

B. Sc. Computer Science & Applications

Syllabus

AFFILIATED COLLEGES

Program Code: ***

2020 – 2021 onwards



BHARATHIAR UNIVERSITY

(A State University, Accredited with “A” Grade by NAAC,
Ranked 13th among Indian Universities by MHRD-NIRF,
World Ranking : Times - 801-1000, Shanghai - 901-1000, URAP - 982)

Coimbatore - 641 046, Tamil Nadu, India

Program Educational Objectives (PEOs)	
The B. Sc. <u>Computer Science and Applications</u> program describe accomplishments that graduates are expected to attain within five to seven years after graduation	
PEO1	Graduates of the program will be engaged in the computing profession, and will be engaged in learning, understanding, and applying new ideas and technologies as the field evolves.
PEO2	To Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
PEO3	Possess an attitude and aptitude for research, entrepreneurship and higher studies in the field of Computer Science & Engineering and Information Technology.
PEO4	Able to provide socially acceptable technical solutions to real world problems with the application of modern and appropriate programming techniques.
PEO5	Possess better communication, presentation, time management and team work skills leading to responsible & competent professionals and will be able to address challenges in the field of IT at global level.

Program Specific Outcomes (PSOs)	
After the successful completion of <u>B.Sc. Computer Science Applications</u> program, the students are expected to	
PSO1	To impart education with clear knowledge of the fundamentals and applied aspects of Computer Science and engineering.
PSO2	To Design next-generation computer systems, networking devices, search engines, soft computing and intelligent systems, web browsers, and knowledge discovery tools.
PSO3	To expose the students to open Source technologies so that they become familiar with it and can seek appropriate opportunity in trade and industry.
PSO4	Ability to apply mathematical methodologies to solve computation task, model real world problem using appropriate data structure and suitable algorithm
PSO5	To inculcate effective communication skills combined with professional & ethical attitude.

Program Outcomes (POs)	
On successful completion of the B.Sc. Computer Science Applications program	
PO1	Disciplinary knowledge: Capable to apply the knowledge of mathematics, algorithmic principles and computing fundamentals in the modeling and design of computer based systems of varying complexity.
PO2	Scientific reasoning/ Problem analysis: Ability to critically analyze, categorizes, formulate and solve the problems that emerges in the field of computer science.
PO3	Problem solving: Able to provide software solutions for complex scientific and business related problems or processes that meet the specified needs with appropriate consideration for the public health and safety and the cultural, societal and environmental considerations.
PO4	Environment and sustainability: Understand the impact of software solutions in environmental and societal context and strive for sustainable development.
PO5	Modern tool usage: Use contemporary techniques, skills and tools necessary for integrated solutions.
PO6	Ethics: Function effectively with social, cultural and ethical responsibility as an individual or as a team member with positive attitude.
PO7	Cooperation / Team Work: Function effectively as member or leader on multidisciplinary teams to accomplish a common objective.
PO8	Communication Skills: An ability to communicate effectively with diverse types of audience and also able to prepare and present technical documents to different groups.
PO9	Self-directed and Life-long Learning: Graduates will recognize the need for self-motivation to engage in lifelong learning to be in par with changing technology.
PO10	Enhance the research culture and uphold the scientific integrity and objectivity

BHARATHIAR UNIVERSITY: : COIMBATORE 641 046

B. Sc. Computer Science and Applications Curriculum

(For the students admitted during the academic year 2020 – 21 onwards)

Course Code	Title of the Course	Credits	Hours		Maximum Marks		
			Theory	Practical	CIA	ESE	Total
FIRST SEMESTER							
	Language – I	4	6		25	75	100
	English – I	4	6		25	75	100
	Core 1: Computing Fundamentals and C Programming	4	4		25	75	100
	Core 2: Digital Fundamentals and Computer Architecture	4	4		25	75	100
	Core Lab 1: Programming Lab – C	4		3	40	60	100
	Allied 1: Mathematical Structures for Computer Science	4	5		25	75	100
	Environmental Studies #	2	2		-	50	50
Total		26	27	3	165	485	650
SECOND SEMESTER							
	Language – II	4	6		25	75	100
	English – II	4	6		25	75	100
	Core 3: C++ Programming	4	5		25	75	100
	Core Lab 2: Programming Lab – C++	4		4	40	60	100
	Core Lab 3: Internet Basics	2		2	20	30	50
	Allied 2: Discrete Mathematics	4	5		25	75	100
	Value Education – Human Rights #	2	2		-	50	50
Total		24	24	6	160	440	600
THIRD SEMESTER							
	Core 4: Data Structures	4	6		25	75	100
	Core 5: Java Programming	4	6		25	75	100
	Core Lab 4: Programming Lab – Java	4		5	25	75	100
	Allied 3: Management Information Systems	4	6		25	75	100
	Skill based Subject 1 : Internet Programming	3	5		20	55	75
	Tamil @/ Advanced Tamil (OR) Non-major elective-1 (Yoga for Human Excellence)# / Women’s Rights#	2	2		-	50	50
Total		21	25	5	120	405	525

