMPUTER SCIENCE

Vision

Our vision is to make the department, a department of excellence at the international level by imparting need based Information Technology education of global industry standards to make students academically and technically sound, enriched with rich spiritual quotients, contribute to the overall development of the self, society and country.

Mission

Developing students to become role models as technocrats by imparting technical knowledge, recent curriculum in catering the needs of Information Technology industry and quality education through dedicated faculty and rejuvenate students into technically sound, in order to make globally fit and improve the standard of life.

B.Sc. – COMPUTER SCIENCE DEGREE COURSE
(FOR THE CANDIDATES ADMITTED FROM THE ACADEMIC YEAR 2017 ONWARDS)
I to VI SEMESTERS : SCHEME OF EXAMINATIONS

Part	Course Code	Title of the Paper	Hrs	Dur. Hrs	MAX.MARKS			Credits
					CIA	ESE	Total	
I SEMESTER								
I	20UTL101/ 20UHN101/ 20UFR101	Tamil Paper-I/ Hindi Paper-I/ French Paper-I	6	3	30	70	100	3
II	20UEN101	English Paper-I	5	3	30	70	100	3
III	20UCS101	Core I: Programming in C	4	3	30	70	100	4
	20UCS102	Core II: Digital Computer fundamentals and organization	4	3	30	70	100	4
	20UCS1A1	Allied-1: Mathematics-I	4	3	30	70	100	4
	20UCS103	Core Lab I: Programming Lab in C	5	3	20	30	50	2
IV	20HEC101	Human Excellence: Personal Values& SKY Yoga Practice-1	1	2	25	25	50	1
	20UHR101	Human Rights in India	1	2	-	50	50	2
V		Extension Activities (NSS, NCC, Sports & Games)						
Total							**650**	**23**
II SEMESTER								
I	20UTL202/ 20UHN202/ 20UFR202	Tamil Paper-II/ Hindi Paper-II/ French Paper-II	6	3	30	70	100	3
II	20UEN202	English Paper – II	5	3	30	70	100	3
III	20UCS204	Core III: Object Oriented Programming Using C++	4	3	30	70	100	4
	20UCS205	Core IV: Data and File Structure	4	3	30	70	100	4
	20UCS2A2	Allied -2: Mathematics-II (Discrete Mathematics)	4	3	30	70	100	4
	20UCS206	Core Lab II: Programming Lab in C++	4	3	20	30	50	2
IV	20HEC202	Human Excellence: Family Values& SKY Yoga Practice-2	1	2	25	25	50	1
	20EVS201	Environmental Studies	2	2	-	50	50	2
V		Extension Activities (NSS, NCC, Sports & Games)						
Total							**650**	**23**

Part	Course Code	Title of the Paper	Hrs	Dur. Hrs	MAX.MARKS			Credits
					CIA	ESE	Total	
III SEMESTER								
III	20UCS307	Core V: Java Programming	4	3	30	70	100	4
	20UCS308	Core VI: Relational Database Management System and Oracle	5	3	30	70	100	4
	20UCS309	Core VII: Operating System	4	3	30	70	100	4
	20UCS3A3	Allied -3 : Computer Based Optimization Techniques	5	3	30	70	100	4
	20UCS310	Core Lab III: Programming Lab in Java	5	3	20	30	50	2
	20UCS311	Core Lab IV: Programming Lab in RDBMS	5	3	20	30	50	2
IV	20HEC303	Human Excellence Paper: Professional Values& SKY Yoga Practice-3	1	2	25	25	50	1
	20UCS3N1/ 20UCS3N2	Non-Major Elective Paper-I Photoshop Lab/ Advanced Applications in MS Excel Lab	1	2	-	50	50	2
V		Extension Activities (NSS, NCC, Sports & Games)						
Total							**600**	**23**
IV SEMESTER								
III	20UCS412	Core VIII: Python Programming	4	3	30	70	100	4
	20UCS413	Core IX: Data Communication and Computer Networks	4	3	30	70	100	4
	20UCS414	Core X: Open Source Programming	4	3	30	70	100	4
	20UCS4A4	Allied -4 : Accountancy for Decision Making	6	3	30	70	100	4
	20UCS415	Core Lab V: Programming Lab using Python	5	3	20	30	50	2
	20UCS416	Core Lab VI:Web Programming using Open Source Tools	5	3	20	30	50	2
IV	20HEC404	Human Excellence Paper : Social Values & SKY Yoga Practice-4	1	2	25	25	50	1
	20UCS4N1/ 20UCS4N2	Non-Major Elective Paper-II Flash Lab/ Internet Services and Applications Lab	1	2	-	50	50	2
V		Extension Activities (NSS, NCC, Sports & Games)						
Total							**600**	**23**

Part	Course Code	Course Title	Hrs	Dur. Hrs	MAX.MARKS Int	Ext	Total	Credits
		V SEMESTER						
III	20UCS517	Core XI: Linux	4	3	30	70	100	3
	20UCS518	Core XII: Kotlin Programming	4	3	30	70	100	3
	20UCS519	Core XIII: Cyber Security	4	3	30	70	100	3
	20UCS5E1/ 20UCS5E2/ 20UCS5E3	Core Elective-I:	6	3	30	70	100	4
	20UCS520	Core Lab VII: Linux Lab	5	3	40	60	100	3
	20UCS521	Core Lab VIII: Programming Lab using Kotlin	5	3	40	60	100	3
IV	20UCS5S1/ 20UCS5S2 / 20UCS5S3	Skill Based Elective-I	1	2	-	50	50	2
	20HEC505	Human Excellence Paper: National Values& SKY Yoga Practice-5	1	2	25	25	50	1
	20GKL501	General Knowledge	SS	2	-	50	50	2
		Total					**750**	**24**

List of Electives-I
20UCS5E1 Software Engineering and Testing
20UCS5E2 Distributed Computing
20UCS5E3 Client/Server Technology

Skill Based Elective I
20UCS5S1 Word Press
20UCS5S2 Dream Weaver
20UCS5S3 Quantitative Aptitude Skills

		VI SEMESTER						
III	20UCS622	Core XIV: R Programming	4	3	30	70	100	3
	20UCS6E4 20UCS6E5 20UCS6E6	Core Elective – II	6	3	30	70	100	5
	20UCS6E7 20UCS6E8 20UCS6E9	Core Elective – III	6	3	30	70	100	5
	20UCS623	Core Lab IX: R Programming Lab	5	3	40	60	100	3
	20UCS624	Core Lab X: Advanced Applications in MS Excel Lab	4	3	20	30	50	2
	20UCS625	Project	4	-	-	100	100	3
IV	20UCS6S4/ 20UCS6S5/ 20UCS6S6	Skill based Elective-II	1	2	-	50	50	2
	20HEC606	Human Excellence Paper: Global Values & SKY Yoga Practice-6	2	2	25	25	50	1

Total	**650**	**24**
Grand Total	**3900**	**140**

List Of Electives-II	List of Electives-III	Skill Based Elective-II
20UCS6E4 Data mining and Warehousing 20UCS6E5 Big data Analytics 20UCS6E6 Grid and Cloud Computing	20UCS6E7 E-Commerce 20UCS6E8 Enterprise Resource Planning 20UCS6E9 Management Information System	20UCS6S4 Joomla 20UCS6S5 Macromedia Director 20UCS6S6 Soft Skills

Annexure-I

List of part- V Subjects

S.No	Subject Code	Subjects
1.	20 UNC 401	NCC
2.	20 UNS 402	NSS
3.	20 USG 403	Sports and Games
4.	20 URO 404	Rotract Club
5.	20 URR 405	Red Ribbon Club
6.	20 UYR 406	Youth Red Cross
7.	20 UCA 407	Consumer Awareness Club
8.	20 UED 408	Entrepreneurship Development Cell
9.	20 UCR 409	Center for Rural Development
10.	20 USS 410	Student Guild of Service
11.	20 UGS 411	Green Society
12.	20 UEO 412	Equal Opportunity Cell
13.	20 UFA 413	Fine Arts Club
14.	20 UAM 414	Arutchelvar Students Thinkers Forum
15.	20 USV 415	Swami Vivekanandhar Students Thinkers Forum

.Sc Computer Science *Effective from the year 2020 onwards*

Bloom's Taxonomy Based Assessment Pattern

K1-Remember; K2- Understanding; K3- Apply; K4-Analyze; K5- Evaluate

Theory Examinations: 70 Marks (Part I, II & III)

TEST- I & II and ESE:

nowledge Level	Section	Marks	Description	Total
K1 & K2 (Q1 -10)	A(Q1 – 5 MCQ) (Q6 – 10 Define/ Short Answer)	10x1=10	MCQ Define	70
K3 (Q11 – 15)	B (Either or pattern)	5x4=20	Short Answers	
K4 & K5 (Q16 – 21)	C (Q-16 is compulsory and Q17 – 21 answer any 3)	4x10=40	Descriptive/ Detailed	

Theory Examinations: 50 Marks (Part IV)

Knowledge Level	Section	Marks	Description	Total
K1 & K2 (Q1 – 10)	A(Q1 – 5 MCQ) (Q6 – 10 Define/ Short Answer	10x1=10	MCQ Define	50
K3 (Q11 – 18)	B (Answer 5 out of 8)	5 x 8=40	Short Answers	

. Practical Examinations: 100/50 Marks

Knowledge Level	Section	Marks	Total
K3	Practical & Record work	60/30	100/50
K4		40/20	
K5			

Note:

1. Question paper pattern for Non-Major Elective(NME) Practical Paper (Maximum Marks: 50 Marks)
   Two questions from Computer Science Practical - 40 marks
   Marks for Record - 10 marks

I. Components of Continuous Assessment

Components		Calculation	CIA Total
Test 1	70	$\frac{70+70+60+10}{7}$	30
Test 2 (Model)	70		
Assignment, Seminar/ Tutorial Knowledge Enhancement	3 * 20		
Information Acquisition	10		

Programme Outcomes

PO1: To inculcate the strong fundamentals of mathematics and to develop competence in computer science.

PO2: To trigger the creativity and programming skills with enhanced knowledge and hands-on practical skill.

Programme Specific Outcomes

PSO1: To impart mathematical foundations of the algorithmic approach and computer science theory in the sculpting and design of computer based systems.

PSO2: Ability to apply the computer science knowledge in all domains and to inculcate strong problem solving skills through the courses of Computer Science.

PSO3: Ability to propose creativity and solutions, and to design modern, user-friendly applications that are greatly useful to the society.

PSO4: Ability to train the students in project based assignments as well as to analyze and interpret data.

PSO5: To impress upon students the importance of good ethical practices, right professional conduct and responsible team leadership, and to develop and update the skill required for IT industry.

Programme code:	B.Sc	**Programme Title :**	Bachelor of Science (Computer Science)	
Course Code:	20UCS101	**Title:**	**Batch :**	2020-2023
		Core I: Programming in 'C'	**Semester:**	I
Hrs/Week:	04		**Credits:**	04

Course Objective

The course objective is to know the basic components of the computer and working of each device, the student gain experience about structured programming, understand the implementation of C language and understand various features in C.

Course Outcomes (CO)

K1	CO1	To keep in mind the fundamentals of C programming
K2	CO2	To understand the loops and decision making statements to solve the problem
K3	CO3	To implement different operations on arrays and use functions to solve the given problem.
K4	CO4	To review the C program that uses pointers, structures and files

Syllabus

Units	Contents	Hrs
Unit I	**Introduction to C** :Overview of C – History and Importance of C – Basic Structure of C programs -Development of program logic skills through Flowchart and Algorithm – Programming Style – Executing a 'C' program – Character set – C Tokens – Keywords – Identifiers – Constants– Variables – Rules for defining variables- Data types, – *Declaring and initializing variables* – Operators & Expressions – Precedence of arithmetic – Type conversion in expressions – Mathematical functions – **Managing Input and output operations** : Introduction –Reading a character –Writing a character – Formatted input- Formatted output . Simple Programs	10
Unit II	**Control Statements:** IF, *IF..ELSE Statements*, ELSE...IF ladder – Switch Statement – GOTO Statement – WHILE Statement – Do Statement – FOR Statement.-Jumps in loops. **Arrays:** One dimensional Arrays – Two Dimensional Arrays – Multi Dimensional Arrays – Structures : Arrays within Structures – Structures within structures – Structures and Functions – Union. Programs using Control Structures and Derived data types	10

Unit III	**Functions:** User-defined functions- A-Multi-function program- Elements of user defined function, definition of function-Return value &their types, function calls & declarations-Category of functions: No arguments & No return values-arguments that No return values – Arguments with return values-No arguments that return a value-Nesting of functions-Recursion - Passing arrays and strings to functions. The scope, Visibility and Lifetime of Variables in functions. Programs using functions	11
Unit IV	**String manipulation:** Introduction - Declaring & Initializing String variables – Reading string from terminal, Writing string to screen – String handling Functions. **Pointers:** Introduction-Accessing, Declaring & Initializing pointer variables--Pointers and Character strings-Array of pointers-Pointers as function arguments-Function returning pointers-Pointers to functions-Pointers and Structures. Programs using String and Pointers	10
Unit V	**Files:** Defining and opening a file – Closing a file –I/O operations on file – Error handling during I/O operations – Random access files – Command line arguments-Preprocessor – Macro Substitution – File Inclusion – Compiler control directives. Programs using Files and Command Line Arguments	11
	Total Contact Hrs	**52**
	******Italicized* texts are for self study	
TEXT BOOKS	Power point Presentations, Seminar, and Assignment	
	1.E.Balagurusamy, "Programming in Ansi C", Tata McGraw-Hill Publishing Co& Ltd.,Sixth Edition, 2016.	
REFERENCES	1. Yaswanth Kanishkar, "LET US C", BPB Publications, Fourteenth Edition, 2016. 2.Ashok N. Kamthane, "Programming with ANSI and Turbo C", First Edition ,2009	

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	M	L	M
CO2	M	H	H	H	H
CO3	M	H	H	H	H
CO4	H	H	H	H	H

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
Dr.Antony Selvadoss Thanamani Dr. M. Sakthi	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Muthukumaran Signature:

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Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	20UCS102	Title:	Batch :	2020-2023
		Core II: Digital Computer Fundamentals and Organization	Semester:	I
Hrs/Week:	4		Credits:	04

Course Objective

On completion of this course, the students can understand the design of combinational and sequential digital logic circuits. Students will also have knowledge on Programmable Logic devices and its usage.

Course Outcomes (CO)

K1	CO1	To recollect the fundamental concepts and techniques used in digital electronics.
K2	CO2	To get the idea of basic postulates of Boolean Algebra and to apply the methods of simplifying Boolean expressions
K3	CO3	To apply knowledge about internal circuitry and logic behind any digital system and to design various synchronous and asynchronous circuits.
K4	CO4	To analyze the concept of memories, and to introduce microcontroller case study.

Syllabus

Units	Contents	Hrs
Unit I	**Number System and Binary Codes:** Introduction – Number System – Conversion from Binary to Decimal, Octal, Hexadecimal- Conversion from Decimal to Binary , Octal ,Hexadecimal – Conversion from Octal to Decimal, Binary , Hexadecimal – Conversion from Hexadecimal to Binary , Decimal , Octal -Floating Point Representation of Numbers – Arithmetic Operation – I's and 2's Complements. 1's Complement Subtraction – 2's Complement Subtraction. 9's Complement – 10's Complement – BCD	10
Unit II	**Boolean algebra, Minimization Techniques and Logic Gates:** Introduction – Boolean Logic Operations – *Basic Laws of Boolean Algebra* – Demorgan's Theorems – Sum of Products and Product of Sums – Karnaugh Map. Logic Gates: OR Gate – AND Gate – NOT Gate – NAND Gate – NOR Gate.	11
Unit III	**Arithmetic Circuits and Flip Flops**: Introduction – Half Adder – Full Adder, Half Subtractor – Full Subtractor – Multiplexers – Demultiplexers – Decoders. Flip Flops: Types of Flip Flops – SR Flip Flop – JK Flip Flop – T Flip Flop. **Registers:** Shift registers- PIPO – PISO – SISO – SIPO	10
Unit IV	Input – Output Organization – Input/output Interface – I/O Bus and Interface – I/O Bus Versus Memory Bus – Isolated Versus Memory – Mapped I/O – Example of I/O Interfaces – Asynchronous Data Transfer – Store Control and Handshaking – DMA –DMA Controller, DMA Transfer.	10

Unit V	**Input – Output Processor:** CPU – IOP Communication – **Memory Organization:** Memory Hierarchy – *Main Memory* – **Associative Memory:** Hardware Organization – Match Logic – Cache Memory – Associative – Direct, set, Associative Mapping.	11
	Total Contact Hrs	**52**
	**Italicized* texts are for self study	
	Power point Presentations, Seminar, Assignment and Case study	
TEXT BOOKS	1. Digital Electronics Circuits and Systems, V.K. Puri, TMH. 2."Digital Circuits And Design" third edition Vikas Publishing House Pvt Limited, 2009, by S.Arivazhagan,S Salivahanan 3. Computer System Architecture -M. Morris Mano , PHI	
REFERENCES	1. Computer Architecture -M. Carter, Schaum's outline series, TMH 2. Digital principles and applications, Albert Paul Malvino, Donald P Leach, TMH, 1996.	

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	M	M
CO2	H	H	H	H	H
CO3	H	H	H	H	H
CO4	H	H	H	H	H

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
Dr.Aruchamy Rajini M.Meenakrithika	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Muthukumaran Signature:

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Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	20UCS1A1	Title :	Batch :	2020-2023
		Allied-1: Mathematics-I	Semester:	I
Hrs/Week:	4		Credits:	04

Course Objective

To make the students to understand and apply the central tendencies deviation, correlation, probability, Statistical Inference tests - To enable the students to solve linear algebra existences, numerical integration and differential equation using numerical methods.

Course Outcomes (CO)

K1	CO1	To recollect the definition of matrix and determinants and perform various operations on it
K2	CO2	To evaluate various Numerical Methods problems and find better result based on given information
K3	CO3	To understand different sampling test techniques such as t-test and F-variance ratio test for Large sample and Small sample
K4	CO4	To figure out appropriate statistical methods like Mean, Median, Mode and apply them in various data analysis problems

Syllabus

Units	Contents	Hrs
Unit I	Matrices –Introduction –Determination –Inverse of a matrix –Rank of a Matrix– Eigen value Problems.	10
Unit II	**Statistics**: Mean, Median, Mode, Range, Quartile Deviation, *Standard Deviation*, Rank Correlation, Co-efficient of Correlation, Regression.	10
Unit III	**Large Sample test:** Standard error- Test of Significance of Large Samples – Tests for (i) single proportion (ii) Difference of two proportions (iii) difference of two means (iv) difference of two standard deviations.Small sample test based on t, – t-test for (i) single mean (ii) Difference of two means (iii) Observed sample correlation co-efficient. F- Variance Ratio Test	10
Unit IV	**Probability:** *Permutation,* combination, trail, event, sample space, mutually exclusive cases, exhaustive events, Independent events, dependent events, simple and compound events. Measurement: Classical, relative frequency, theory of probability, Limitations, personalistic view of probability and Axiomatic Approach of probability, addition and multiplication theorem, odds, miscellaneous illustrations question	11
Unit V	**Numerical Methods:** Gauss-Seidal method for linear algebric system-Newton's Rapshon method for polynomial system-Newton forward and backward interpolation-Trapezoidal rule-Simpson 1/3 rule and 3/8 rule for Numerical Integration.	9
	Total Contact Hrs	**50**

	**Italicized* texts are for self study	
	Power point Presentations, Seminar, and Assignment	
TEXT BOOKS	1. Dr. M.K.Venkataraman , "Engineering Mathematics", National Publishing Company, Chennai. 2.RSN Pillai & Bagavathi ,"Statistics Theory and Practice", S.Chand& Company Ltd. July 2011 3. P.Kandasamy, K.Thilagavathy, K.Gunavathy, "Numerical Methods", Sultan Chand & Co. Ltd., Third Edition,2002.	
REFERENCES	1. S.P. Gupta, "Statistical Methods", Sultan Chand & Sons Publishers, Thirty-third Edition, 2002. 2. M.Venkatraman, "Numerical Methods in Science and Engineering", The National Publications, Fifth Edition,1999. 3. "Computer Oriented Statistics and Numerical Methods", S.Chand and Co Delhi. 2009	

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	H	H
CO2	H	M	H	H	H
CO3	M	H	H	M	M
CO4	M	H	H	L	H

H-High; M-Medium; L-Low

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
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Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	20UCS103	Title :	Batch :	2020-2023
		Core Lab I: Programming Lab In 'C'	Semester:	I
Hrs/Week:	5		Credits:	02

Course Objective

The purpose of this course is to introduce students to the field of programming using C language. The students will be able to enhance their analyzing and problem solving skills and use the same for writing programs in C.

Course Outcomes (CO)

K3	CO1	To implement different operations on arrays and use functions to solve the given problems.
K4	CO2	To evaluate the C program that uses pointers, structures and files
K5	CO3	To validate programs with pointers and arrays, perform pointer arithmetic, and use the pre processor

Syllabus

Units	Contents	Hrs
	SET A • Program to find the greatest number among 'n' numbers. • Program to Generate Fibonacci series. • Program to check whether the given number is Armstrong number or not. • Program to find Prime numbers between a given ranges. • Program for finding Sum of individual digits. • Program to display a set of numbers in Ascending order. • Program to display a set of numbers in Descending order. • Program to display the Names in Alphabetic order. • Program to find whether a given string is a palindrome or not • Program to calculate the Matrix addition. • Program to find the Transpose of a Matrix. • Program to illustrate the concept of structures. **SET B** • Program to find the values of the following Series sin(x), cos(x), e^x, log(1+x). • Program to perform the Sequential search. • Program for Binary search. • Program to generate the Piglatin. • Program to find a Mean, median & mode for given values. • Program to find Standard deviation & variance for given values.	

- Program to calculate the Matrix multiplication.
- Program to count vowels, consonants, white spaces in a given sentence.
- Program to illustrate the concept of Pointers.
- Program to illustrate the concept of subroutine functions.
- Program to create a file.
- Program for processing a file.
- Program using command line arguments

INTERNAL MARK (20 Marks)

Observation Record Note	5 Marks
Practical Skills	5 Marks
Model Exam	10 marks

EXTERNAL MARK (30 Marks)

Record Note	5 Marks
Set A	10 Marks
Set B	15 marks

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	H	M
CO2	H	H	H	H	H
CO3	H	H	H	H	H

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
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Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	20UCS204	Title : Core III: Object Oriented Programming Using C++	Batch :	2020-2023
			Semester:	II
Hrs/Week:	4		Credits:	04

Course Objective

On successful completion of the course the students should understand all the features of C++ and make the students to apply the same for writing programming for solving problem.

Course Outcomes (CO)

K1	CO1	To remember the basic OOPs concepts such as Class, Inheritance, Abstraction, Polymorphism etc.
K2	CO2	To understand how C++ differentiates between object oriented programming and procedural programming and the use of function, operator overloading.
K3	CO3	To implement programs using more advanced features such as composition of Objects, Operator overloads, Inheritance, Polymorphism, Dynamic memory allocation etc.
K4	CO4	To evaluate C++ programs using File I/O, Command line Arguments and Exception Handling.

Syllabus

Units	Contents	Hrs
Unit I	**Introduction:** Evolutions of C++- Object oriented Technology- Programming Paradigms- Disadvantages of Conventional Programs- Key concepts of object oriented programming- Advantages of OOPs- Applications of oops -Input and Output in *C++:*Streams in C++- Predefined Streams – Stream Classes- Formatted and Unformatted data - Formatted Console I/O Operations – Unformatted Console I/O operations- Bit Fields	8
Unit II	**C++ Declarations:** Parts of C++ programs – *Types of Tokens, Keywords, Identifiers*. Data Types: Basic, Derived, User defined, Void – Operators in C++ - Constants- Memory Management Operators- Precedence of Operators in C++. **Control Structures:** Decision making statements: if- else, nested if – else, goto, break, continue, Switch Case- For loop- While Loop- do while loop. **Functions in C++:** Parts of a function- passing arguments- Inline Function- Function overloading.	9
Unit III	**Classes and Objects:** Classes in C++ - Declaring Objects: Public, Private, Protected-Defining Member functions – Characteristics of Member Functions – Rules for Inline Functions- Array of Objects- Friend functions- Constant Member function- Data Hiding- overloading member function. **Arrays:** *Characteristics of arrays- Initialization of Array using functions*- Array of **Classes.** **Constructors and Destructors**: Characteristics of Constructors and Destructors-Application with constructors- Overloading and Copy Constructors.	10
Unit IV	**Operator Overloading and Type Conversion:** Keyword 'Operator – Overloading Unary Operators- Operator Return Type- Constraint on Increment and Decrement Operators- Overloading with friend functions- Type Conversion- Rules for Overloading Operators. **Inheritance**: Introduction –types of Inheritance: Single, Multi-level, Multiple, Hierarchical, Multi-Path Advantages and its Disadvantages. **Polymorphism:** Introduction- Pointer to derived Class Objects- Virtual Functions- Rules- Pure Virtual functions.	11

Unit V	**Files:** File Stream Classes- Steps of File Operation – Finding End of File- File Opening Modes- Manipulators with Arguments – Sequential Read and Write Operations – Binary and ASCII Files- Command Line Arguments. Exception Handling- Principles of Exception Handling- Try, Throw, Catch- Exception Handling Mechanism- Commonly used header Files. **Templates:** Class Templates-Function Templates– Manipulators.	12
	Total Contact Hrs	50
	**Italicized* texts are for self study	
	Power point Presentations, Seminar, and Assignment	
TEXT BOOKS	1. E. Balagurusamy,"Object Oriented Programming with C++",Tata McGraw Hill publication, Fifth edition, 2012. 2. Ashok N. Kamthane,"Object Oriented Programming with ANSI and Turbo C++", Pearson Education 5th Impression 2008.	
REFERENCES	1. D.Ravichandran.J, "Programming with C++", Tata McGraw Hill publication, fourteenth edition, 2001. 2. RabortLafore, "Object Oriented Programming with C++", Galgotia Publication Pvt. Ltd, second edition,2001. 3. Ashok Kamathane-"Programming in C++" Prentice Hall 2003	

Mapping

CO \ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	H	H
CO2	H	M	M	H	H
CO3	M	M	H	H	H
CO4	H	H	H	H	H

H-High; M-Medium; L-Low

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
Dr.R.Manicka Chezhian P.Jayapriya	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Muthukumaran Signature:

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Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	20UCS205	Title: Core IV: Data and File Structure	Batch :	2020-2023
			Semester:	II
Hrs/Week:	4		Credits:	04

Course Objective

On successful completion of the course the students are able to understand the concepts of array, stack, queue, list, linked list, tree, graph theory, searching and sorting.

Course Outcomes (CO)

K1	CO1	To keep in mind the basic static and dynamic data structures and relevant standard algorithms for them.
K2	CO2	To get the idea about advantages and disadvantages of specific algorithms and data structures.
K3	CO3	To implement new solutions for programming problems or improve existing code using learned algorithms and data structures.
K4	CO4	To evaluate algorithms and data structures in terms of time and memory complexity of basic operations.

Syllabus

Units	Contents	Hrs
Unit I	Introduction – Creation of Programs – Analysis of programs – Arrays – representation of Arrays – Ordered Lists – Polynomials – Stacks and Queues – fundamentals – Evaluation of Expressions – Multiple stacks and queues.	9
Unit II	Linked List – Singly Linked lists – Linked Stacks and Queues – Polynomial addition using stack – Functions of Linked list – *Doubly Linked List* – Dynamic Storage Management – Garbage collection and Compaction.	10
Unit III	Trees – Basics – Binary Trees – Binary Trees Representation – Binary Trees Traversal – Binary tree representation of Trees .Symbol Tables –Hash table.	11
Unit IV	Searching and Sorting – Linear search, Binary search & Fibonacci search – Sorting – Insertion, Quick, Merge (2-way), Heap, and Radix.	11
Unit V	Files: Files, Queries and Sequential Organizations: *Storage device types*-Query types, Mode of Retrieval, Mode of update– Indexing techniques: Cylinder-Surface Indexing-Hashed Indexes – File Organizations :Sequential Organizations-Random Organizations-Linked Organization-Storage Management.	9
	Total Contact Hrs	**50**
	**Italicized* texts are for self study	
	Power point Presentations, Seminar, and Assignment	

TEXT BOOKS	1. Ellis Horowitz & Sartaz Sahani, "Fundamentals of Data Structures" Galgotia Book Source, 1999. 2. ISRD GROUP, "Data Structures using C" , Tata McGraw Hill ,Seventh Reprint,2010
REFERENCES	1. Jean Paul Tremblay and Paul G. Sorenson, "An Introduction to Data Structures with Applications" Tata McGraw Hill Publication, Second Edition, 2008. 2. Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, "Fundamentals of Data Structures in C", Universities Press (India) Private Limited, 2008. 3. R.Krishnamurthy and G. IndiraniKumaravel, "Data Structures using C", Tata McGraw – Hill Publishing Company Limited, New Delhi, 2008.

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	H	M
CO2	H	M	H	H	H
CO3	M	H	H	H	H
CO4	M	H	M	H	H

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
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Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	20UCS2A2	Title : Allied-2: Mathematics-II (Discrete Mathematics)	Batch :	2020-2023
			Semester:	II
Hrs/Week:	4		Credits:	04

Course Objective

On successful completion of the course the students are able to understand the concepts and principles of relations, functions, fuzzy sets, partial ordering, algebraic structures, mathematical logic, and formal languages and graph theory.

Course Outcomes (CO)

K1	CO1	To keep in mind about the fundamental ideas and notation of discrete mathematics with examples
K2	CO2	To get the idea of relations and its types and fuzzy sets and its operations
K3	CO3	To analyze the formal language such as formation of words with examples ,groups and monoids
K4	CO4	To Understand some basic properties of graphs and types of graphs, and be able to relate these to practical examples

Syllabus

Units	Contents	Hrs
Unit I	**Mathematical logic:** Connectives – Tautology and contradiction-Equivalence of Propositions- Duality law- Normal forms – Disjunctive and conjunctive normal Forms-PDNF-PCNF– Worked examples-Predicate calculus – Quantifiers – Free and bound variables(Definitions only).	10
Unit II	**Relations:** Types of relations-some operation of relation- Composition of Relations – Properties of relation-Equivalence Classes-matrix representation of a relation-Worked Examples. ***Fuzzy Sets:*** Fuzzy sets – Crisp Sets –Overview of operations on fuzzy sets – Fuzzy complement – Fuzzy union – Fuzzy intersection – Aggregation operations.	9
Unit III	**Functions:** Representation of function-*Types of function*- Composition of functions – Inverse of functions-Worked Examples. **Partial ordering:** Hasse diagrams for partial ordering-terminology related to posets-Lattice- Properties of Lattices Worked Examples.	10
Unit IV	**Algebric Structure:** Semigroups & monoids- Homomorphism of semigroups and monoids- sub semigroups and submonoids-groups **Formal languages:** Basic definitions-phase structure grammar- types of phase structure grammar-Worked examples	10
Unit V	**Graph Theory:** Graph –Degree of the vertex – some special simple graphs-*Matrix representation of graphs*-Paths, Cycles and connectivity- Eulerian Graphs - Hamiltonian graphs- Connectedness in directed graphs- Shortest path algorithm-Dijkstra's Algorithm-Worked Examples.	11
	Total Contact Hrs	**50**

	**Italicized* texts are for self study	
	Power point Presentations, Seminar, and Assignment	
TEXT BOOKS	1. T.Veerarajan, "Discrete mathematics", Tata McGraw Hill, 2007. 2. GeorgeKlir& Tina A Folger,"Fuzzy Sets, Uncertainity& Information", Prentice hall of India, Eighth Edition, 2003. 3.Narasingh Deo,"Graph theory with applications to Engineering and computerscience",Prentice hall, 2008	
REFERENCES	1. V. Sundaresan, K.S. Ganapathi Subramanian, K. Ganesan, "Discrete Mathematics", A.P.Publications, Sirkali, 2006. 2. RaniSironmani," Formal Languages ",The Christian Literature Societry, First Edition,1984. 3.J.P.Tremplay & R. Manohar"Discrete Mathematical structures with Applications to computer Science ", McGraw Hill Publication 19751.NarsingDeo, "Graph Theory ", Prentice hall of India, New Delhi, 2008.	

Mapping

CO \ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	H	H
CO2	H	M	H	H	H
CO3	M	H	H	M	M
CO4	M	H	H	L	H

H-High; M-Medium; L-Low

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
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Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	20UCS206	Title : Core Lab II : Programming Lab in C++	Batch :	2020-2023
			Semester:	II
Hrs/Week:	4		Credits:	02

Course Objective

The prime purpose of C++ programming was to add object orientation to the C programming language and also to enhance problem solving and programming skills using OOPs concepts in various domains.

Course Outcomes (CO)

K3	CO1	To apply the basic concepts of C++ such as function, friend functions and array of objects to solve a particular problem.
K4	CO2	To analyze programs using more advanced OOPs concepts such as Constructor/Destructor, Operator overloading, Inheritance, and Polymorphism.
K5	CO3	To validate programs using Dynamic memory allocation and Virtual functions.