FOURTH SEMESTER							
	Core 6: System Software and Operating System	4	6		25	75	100
	Core 7: Linux and Shell Programming	4	6		25	75	100
	Core Lab 5: Linux and Shell Programming Lab	4		6	40	60	100
	Allied 4: Organizational Behavior	4	6		25	75	100
	Skill based subject 2 (lab) : PHP Programming Lab	3	4		30	45	75
	Tamil @/ Advanced Tamil (OR) Non-major elective-II (General Awareness) #	2	2		-	50	50
	Total	21	24	6	145	380	525
FIFTH SEMESTER							
	Core 8: RDBMS & Oracle	4	6		25	75	100
	Core 9: Visual Basic	4	6		25	75	100
	Core Lab 6: Programming Lab – VB & Oracle	4		6	40	60	100
	Elective-I Client/Server Computing / E-Commerce / Software Engineering	4	6		25	75	100
	Skill based Subject 3: Web designing with ASP and ASP .NET	3	6		20	55	75
	Total	19	24	6	135	340	475
SIXTH SEMESTER							
22K	Core 10: Graphics & Multimedia	4	5		25	75	100
22K	Core 11: Project Work Lab % %	8	5		-	200	200
22K	Core Lab 7: Programming Lab – Graphics & Multimedia	4		6	40	60	100
22K	Elective-II : Network Security & Cryptography / Distributed Computing / Computer Networks	4	5		25	75	100
22K	Elective-III : Mobile Computing / Web Technology / Software Testing	4	5		25	75	100
22K	Skill based Subject 4 (lab): ASP Lab	3		4	30	45	75
22K	Extension Activities	2			50	-	50
	Total	29	20	10	195	530	725
	Grand Total	140	144	36	920	2580	3500
ONLINE COURSES							



First Semester

Course code		Computing Fundamentals and C Programming	L	T	P	C
Core/Elective/Supportive		Core Paper: 1	4	0	0	4
Pre-requisite	Students should have basic Computer Knowledge		Syllabus Version		2020-21 Onwards	
Course Objectives:						
The main objectives of this course are to:						
1. To impart knowledge about Computer fundamentals						
2. To understand the concepts and techniques in C Programming						
3. To equip and indulge themselves in problem solving using C						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Learn about the Computer fundamentals and the Problem solving					K2
2	Understand the basic concepts of C programming					K2
3	Describe the reason why different decision making and loop constructs are available for iteration in C					K3
4	Demonstrate the concept of User defined functions , Recursions , Scope and Lifetime of Variables, Structures and Unions					K4
5	Develop C programs using pointers Arrays and file management					K3
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1 Fundamentals of Computers & Problem Solving in C 12 hours						
Fundamentals of Computers : Introduction – History of Computers-Generations of Computers-Classification of Computers-Basic Anatomy of a Computer System-Input Devices-Processor-Output Devices-Memory Management – Types of Software- Overview of Operating System-Programming Languages-Translator Programs-Problem Solving Techniques - Overview of C.						
Unit:2 Overview of C 15 hours						
Overview of C - Introduction - Character set - C tokens - keyword & Identifiers - Constants - Variables - Data types - Declaration of variables - Assigning values to variables - Defining Symbolic Constants - Arithmetic, Relational, Logical, Assignment, Conditional, Bitwise, Special, Increment and Decrement operators - Arithmetic Expressions - Evaluation of expression - precedence of arithmetic operators - Type conversion in expression – operator precedence & associativity - Mathematical functions - Reading & Writing a character - Formatted input and output.						
Unit:3 Decision Making , Looping and Arrays 15 hours						
Decision Making and Branching: Introduction – if, if...else, nesting of if ...else statements- else if ladder – The switch statement, The ?: Operator – The goto Statement. Decision Making and Looping: Introduction- The while statement- the do statement – the for statement-jumps in loops. Arrays – Character Arrays and Strings						
Unit:4 User-Defined Functions, Structures and Unions 15 hours						
User-Defined Functions: Introduction – Need and Elements of User-Defined Functions-Definition-Return Values and their types - Function Calls – Declarations – Category of Functions- Nesting of Functions - Recursion – Passing Arrays and Strings to Functions - The						

Scope, Visibility and Lifetime of Variables- Multi file Programs. Structures and Unions		
Unit:5	Pointers & File Management	15 hours
Pointers: Introduction-Understanding pointers -Accessing the address of a variable Declaration and Initialization of pointer Variable – Accessing a variable through its pointer Chain of pointers- Pointer Expressions – Pointer Increments and Scale factor- Pointers and Arrays- Pointers and Strings – Array of pointers – Pointers as Function Arguments Functions returning pointers – Pointers to Functions – Pointers and Structures. File Management in C.		
Unit:6	Contemporary Issues	3 hours
Problem Solving through C Programming - Edureka		
	Total Lecture hours	75 hours
Text Book(s)		
1	E Balagurusamy: Computing Fundamentals & C Programming – Tata McGraw-Hill, Second Reprint 2008	
Reference Books		
1	Ashok N Kamthane: Programming with ANSI and Turbo C, Pearson, 2002.	
2	Henry Mullish & Hubert L.Cooper: The Sprit of C, Jaico, 1996.	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1	Introduction to Programming in C – NPTEL	
2	Problem solving through Programming in C – SWAYAM	
3	C for Everyone : Programming Fundamentals – Coursera	
Course Designed By:		

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	M	S	M	S	L
CO3	S	M	S	M	M	L	S	L	S	L
CO3	S	S	S	M	M	M	S	M	S	M
CO4	S	S	S	M	S	M	S	M	S	M
CO5	S	S	S	M	M	M	S	M	S	M