Syllabus

Units	Contents	Hrs
	SET A • Program to print Floyd's triangle. • Program to illustrate the concept of class and object. • Program to illustrate the concept of function without return statement. • Program to illustrate the concept of function with return statement. • Program to illustrate the concept of Inline function. • Program to illustrate the concept of Default argument. • Program to illustrate the concept of Friend function. • Program to illustrate the concept of function overloading. • Program to illustrate the concept Array of Object. • Program to illustrate the concept of objects as Function argument. • Program to illustrate the concept of returning by objects. • Program to illustrate the concept of constructors. • Program to illustrate formatting with manipulators. **SET B** • Program to illustrate the concept of destructors. • Program to illustrate the concept copy constructor. • Program to illustrate the concept overloading unary operators. • Program to illustrate the concept overloading binary operators.	

- Program to illustrate the concept of single inheritance.
- Program to illustrate the concept of multiple inheritances.
- Program to illustrate the concept pointers to objects
- Program to illustrate the concept pointers to derived objects.
- Program to illustrate the concept virtual function.
- Program to illustrate formatted console I/O operations.
- Program to illustrate working with single file.
- Program to illustrate working with multiple files

INTERNAL MARK (20 Marks)

Observation Record Note	5 Marks
Practical Skills	5 Marks
Model Exam	10 marks

EXTERNAL MARK (30 Marks)

Record Note	5 Marks
Set A	10 Marks
Set B	15 marks

Mapping

CO \ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	H	H
CO2	H	M	M	H	H
CO3	M	M	H	H	M

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
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Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	20UCS307	Title :	Batch :	2020-2023
		Core V: Java Programming	Semester:	III
Hrs/Week:	4		Credits:	04

Course Objective

The objective of this course is to make the students to understand the various features of Java such as Packages, Applets, AWT controls, Stream classes and Files and make the students to apply the same for writing the programs.

Course Outcomes (CO)

K1	CO1	To remember the OOPs concepts such as class, methods, inheritance, encapsulation and polymorphism etc.
K2	CO2	To understand the differences between application programs and applets, applet lifecycle and graphics programming.
K3	CO3	To implement programs using Thread, Applet and AWT controls like Text Fields, Buttons, Checkboxes, Radio Buttons and Layouts etc.,
K4	CO4	To evaluate java programs using stream classes and files.

Syllabus

Units	Contents	Hrs
Unit I	Java Evolution-Overview of Java Language-Constants, Variables & Datatypes-Operators & Expressions-*Decision making & branching*-Decision making & looping.	10
Unit II	Classes, Objects & methods- Arrays, Strings & Vectors-Interfaces: Multiple Inheritance-Packages: Putting classes together - Multithreaded Programming.	10
Unit III	Managing Errors & Exceptions- Applet Programming: Introduction-How Applets differ from application-Writing Applets-Building applet code- lifecycle-Executable Applet-*Designing Web page*-Applet tag-Adding & Running Applet using HTML File-Passing Parameters to Applets -Graphics Programming.	11
Unit IV	AWT: Event Handling - Labels, Buttons, Checkboxes, Radio Buttons(CheckBoxGroups), Choice and List Controls. AWT –Managing Scrollbars-TextFields-Text Areas. Introduction to servlet : Life cycle of a servlet, tomcat for a servlet development.	10
Unit V	Managing Input/Output in files in Java: Introduction-Concept of Streams-Stream Classes-Byte Stream classes-Character Stream Classes-Using Streams-Using I/O Classes, File Class-I/O Exceptions-Creation of Files-Reading/Writng Characters & Bytes.	11
	Total Contact Hrs	**52**
	**Italicized* texts are for self study	
	Power point Presentations, Seminar, Quiz and Assignment	

TEXT BOOKS	1.E.Balagurusamy,"Programming with Java – A Primer", Tata McGraw Hill Publishing Company Limited, New Delhi, 5th Edition, 2014. (Units-I ,I,III and V) 2. Herbert Schildt,"The Complete Reference-Java2", Tenth Edition, TataMcGraw Hill Publishing Company Limited, New Delhi, 2017. (Unit-IV) 3.Phil Hanna," The Complete Reference JSP 2.0", Tata McGrawHill Publishing Company Ltd, 2011.
REFERENCES	1. Kogent Solutions Inc., "JAVA 6 Programming Black Book", Dream TechPress , New Delhi, 2009 2. K.Somasundram, "Programming in Java2", Jaico Publishing House, Chennai, 2005. 3. ISRD Group," Introduction to Object Oriented Programming through Java", Tata McGraw Hill Publishing Company, New Delhi, 2007. 4. Bruce W. Perry, "Java Servlet and JSP Cookbook", O'Reilly Media, New Delhi,2004. 5.Sagayaraj, Denis, Karthik and Gajalakshmi, " Java Programming for Core and Advanced Learners", Universities Press, 2018.

Mapping

CO \ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	M	H	H
CO2	M	M	H	H	H
CO3	H	H	H	H	H
CO4	H	M	H	H	H

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
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Programme code:	B.Sc	**Programme Title :**	Bachelor of Science (Computer Science)	
Course Code:	20UCS308	**Title :**	**Batch :**	2020-2023
		Core VI: Relational Database Management System and Oracle	**Semester:**	III
Hrs/Week:	5		**Credits:**	04

Course Objective

The objective of this course is to make the students to understand and apply the principles of data modeling using Entity Relationship and normalization techniques and understand the use of Structured Query Language (SQL) and its syntax.

Course Outcomes (CO)

K1	CO1	To remember the basic concepts and applications of database systems and SQL.
K2	CO2	To understand the relational database theory, and be able to write relational algebra expressions for queries
K3	CO3	To apply design principles using the E-R method and normalization approach
K4	CO4	To interpret SQL interface of a relational DBMS package to create, secure, populate, maintain, and query a database and PL/SQL programming using Triggers and Cursors.

Syllabus

Units	**Contents**	**Hrs**
Unit I	**Database Concepts: A Relational Approach:** An Introduction- Relationships- Database Management System- The Relational Database Model – Integrity Rules – Theoretical Relational Languages – Relational Algebra, Applications of Relational Algebra, Relational Calculus. **Database Design:** Data Modeling – Dependency – Database Design – Entity – Relationship Model – DFD Diagrams – Codd's Rules for RDBMS.	13
Unit II	**Normalization:** Normal Forms (1NF, 2NF, 3NF, BCNF, 4NF) – Dependency Diagrams – *Denormalization.* **Oracle SQL:** Personal Databases-Client/Server Databases- Oracle9i-An Introduction-The SQL*Plus Environment-Structured Query Language(SQL)-SQL*Plus Commands. **Oracle Table: Data Definition Language (DDL):** Naming rules and conventions-Data Types-Constraints-Creating an Oracle Table-Displaying Table Information-Altering, Dropping, Renaming a Table-Truncating a Table.	12
Unit III	**Working with Table: Data Management and Retrieval:** DML – Adding a new Row /Record – Customized Prompts – Updating and Deleting an existing Rows/Records – Retrieving data from table – Arithmetic Operations – Restricting data with WHERE Clause – Sorting – Revisiting substitution variables – DEFINE Command – CASE structure. Functions and Grouping: Built-in functions- Grouping Data	13

Unit IV	**Multiple Tables: Joins and Set Operations:** Join – Set Operations- Subqueries. **Views:** Creation of views-Renaming the columns of a view-Using Views - Selecting a data set from a view-Updateable Views-Destroying a view. **PL/SQL:** Introduction – Block Structure – Comments – *Data types* – Other data types – Declaration – Assignment Operators. **Control Structures and Embedded SQL:** Control Structures – Nested Blocks – SQL in PL/SQL – Data Manipulation – Transaction Control Statements.	14
Unit V	**PL/SQL Cursors and Exceptions:** Cursors – Implicit & Explicit Cursors and Attributes – Cursor FOR Loops – SELECT...FOR UPDATE – WHERE CRRENT OF Clause – Cursor with parameters – Cursor Variables – Exceptions – Types of Exceptions. **PL/SQL: Composite Data Types:** Records – Tables – VArrays - Triggers – Data Dictionary Views.	13
	Total Contact Hrs	**65**
	**Italicized* texts are for self study Power point Presentations, Seminar, Quiz and Assignment	
TEXT BOOKS	1.NileshShah,"Database System Using Oracle-A Simplified Guide to SQL and PL/SQL", 2nd Edition, Pearson Education,2005. 2.Ivan Bayross, "*SQL, PL/SQL-The programming language of Oracle*", BPB Publication, 3rd edition.	
REFERENCES	1.Ivan Bayross, "Commercial Application Development Using Oracle", BPB Publication, 2000. 2.George Koch,"The Complete Reference - Oracle 8i ",Tata McGraw Hill publication.2000.	

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	H	M
CO2	M	M	H	M	H
CO3	M	M	M	H	H
CO4	H	H	M	H	M

H-High; M-Medium; L-Low

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
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Programme code:	B.Sc	**Programme Title :**	**Bachelor of Science (Computer Science)**	
Course Code:	20UCS309	**Title :**	**Batch :**	2020-2023
		Core VII: Operating System	**Semester:**	III
Hrs/Week:	4		**Credits:**	04

Course Objective

To objective of the course is to enable the students to understand the concepts of operating system including process management, storage management, scheduling and windows.

Course Outcomes (CO)

K1	CO1	To remember the basic concepts Operating System
K2	CO2	To understand the concepts of Storage Allocation, Process Management, and Scheduling Algorithms
K3	CO3	To apply the Process Management principles and functionalities in Database Systems
K4	CO4	To review the case studies in Windows

Syllabus

Units	Contents	Hrs
Unit I	**Introduction:** Definition of operating system – History of operating system.**Hardware:** Interrupts and polling – Buffering – Storage protection – online and offline operation – Cycle stealing – Problem state – Virtual storage – Multi processing – Storage Hierarchy – RISC. **Software:** Machine Language programming – Spooling – *Optimizing Compiler* – Object oriented programming – Emulation. **Process Management:** Definition – process states – The Process Control Block – Operations on process – Interrupt Processing – Nucleus of OS.	10
Unit II	**Storage Mangement:** Real Storage: Storage organization – Management – Hierarchy – Storage management Strategies – Contiguous Vs Non-contiguous storage allocation – Fixed partition multiple programming – Variable partition multiple programming - Multiprogramming with storage swapping – Virtual storage organization – Concepts – Paging – Segmentation – Paging /segmentation systems.	10
Unit III	**Job and Processor Scheduling:**Introduction –Scheduling levels – Scheduling objectives – Scheduling criteria – Preemptive Vs Non-preemptive scheduling – Priorities – FIFO – Round Robin –Quantum size – Shortest job – Shortest remaining time – Highest response ratio next. **Deadlock:**Definition – Examples – Deadlock prevention, avoidance, detection and recovery – Banker's Algorithm only.	10
Unit IV	**Auxillary Storage Management:** Disk performance optimization: Why Disk scheduling is necessary – Desirable characteristics of disk scheduling polices – Seek optimization – Disk Caching – RAM Disks.File and Database Systems :Introduction – File system- File system function – Blocking and buffering – File Organization – Allocating and freeing space – File Descriptor – Access Control matrix – access control by user classes – Backup and recovery	10

Unit V	**Case study Windows:** Introduction - *History- design goals* - system architecture. Process & thread management: Process & thread organization-scheduling-synchronization. Memory management: memory organization-allocation-page replacement. File system management: file system drivers-NTFS. Input output management: device drivers- I/O processing-interrupt handling-file cache management.	10
	Total Contact Hrs	**50**
	**Italicized* texts are for self study	
	Power point Presentations, Seminar, Quiz and Assignment	
TEXT BOOKS	1. Deital, Deital, Choffnes "Operating systems", Pearson education and dorliing kindersly publishing,Inc., Third edition,2009.	
REFERENCES	1.Andrew S. Tanenbaum, Albert S. Woodhull, "Operating Systems Design and Implementation", Prentice Hall, Third Edition,2006	

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	M	H	M
CO2	M	H	H	M	H
CO3	H	M	M	H	H
CO4	M	M	M	H	M

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
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Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	20UCS3A3	Title :	Batch :	2020-2023
		Allied-3: Computer Based Optimization Techniques	Semester:	III
Hrs/Week:	5		Credits:	04

Course Objective

To enable the students to understand and to apply the resource management techniques available in OR including linear programming transportation assignment problem, inventory control, queuing theory and network problems.

Course Outcomes (CO)

K1	CO1	To remember the Linear Programming Problem concepts such as Mathematical formulations, Graphical Method, Two-phase problem, etc.
K2	CO2	To understand the differences between Transportation and Assignment Problems
K3	CO3	To implement concept of Sequencing, Replacement, Inventory and Queuing System
K4	CO4	To evaluate CPM,PERT methods

Syllabus

Units	Contents	Hrs
Unit I	Origin and development of OR – *Applications of OR* – Linear programming – Mathematical formulation of the problem – Graphical Method – Simplex Method – Two Phase Simplex Method **(Big-M Method not included)**–Primal and Dual problem- **(Duality Method not included)** - Dual Simplex Method	13
Unit II	**Transportation Problem:** Balanced Transportation problem and Un-Balanced Transportation problem-Row Minimum-Column Minimum-North-West Corner-Matrix Minima Method-Vogel's Approximation Methods-MODI Method(U-V Method for OBFS). **Assignment Problem:** Balanced and Un-Balanced Assignment problem– Hungarian method – Routing problem.	13
Unit III	**Network Scheduling:** Network and Basic components – *Logical sequencing*: Formation of a loop, Dangling, Redundancy-Network Construction- Rules of Network construction –Time calculation in Network-Numbering the events– Critical Path Method (CPM)– PERT: PERT Calculations (Normal table is not included).	14
Unit IV	**Sequencing problem:** Problems with n jobs and 2 machines – Problems with 'n' jobs and 'k' machines. **Queueing Theory:** Queueing System – Characteristics of Queueing system – Symbols and Notations- Queueing models Model 1: (M/M/1) : (∞/ FIFO) Mode l 2: (M/M/1) : (N/ FIFO).	12
Unit V	**Game and Strategies**: Introduction-Two-Person Zero-Sum games-Pure Strategies: Maximin-Minimax Principles-Saddle Point and Value of the Game-Rule for determining a Saddle Point- Mixed Strategies: Games without Saddle Points- 2x2 Rectangular Games. **Replacement Problem and System Reliability:** Model 1: Value of Money does not change with time. Model 2: Value of Money change with time.	13

	Total Contact Hrs	**65**
	**Italicized* texts are for self study	
	Power point Presentations, Seminar and Assignment	
TEXT BOOKS	1.KantiSwarup, PK Gupta, Man Mohan, "Operations Research ", Sulthan Chand & Sons, Seventeenth edition, 2013.	
REFERENCES	1. S. DharaniVenkatakrishnan,"Operations Research". KeerthiPublishing(p) ltd. 2002. 2. PK Gupta , Man Mohan, "Problems in Operations Research". 3rd Edition,2001. 3. J K Sharma," Operations Research: Problems and Solutions", 3rd Edition 2013 4. G. Srinivasan "Operations Research: principles and Applications", 2nd Edition, 2012. Hamdy A.Taha,"Operations Research an Introduction", Eight edition, Dorling Kindersley (India) Pvt.Ltd Publications,2007.	

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	H	M	H	H
CO2	H	M	M	H	H
CO3	M	M	H	H	M
CO4	H	M	H	H	H

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
Dr.R.Manickachezian R.Nandhakumar	Name:Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Muthukumaran Signature:

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Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	20UCS310	Title : Core Lab III: Programming Lab in Java	Batch :	2020-2023
			Semester:	III
Hrs/Week:	5		Credits:	02

Course Objective

The objective of this course is to make the students to implement various features of java programming by using Java SDK environment to create, debug and run java programs.

Course Outcomes (CO)

K3	CO1	To apply the basic concepts of Java such as class, methods, constructors, arrays and interfaces to solve the problems.
K4	CO2	To analyze programs using method overloading, method overriding, packages and threads.
K5	CO3	To validate programs using event handling, applets, AWT controls and files.

Syllabus

Units	Contents	Hrs
	SET A • Program to sort the given names in alphabetical order. • Program for command line arguments. • Program to display the mark list of the students by using single inheritance. • Program to display the employee payslip using multiple inheritance. • Program for extending the Thread class. • Program to creating Thread by implementing Runnable Interface. • Program for method overloading. • Program for exception handling. • Program to add the two numbers using applet. • Program to show Hello World using Servlets. **SET B** • Program for Bank processing using Interface. • Program for salary details using packages. • Program for multithreading. • Program to create a Thread using a synchronized block within the run () method. • Program to display the different shapes using applet.. • Program using AWT Components (TextField, Button, Checkbox, CheckboxGroup, Choice and List) • Program to copy one file to another file.	

- Program to perform Mouse Events.
- Program for the processing of random access file
- Program to display the user input using getParameter() in servlets

INTERNAL MARK (20 Marks)

Observation Record Note	5 Marks
Practical Skills	5 Marks
Model Exam	10 Marks

EXTERNAL MARK (30 Marks)

Record Note	5 Marks
Set A	10 Marks
Set B	15 Marks

Mapping

CO \ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	H	M	H
CO2	H	H	M	H	M
CO3	M	M	H	H	M

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
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Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	20UCS311	Title :	Batch :	2020-2023
		Core Lab IV: Programming Lab in RDBMS	Semester:	III
Hrs/Week:	5		Credits:	02

Course Objective

The objective of this lab is to provide a strong formal foundation in database concepts, technology and practice to the participants to groom them into well-informed database application developers.

Course Outcomes (CO)

K3	CO1	To apply the normalization techniques for development of application software to realistic problems and ability to formulate queries using SQL DML/DDL/DCL commands
K4	CO2	To interpret SQL interface of a relational DBMS package to create, secure, populate, maintain, and query a database and PL/SQL programming using Triggers and Cursors.
K5	CO3	To access data stored in an Oracle Relational DBMS using Oracle SQL, PL/SQL

Syllabus

Units	Contents	Hrs

SET A

- Write the SQL Commands for DDL
- Write the SQL Commands for DML
- Write the SQL Commands for TCL
- Write the SQL Commands to perform SQL Operations
- Write the SQL Commands for Views
- Write the SQL Commands for Joins
- Write the SQL Commands to perform Set Operations
- Write the SQL Commands for Sub Queries
- Write a Pl/Sql program to Reverse a given number
- Write a Pl/Sql program to find given number is Odd Or Even
- Write a Pl/Sql program to display Fibonacci Series
- Write a Pl/Sql program to find given number is Prime Or Not

SET B

- Apply Normalizations (1st, 2nd & 3rd) to the following table:

Table Name: Users

Name	Company	Company_Address	Url1	Url2
Joe	ABC	Work Lane	abc.com	xyz.com
Jill	XYZ	1 Job Street	abc.com	xyz.com

- Salary Calculation Using Cursor
- Write a Pl/Sql program to generate all prime numbers below 100
- Write a program to demonstrate %type and %rowtype attributes
- Create a trigger before/after update on employee table for each row/statement
- Create a trigger before/after delete on employee table for each row/statement

- Create a cursor, which displays all employee numbers and names from the EMP table
- Create a cursor, which update the salaries of all employees as per the given data
- Create a cursor, which displays names of employees having salary > 50000
- Cursor For Loop
- **Database Schema for a Employee-pay scenario**

Tables: Employee , department, pay details, payroll

For the above schema, perform the following—

- Create the tables with the appropriate integrity constraints
- Insert around 10 records in each of the tables
- List the employee details department wise
- List all the employee names who joined after particular date
- List the details of employees whose basic salary is between 10,000 and 20,000
- Give a count of how many employees are working in each department
- Give a names of the employees whose netsalary>10,000
- List the details for an employee_id=5
- Create a view which lists out the emp_name, department, basic, deductions, netsalary
- Create a view which lists the emp_name and his netsalary

INTERNAL MARK (20 Marks)

Observation Record Note	**5 Marks**
Practical Skills	**5 Marks**
Model Exam	**10 Marks**

EXTERNAL MARK (30 Marks)

Record Note	**5 Marks**
Set A	**10 Marks**
Set B	**15 Marks**

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	H	H
CO2	H	H	M	M	M
CO3	H	H	M	H	M

H-High; M-Medium; L-Low

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
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Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	20UCS3N1	Title :	Batch :	2020-2023
		Non-Major Elective Paper-I: Photoshop Lab	Semester:	III
Hrs/Week:	1		Credits:	02

Course Objective

The objective of this course is to make the students to gain a working knowledge of Photoshop and develop their skills in editing and altering photographs for through a basic understanding of the tool bar, layers, and the adjustments panel.

Course Outcomes (CO)

K3	CO1	To apply the different type of tools available in Photoshop to create simple applications.
K4	CO2	To interpret programs using various filters in Photoshop.
K5	CO3	To access the new tools for designing multi-layered applications.

Syllabus

Units	Contents	Hrs
	SET A • Image Menu using Photoshop • Reduce Picture Size using Photoshop • Replace color in an image using Photoshop • Make a simple book cover by using basic functionalities using Photoshop • Transfer an object from one image to another and erase background using Photoshop • Add a pattern as background using Photoshop **SET B** • Create India Map using Photoshop • Retouching photos using Photoshop • Take a logo and modify it using Photoshop • Alter an image using filters using Photoshop • Special Effects-Color in black and white image using Photoshop • Special Effects-Feathered Portraits (Soft fade) using Photoshop **EXTERNAL MARK (50 Marks)** **Record Note** — **10 Marks** **Set A** — **20 Marks** **Set B** — **20 Marks**	

Mapping

CO \ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	M	H
CO2	M	M	H	H	H
CO3	H	H	M	H	M

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
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Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	20UCS3N2	Title : Non-Major Elective Paper-I: Advanced Applications in MS Excel Lab	Batch :	2020-2023
			Semester:	III
Hrs/Week:	1		Credits:	02

Course Objective

This course was designed for the intermediate student who has already mastered the basic skills and wants to gain more advanced skills to put to work in a business environment or for personal use.

Course Outcomes (CO)

K3	CO1	To apply the basic concepts of Excel such as mathematical function, Data function, text function
K4	CO2	To analyze the data using charts
K5	CO3	To validate the data using if statements.

Syllabus

Units	Contents	Hrs
	SET A • In a new worksheet, create a table and insert information of student details. Use features of Format Menu. • Create employee table and calculate the salary. Use mathematical functions for the worksheet. • Create own templates in Excel. • Create and use data validation rules. • Create, manage, and format pivot tables and pivot charts. **SET B** • Create and write complex formulas. • Create and use IF statements. • Apply custom and prebuilt conditional formatting. • Work with functions to manipulate strings of text and data. • Create charts in excel **EXTERNAL MARK (50 Marks)** **Record Note — 10 Marks** **Set A — 20 Marks** **Set B — 20 Marks**	

Mapping

CO \ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	H	H
CO2	H	M	M	H	H
CO3	M	M	H	H	M

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
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Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	20UCS412	Title :	Batch :	2020-2023
		Core V: Python Programming	Semester:	IV
Hrs/Week:	4		Credits:	04

Course Objective

On successful completion of this course the students should understand the core principles of the Python Language and use the tools to produce well designed programs in python and create effective GUI applications.

Course Outcomes (CO)

K1	CO1	To remember the principles of structured programming and to understand basics of python.
K2	CO2	To understand the common programming idioms: variables, loop, branch, subroutine, and input/output
K3	CO3	To deploy the concepts of functions, standard libraries, modular programming and the design of user interfaces
K4	CO4	To figure out ability to analyze and solve the problems using advanced facilities of the Python Language

Syllabus

Units	Contents	Hrs
Unit I	**BASICS :** Python - Variables - Executing Python from the Command Line - Editing Python Files - Python Reserved Words - Basic Syntax-Comments - Standard Data Types – Relational Operators - Logical Operators - Bit Wise	10
Unit II	**CONTROL STATEMENTS:** Control Flow and Syntax - Indenting - if Statement - statements and expressions- string operations- Boolean Expressions - while Loop - break and continue - for Loop - Lists – Tuples - Sets - Dictionaries	11
Unit III	**FUNCTIONS:** Definition - Passing parameters to a Function - Built-in functions- Variable Number of Arguments - Scope – Type conversion-Type coercion-Passing Functions to a Function - Mapping Functions in a Dictionary – Lambda - Modules - Standard Modules – sys – math – time - dir - help Function.	10
Unit IV	**ERROR HANDLING:** Run Time Errors - Exception Model - Exception Hierarchy - Handling Multiple Exceptions - Data Streams - Access Modes Writing - Data to a File Reading - Data From a File - Additional File Methods - Using Pipes as Data Streams - Handling IO Exceptions - Working with Directories.	11

Unit V	**OBJECT ORIENTED FEATURES:** Classes Principles of Object Orientation - Creating Classes - Instance Methods - File Organization - Special Methods - Class Variables – Inheritance – Polymorphism - Type Identification - Simple Character Matches - Special Characters - Character Classes – Quantifiers - Dot Character - Greedy Matches – Grouping - Matching at Beginning or End - Match Objects – Substituting - Splitting a String - Compiling Regular Expressions.	10
	Total Contact Hrs	**52**
	******Italicized* texts are for self study	
	Power point Presentations, Seminar, Quiz and Assignment	
TEXT BOOKS	1. Mark Summerfield. —Programming in Python 3: A Complete introduction to the Python Language, Addison-Wesley Professional, 2009. 2. Martin C. Brown, —PYTHON: The Complete Referencel, McGraw-Hill, 2001.	
REFERENCES	1. Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist‘‘, 2nd edition, Updated for Python 3, Shroff/ O‘Reilly Publishers, 2016 2. Guido van Rossum and Fred L. Drake Jr, —An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011. 3. Wesley J Chun, —Core Python Applications Programmingl, Prentice Hall, 2012.	

Mapping

CO \ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	M	M
CO2	H	H	H	H	M
CO3	H	M	H	H	H
CO4	H	H	H	H	H

H-High; M-Medium; L-Low

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
K.Srinivasan K.Kannika Parameswari	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Muthukumaran Signature:

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Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	20UCS413	Title : Core IX: Data Communication and Computer Networks	Batch :	2020-2023
			Semester:	IV
Hrs/Week:	4		Credits:	04

Course Objective

To enable the students to understand the concepts and principles of data communication and networking including topology, protocols, and types of networks.

Course Outcomes (CO)

K1	CO1	To remember the basic concepts Networks
K2	CO2	To get the idea on Connection-oriented and Connection-less networks
K3	CO3	To apply design principles and functionalities in OSI Reference Layers
K4	CO4	To analyze ISDN network, TCP/IP, etc.,

Syllabus

Units	Contents	Hrs
Unit I	**Introduction:** Communications and Networking-fundamental concepts-Data communications-Protocols-Standards-Signal Propagation-Analog and Digital Signals-Parallel and Serial Communications-Simplex, Half-duplex and full duplex communications-Multiplexing-Transmission errors-Detection and	9
Unit II	**Transmission Media:** Guided Media-Twisted Pair-Coaxial Cable-Optical fiber-Unguided Media –Microwave Communication-Satellite Communication–FDMA,CDMA,SDMA. **Network Topology:** Mesh Topology-Star Topology-Tree Topology-*Ring Topology-Bus Topology-Hybrid Topology.* **Switching and Routing:** Switching basics-Circuit switching-Packet switching-Message switching-Router and Routing.	11
Unit III	**Networking protocols and OSI model**-Protocols in Computer Communication-OSI Reference Models-Physical layer-Data link layer-Network layer-Transport Layer-Session Layer-Presentation Layer-Application Layer-Internet Layer.	9
Unit IV	**Local Area Network** (LAN)-Ethernet-Ethernet properties-CSMA/CD-Metropolitan Area Network (MAN)-Distributed Queue Dual Bus(DQDB)-Switched Multimegabit Data Services(SMDS)-Wide Area Network(WAN)-WAN Architecture	10
Unit V	**Integrated Services Digital Network(ISDN)**-ISDN Architecture-ISDN Interfaces-X.25 Protocol-Understanding and Working of X.25 protocol.**TCP/IP:** An Introduction to TCP/IP- Basics- IP Addresses-*Logical Addresses*-TCP/IP Example. ARP-RARP.	11
	Total Contact Hrs	**50**

	**Italicized texts are for self study*	
	Power point Presentations, Seminar, Quiz and Assignment	
TEXT BOOKS	1 . Achyit S Godbole,"Data Communications And Computer Networks", - TataMcGrawHill, FourteenthEdition, 2007. 2. William Stallings," Data and Computer Communications", PearsonEducation, Sixth Edition, 20	
REFERENCES	1. Andrew S. Tannenbaum,"Computer Networks", Prentice hall of India, FourthEdition, 2003. 2. W.Stallings,"Data and Computer Communications", Prentice hall of India, SeventhEdition, 2004.	

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	M	H	M
CO2	M	M	H	M	H
CO3	M	M	M	H	H
CO4	M	H	M	H	M

H-High; M-Medium; L-Low

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
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Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	20UCS414	Title :	Batch :	2020-2023
		Core X:Open Source Programming	Semester:	IV
Hrs/Week:	4		Credits:	04

Course Objective

To discuss techniques that can be effectively applied in practice about HTML5, JavaScript, PHP, CSS and Linux

Course Outcomes (CO)

K1	CO1	To recollect basic software quality assurance practices to ensure that software designs, development, and maintenance meet or exceed applicable standards.
K2	CO2	To understand concepts of software process models, management activities, requirement gathering.
K3	CO3	To implement proficiency of quality in software development process.
K4	CO4	To review and manage software projects in designing, testing, cost estimation and risk management.

Syllabus

Units	Contents	Hrs
Unit I	Introduction to html 5, java script and css :Introduction to Dynamic Web content- HTTP and HTML- Request and Response Procedure- The Benefits of PHP, JAVA Script, CSS, and HTML5- Introduction to HTML5- The Canvas -The HTML5 Canvas- HTML5 Audio and Video- Introduction to CSS- CSS Rules-Style	9
Unit II	**Apache:** introduction - apache explained - starting, stopping, and restarting apache - modifying the default configuration - securing apache - set user and group - consider allowing access to local documentation - don't allow public_html web sites - apache control with .htaccess .	9
Unit III	MYSQ:Introduction to MY SQL – The show Databases and Table – The USE command – Create Database and Tables – Describe Table – Select, Insert, Update, and Delete statement – Some Administrative detail – Table Joins – Loading and Dumping a Database.	11
Unit IV	PHP:PHP Introduction – General Syntactic Characteristics – PHP Scripting – Commenting your code – Primitives, Operations and Expressions – PHP Variables –Control -statement – Array – Functions-Files.	10
Unit V	PHP:Basic Form Processing – File and Folder Access – Cooking – Sessions – Database Access with PHP – MySQL - MySQL Functions – Inserting Records – Selecting Records– Deleting Records – Update Records	11

		50
	*Italicized texts are for self study	
	Power point Presentations, Seminar, Quiz and Assignment	
TEXT BOOKS	1. "Learning PHP, MySQL, Java Script, CSS and HTML5", Robin Nixon, O'Reilly Publications, 3rd Edition, 2014. 2. Steven Holzner, "HTML Black Book", Dreamtech Press &Paraglyph Press Publishers, 2007	
REFERENCES	Open Source Software, P.Rizwan Ahmed, Margham Publication, Chennai, 2015	

Mapping

CO \ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	H	H
CO2	H	M	M	H	H
CO3	M	M	H	H	H
CO4	H	H	H	H	H

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
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Programme code:	B.Com	Programme Title :	Bachelor of Commerce (AIDED and SELF FINANCING)	
Course Code:	20UCO2A2	Title	Batch :	2020-2023
		BUSINESS APPLICATION SOFTWARE AND INTERNET	Semester	IV
Hrs/Week:	03		Credits:	03

Course Objective

To make the students understand the application of computer in business.

Course Outcomes (CO)

K1	CO1	To recollect the document format by reference to the file extension.
K2	CO2	To understand the concept in word processing document.
K3	CO3	To execute the knowledge relating to create effective presentation of data base.
K4	CO4	To evaluate the designs to enhance the looks of the presentation.

Syllabus

Unit-1

Introduction to Windows – Introduction to Word – *Editing a Document* – Moving and Copying a Text – Text and Paragraph Formatting – Finding and Replacing Text – Spell and Grammar Check – File Export and Import.-Columns, Tables– Using Graphics, Templates– Using Mail Merge- Introduction to Worksheet and Excel – Getting Started with Excel – Editing Cells and Using Commands and Functions – Moving and Copying – Inserting and Deleting Rows and Columns – Formatting a Worksheet – Printing the Worksheet – Creating Charts – Using Date and Time – Naming ranges and Using Simple Statistical and Mathematical functions –Additional Formatting Commands and Drawing Toolbar –Multiple Worksheet. (8hrs)

Unit-2

Introduction to PowerPoint – Creating a Presentation – Different Views in PowerPoint – Running a Slide Show – Animation and Sound – Importing Objects from other Applications – Automating Presentations – Printing Presentations - Modifying and Integrating Presentations. (7hrs)

Unit-3

Access – Databases and Tables – Creating Tables for Storing Data – Relationship Between Tables and Queries–Building User Interface with Forms – Displaying Data with reports. (8 hrs)

Unit-4

Introduction to Internet – Resources of Internet – Internet Services – Hardware and Software Requirements of Internet – Uses of Internet – Dialup Connection – Shell Accounts – ISP – ISDN Dial Up Connection – IP Address – Domain Naming System Internet Protocols – IP/TCP – FTP – HTTP – Internet Clients and Internet Servers – Uniform Resource Locator(URL). (8 hrs)

Unit-5

Worldwide Web – Web Page – Web Index - Web Browsing – Browser Search Engines – *Electronic Mail (E Mail)* – E–Mail Message – Customizing E Mail Programmes – Address Book – Significant Feature – File Attachment Facility – Advantages and Disadvantages of Email – Telnet – Gopher –WAIS-Important HTML Tags-Creation of Simple Web Page. (8 hrs)

Total Contact hrs / Semester **(39 hours)**

Power point Presentations, Group discussions, Seminar and Assignment.