*S-Strong; M-Medium; L-Low

Course code		Digital Fundamentals and Computer Architecture	L	T	P	C
Core/Elective/Supportive		Core Paper : 2	4	0	-	4
Pre-requisite		Student should have basic computer knowledge	Syllabus Version	2020-21 Onwards		
Course Objectives:						
On successful completion of this subject the students should have Knowledge on						
1. To familiarize with different number systems and digital arithmetic & logic circuits						
2. To understand the concepts of Combinational Logic and Sequential Circuits						
3. To impart the knowledge of buses, I/O devices, flip flops, Memory and bus structure.						
4. To understand the concepts of memory hierarchy and memory organization						
5. To understand the various types of microprocessor architecture						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Learn the basic structure of number system methods like binary, octal and hexadecimal and understand the arithmetic and logical operations are performed by computers.					K3
2	Define the functions to simplify the Boolean equations using logic gates.					K1
3	Understand various data transfer techniques in digital computer and control unit operations.					K2
4	Compare the functions of the memory organization					K4
5	Analyze architectures and computational designs concepts related to architecture organization and addressing modes					K4
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1						
Number System and Arithmetic circuits			12 hours			
Number System and Binary Codes: Decimal, Binary, Octal, Hexadecimal – Binary addition, Multiplication, Division – Floating point representation, Complements, BCD, Excess3, Gray Code. Arithmetic Circuits: Half adder, Full adder, Parallel binary adder, BCD adder, Half subtractor, Full subtractor, Parallel binary subtractor - Digital Logic: The Basic Gates – NOR, NAND, XOR Gates.						
Unit:2						
Combinational Logic and Sequential Circuits			14 hours			
Combinational Logic Circuits: Boolean algebra – Karnaugh map – Canonical form Construction and properties – Implementations – Don't care combinations - Product of sum, Sum of products, Simplifications. Sequential circuits: Flip-Flops: RS, D, JK, and T - Multiplexers – Demultiplexers – Decoder Encoder – Shift Registers-Counters.						
Unit:3						
Input – Output Organization and Data Transfer			12 hours			
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 Interface. Asynchronous data transfer: Strobe Control and Handshaking – Priority Interrupt: Daisy- Chaining Priority, Parallel Priority Interrupt. Direct Memory Access: DMA Controller, DMA Transfer. Input – Output Processor: CPU-IOP Communication.						

Unit:4	Memory Organization	10 hours
Memory Organization: Memory Hierarchy – Main Memory- Associative memory: Hardware Organization, Match Logic, Read Operation, Write Operation. Cache Memory: Associative, Direct, Set-associative Mapping – Writing into Cache Initialization. Virtual Memory: Address Space and Memory Space, Address Mapping Using Pages, Associative Memory, Page Table, Page Replacement.		
Unit:5	Case Studies	6 hours
CASE STUDY: Pin out diagram, Architecture, Organization and addressing modes of 80286-80386-80486-Introduction to microcontrollers.		
Unit:6	Contemporary Issues	2 hours
Expert lectures, online seminars - webinars		
	Total Lecture hours	56 hours
Text Book(s)		
1	Digital principles and applications, Albert Paul Malvino, Donald P Leach, TMH, 1996.	
2	Computer System Architecture -M. Morris Mano , PHI.	
3	Microprocessors and its Applications-Ramesh S. Goankar	
Reference Books		
1	Digital Electronics Circuits and Systems, V.K. Puri, TMH.	
2	Computer Architecture, M. Carter, Schaum’s outline series, TMH.	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1	https://nptel.ac.in/courses/106/103/106103068/	
2	http://www.nptelvideos.in/2012/12/digital-computer-organization.html	
3	http://brittunculi.com/foca/materials/FOCA-Chapters-01-07-review-handout.pdf	
Course Designed By:		

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	M	S	M	M	L
CO3	S	M	S	M	M	S	M	M	M	L
CO3	S	S	S	M	S	S	S	M	M	M
CO4	S	S	S	S	S	S	S	M	S	S
CO5	S	S	S	S	S	S	S	M	S	S

*S-Strong; M-Medium; L-Low

Course code		Programming Lab – C	L	T	P	C
Core/Elective/Supportive		Core Lab: 1	0	0	3	4
Pre-requisite		Students should have basic knowledge in C programming and algorithms	Syllabus Version		2020-21 Onwards	
Course Objectives:						
The main objectives of this course are to:						
1. To practice the Basic concepts, Branching and Looping Statements and Strings in C programming						
2. To implement and gain knowledge in Arrays, functions, Structures, Pointers and File handling						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Remember and Understand the logic for a given problem and to generate Prime numbers & Fibonacci Series (Program-1,2,3)					K1, K2
2	Apply the concepts to print the Magic square, Sorting the data , Strings, Recursive functions and Pointers (Program-4,5,6,8,10)					K2, K3
3	Remember the logic used in counting the vowels in a sentence (Program-7)					K1
4	Apply and Analyze the concepts of Structures and File management (Program-9,11,12)					K3&K4
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Programs			36 hours			
1. Write a C program to find the sum, average, standard deviation for a given set of numbers.						
2. Write a C program to generate n prime numbers.						
3. Write a C program to generate Fibonacci series.						
4. Write a C program to print magic square of order n where $n > 3$ and n is odd.						
5. Write a C program to sort the given set of numbers in ascending order.						
6. Write a C program to check whether the given string is a palindrome or not using pointers.						
7. Write a C program to count the number of Vowels in the given sentence.						
8. Write a C program to find the factorial of a given number using recursive function.						
9. Write a C program to print the students Mark sheet assuming roll no, name, and marks in 5 subjects in a structure. Create an array of structures and print the mark sheet in the university pattern.						
10. Write a function using pointers to add two matrices and to return the resultant matrix to the calling function.						
11. Write a C program which receives two filenames as arguments and check whether the file contents are same or not. If same delete the second file						
12. Write a program which takes a file as command line argument and copy it to another file. At the end of the second file write the total i) no of chars ii) no. of words and iii) no. of lines.						
			Total Lecture hours		36 hours	
Text Book(s)						
1	E Balagurusamy: Computing Fundamentals & C Programming – Tata McGraw-Hill, Second Reprint 2008					

Reference Books	
1	Ashok N Kamthane: Programming with ANSI and Turbo C, Pearson, 2002.
2	Henry Mullish & Hubert L.Cooper: The Sprit of C, Jaico, 1996.
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	Introduction to Programming in C - NPTEL
2	Problem solving through Programming in C - SWAYAM
3	C for Everyone : Programming Fundamentals – Course
Course Designed By:	

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	L	M	S	S	S	L
CO3	S	S	S	M	L	M	S	S	S	M
CO3	S	S	S	L	L	M	S	S	S	L
CO4	S	S	S	M	L	M	S	S	S	M