- Italics denotes self study topics

Books for Study:

Taxali. R.K ,PC (2017), Software Made Simple.

Books for Reference:

1.Alexis Leon & Mathews Leon, (2017),Internet for everyone, New Delhi, Vikas Publishing House .

2.Nellai Kannan ,C(2017),MS Office,4th edition, Tirunelveli, NEIS Publications.

Mapping

CO \ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	H	H
CO2	M	H	H	H	H
CO3	M	H	H	H	M
CO4	H	H	H	M	H

H-High; M-Medium; L-Low

Course Designed by	Verified by HoD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
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Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	20UCS415	Title :	Batch :	2020-2023
Hrs/Week:	5	Core Lab V: Programming Lab using Python	Semester:	IV
			Credits:	02

Course Objective

On successful completion of the course the students should write well-documented programs in the Python language, including use of the logical constructs of that language.

Course Outcomes (CO)

K3	CO1	To implement, Interpret, Contrast of various operators.
K4	CO2	To review and analyze database with variables, loop, branch, subroutine, and input/output
K5	CO3	To validate how databases are integrated with components ,modular programming and the design of user interfaces

Syllabus

Units	Contents	Hrs
	SET A • Write a program to find the largest of n numbers. • Write a program that asks the user to enter a series of positive numbers (The user should enter a negative number to signal the end of the series)and the program should display the numbers in order and their sum. • Write a program to find the product of two matrices [A]mxp and [B]pxr • Write recursive and non-recursive functions for the following: o To find GCD of two integers. o To find the factorial of positive integer o To print Fibonacci Sequence up to given number n • Write a program to display two random numbers that are to be added, such as: 247 + 129, the program should allow the student to enter the answer. If the answer is correct, a message of congratulations should be displayed. If the answer is incorrect, a message showing the correct answer should be displayed. • Write recursive and non-recursive functions to display prime number from 2 to n. • Write a program that writes a series of random numbers to a file from 1 to n and display.	

- Write a program to create file, write the content and display the contents of the file with each line preceded with a line number (start with 1) followed by a colon.
- In a program, write a function that accepts two arguments: a list and a number n. The function displays all of the numbers in the list that are greater than the number n.

SET B

- Write a program for linear search and binary search.
- Write a program with a function that accepts a string as an argument and returns the no. of vowels that the string contains. Another function to return number of consonants.
- Write a program that opens a specified text file and then displays a list of all the unique words found in the file. (Store each word as an element of a set.)
- Write a program to analyze the contents of two text files using set operations.
- Write a program to implement the inheritance and dynamic polymorphism.
- Write a GUI program that converts Celsius temperatures to Fahrenheit temperatures.
- Write a GUI program that displays your details when a button is clicked.
- Write a program to delete or remove elements from a list
- Write a program to slice lists in Python
- Write a Program to Illustrate Different Set Operations
- Write a Program to Display Calendar

INTERNAL MARK (20 Marks)

Observation Record Note	**5 Marks**
Practical Skills	**5 Marks**
Model Exam	**10 Marks**

EXTERNAL MARK (30 Marks)

Record Note	**5 Marks**
Set A	**10 Marks**
Set B	**15 Marks**

Mapping

CO \ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	H	M
CO2	H	M	H	H	H
CO3	H	H	M	H	M

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
K.Srinivasan K.Kannika Parameswari	Name: Dr.Antony Selvadoss Thanamani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Muthukumaran Signature:

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Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	20UCS416	Title :	Batch :	2020-2023
		Core Lab VI: Web Programming using Open source Tools	Semester:	IV
Hrs/Week:	5		Credits:	02

Course Objective

To enable the students to know how to work with HTML and to create static webpage.

Course Outcomes (CO)

K3	CO1	To apply the different type of available open source to create simple applications.
K4	CO2	To interpret programs using various open source tools.
K5	CO3	To decide the appropriate tool used for creating dynamic web pages

Syllabus

Units	Contents	Hrs
	SET A 1. Create title, heading, and body tag using HTML 2. Changing foreground and background using HTML 3. Formatting webpage using HTML 4. Design college logo using HTML 5. Create student mark list and list the class toppers using ordered list. 6. Create a web page for employee salary calculation. 7. Create a web page for calculating Electricity Bill. 8. Create web site for various department in our college using Frame. 9. Create an application form using HTML 10. Create bio-data using HTML tags. 11. List the details of product stored using HTML table **SET B** 1. Create a web page with Frames and Tables. 2. Create a web page incorporating CSS (Cascading Style Sheets) 3. Create a simple calculator in Java script. 4. Write a JavaScript program to scroll your name in the scroll bar. 5. Develop a program and check message passing mechanism between pages. 6. Develop a program and check file system functions, date &time functions. 7. Create a student database table in MYSQL and manipulate records (insert, delete, and update) records in a web browser. 10.Develop a program using cookies and session.	

INTERNAL MARK (20 Marks)

Observation Record Note	5 Marks
Practical Skills	5 Marks
Model Exam	10 Marks

EXTERNAL MARK (30 Marks)

Record Note	5 Marks
Set A	10 Marks
Set B	15 Marks

Mapping

CO \ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	H	H	H
CO2	H	H	M	H	M
CO3	H	M	H	H	H

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
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Programme code:	**B.Sc**	**Programme Title :**	**Bachelor of Science (Computer Science)**	
Course Code:	**20UCS4N1**	**Title :**	**Batch :**	**2020-2023**
		Non-Major Elective Paper-II: Flash Lab	**Semester:**	**IV**
Hrs/Week:	**1**		**Credits:**	**02**

Course Objective

The objective of this course is to make the students to learn about Macromedia Flash and develop their skills in creating animations and special effects by using the tools.

Course Outcomes (CO)

K3	CO1	To apply the various tools available in Flash for creating animations.
K4	CO2	To get the idea about timeline, frames and motion tweens.
K5	CO3	To validate the animations by running the test movies.

Syllabus

Units	Contents	Hrs
	SET A • Bouncing ball using Flash • Volcano Eruption using Flash • Drawing and creating text with effects using Flash • Logo using Flash • Robot arm using Flash **SET B** • Rotating globe using Flash • Fog Effect using Flash • Lightning Effect using Flash • Animated Effect using Flash • Raining Effect using Flash **EXTERNAL MARK (50 Marks)** **Record Note 10 Marks** **Set A 20 Marks** **Set B 20 Marks**	

Mapping

CO \ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	M	M
CO2	H	H	H	H	H
CO3	H	H	H	H	H

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
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Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	20UCS4N2	Title : Non-Major Elective Paper-II: Internet Applications Lab	Batch :	2020-2023
			Semester:	IV
Hrs/Week:	1		Credits:	02

Course Objective

To enable the students to know how to work with internet, the usage of internet and its applications.

Course Outcomes (CO)

K3	CO1	To Know about basic of internet
K4	CO2	To analyze the concept through online.
K5	CO3	To get idea about online applications.

Syllabus

Units	Contents	Hrs
	SET A • Download a information about "Power of Indian president" from a website by using a search engine. • Select two electronics items by e-shopping. • Select mobile phone items by e-shopping. • Book Online train Tickets from coimbatore to Chennai. • Using Search Engine download information on "Benefits of Yoga". • Open an email account in your names in gmail/yahoomail/hotmail. • Write e-mail to Pradeep by marking a blind copy to Priya. • Download information about "greatness of Himalayas for tourism interest" in powerpoint presentation. • Create an electronic greeting card with personal remarks and pictures. **SET B** • Download information about greatness of Himalayas for tourism interest. • Write a congratulating letter to your friend on his promotion using mail. • Download research articles on "Information technology Applications" and save as doc. Files. • Download m.phil application form in bharathiar university • Search the information about " powerpoint creation" in youtube • Download pdf about the concept of "Environmental studies". • Convert word to pdf and pdf to word using online convertor. • Pay EB-Bill through online **EXTERNAL MARK (50 Marks)** **Record Note — 10 Marks** **Set A — 20 Marks** **Set B — 20 Marks**	

Mapping

CO \ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	H	H
CO2	H	M	M	H	H
CO3	M	M	H	H	M

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
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Programme code:	B.Sc	**Programme Title :**	**Bachelor of Science (Computer Science)**	
Course Code:	20UCS517	**Title :**	**Batch :**	2020-2023
Hrs/Week:	4	Core XI: Linux	**Semester:**	V
			Credits:	03

Course Objective

This course introduces basic understanding of Linux OS, Linux commands and File system and to familiarize students with the Linux environment. To make student learn fundamentals of shell scripting. This course contains details of shell programming and introduces system administration.

Course Outcomes (CO)

K1	CO1	To remember the operating system architecture and low level interfaces that are required to build Linux systems
K2	CO2	To understand different commands used by system administrator and file related commands.
K3	CO3	To apply various Linux operating system commands and utilities in Linux systems
K4	CO4	To evaluate the shell scripts with different programming goals
K5	CO5	To analyze different types of shell associated commands.

Syllabus

Units	Contents	Hrs
Unit I	***Introduction*** – Hardware Requirements for Linux – Salient Features – Multiuser Capability, Multitasking Capability, Communication, Security, Portability – Linux System Organization – Types of Shells – Bourne Shell, C shell, Korn Shell - Unix Commands. ***Unix File System*** – Creating Files – Indulging in File Play – Listing Files and	10
Unit II	***File System*** – The Boot Block, The Super Block, The Inode Table, Data Blocks – Storage of Files – Disk Related Commands – Disk Usage. ***Essential Linux Commands*** – Password - cal command – banner command – touch command – file command – Links with DOS – File Related Commands – wc, sort, cut, grep, dd – Viewing Files – *File Compression.*	11
Unit III	***VI Editor*** – Modes of Operations – Learning the Ropes – Adding Text, Delete Text, Overwriting Text, Quitting *vi* – Block Commands – Search Strings – Find and Replace, Delete and Paste, Yank and Paste – Set Command – Customizing *vi* Environment – Multiple File Editing in *vi.* ***Processes in Linux*** – ps command – Background Process – The nohup Command – Killing a Process – Changing Process Priorities – Scheduling of Processes –'at' command – 'batch' command – 'crontab' command. ***Communication*** – 'Write' command – ''wall' command –'mail' Command	10

Unit IV	***Programming with Shell:*** Introduction to shell script-creation and execution-system variables-profile-read statement-command line arguments-logical operators && and ||-exit-if conditional-case-while statement-for set-shift-trap statement-shell variables-cd command-merging stream-expr command-eval command-shell programs.	11
Unit V	***System Administration:*** System Administrator-Booting and shutting down-super user status (su) - security-user services - disk management (fsck) - operation - file system administration-backups utilities - cpio- afio- shutdown – mount – unmount – df - find commands-creating device files-*installing and managing printers.*	10
	Total Contact Hrs	**52**
	******Italicized* texts are for self study	
	Power point Presentations, Seminar, Quiz and Assignment	
TEXT BOOKS	1.Yashavant Kanetkar, "UNIX Shell Programming", BPB Publications, 1st Edition, 2003 (Unit I – III) 2.Sumitabha das, "UNIX System Concepts and Applications", Tata McGraw - Hill, Fourth edition 2010 (Unit IV,V)	
REFERENCES	1.Mark.G.Gobell,"Red Hat LINUX-Reference Manual", Pearson education, first Edition, 2003	

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	M	M	M
CO2	M	M	M	M	M
CO3	M	H	H	H	M
CO4	H	H	H	H	M
CO5	M	H	M	H	H

H-High; M-Medium; L-Low

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
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Programme code:	B.Sc	**Programme Title :**	Bachelor of Science (Computer Science)	
Course Code:	20UCS518	**Title:**	**Batch :**	2020-2023
		Core XII: Kotlin Programming	**Semester:**	V
Hrs/Week:	4		**Credits:**	03

Course Objective

On successful completion of this course, the students will be able to understand the kotlin programming concepts, to develop multi- platform applications and hands on practices by applying these concepts to implement in both mobile and web based applications.

Course Outcomes (CO)

K1	CO1	To remember the coding conventions used for kotlin programming.
K2	CO2	To get an idea about classes, objects, properties, fields and interfaces of kotlin.
K3	CO3	To deploy multi-platform mobile and web based applications.
K4	CO4	To analyze the composition of suspending functions.
K5	CO5	To validate the execution of applications on various platforms.

Syllabus

Units	Contents	Hrs
Unit I	**Introduction:** Overview-Using Kotlin for Server-side Development - Using Kotlin for Android Development - Kotlin JavaScript Overview - Kotlin/Native for Native - Kotlin for Data Science - Coroutines for asynchronous programming and more - Multiplatform Programming. **Getting Started :** Basic Syntax – Idioms - Coding Conventions. **Basics:** Basic Types – Packages - Control Flow: if, when, for, while - Returns and Jumps.	**13**
Unit II	**Classes and Objects :** Classes and Inheritance - Properties and Fields – Interfaces – Visibility Modifiers – Extensions - Data Classes - Sealed Classes – Generics - Nested and Inner Classes - Enum Classes - Object Expressions and Declarations - Inline classes – Delegation - Delegated Properties. **Functions and Lambdas :** Functions - Higher-Order Functions and Lambdas - Inline Functions.	**13**
Unit III	**Collections :** Kotlin Collections Overview - Constructing Collections – Iterators - Ranges and Progressions – Sequences - Collection Operations Overview - Collection Transformations – Filtering - plus and minus Operators – Grouping - Retrieving Collection Parts - Retrieving Single Elements - Collection Ordering - Collection Aggregate Operations - Collection Write Operations - List Specific Operations - Set Specific Operations - Map Specific Operations.	**13**
Unit IV	**Coroutines :** Coroutine Basics - Cancellation and Timeouts - Composing Suspending – Functions - Coroutine Context and Dispatchers - Asynchronous Flow – Channels - Exception Handling - Shared mutable state and concurrency - Select Expression.	**13**

Unit V	**Multiplatform Programming :** Platform-Specific Declarations - Building Multiplatform Projects with Gradle: Project Structure - Setting up a Multiplatform Project - Gradle Plugin - Setting up Targets - Con□guring Source Sets - Default Project Layout - Running Tests - Publishing a Multiplatform Library - Java Support in JVM Targets - Android Support - Using Kotlin/Native Targets.	13
	Total Hours	65
	******Italicized* texts are for self study	
	Power point Presentations, Seminar , Assignment, Brain storming	
TEXT BOOKS	1. "Kotlin 1.3 Language Documentation", https://kotlinlang.org/docs/kotlin-docs.pdf, Kotlin official website.	
REFERENCES	1. Ken Kousen, "Kotlin Cookbook", First Edition, 2019, O'Reilly Media, Inc., ISBN: 9781492046660 2.David Griffiths, Dawn Griffiths, "Head First Kotlin", First Edition, 2019, O'Reilly Media, Inc., ISBN: 9781491996683	

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	H	H	H
CO2	M	M	H	H	H
CO3	H	M	H	H	H
CO4	M	H	H	M	H
CO5	M	M	H	M	H

H-High; M-Medium; L-Low

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
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Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	20UCS519	Title :	Batch :	2020-2023
		Core XIII: Cyber Security	Semester:	V
Hrs/Week:	4		Credits:	03

Course Objective

This course provides students with concepts of computer security, cryptography, digital money, secure protocols, detection and other security techniques. Upon the completion of this course, students should be able to understand, appreciate, employ, design and implement appropriate security technologies and policies to protect computers and digital information.

Course Outcomes (CO)

K1	CO1	Evaluate the computer network and information security needs of an organization.
K2	CO2	Assess cyber security risk management policies in order to adequately protect an organization's critical information and assets.
K3	CO3	Troubleshoot, maintain and update an enterprise-level information security system.
K4	CO4	Implement continuous network monitoring and provide real-time security solutions.
K5	CO5	Formulate, update and communicate short- and long-term organizational cyber security strategies and policies.

Syllabus

Units	Contents	Hrs
Unit I	Introduction: Why Network Security is needed – Management principles – Security principles - Network management - Security attacks – Qualities of a Good Network. Organizational Policy and Security: Security policies, Standards and Guidelines – Information Policy – Security Policy - Physical Security – Social Engineering – Security Procedures – Building a Security Plan. Security	10
Unit II	Cryptography: Terminology and background – Data Encryption Methods – Cryptographic Algorithms- Secret Key Cryptography - Public key cryptography – Message Digest – Security Mechanisms. Database Security: Introduction to Database – Characteristics of a Database Approach – Database Security Issues - Database Security – Vendor-Specific Security – Data Warehouse Control and Security	10
Unit III	Intrusion Detection Systems: What is not ad IDS – Infrastructure of IDS – Classification of Intrusion Detection Systems – Host-Based IDS – Network-Based IDS - Anomaly Vs Signature Detection – Manage an IDS – Intrusion Detection Tools – IDS Products and Vendors. Network Security: Fundamental Concepts – Identification and Authentication – Access Control – A Model for Network Security – Malicious Software – Firewalls	11
Unit IV	Network Management: Goal of Network Management – Network Management Standards – Network Management Model – Infrastructure for Network Management - Simple Network Management Protocol (SNMP). Security Management: Security Plan - Security Analysis - Change Management - Disaster Recovery - Systems Security Management - Protecting Storage Media- Protection of System Documentation -Exchanges of Information and Software – Security Requirements of Systems.	11

Unit V	**Electronic Mail Policy: Electronic Mail – What are the E-mail threats that organization's face - Why do you need an E-mail Policy - How do you create an E-mail Policy - Publishing the E-mail Policy - University E-mail Policy. Security of Internet Banking Systems: Introduction Banking System – Security Problem – Methodology for Security Problem – Schematic flow of Internet Banking – A layered approach to security.**	**10**
	Total Contact Hrs	**52**
	******Italicized* **texts are for self study**	
	Power point Presentations, Seminar, and Assignment	
TEXT BOOKS	1. Brijendra singh ,Network Security and Management, PHI, 2007	
REFERENCES	1. Rick Howard, "Cyber Security Essentials" Auerbach Publications 2011.	

Mapping

CO \ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	M	H	H
CO2	M	M	H	H	H
CO3	H	H	H	H	H
CO4	H	M	H	H	H
CO5	M	H	M	H	M

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
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Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	20UCS5E1	Title	Batch :	2020-2023
		Core Elective- I:	Semester	V
Hrs/Week:	6	Software Engineering and Testing	Credits:	4

Course Objective

The objective of this course is to make the students to understand the various features of testing such as software test automation, test metrics and measurement. Software testing tool win runner is used for applications.

Course Outcomes (CO)

K1	CO1	To remember the software development life cycle phases,quality assurance and quality control.
K2	CO2	To understand the types of testing, scenarios, process,methodologies, challenges in testing.
K3	CO3	To implement design and architecture for automation, software testing tools are applied.
K4	CO4	To evaluate performance ,test metrics and measurement , WinRunner software is used.
K5	CO5	To Access verification and validation, integrate functional and non-functional testing,to perform regression testing, framework for test tools, testing an application using WinRunner.

Syllabus

Units	Contents	Hrs
Unit I	***Introduction***- The software Engineering Discipline-Its Evolution and Impact-Evolution of the Art into as Engineering Discipline-A solution to the software Crisis-***Software Life Cycle Models:*** Why use a Life Cycle model? Classical Waterfall model-Iterative Waterfall model-Prototyping model-Evolutionary	14
Unit II	***Requirements Gathering and Analysis:*** Requirements Gathering –Requirements Analysis-***Software Design:*** Outcome of a Design process-Cohesion and Coupling. ***Coding and Testing:*** Coding: Coding Standards and Guidelines-Testing-Basic concepts and Terminologies-Why Design Test Cases. ***Software Maintenance:*** Characteristics of Software Maintanance-Types.***Software Reuse:*** What can be Reused-Basic Issues in any Reuse Program?	16
Unit III	***Phases of Software Project***-Quality, Quality Assurance, and Quality Control-Testing, Verification, and Validation. White Box Testing: Static Testing-Structural Testing-Challenges. Black Box Testing: What is Black Box Testing, Why Black Box Testing-When to do Black Box Testing-How to do Black Box Testing	16

Unit IV	***Software Test Automation:*** Skills needed for Automation-What to Automate-Scope of Automation-Design and Architecture for Automation-Generic requirements for Test Tools Framework-Selecting a Test Tool-Challenges. Test Metrics and Measurements: Metrics and Measurements-Metrics in Testing-Types of Metrics.	16
Unit V	***WinRunner:***Overview of WinRunner-Testing an Application Using WinRunner-Test Script Language-Synchronization of Test Cases-Data Driven Testing-Rapid Test Script Wizard-Mapping Custom Object to Standard Class-Checking GUI Objects	16
	Total Contact Hrs	**78**
	**Italicized* texts are for self study	
	Power point Presentations, Seminar, and Assignment	
TEXT BOOKS	1.Rajib Mall: Fundamentals od Software Engineering "PHI Learning private Limited Edition,2010.(unit I and unit II) 2.Srinivasan Desikan, Gopalaswamy Ramesh, "Software Testing Principles and Practices"pearson Education-7th impression 2009(unit III and unit IV) 3.Dr K.V.K.K Prasad, "Software Testing Tools", Dreamtech press, New Delhi, 2007 (for unit V)	
REFERENCES	1. Roger S.Pressman,"Software Engineering", Tata McGraw Hill Publication, Sixth Edition, 2009.	

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	M	M	H
CO2	H	M	M	M	H
CO3	M	M	H	M	M
CO4	M	H	H	H	H
CO5	H	M	H	H	H

H-High; M-Medium; L-Low

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
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Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	20UCS5E2	Title	Batch :	2020-2023
		Core Elective- I:	Semester	V
Hrs/Week:	6	Distributed Computing	Credits:	4

Course Objective

The objective of this course is to introduce the area of distributed systems. To examine and analyze how a set of connected computers can form a functional, usable and high performance distributed system.

Course outcomes

K1	CO1	To remember the basic elements and concepts related to distributed system technologies;
K2	CO2	To understand the knowledge of the core architectural aspects of distributed systems
K3	CO3	To implement the design of distributed applications and underlying components of distributed systems
K4	CO4	To evaluate distributed systems scalability and fault tolerance
K5	CO5	To access the servers in the network

Syllabus

Units	Contents	Hrs
Unit I	Introduction: Distributed system: Goals, Advantages and disadvantages-architecture of Distributed Computing - Client-server, 3-tier architecture, N-tier architecture, Distributed objects, Loose coupling, tight coupling. Concurrency in Distributed Computing - Multiprocessor systems, Multicore systems, Multicomputer systems, Computing taxonomies, Computer clusters, Grid computing.	15
Unit II	Characteristics of Distributed Computing, Network and Interconnection Structures. *Message Switching and Circuit Switching*, Designing of distributed system, Top down approach and Bottom up approach. Distributed computing system model - Minicomputer Model, Workstation Model, Workstation – Server Model, Processor – Pool Model, Hybrid Model. Challenges in distributed data	15
Unit III	Data flow system: Issues in load balancing- Classification of Load Distributing Algorithms, Load Balancing Vs. Load Sharing, Selecting a suitable load-sharing algorithm, Requirements for Load Distributing. data flow- Software architecture, hardware architecture. Design consideration: peer to peer network-client and server network-application server network.	16
Unit IV	Client and server network model: client /server model-characteristics-architecture-Implementation of Client/ server Model, tiered architecture- 2 tier architecture, 3-tier architecture, n-tier architecture. Client queue - Client architecture. Configuring a Client/ Server Network Model. types of server – file server, print server, mail server.	16
Unit V	Distributed database: Need for distributed database Principles of distributed databases, types of distributed database-advantages and limitations. Distributed DBMS: levels of transparency- distributed DBMS products- *features of distributed file system.*	16
	Total Contact Hrs	**78**
	**Italicized* texts are for self study	
	Power point Presentations, Seminar, and Assignment	

TEXT BOOKS	1.Elmasri & Navathe, "Fundamentals of Database Systems", Pearson Education Asia,3rd Edition, 2011 2. Stefans Ceri, Ginseppe Pelgatti "Distributed database Principles and systems" McGraw Hill, First Edition, 2008
REFERENCES	1.Andrew S. Tanenbaum and Maarten van Steen, "Distributed Systems: Principles and Paradigms", Prentice Hall, 2002

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	M	H	H
CO2	M	M	H	H	H
CO3	H	H	H	H	H
CO4	H	M	H	H	H
CO5	M	H	H	M	H

H-High; M-Medium; L-Low

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
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Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	20UCS5E3	Title	Batch :	2020-2023
		Core Elective- I:	Semester	V
Hrs/Week:	6	Client/Server Technology	Credits:	4

Course Objective .

To inculcate Knowledge on Client / Server Concepts and various components of client / server Applications.

Course Outcomes (CO)

K1	CO1	To remember basics concepts of client-server architecture.
K2	CO2	To Understand the components used for client-server development.
K3	CO3	To implement client-server architecture using WAN and other technologies.
K4	CO4	To review client – server services and support.
K5	CO5	To validate the clients in the server

Syllabus

Units	Contents	Hrs
Unit I	Client / Server Computing – Advantages of Client / Server Computing – Technology Revolution – Connectivity – Ways to improve Performance – How to reduce network	15
Unit II	Components of Client / Server Applications – The Client: Role of a Client – Client Services – Request for Service. Components of Client / Server Applications – The Server: The Role of a Server – Server Functionality in Detail – The Network Operating System – What are the Available Platforms – The Server Operating system.	15
Unit III	Components of Client / Server Applications – Connectivity: Open System Interconnect – communications Interface Technology – Inter-process communication – WAN Technologies.	16
Unit IV	Components of Client / Server Applications – Software. Components of Client / Server Applications – Hardware.	16
Unit V	Components of Client / Server applications – Service and Support: System Administration. The Future of Client / Server Computing: Enabling Technologies – Transformational Systems.	15
	Total Contact Hrs	**78**
	**Italicized* texts are for self study	
	Power point Presentations, Seminar, and Assignment	
TEXT BOOKS	1. Steve guenferich, "Client / Server Computing – Patrick Smith", PHI, Second edition, 1994 (For Chapters 1-8 & 10)	
REFERENCES	1.Robert Orfali, Dan Harkey, Jeri Edwards," the essential client/server survival guide", galgotia publication private limited, Second edition, 2007. 2.Dewire and Dawana Travis "Client/ Server Computing", TMH, 2003.	

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	H	H
CO2	H	M	H	H	H
CO3	M	H	H	M	M
CO4	M	H	H	M	H
CO5	H	M	M	H	H

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
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Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	20UCS520	Title :	Batch :	2020-2023
		Core Lab VII:Linux Lab	Semester:	V
Hrs/Week:	5		Credits:	03

Course Objective

To enable the students to write program in Linux for solving specified problems.

Course Outcomes (CO)

K3	CO1	To apply the various Linux distributions.
K4	CO2	To evaluate the basic set of commands and utilities in Linux systems.
K5	CO3	To validate various shell scripts with different programming concepts.

Syllabus

Units	Contents	Hrs
	SET A • Create a program to display pattern. • Create a program using pipes and filters. • To find Prime numbers between given range. • Check a given number is an Armstrong or not • Sorting of a given set of numbers. • Create a program using grep command • Create a program using Translating character commands. • Create a program using different file and directory commands. • To print the multiplication table for a given number. • Swapping two numbers without third variable **SET B** • To generate student marksheet for given numbers. • Calculate Electricity Bill tariff of a customer. • Calculate Income tax of an employee. • Calculate telephone tariff of a customer. • Create a program to add two dimensional array. • Create a program to generate student marklist.	65

- To print floyds and pascal triangle.
- Create a program to generate sum of series.
- Create a program to calculate speed,distance and time.
- To find nCr of a given numbers.

INTERNAL MARK (40 Marks)

Observation Record Note	**10 Marks**
Practical Skills	**10 Marks**
Model Exam	**20 Marks**

EXTERNAL MARK (60 Marks)

Record Note	**10 Marks**
Set A	**20 Marks**
Set B	**30 Marks**

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	H	M	M
CO2	M	H	M	M	M
CO3	H	M	H	M	H

H-High; M-Medium; L-Low

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
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Programme code:	B.Sc	**Programme Title :**	Bachelor of Science (Computer Science)	
Course Code:	20UCS521	**Title :**	**Batch :**	2020-2023
		Core Lab VIII: Programming Lab using Kotlin	**Semester:**	V
Hrs/Week:	5		**Credits:**	03

Course Objective

To enable the students to design and validate web applications using markup languages and scripts.

Course Outcomes (CO)

K3	CO1	To Install and configure Android application development tools.
K4	CO2	To Design and develop user Interfaces for the Android platform.
K5	CO3	To Apply Java programming concepts to Android application development.

Syllabus

Units	Contents	Hrs
	1. Kotlin program to print an integer 2. Kotlin program to swap two numbers 3. Kotlin program to find the frequency of character in a string 4. Kotlin program to check leap year 5. Kotlin program to find factorial of a number 6. Kotlin program to generate multiplication table 7. Kotlin program to make a simple calculator using switch...case 8. Kotlin program to calculate average using arrays 9. Kotlin program to find transpose of a matrix 10. Kotlin program for inheritance and function overriding 11. Kotlin program for bucket sort 12. Kotlin program for interfaces 13. Kotlin program for collections 14. Kotlin Program to override method of super class 15. Kotlin Program to Calculate Difference Between Two Time Periods	

INTERNAL MARK (40 Marks)

Observation Record Note	**10 Marks**
Practical Skills	**10 Marks**
Model Exam	**20 Marks**

EXTERNAL MARK (60 Marks)

Record Note	**10 Marks**
Set A	**20 Marks**
Set B	**30 Marks**

Mapping

CO \ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	M	H
CO2	H	H	M	H	M
CO3	M	M	H	M	H

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
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Programme code:	**B.Sc**	**Programme Title :**	**Bachelor of Science (Computer Science)**	
Course Code:	**20UCS5S1**	**Title :** Skill Based Elective -I: Word Press	**Batch :**	2020-2023
			Semester:	V
Hrs/Week:	1		**Credits:**	02

Course Objective

The objective of this course is to enable the students to know how to work with Word press and to create blogs.

Course Outcomes (CO)

K3	CO1	To apply the available templates for creating blogs
K4	CO2	To analyze the various plugins and apply them appropriately
K5	CO3	To validate the available content in the blog or website

Syllabus

Units	Contents	Hrs
	SET A • To create a Blogs Web site • To create a Web site for online books shopping • To create a E-commerce Web site • To create a Web site for Mobile device • To create a Web site for photo sharing **SET B** • To create a Web site for online business brochure • To create a informational Web site • To create a Authors Web site • To create a community building Web site • To create a personal Web site **EXTERNAL MARK (50 Marks)** **Record Note — 10 Marks** **Set A — 20 Marks** **Set B — 20 Marks**	**13**

Mapping

CO \ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	H	H	H
CO2	H	H	M	H	H
CO3	M	H	H	M	M

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
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Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	20UCS5S2	Title :	Batch :	2020-2023
		Skill Based Elective -I:	Semester:	V
Hrs/Week:	1	Dream Weaver	Credits:	02

Course Objective

The objective of this course is to train the students to use a friendly interface for creating and editing the web pages using HTML, XML, CSS, and JavaScript.

Course Outcomes (CO)

K3	CO1	To apply the different controls in dreamweaver for creating a webpage
K4	CO2	To analyze the markup languages and using them based on the requirements
K5	CO3	To validate the webpage using javascript

Syllabus

Units	Contents	Hrs
	SET A • To create a picture gallery. • To create a template. • To create CSS text rollovers. • To create Mailto Links. • To create small pop-up windows for ads or news. **SET B** • To create a website. • To create a link to different pages from the same image. • To create customizing input boxes, list menus, submit buttons. • To create a webpage using internal and external CSS. • To create links without an underline using CSS Styles. **EXTERNAL MARK (50 Marks)** **Record Note 10 Marks** **Set A 20 Marks** **Set B 20 Marks**	13

Mapping

CO \ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	H	H
CO2	M	H	H	H	H
CO3	H	M	M	M	M

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
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Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	20UCS5S3	Title :	Batch :	2020-2023
		Skill Based Elective -1: Quantitative Aptitude Skills	Semester:	V
Hrs/Week:	1		Credits:	02

Course Objective

The objective of the course is to develop a wide variety of soft skills starting from communication, to working in different environments, learning creative and critical decision making, developing awareness of how to work with people and to resolve stress.

Course Outcomes (CO)

K1	CO1	To remember the basic mathematics and its functions.
K2	CO2	To understand the various problems in the real world related to shapes, purchase, sales, interest.
K3	CO3	To apply the skills required for various problems.
K4	CO4	To analyze the illustration and steps involved in problem solving approach.
K5	CO5	To build the quantitative aptitude skills for solving various mathematical and application problems.