*S-Strong; M-Medium; L-Low





Second Semester

Course code		C++ PROGRAMMING	L	T	P	C
Core/Elective/Supportive		Core: 3	5	0	0	4
Pre-requisite		Before starting this course one should have a basic understanding of computer programs and computer programming language. If you know the concepts of C programming it will be much easier to understand this course	Syllabus Version		2020-21 Onwards	
Course Objectives:						
The main objectives of this course are to:						
1. Impart knowledge of object oriented programming concepts and implement them in C++						
2. Enable to differentiate procedure oriented and object-oriented concepts.						
3. Equip with the knowledge of concept of Inheritance so that learner understands the need of inheritance.						
4. Explain the importance of data hiding in object oriented programming						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Define the different programming paradigm such as procedure oriented and object oriented programming methodology and conceptualize elements of OO methodology					K1
2	Illustrate and model real world objects and map it into programming objects for a legacy system.					K2
3	Identify the concepts of inheritance and its types and develop applications using overloading features.					K3
4	Discover the usage of pointers with classes					K4
5	Explain the usage of Files, templates and understand the importance of exception Handling					K5
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1						
Unit:1		INTRODUCTION TO C++	10 hours			
Key concepts of Object-Oriented Programming –Advantages – Object Oriented Languages – I/O in C++ - C++ Declarations. Control Structures: - Decision Making and Statements: If.. Else, jump, goto, break, continue, Switch case statements - Loops in C++: for, while, do - functions in C++ - inline functions – Function Overloading..						
Unit:2						
Unit:2		CLASSES AND OBJECTS	10 hours			
Declaring Objects – Defining Member Functions – Static Member variables and functions – array of objects –friend functions – Overloading member functions – Bit fields and classes – Constructor and destructor with static members.						
Unit:3						
Unit:3		OPERATOR OVERLOADING	12 hours			
Overloading unary, binary operators – Overloading Friend functions – type conversion – Inheritance: Types of Inheritance – Single, Multilevel, Multiple, Hierarchal, Hybrid, Multi path						

inheritance – Virtual base Classes – Abstract Classes.		
Unit:4	POINTERS	13 hours
Declaration – Pointer to Class , Object – this pointer – Pointers to derived classes and Base classes – Arrays – Characteristics – array of classes – Memory models – new and delete operators – dynamic object – Binding, Polymorphism and Virtual Functions.		
Unit:5	FILES	13 hours
File stream classes – file modes – Sequential Read / Write operations – Binary and ASCII Files – Random Access Operation – Templates – Exception Handling - String – Declaring and Initializing string objects – String Attributes – Miscellaneous functions .		
Unit:6	Contemporary Issues	2 hours
Expert lectures, online seminars - webinars		
	Total Lecture hours	60 hours
Text Book(s)		
1	Ashok N Kamthane, Object-Oriented Programming with Ansi And Turbo C++, Pearson Education, 2003.	
2		
Reference Books		
1	E. Balagurusamy, Object-Oriented Programming with C++, TMH, 1998.	
2	Maria Litvin & Gray Litvin, C++ for you, Vikas publication, 2002.	
3	John R Hubbard, Programming with C, 2nd Edition, TMH publication, 2002.	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1	https://www.spoken-tutorial.org	
2	https://www.tutorialspoint.com/cplusplus/index.htm	
3	https://www.w3schools.com/cpp/	
Course Designed By:		

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	M	M	M	M	L
CO2	S	S	S	S	S	S	S	M	M	M
CO3	S	S	S	S	S	S	S	M	M	M
CO4	S	S	S	S	S	S	S	M	M	S
CO5	S	S	S	S	S	S	S	M	M	S

*S-Strong; M-Medium; L-Low

Course code		PROGRAMMING LAB - C++	L	T	P	C
Core/Elective/Supportive		Core Lab : 2	0	0	4	4
Pre-requisite		Basic understanding of computer programs and computer programming language like C.	Syllabus Version		2020-21 Onwards	
Course Objectives:						
The main objectives of this course are to:						
1. Impart knowledge of object oriented programming concepts and implement them in C++						
2. Enable to differentiate procedure oriented and object-oriented concepts.						
3. Equip with the knowledge of concept of Inheritance so that learner understands the need of inheritance.						
4. Explain the importance of data hiding in object oriented programming						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Define the different programming paradigm such as procedure oriented and object oriented programming methodology and conceptualize elements of OO methodology					K1
2	Illustrate and model real world objects and map it into programming objects for a legacy system.					K2
3	Identify the concepts of inheritance and its types and develop applications using overloading features.					K3
4	Discover the usage of pointers with classes					K4
5	Explain the usage of Files, templates and understand the importance of exception Handling					K5
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Programs						
36 hours						
1. Write a C++ Program to create a class to implement the data structure STACK. Write a constructor to initialize the TOP of the STACK. Write a member function PUSH() to insert an element and member function POP() to delete an element check for overflow and underflow conditions..						
2. Write a C++ Program to create a class ARITHMETIC which consists of a FLOAT and an INTEGER variable. Write member functions ADD (), SUB(), MUL(), DIV() to perform addition, subtraction, multiplication, division respectively. Write a member function to get and display values.						
3. Write a C++ Program to read an integer number and find the sum of all the digits until it reduces to a single digit using constructors, destructors and inline member functions.						
4. Write a C++ Program to create a class FLOAT that contains one float data member. Overload all the four Arithmetic operators so that they operate on the object FLOAT						
5. Write a C++ Program to create a class STRING. Write a Member Function to initialize, get and display stings. Overload the operators ++ and == to concatenate two Strings and to compare two strings respectively.						
6. Write a C++ Program to create class, which consists of EMPLOYEE Detail like E_Number, E_Name, Department, Basic, Salary, Grade. Write a member function to get and display them. Derive a class PAY from the above class and write a member function to calculate DA, HRA and PF depending on the grade.						
7. Write a C++ Program to create a class SHAPE which consists of two VIRTUAL FUNCTIONS Calculate_Area() and Calculate_Perimeter() to calculate area and perimeter of various figures. Derive three classes SQUARE, RECTANGLE, TRIANGE from class Shape and Calculate Area and						