Syllabus

Units	Contents	Hrs
Unit I	Numeral- Place Value or Local Value of a Digit in a Numeral- Face Value- Types Of Numbers- Tests Of - Multiplication By Short Cut Methods Divisibility- Basic Formulae-Progression	2
Unit II	Time – Speed – Distance – Heights And Distances -Races - Problems On Trains -Boats & Streams - Time And Work - Ratio Proportion- Partnership -- Pipes and Cisterns -Chain Rule- Mixtures & Solutions- Clocks – Calendar	2
Unit III	LCM AND GCD - Unit digit, Number of zeroes, Factorial notation - Sets- Functions-Square root, Cube roots, Remainder concepts—Identities- Fractions and Decimals, surds.	3
Unit IV	Problems On Ages- Percentage- Profit And Loss- Discount- . Simple Interest- Compound Interest-Installments- Stocks And Shares- True Discount	3
Unit V	Logarithms- Linear Equations - Quadratic Equations And In-Equations Area- Volume And Surface Area- Permutations And Combinations - Probability - Bar Graphs-Pie Charts-Line Graphs.	3
	Total Contact Hrs	**13**
	**Italicized* texts are for self study	
	Power point Presentations, Seminar, Quiz and Assignment	
TEXT BOOKS	1. "Quantitative Aptitude ", 2015, R.S Agarwal, S.Chand Publications.	
REFERENCES	1. "Quantitative Aptitude for Competitive Exams, Abhijit Guha. McGrawhill Education, 6th edition, 2016. 2."Quantitative Aptitude for Competitive Exams" by Dilip KumarYugnirmal, Trail Blazer Winning Edge Series Publications.	

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	H	H
CO2	H	H	H	M	M
CO3	M	H	H	H	H
CO4	H	M	H	M	H
CO5	H	H	M	H	M

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
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Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	20UCS622	Title	Batch :	2020-2023
		Core XIV: R Programming	Semester	VI
Hrs/Week:	4		Credits:	03

Course Objective

This course is laid to master techniques like data exploration, data visualization, and predictive analytics and descriptive analytics with the help of R language.

Course Outcomes (CO)

K1	CO1	To remember the core to provide a conceptual understanding of the basics of R programming
K2	CO2	To understand the common programming Variable classes,Data frames and lists
K3	CO3	To deploy the concepts of Reading, creating and storing R -CSV file
K4	CO4	To figure out appropriate statistical tests using R
K5	CO5	To describe the various data visualization methods.

Syllabus

Units	Contents	Hrs
Unit I	**OVERVIEW OF THE R LANGUAGE:** Defining the R project, Obtaining R, Generating R codes, Scripts, Comments,Text editors for R, Graphical User Interfaces (GUIs) for R, Packages.	9
Unit II	**R OBJECTS AND DATA STRUCTURES:** Variable classes, Vectors and matrices, Data frames and lists, Array and Factors.	9
Unit III	**MANIPULATING OBJECTS IN R:** Mathematical operations, Decision making, loops, functions and Strings.	9
Unit IV	**EXPLORATORY DATA ANALYSIS:** Reading, creating and storing R -CSV file, Excel File, Binary file, XML File - R -Mean,Median,Mode- Regression.	8
Unit V	**GRAPHICAL REPRESENTATION:** R-PIE chart – Bar chart – Box plots-Histograms – line graphs - Scatter plots.	8
	Total Contact Hrs	**43**
	**Italicized* texts are for self study	
	Power point Presentations, Seminar, Quiz and Assignment	

TEXT BOOKS	1.Jared Lander "R for everyone" Pearson Education ,2017 (I,II and III) 2. Norman Matloff "The Art of R Programming" No Starch Press, 2011. (IV and V)
REFERENCES	1. Hands on Programming with R "Garrett Grolemund", O'Reilly Media, 2014 2. Practical data science with R "Nina Zumel &John Mount", Manning Publications ,2014

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	H	H
CO2	H	M	H	H	H
CO3	H	H	H	H	M
CO4	M	H	M	M	H
CO5	H	H	M	H	M

H: High M: Medium L: Low

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Programme code:	B.Sc	**Programme Title :**	Bachelor of Science (Computer Science)	
Course Code:	20UCS6E4	**Title :**	**Batch :**	2020-2023
		Core Elective II : Data mining and Warehousing	**Semester:**	VI
Hrs/Week:	6		**Credits:**	05

Course Objective

This course will introduce the concepts of data ware house and data mining, which gives a complete description about the principles, used, architectures, applications, design and implementation of data mining and data ware housing concepts.

Course Outcomes (CO)

K1	CO1	Be familiar with the basics of data mining and data warehousing
K2	CO2	Develop skill in selecting the appropriate data mining algorithm for solving practical problems
K3	CO3	Characterize the kinds of patterns that can be discovered by classification, decision tree and neural network
K4	CO4	Identify the master data mining techniques in clustering
K5	CO5	Understand and implement classical models and algorithms in data warehouses and data mining

Syllabus

Units	**Contents**	**Hrs**
Unit I	**Introduction :**Basic data mining tasks – data mining versus knowledge discovery in databases – *data mining issues* – data mining metrics – social implications of data mining – data mining from a database perspective. Data mining techniques: Introduction – a statistical perspective on data mining – similarity measures – decision trees – neural networks – genetic algorithms.	15
Unit II	**Classification**: Introduction – Statistical – based algorithms - distance – based algorithms – decision tree - based algorithms - neural network – based algorithms –rule - based algorithms – combining techniques.	15
Unit III	**Clustering**: Introduction – Similarity and Distance Measures – Outliers – Hierarchical Algorithms - Partitional Algorithms. Association rules: Introduction - large item sets - basic algorithms – parallel & distributed algorithms – comparing approaches- incremental rules – advanced association rules techniques – *measuring the quality of rules*	16
Unit IV	**Data warehousing**: an introduction - characteristics of a data warehouse – data marts – other aspects of data mart. Online analytical processing: introduction - OLTP & OLAP systems – data modelling –star schema for multidimensional view –data modelling – multifact star schema or snow flake schema – OLAP TOOLS – State of the market – OLAP TOOLS and the internet	16
Unit V	**Advanced Topics**: Web mining-introduction – web content mining-web structured mining(Page Ranking only)-Web usage mining-spatial mining-introduction-spatial data overview-Temporal mining-introductions-Time series	16
	Total Contact Hrs	**78**

	**Italicized* texts are for self study	
	Power point Presentations, Seminar, Quiz and Assignment	
TEXT BOOKS	1. Margaret H. Dunham, "Data mining introductory and advanced topics", Pearson education, 2003. 2. C.S.R. Prabhu, "Data warehousing concepts, techniques, products and a applications", PHI, Second Edition. 3. Arun K. Pujari, " Data Mining Techniques", Universities Press (India) Private Limited, Hyderabad, 2008	
REFERENCES	1. Alex Berson, Stephen J. Smith, "Data warehousing, Data mining, & OLAP, TMCH, 2001. 2. Jiawei Han & Micheline Kamber, " Data mining Concepts & Techniques", 2001, Academic press	

Mapping

CO \ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	H	M
CO2	H	H	H	M	H
CO3	H	H	H	H	H
CO4	H	H	H	H	H
CO5	M	H	H	M	H

H-High; M-Medium; L-Low

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Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	20UCS6E5	Title :	Batch :	2020-2023
		Core Elective II :	Semester:	VI
Hrs/Week:	6	Big data Analytics	Credits:	Hrs/Week:

Course Objective

On successful completion of course students will possess the skills necessary for utilizing tools (including deploying them on Hadoop/MapReduce) to handle a variety of big data analytics, and to be able to apply the analytics techniques on a variety of applications.

Course Outcomes (CO)

K1	CO1	To remember how to collect, manage, store, query, and analyze various forms of big data
K2	CO2	To understand the concept and challenge of big data and why existing technology is inadequate to analyze the big data
K3	CO3	To deploy use of Big Data to deliver business value
K4	CO4	To analyze un-modeled, multi-structured data using Hadoop, MapReduce
K5	CO5	To validate the novel architectures and platforms introduced for Big data, in particular Hadoop and MapReduce.

Syllabus

Units	Contents	Hrs
Unit I	**Big Data Road Map:** Digital Data – an Imprint, Evolution of Big Data – What is Big Data – Sources of Big Data – Characteristics of Big Data – Data Discovery – Traditional Approach – Applications of Big Data. **Hadoop:** Why Hadoop – Hadoop Milestones – Hadoop Architecture – An Overview – Why Hadoop Distributed File System (HDFS) –HDFS Architecture – Why MapReduce – MapReduce Applications – Real time – Hadoop Ecosystem – Limitations of Hadoop 1.X Architecture – Hadoop YARN: Beyond	15
Unit II	**HADOOP ECOSYTEM:** Components of Hadoop Ecosystem – Hadoop Installation – PIG Installation – HIVE Installation. **SPARK and SCALA:** Why SPARK? Spark Ecosystem – Apache Spark Use Cases – SCALA Programming – SCALA REPL – SCALA vs Java.	16
Unit III	**NoSQL Database – HBASE** – Why NoSQL – Types of NoSQL Database – Advantages of NoSQL –HBASE – HBASE Architecture – HBASE vs RDBMS. **PIG:** Why PIG? PIG user Interactive Modes – PIG Latin – Dataset – PIG Commands and Functions – Relational Operators – Evaluation Functions – Batch Mode – Embedded Mode – PIG vs SQL.	16

Unit IV	**HIVE:** Why HIVE - HIVE Architecture – Data Units in Hive – Hive Query Languages – HIVE Startup – Database Operations – Tables – Joins – A Comparative View. **Data Analytics Big Data Tools:** R- Programming – Why R + Hadoop – Rhadoop Architecture – R Big Data Intergration Packages – SAS – SAS program Components – SAS Support for -Hadoop – SAS Functions – KNIME – KNIME Components – KNIME Big Data Analytics.	16
Unit V	**Big Data Solutions in the Real World:** The Importance of Big Data to Business – Big Data as a Business Planning Tool – Adding New Dimensions to the Planning Cycle – Keeping Data Analytics in Perspective – Getting Started with Right Foundation – Planning for Big Data – Transforming Business Processes with Big Data. **Ten Big Data Best Practices – Ten Big Data Do's and Don'ts.**	15
	Total Contact Hrs	**78**
	******Italicized* texts are for self study Power point Presentations, Seminar, Quiz and Assignment	
TEXT BOOKS	**1.** Judith Hurwitz, Alan Nurgent, Dr. Fern Halper, Marcia Kaufman, 2013, " Big Data for Dummies", First Edition, A Wiley Publication(UNIT 5) 2.V. Bhuvaneswari, T. Devi, 2016, "Big Data Analytics-A Practitioner Approach"(UNIT 1,2,3,4)	
REFERENCES	1.Michael Minelli, Michele Chambers, Ambiga Dhiraj, 2013, "Big Data, Big Analytics – Emerging Business Intelligence and Analytic Trends For Todays Businesses", First Edition, A Wiley Publication 2. Strata Conference, Making Data Work, 2013, "Big Data Now", First Edition, Shroff Publication	

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	M	H	M
CO2	M	H	H	H	H
CO3	H	H	H	H	H
CO4	M	H	H	H	H

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
M.Malathi R.Nandhakumar	Name: Dr.Antony Selvadoss Thamanani Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Muthukumaran Signature:

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Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	20UCS6E6	Title :	Batch :	2020-2023
		Core Elective II : Grid and Cloud Computing	Semester:	VI
Hrs/Week:	6		Credits:	05

Course Objective

The objective of this course is to explain the evolving computer models called grid and cloud computing by introducing the various levels of services that can be achieved by them. Also learn how to make applications for cloud and grid environment by using toolkits.

Course Outcomes (CO)

K1	CO1	To remember the advantages of web applications and web services.
K2	CO2	To get an idea about fundamentals and architecture of cloud and grid computing.
K3	CO3	To deploy the cloud and grid based applications using toolkits
K4	CO4	To review the applications of various cloud services development tools such as Amazon Ec2, Google App Engine and IBM clouds.
K5	CO5	To validate the cloud security in applications

Syllabus

Units	Contents	Hrs
Unit I	***Fundamentals Of Grid And Cloud Computing:*** Fundamentals – Scope of Grid Computing – Merging the Grid sources – Architecture with the Web Devices Architecture – Cloud computing – History of Cloud Computing – Cloud Architecture – Cloud Storage – Why cloud computing Matters – *Advantages of Cloud computing* – Disadvantages of Cloud Computing – Companies in the Cloud Today – Cloud Services.	16
Unit II	***Developing Cloud Services:*** Web-Based Application – Pros and Cons of Cloud Service Development – Types of Cloud Service Development – Software as a Service – Platform as a Service – *Web Services* – On-Demand computing – Discovering Cloud Services Development Services and Tools – Amazon Ec2- Google App Engine – IBM Clouds.	16
Unit III	***Cloud Computing For Everyone***: Centralizing Email communications – collaborating on Schedules – Collaborating on To-Do Lists – Collaborating Contact Lists – Cloud computing for the Community – Collaborating on Group Projects and Events – Cloud Computing for the Corporation.	16
Unit IV	***Using Cloud Services:*** Collaborating on Calendars, Schedules and Task Management – Exploring Online Scheduling Applications – Exploring Online Planning and Task Management – collaborating on Event Management – Collaborating on Contact Management – Collaborating on Project Management – Collaborating on Word Processing – Collaborating on Databases – Storing and Sharing Files.	15
Unit V	***Grid Computing:*** OGSA – Sample Use Cases – OGSA Platform Components – OGSI – OGSA Basic Services. Globus Toolkit – Architecture – Programming Model – High Level Services – OGSI.Net. Middleware Solutions.	15
	Total Contact Hrs	78
	**Italicized* texts are for self study	
	Power point Presentations, Seminar, Quiz and Assignment	
TEXT BOOKS	1.Joshy Joseph & Criag Fellenstein, 2009, "Grid Computing", PHI, PTR. 2. Michael Miller, August 2009 , "Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online", Que Publishing.	
REFERENCES	1.Jose C.Cunha, Omer F.Rana (Eds), 2006, "Grid Computing", Springer International Edition. 2.Anthony T. Velte and others, 2011 , "Cloud Computing" TATA Mc-Graw Hill Publications, New Delhi.	

Mapping

CO \ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	M	H	H
CO2	H	H	H	H	H
CO3	M	H	M	H	H
CO4	H	M	H	H	H
CO5	M	H	H	M	H

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
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Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	20UCS6E7	Title :	Batch :	2020-2023
		Core Elective III : E-Commerce	Semester:	VI
Hrs/Week:	6		Credits:	Hrs/Week:

Course Objective

Through this course, students are expected to achieve a basic understanding of E-Commerce. With such background equipment, students would be able to evaluate more advanced or future E-Commerce systems. This course will also awaken students' interest and further motivate them towards developing their career in the area of E-Commerce , E-Market , EDI , Business Strategies and internet applications.

Course Outcomes (CO)

K1	CO1	To keep in mind the Marketing techniques of various product
K2	CO2	To understand the user requirements and product development techniques using e-commerce.
K3	CO3	To apply design creative approach in product , equipment and systems.
K4	CO4	To analyze, design the product development involving computer analytics using advanced techniques and tools.
K5	CO5	To evaluate E-Commerce application in real time.

Syllabus

Units	Contents	Hrs
Unit I	Introduction to E-Commerce: The Scope of E-Commerce – Definition-E-Commerce & the Trade Cycle – Electronic Market – Electronic Data Interchange – The Internet Commerce – The E-Commerce in Perspective. Business Strategy: The Value Chain – Supply Chains – Porter's Value Chain Model – The Inter Organizational Value Chain.	16
Unit II	The Introduction to Business Strategy – Strategic Implications of IT – Technology – Business Environment – Business Capability – Existing Business Strategy – Strategy Formulation & Implementation Planning – e-Commerce Implementation –Commerce Evaluation. The Inter Organizational Transactions.	15
Unit III	E-Markets: Markets – E-Markets-Usage of E-Markets-Advantages & Disadvantages of E-Markets. EDI: Introduction – Definition - Benefits of EDI – EDIStandards – EDI Communication EDI Implementation – EDI Agreement – EDI Security.	15

Unit IV	The Internet : The Internet – The Development of the Internet – TCP/IP – Internet Components – Uses of the Internet – A Page on the Web: HTML Basics – Introduction to HTML – Further HTML – Client Side Scripting – Server Side Scripting – HTML Editors & Editing – The Elements of E-Commerce : Elements – e-Visibility – The e-Shop – On line Payments - Delivering the Goods – Internet e-Commerce Security .	16
Unit V	E-Business: Introduction - The Internet Bookshops – Grocery Supplies - SoftwareSupplies and Support – Electronic Newspapers – The Internet Banking - The Virtual Auctions – Online Share Dealing – Gambling on the Net – e-Diversity.	16
	Total Contact Hrs	78
	**Italicized* texts are for self study	
	Power point Presentations, Seminar, Quiz and Assignment	
TEXT BOOKS	1. David Whiteley, E-Commerce – Strategy, Technology & Applications, Tata McGraw-Hill Publication 2012 Edition	
REFERENCES	1. Dr.Rayudu.C.S, E-Commerce and E-Business,Himalaya Publication House New Delhi 2017 Edition	

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	M	H	H	H
CO2	H	H	H	H	H
CO3	H	H	H	H	H
CO4	M	H	H	H	H
CO5	H	M	M	H	M

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
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Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	20UCS6E8	Title :	Batch :	2020-2023
		Core Elective III : Enterprise Resource Planning	Semester:	VI
Hrs/Week:	6		Credits:	Hrs/Week:

Course Objective

The objective of this course is to make the students to understand the various basic concepts of ERP systems and able to identify and describe typical functionality in an ERP system.