Perimeter of each class separately and display the result.	
8.	Write a C++ Program to create two classes each class consists of two private variables, a integer and a float variable. Write member functions to get and display them. Write a FRIEND Function common to both classes, which takes the object of above two classes as arguments and the integer and float values of both objects separately and display the result.
9.	Write a C++ Program using Function Overloading to read two Matrices of different Data Types such as integers and floating point numbers. Find out the sum of the above two matrices separately and display the sum of these arrays individually.
10.	Write a C++ Program to check whether the given string is a palindrome or not using Pointers
11.	Write a C++ Program to create a File and to display the contents of that file with line numbers.
12.	Write a C++ Program to merge two files into a single file.
Text Book(s)	
1	Ashok N Kamthane, Object-Oriented Programming with Ansi And Turbo C++, Pearson Education, 2003
2	
Reference Books	
1	E. Balagurusamy, Object-Oriented Programming with C++, TMH, 1998.
2	Maria Litvin & Gray Litvin, C++ for you, Vikas publication, 2002.
3	John R Hubbard, Programming with C, 2nd Edition, TMH publication, 2002.
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	
2	
4	
Course Designed By:	

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	M	M	M	M	L
CO2	S	S	S	S	S	S	S	M	M	M
CO3	S	S	S	S	S	S	S	M	M	M
CO4	S	S	S	S	S	S	S	M	M	S
CO5	S	S	S	S	S	S	S	M	M	S

*S-Strong; M-Medium; L-Low

Course code		Internet Basics	L	T	P	C
Core/Elective/Supportive		Core Lab : 3	0	0	2	2
Pre-requisite		Knowledge of WINDOWS Operating Systems	Syllabus Version		2020-21 Onwards	
Course Objectives:						
The main objectives of this course are to:						
1. Introduce the fundamentals of Internet and the Web functions.						
2. Impart knowledge and essential skills necessary to use the internet and its various components.						
3. Find, evaluate, and use online information resources.						
4. Use Google Apps for education effectively.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Understand the fundamentals of Internet and the Web concepts					K2
2	Explain the usage of internet concepts and analyze its components.					K2
3	Identify and apply the online information resources					K3
4	Inspect and utilize the appropriate Google Apps for education effectively					K3, K4
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Programs						
						36 hours
1. Create an email account in Gmail. Using the account created compose a mail to invite other college students for your college fest, enclose the invitation as attachment and send the mail to at least 50 recipients. Use CC and BCC options accordingly						
2. Open your inbox in the Gmail account created, check the mail received from your peer from other college inviting you for his college fest, and download the invitation. Reply to the mail with a thank you note for the invite and forward the mail to other friends.						
3. Assume that you are studying in final year of your graduation and are eagerly looking for a job. Visit any job portal and upload your resume.						
4. Create a meeting using Google calendar and share meeting id to the attendees. Transfer the ownership to the Manager once the meeting id is generated.						
5. Create a label and upload bulk contacts using import option in Google Contacts						
6. Create your own Google classroom and invite all your friends through email id. Post study material in Google classroom using Google drive. Create a separate folder for every subject and upload all unit wise E-Content Materials.						
7. Create and share a folder in Google Drive using 'share a link' option and set the permission to access that folder by your friends only.						
8. Create one-page story in your mother tongue by using voice recognition facility of Google Docs.						
9. Create a registration form for your Department Seminar or Conference using Google Forms.						
10. Create a question paper with multiple choice types of questions for a subject of your choice, using Google Forms.						
11. Create a Google form with minimum 25 questions to conduct a quiz and generate a certificate after submission.						

12.	Create a meet using Google Calendar and record the meet using Google Meet.
13.	Create a Google slides for a topic and share the same with your friends.
14.	Create template for a seminar certificate using Google Slides.
15.	Create a sheet to illustrate simple mathematical calculations using Google Sheets.
16.	Create student's internal mark statement and share the Google sheets via link.
17.	Create different types of charts for a range in CIA mark statement using Google Sheets.
18.	Create a mark statement in Google Sheets and download it as PDF, .xls and .csv files
Text Book(s)	
1	Ian Lamont, Google Drive & Docs in 30 Minutes, 2 nd Edition.
2	
Reference Books	
1	Sherry Kinkoph Gunter, My Google Apps, 2014.
2	
3	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://www.youtube.com/watch?v=NzPNk44tdlQ
2	https://www.youtube.com/watch?v=PKuBtQuFa-8
4	https://www.youtube.com/watch?v=hGER1hP58ZE
Course Designed By:	

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	S	S	S	M	M	S	L
CO2	S	M	S	S	S	S	S	S	S	M
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S