Course Outcomes (CO)

K1	CO1	To remember the knowledge of typical ERP systems, and the advantages and limitations of implementing ERP systems.
K2	CO2	To comprehend the technical aspects of ERP systems
K3	CO3	To implement one of the popular ERP packages to support business operations and decision-making,
K4	CO4	To analyze the challenges associated with implementing enterprise systems and their impacts on organizations
K5	CO5	To build the application integration for ERP

Syllabus

Units	Contents	Hrs
Unit I	***Introduction to ERP:*** Integrated Management Information Seamless Integration – Supply Chain Management – Integrated Data Model – Benefits of ERP – Business Engineering and ERP – Definition of Business Engineering – Principle of Business Engineering – *Business Engineering with information Technology*.	15
Unit II	***Business Modelling For ERP:-*** Building the Business Model – ERP Implementation – An Overview – Role of Consultant, Vendors and Users, Customization – Precautions – ERP Post Implementation Options-ERP Implementation Technology –*Guidelines for ERP Implementation.*	16
Unit III	***ERP and the Competitive Advantage ERP:*** domain MPGPRO – IFS/Avalon – Industrial and Financial Systems – Baan IV SAP-Market Dynamics and Dynamic Strategy.	16
Unit IV	***Commercial ERP Package:*** Description – Multi-Client Server Solution – Open Technology – User Interface- Application Integration	16
Unit V	***Architecture:*** Basic Architectural Concepts – The System Control Interfaces – Services – Presentation Interface – Database Interface - Cases.	15
	Total Contact Hrs	78
	**Italicized* texts are for self study Power point Presentations, Seminar, Quiz and Assignment	
TEXT BOOKS	1. Vinod Kumar Garg and N.K.Venkita Krishnan, "Enterprise Resource Planning – Concepts and Practice", PHI, Second Edition,2003.	

REFERENCES	1. Jose Antonio Fernandz, "The SAP R/3 Handbook", TMH, 1998. 2. Lau, "Enterprise Resource Management", McGraw Hill,2005 3. Daniel E O'Leary, "Enterprise Resource System", tenth Edition,2000 4. Mary Sumner, "Enterprise Resource Planning", First edition,2007

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	H	H
CO2	H	H	H	H	H
CO3	H	H	M	M	H
CO4	H	M	H	H	H
CO5	H	M	H	H	M

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
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Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	20UCS6E9	Title :	Batch :	2020-2023
		Core Elective III : Management Information System	Semester:	VI
Hrs/Week:	6		Credits:	Hrs/Week:

Course Objective

On successful completion of the course, the students should have a good understanding on the Management Information System and acquired Management Knowledge and development skills for Business Administration.

Course Outcomes (CO)

K1	CO1	To remember the operation of the application, application lifecycle, and activities and organization layout
K2	CO2	To get an idea of the Management - components, various controls strategies, fragments and examples.
K3	CO3	To deploy a basic application that acts as a working example with various concepts
K4	CO4	To analyze the functions of various organizational department.
K5	CO5	To validate the company for its security and permissions.

Syllabus

Units	Contents	Hrs
Unit I	Introduction: MIS Concept – MIS Definition – Role of the MIS – Impact of the MIS – MIS and Computer. Role and Importance of Management – Introduction Approaches to	16
Unit II	Organization Structure and Theory – Strategic Management of Business: Basics of Management Information Systems: Decision Making – Information Systems.	16
Unit III	System Analysis and Design – Development of MIS – Choice of Information Technology – Applications of Management Information System – Decision Support Systems	16
Unit IV	Enterprise Management Systems – Technology of Information Systems – Database Management Systems – Object Oriented Technology (OOT): Conceptual Presentation – Client Server Architecture.	15
Unit V	Networks – Business Process Re-Engineering (BPR) – Data Warehouse: Architecture to Implementation – Electronic Business Technology.	15
	Total Contact Hrs	**78**
	**Italicized* texts are for self study	
	Power point Presentations, Seminar, Quiz and Assignment	
TEXT BOOKS	1 W.S.Jawadekar, Management Information Systems, 4th Edition,2009 Tata McGraw Hill	

Reference Book	"Management Information System" Ghai Neha Published by Kataria, S. K.. & Sons

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	M	H	H
CO2	M	M	H	H	H
CO3	H	H	H	H	M
CO4	H	M	H	H	H
CO5	H	H	M	H	H

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
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Programme code:	B.Sc	**Programme Title :**	Bachelor of Science (Computer Science)	
Course Code:	20UCS623	**Title :**	**Batch :**	2020-2023
		Core Lab IX:	**Semester:**	VI
Hrs/Week:	5	R Programming Lab	**Credits:**	03

Course Objective

On successful completion of the course the students learn the practical aspects of the R programming language

Course Outcomes (CO)

K3	CO1	To implement Vector R operations
K4	CO2	To review and analyze data frames and objects
K5	CO3	To validate how Bar charts and Pie charts are implemented

Syllabus

Units	Contents	Hrs
	1. R Program for Vector operations. 2. Create a R- list. 3. Implement matrices addition, subtraction and Multiplication. 4. Create a Data frame. 5. Create a factor object. 6. Import data, copy data from CSV file to R. 7. Create a R program for Mean median and mode. 8. Draw Bar charts and Pie charts in R. 9. Make visual representations of data for plotting functions in R. 10. Create a R program for Regression Model.	65

INTERNAL MARK (40 Marks)

Observation Record Note	**10 Marks**
Practical Skills	**10 Marks**
Model Exam	**20 Marks**

EXTERNAL MARK (60 Marks)

Record Note	**10 Marks**
Set A	**20 Marks**
Set B	**30 Marks**

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	H	H
CO2	H	M	M	H	H
CO3	M	H	H	M	M

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
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Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	20UCS624	Title :	Batch :	2020-2023
		Core Lab X: Advanced Applications in MS Excel Lab	Semester:	VI
Hrs/Week:	4		Credits:	02

Course Objective

This course was designed for the intermediate student who has already mastered the basic skills of MS Excel and wants to gain more advanced skills to put to work in a business environment or for personal use.

Course Outcomes (CO)

K3	CO1	To implement, Interpret data using MS Excel.
K4	CO2	To review and analyze the mathematical functions, data analytics using MS Excel
K5	CO3	To validate the macros and manipulation for objects and data using MS Excel

Syllabus

Units	Contents	Hrs
	SET A • Create an excel worksheet for entering data and apply the auto function in Excel. • Create an excel worksheet to calculate Electricity Bill • Create an excel worksheet to calculate salary with basic pay, net pay, Gross Pay with deductions. • Create an excel Worksheet to apply Statistical functions. • Create an excel Worksheet to calculate Student Mark sheet. **SET B** • Create a macro and assign to an object or graphic or control. • Create a macro by using Microsoft Visual Basic and run it. • Create a macro and do edit, copy, delete operations. • Create an excel worksheet to enter the given data and use filter options to get the required result. • Create an excel worksheet to enter the given data and use sorting functions to get the required results	52

INTERNAL MARK (20 Marks)

Observation Record Note	5 Marks
Practical Skills	5 Marks
Model Exam	10 Marks

EXTERNAL MARK (30 Marks)

Record Note	5 Marks
Set A	10 Marks
Set B	15 Marks

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	H	H
CO2	H	H	M	H	H
CO3	H	M	H	H	H

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
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Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	20UCS6S4	Title :	Batch :	2020-2023
		Skill Based Elective -II: Joomla	Semester:	VI
Hrs/Week:	1		Credits:	02

Course Objective

This course was designed for the purpose of introducing to the students in the field of programming using Joomla. The students will be able to enhance their analyzing and problem solving skills and use the same for writing programs in Joomla.

Course Outcomes (CO)

K3	CO1	To apply the basic concepts to solve real world problems using Joomla
K4	CO2	To analyze design issues in developing various applications
K5	CO3	To validate Web based applications

Syllabus

Units	Contents	Hrs
	SET A • To create the Corporate Web sites or portals • To create a web site for online newspaper • To create a web site for Online magazines • To create a Web site for online bus ticket reservation • To create a Government application **SET B** • To create a Small business Web site • To create a organizational Web site • To create a web site for Community-based portal • To create a School Web site • To create a Web site for family homepage **EXTERNAL MARK (50 Marks)**	13

Record Note	**10 Marks**
Set A	**20 Marks**
Set B	**20 Marks**

Mapping

CO \ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	H	H
CO2	H	H	M	H	H
CO3	H	M	H	H	H

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
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Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	20UCS6S5	Title :	Batch :	2020-2023
		Skill Based Elective -II: Macromedia Director	Semester:	VI
Hrs/Week:	1		Credits:	02

Course Objective

The objective of this course is to make the students to implement several features of Macromedia Director by using various specialized tools.

Course Outcomes (CO)

K3	CO1	To apply the basic tools of macromedia director.
K4	CO2	To analyze specialized tools like shadow emboss,mask function and implement it in any animated picture.
K5	CO3	To validate website designing using the scripts.

Syllabus

Units	Contents	Hrs
	SET A • To position the picture preferably on a plain background of a colour of your choice - positioning • includes rotation and scaling. • To remove the arrows and text from the given photographic image • To type a word and apply the effects shadow emboss • To create an animated cursor using startdrag("ss",true); mouse. Hide(); • To design a visiting card containing atleast one graphic and text information **SET B** • To use appropriate tool(s) from the toolbox, cut the objects from 3 files (f1.jpg, f2.jpg & f3.jpg) • organize them in a single file and apply feather effects • To display the background given (filename: garden.jpg) through your name using mask • To make anyone of one of the parrots black & white in a given picture. • To change a circle into a square using director • Design an interactive director content box using actions scripts for a website. • Design a picture and animations using director. **EXTERNAL MARK (50 Marks)** **Record Note 10 Marks** **Set A 20 Marks** **Set B 20 Marks**	**13**

Mapping

CO \ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	H	H
CO2	M	H	M	M	H
CO3	H	M	H	H	M

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
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Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	20UCS6S6	Title :	Batch :	2020-2023
Hrs/Week:	1	Skill Based Elective -II: Soft Skills	Semester:	VI
			Credits:	02

Course Objective

The objective of the course is to develop a wide variety of soft skills starting from communication, to working in different environments, learning creative and critical decision making, developing awareness of how to work with people and to resolve stress.

Course Outcomes (CO)

K1	CO1	To remember the basics of communication skills
K2	CO2	To understand the relationship between leadership networking and team work
K3	CO3	To apply the skills required for a good leadership
K4	CO4	To analyze the causes of stress and its impact
K5	CO5	To build the interpersonal skills for being an effective goal oriented team player.

Syllabus

Units	Contents	Hrs
Unit I	**Self Analysis:** SWOT Analysis- Who am I- Attributes- Importance of Self Confidence- Self Esteem. **Creativity:** Out of box thinking- Lateral Thinking. **Attitude:** Factors influencing Attitude- Challenges and lessons from Attitude- Etiquette.	2
Unit II	**Motivation:** Factors of motivation- Self talk- Intrinsic & Extrinsic Motivators. **Goal Setting:** Wish List- SMART Goals- Blue print for success- Short Term- Long Term- Life Time Goals.	2
Unit III	**Gratitude:** Understanding the relationship between Leadership Networking & Team work- Assessing Interpersonal Skills Situation-Description of Interpersonal Skills. **Team Work:** Necessity of Team Work Personally, Socially and Educationally.	3
Unit IV	**Leadership:** Skills for a good Leader- Assessment of Leadership Skills. **Decision Making:** Importance and necessity of Decision Making- Process and practical way of Decision Making- Weighing Positives & Negatives.	3
Unit V	**Stress Management:** Causes of Stress and its impact- how to manage & distress- Circle of control- Stress Busters. **Emotional Intelligence:** What is Emotional Intelligence- emotional quotient -why Emotional Intelligence matters- Emotion Scales- Managing Emotions.	3
	Total Contact Hrs	
	**Italicized* texts are for self study	13
	Power point Presentations, Seminar, Quiz and Assignment	
TEXT BOOKS	1. "Soft Skills", 2015, Career Development Centre, Green Pearl Publications.	
REFERENCES	1.Daniel Coleman, "Emotional Intelligence", Bantam Book, 2006	

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	H	H
CO2	H	H	H	M	M
CO3	M	H	H	H	H
CO4	H	M	H	M	H
CO5	H	H	M	H	M

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
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Programme code:	B.Sc	**Programme Title :**	Bachelor of Science (Computer Science)	
Course Code:	20UCS6P1	**Title :**	**Batch :**	2020-2023
		Project	**Semester:**	VI
Hrs/Week:	4		**Credits:**	03

Course Objective

To provide experience to the students in analyzing, designing, implementation and evaluation of software.

	Instructional Notes: Students are required to develop entire new software system or to enhance/modify functionalities of existing software or to provide customization based on existing technology/framework to fulfill specific requirements. **MAXIMUM MARKS : 100** PROJECT EVALUATION : 80 VIVA-VOCE : 20

Core XIII - SOFT SKILLS FOR INFORMATION TECHNOLGIES

Subcode: 20UCSVA1

Unit I :

Attitude and Altitude-Behavior-Passive-Aggressive-Assertive people-Change in behaviour and attitude-Courtesy-Basic mental attitudes-Lateral thinking-Leader-Conventional leader-Lateral leader-Time is money-Top time wasters

Unit II :

Are leaders born or made-Managers-Leader-Leadership-Motivate the team-Qualities for good leader-Team building-Group-Team-Internal conflicts-Team work-Good team-Forming-Storming-Norming-performing-Advantages-Disadvantages of team work-Interpersonal skills-improving interpersonal skills-Resolve conflicts-Tips for dealing-Negotiation skills-Cross cultural communication

Unit III :

Business communication in English-Communication skills-Listening skills-Effective communicator-Speaking skill-Reading skill-Writing skill-Clear and effective writing-Current English usage-Debate-Précis writing-Essay writing-Situational dialogue-Presentation skills-Planning and preparing-Delivery-Inclusion of visual aids-Body language-Business correspondence-Principles of clear writing-writing in business communication-Misused words and phrases-Organizing meetings-Agenda-Minutes-Report writing-Structure of a report-Email Etiquette-Telephone Etiquette

Unit IV :

Interviews-Different types of interview-Sample questions-Interviewer's expectations-Assessment record sheet-Stress interviews-Resume or curriculum vitae-video resume-Group dynamics-Evaluation of GD-Interpretation of gestures-Non verbal behaviour-interpretation

Unit V :

Case studies

Soft Skill-Development Paper-I
Arithmetic reasoning Skill

Sub Code: 20UCSVA2 **(Credits: 2)**

UNIT I:
Numbers
H.C.F and L.C.M of numbers
Simplification
Average

UNIT II:
Problems on Numbers
Problems on ages
Percentage
Profit and Loss

UNIT III:
Ratio & Propagation
Chain Rule
Time and Work
Pipes and Cisterns

UNIT IV:
Time and Distance
Problems of Trains
Problems on Boats and Streams
Clocks

UNIT V:
Simple interest
Compound interest
Logarithms
Odd man out and series

TEXT BOOK

R.S. Aggarwal, "*Quantitative Aptitude*", S. Chand & Company Ltd

SOFT SKILL- DEVELOPMENT PAPER- II
NON-VERBAL REASONING SKILL

Sub Code: 20UCSVA3 **(Credits: 2)**

UNIT I:

- Series
- Analogy
- Classification
- Analytical Reasoning

UNIT II:

- Mirror Images
- Water Images
- Embedded Figures

UNIT III:

- Completion of Incompletion Pattern
- Figure Matrix
- Paper Folding

UNIT IV:

- Rule Detection
- Grouping of Identical Figures
- Cubes and Dice

UNIT V:

- Dot Situation
- Construction of Squares and Triangles
- Figure Formation and Analysis

TEXT BOOKS:

R.S. Aggarwal "*Quantitative Aptitude*" S. Chand Company Ltd, 2005