*S-Strong; M-Medium; L-Low



Third Semester

Course code		Data Structures	L	T	P	C
Core/Elective/Supportive		Core: 4	6	0	0	4
Pre-requisite		Basic understanding of Data storage, retrieval and algorithms.	Syllabus Version		2020-21 Onwards	
Course Objectives:						
The main objectives of this course are to:						
1. To introduce the fundamental concept of data structures						
2. To emphasize the importance of data structures in developing and implementing efficient algorithms.						
3. Understand the need for Data Structures when building application						
4. Ability to calculate and measure efficiency of code						
5. Improve programming logic skills.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Understand the basic concepts of data structures and algorithms					K1-K2
2	Construct and analyze of stack and queue operations with illustrations					K2-K4
3	Enhance the knowledge of Linked List and dynamic storage management.					K2-K3
4	Demonstrate the concept of trees and its applications					K2-K3
5	Design and implement various sorting and searching algorithms for applications and understand the concept of file organizations					K1-K4
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1						
Unit:1		INTRODUCTION			15 hours	
Introduction of Algorithms, Analysing Algorithms. Arrays: Sparse Matrices - Representation of Arrays. Stacks and Queues. Fundamentals - Evaluation of Expression Infix to Postfix Conversion - Multiple Stacks and Queues						
Unit:2						
Unit:2		LINKED LIST			12 hours	
Linked List: Singly Linked List - Linked Stacks and Queues - Polynomial Addition- More on Linked Lists - Sparse Matrices - Doubly Linked List and Dynamic – Storage Management - Garbage Collection and Compaction.						
Unit:3						
Unit:3		TREES			15 hours	
Basic Terminology - Binary Trees - Binary Tree Representations – Binary Trees-Traversal-More On Binary Trees – Threaded Binary Trees - Binary Tree. Representation of Trees - Counting Binary Trees. Graphs: Terminology and Representations-Traversals, Connected Components and Spanning Trees, Shortest Paths and Transitive Closure						
Unit:4						
Unit:4		EXTERNAL SORTING			15 hours	
Storage Devices -Sorting with Disks: K-Way Merging – Sorting with Tapes Symbol Tables: Static Tree Tables - Dynamic Tree Tables - Hash Tables: Hashing Functions - Overflow Handling.						

Unit:5	INTERNAL SORTING	15 hours
Insertion Sort - Quick Sort - 2 Way Merge Sort - Heap Sort – Shell Sort - Sorting on Several Keys. Files: Files, Queries and Sequential organizations – Index Techniques -File Organizations.		
Unit:6	Contemporary Issues	3 hours
Expert lectures, online seminars - webinars		
	Total Lecture hours	75 hours
Text Book(s)		
1	Ellis Horowitz, Sartaj Shani, Data Structures, Galgotia Publication.	
2	Ellis Horowitz, Sartaj Shani, Sanguthevar Rajasekaran, Computer Algorithms, Galgotia Publication.	
3	S.Lovelyn Rose, R.Venkatesan, Data Structures, Wiley India Private Limited,2015, 1 st Edition	
Reference Books		
1	Jean-Paul,Tremblay & Paul G.Sorenson , An Introduction to Data structures with Applications Tata McGraw Hill Company 2008, 2ndEdition.	
2	Samanta.D , Classic Data Structure Prentice Hall of India Pvt Ltd 2007, 9 th Edition	
3	Seymour Lipschutz, Data Structures McGraw Hill Publications, 2014, 1st Edition	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1		
2		
3		
Course Designed By:		

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	M	S	M	M	M
CO2	S	S	S	M	M	M	M	M	M	M
CO3	S	S	S	M	S	M	M	M	S	S
CO4	S	S	S	M	S	S	S	S	M	M
CO5	S	S	S	M	M	S	S	M	M	S

*S-Strong; M-Medium; L-Low

Course code		Java Programming	L	T	P	C
Core/Elective/Supportive		Core: 5	6	0	0	4
Pre-requisite		The objective of the course is to train the students to acquire problem-solving skills through object oriented programming	Syllabus Version		2020-21 Onwards	
Course Objectives:						
The main objectives of this course are to:						
1. To expose the students with the introduction to OOPs and advantages of object oriented programming.						
2. The concepts of OOPs make it easy to represent real world entities.						
3. The course introduces the concepts of converting the real time problems into objects and methods and their interaction with one another to attain a solution.						
4. Simultaneously it provides the syntax of programming language Java for solving the real world problems.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	The competence and the development of small to medium sized application programs that demonstrate professionally acceptable coding					K1-K2
2	Demonstrate the concept of object oriented programming through Java					K2-K4
3	Apply the concept of Inheritance, Modularity, Concurrency, Exceptions handling and data persistence to develop java program					K3
4	Develop java programs for applets and graphics programming					K3
5	Understand the fundamental concepts of AWT controls, layouts and events					K1-K2
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1						
		FUNDAMENTALS OF OBJECT-ORIENTED PROGRAMMING	15 hours			
Object-Oriented Paradigm – Basic Concepts of Object-Oriented Programming – Benefits of Object-Oriented Programming –Application of Object-Oriented Programming. Java Evolution: History – Features – How Java differs from C and C++ – Java and Internet – Java and www –Web Browsers. Overview of Java: simple Java program – Structure – Java Tokens – Statements – Java Virtual Machine.						
Unit:2						
		BRANCHING AND LOOPING	12 hours			
Constants, Variables, Data Types - Operators and Expressions – Decision Making and Branching: if, if...else, nested if, switch, ? : Operator - Decision Making and Looping: while, do, for – Jumps in Loops - Labeled Loops – Classes, Objects and Methods.						
Unit:3						
		ARRAYS AND INTERFACES	15 hours			
Arrays, Strings and Vectors – Interfaces: Multiple Inheritance – Packages: Putting Classes together – Multithreaded Programming.						
Unit:4						
		ERROR HANDLING	15 hours			
Managing Errors and Exceptions – Applet Programming – Graphics Programming.						

Unit:5	MANAGING INPUT / OUTPUT FILES IN JAVA	15 hours
Concepts of Streams- Stream Classes – Byte Stream classes – Character stream classes – Using streams – I/O Classes – File Class – I/O exceptions – Creation of files – Reading / Writing characters, Byte-Handling Primitive data Types – Random Access Files.		
Unit:6	Contemporary Issues	3 hours
Expert lectures, online seminars - webinars		
	Total Lecture hours	75 hours
Text Book(s)		
1	Programming with Java – A Primer - E. Balagurusamy, 5 th Edition, TMH.	
2	Herbert Schildt , Java: The Complete Reference, McGraw Hill Education, Oracle Press 10 th Edition, 2018	
3	Programming with Java – A Primer - E. Balagurusamy, 3rd Edition, TMH.	
Reference Books		
1	The Complete Reference Java 2 - Patrick Naughton & Hebert Schildt, 3rd Edition, TMH	
2	Programming with Java – John R. Hubbard, 2nd Edition, TMH.	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1	www.spoken-tutorial.org	
2	www.nptel.ac.in	
3	https://www.w3schools.in/java-tutorial/	
Course Designed By:		

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	L	S	M	M	M
CO2	S	S	S	M	S	L	S	M	M	M
CO3	S	S	S	M	S	M	S	S	M	M
CO4	S	S	S	M	S	M	M	S	M	M
CO5	S	S	S	M	S	M	S	S	M	M

*S-Strong; M-Medium; L-Low

Course code		Programming Lab – JAVA	L	T	P	C
Core/Elective/Supportive		Core Lab: 4	0	0	5	4
Pre-requisite		Students should know about the OOPs concept and basic knowledge in java theory.	Syllabus Version		2020-21 Onwards	
Course Objectives:						
The main objectives of this course are to:						
3. The main objective of JAVA Programming Lab is to provide the students a strong foundation on programming concepts and its applications through hands-on training.						
4. To practice the Basic concepts, Branching and Looping Statements and Strings in C programming						
5. To implement and gain knowledge in Arrays, functions, Structures, Pointers and File handling						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Understand the basic concepts of Java Programming with emphasis on ethics and principles of professional coding					K1, K2
2	Demonstrate the creation of objects, classes and methods and the concepts of constructor, methods overloading, Arrays, branching and looping					K2
3	Create data files and Design a page using AWT controls and Mouse Events in Java programming Implement the concepts of code reusability and debugging.					K2, K3
4	Develop applications using Strings, Interfaces and Packages and applets					K3
5	Construct Java programs using Multithreaded Programming and Exception Handling					K3
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Programs			36 hours			
1. Write a Java Applications to extract a portion of a character string and print the extracted string.						
2. Write a Java Program to implement the concept of multiple inheritance using Interfaces.						
3. Write a Java Program to create an Exception called payout-of-bounds and throw the exception.						
4. Write a Java Program to implement the concept of multithreading with the use of any three multiplication tables and assign three different priorities to them.						
5. Write a Java Program to draw several shapes in the created windows.						
6. Write a Java Program to create a frame with four text fields name, street, city and pin code with suitable tables. Also add a button called my details. When the button is clicked its corresponding values are to be appeared in the text fields.						
7. Write a Java Program to demonstrate the Multiple Selection List-box.						
8. Write a Java Program to create a frame with three text fields for name, age and qualification and a text field for multiple line for address						
9. Write a Java Program to create Menu Bars and pull down menus.						
10. Write a Java Program to create frames which respond to the mouse clicks. For each events with mouse such as mouse up, mouse down, etc., the corresponding message to be displayed.						
11. Write a Java Program to draw circle, square, ellipse and rectangle at the mouse click						

positions.		
12. Write a Java Program which open an existing file and append text to that file.		
	Total Lecture hours	36 hours
Text Book(s)		
1	Programming with Java – A Primer – E. Balagurusamy, 5 th Edition, TMH.	
2	Herbert Schildt , Java: The Complete Reference, McGraw Hill Education, Oracle Press 10 th Edition, 2018	
3	Programming with Java – A Primer – E. Balagurusamy, 3 rd Edition, TMH.	
Reference Books		
1	The Complete Reference Java 2 – Patrick Naughton & Hebert Schildt, 3 rd Edition, TMH	
2	Programming with Java – John R. Hubbard, 2 nd Edition, TMH.	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1	https://www.w3resource.com/java-exercises/	
2	https://www.udemy.com/introduction-to-java-programming/	
3		
Course Designed By:		

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	L	S	S	S	M	M	L
CO3	S	S	S	L	S	M	S	M	M	L
CO3	S	S	S	M	S	M	S	M	M	L
CO4	S	S	S	M	S	M	S	S	M	S
CO5	S	S	S	M	S	S	S	S	M	S

*S-Strong; M-Medium; L-Low

Course code		INTERNET PROGRAMMING	L	T	P	C
Core/Elective/Supportive	Skill based Subject: 1		5	0	0	3
Pre-requisite	Students should have basic Computer Knowledge		Syllabus Version	2020-21 Onwards		
Course Objectives:						
The main objectives of this course are to: 1. To enable the students to learn internet basics, web development using HTML and scripting language to respond the events. 2. To learn the standard notation XML, CSS, DTD and XSD. 3. To study the dynamic web application development using ASP and PHP.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Understand the basics of internet, internet services, protocols, remote access and transaction.				K2	
2	Understand the basics of HTML, HTML tags, Tables, Frames and Forms and apply to develop web pages.				K2,K4	
3	Understand the basics of scripting and apply the java script, VB script and Perl script for developing web pages.				K2-K4	
4	Knowledge on XML, CSS, XSL, DTD and XSD.				K4	
5	Knowledge on dynamic web applications, basics of ASP, ASP objects and basics of PHP.				K2-K4	
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1	BASICS OF INTERNET				12 hours	
Basics of Internet communication - Hardware elements associated with internet - Internet Services - Internet Protocols - TCP/IP, UDP, and HTTP - other Protocols - Telnet - Gopher - Mail and its types - FTP - Remote access and Transaction - Web Indexes Search Engines.						
Unit:2	INTRODUCTION TO HTML				15 hours	
Introduction to HTML - Tags and Documents - Link documents using Anchor Tags - Images and Pictures - Tables -HTML Forms - Frames - Framesets.						
Unit:3	INTRODUCTION TO SCRIPTING				15 hours	
Introduction to Scripting - Java Script - Data types - Operators - Variables - Conditional Statements - Functions -Objects - Document object - Image Object – Event Handling -Introduction to VBScript and Perl Script.						
Unit:4	INTRODUCTION TO XML				15 hours	
Introduction to XML - Well formed XML - CSS - XSL - Valid XML - DTD - XSD -Introduction to DOM and SAX.						
Unit:5	INTRODUCTION TO DYNAMIC WEB APPLICATIONS				15 hours	
Introduction to Dynamic web applications -Active Server Page Basics – ASP Object Model - Collections - Introduction to PHP.						

Unit:6	Contemporary Issues	3 hours
Problem Solving through C Programming - Edureka		
	Total Lecture hours	75 hours
Text Book(s)		
1	Deitel & Deitel, Internet and WWW How to Pprogram, Prentice Hall 2000.	
2	David Hunter et al., Beginning XML, Wrox Publications 2000.	
Reference Books		
1	Daniel C.Lynch, Marehall T. Rose. Internet Systems Handbook , Addison Wesley 1993.	
2	Thomas Penny, How to do Everything with HTML, McGraw-Hill Education, 2 edition, 2003.	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
Course Designed By:		

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	M	M	S	M	S	L
CO3	S	M	S	S	M	M	S	M	M	L
CO3	M	S	S	S	M	M	M	M	M	M
CO4	S	M	M	M	S	M	M	M	S	M
CO5	M	S	S	M	M	M	S	S	S	M

*S-Strong; M-Medium; L-Low



Fourth Semester

Course code		System Software and Operating Systems	L	T	P	C
Core/Elective/Supportive	Core : 6		6	0	0	4
Pre-requisite	Students Should have the basic knowledge in computer.		Syllabus Version		2020-21 Onwards	
Course Objectives:						
The main objectives of this course are to:						
1. To understand the processing of programs on a computer system to design and implementation of language processor.						
2. To enhance the ability of program generation through expansion and gain knowledge about Code optimization using software tools.						
3. Students will gain knowledge of basic operating system concepts.						
4. To have an in-depth understanding of process concepts, deadlock and memory management.						
5. To provide an exposure to scheduling algorithms, devices and information management.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Know the program generation and program execution activities in detail					K1
2	Understand the concepts of Macro Expansions and Gain the knowledge of Editing processes					K2-K3
3	Remember the basic concepts of operating system					K1
4	Understand the concepts like interrupts, deadlock , memory management and file management					K2
5	Analyze the need for scheduling algorithms and implement different algorithms used for representation, scheduling, and allocation in DOS and UNIX operating system.					K1-K4
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1						
INTRODUCTION TO SYSTEM SOFTWARE			12 hours			
Introduction–System Software and machine architecture. Loader and Linkers: Basic Loader Functions - Machine dependent loader features –Machine independent loader features - Loader design options						
Unit:2						
MACHINE AND COMPILER			15 hours			
Machine dependent compiler features - Intermediate form of the program - Machine dependent code optimization - Machine independent compiler features - Compiler design options - Division into passes – Interpreters – p-code compilers - Compiler-compilers.						
Unit:3						
OPERATING SYSTEM			15 hours			
What is an Operating System? – Process Concepts: Definition of Process - Process States - Process States Transition – Interrupt Processing – Interrupt Classes - Storage Management: Real Storage: Real Storage Management Strategies – Contiguous versus Non-contiguous storage allocation – Single User Contiguous Storage allocation- Fixed partition multiprogramming – Variable partition multiprogramming.						

Unit:4	VIRTUAL STORAGE	15 hours
Virtual Storage: Virtual Storage Management Strategies – Page Replacement Strategies – Working Sets – Demand Paging – Page Size. Processor Management: Job and Processor Scheduling: Preemptive Vs Non-preemptive scheduling – Priorities – Deadline scheduling.		
Unit:5	DEVICE AND INFORMATION MANAGEMENT	15 hours
Device and Information Management Disk Performance Optimization: Operation of moving head disk storage – Need for disk scheduling – Seek Optimization – File and Database Systems: File System – Functions – Organization – Allocating and freeing space – File descriptor – Access control matrix.		
Unit:6	Contemporary Issues	3 hours
Expert lectures, online seminars - webinars		
	Total Lecture hours	75 hours
Text Book(s)		
1	Leland L.Beck, System Software: An Introduction to Systems Programming, Pearson, Third Edition.	
2	H.M. Deitel, Operating Systems, 2nd Edition, Perason, 2003.	
Reference Books		
1	Achy8ut S. Godbole, Operating Systems, TMH, 2002.	
2	John J. Donovan, Systems Programming, TMH, 1991.	
3	D.M. Dhamdhere, Systems Programming and Operating Systems, 2nd Revised Edition, TMH.	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1		
2		
3		
Course Designed By:		

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	M	M	M	M	L
CO2	S	S	S	S	S	M	M	M	S	L
CO3	S	M	M	M	S	M	S	S	S	L
CO4	S	S	S	M	S	S	S	M	M	M
CO5	S	S	S	M	S	S	S	M	M	M

*S-Strong; M-Medium; L-Low

Course code		Linux and Shell Programming	L	T	P	C
Core/Elective/Supportive	Core : 7		6	0	0	4
Pre-requisite	Before starting the course students should have the basic knowledge about operating system and C programming.		Syllabus Version		2020-21 Onwards	
Course Objectives:						
The main objectives of this course are to:						
1. Linux is a multi-user and multi-tasking operating system and after learning the concepts of an operating system						
2. Student will be able to write simple shell programming using Linux utilities, pipes and filters.						
3. The file system, process management and memory management are discussed.						
4. Various commands used by Linux shell is also discussed which makes the users to interact with each other.						
5. Bourne shell programming is dealt in depth which can be used to develop applications.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Describe the architecture and features of Linux Operating System and distinguish it from other Operating System.					K1
2	Develop Linux utilities to perform File processing, Directory handling, User Management and display system configuration					K2-K3
3	Develop shell scripts using pipes, redirection, filters and Pipes					K2
4	Apply and change the ownership and file permissions using advance Unix commands.					K3
5	Build Regular expression to perform pattern matching using utilities and implement shell scripts for real time applications.					K3-K6
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1						
INTRODUCTION			12 hours			
Introduction to LINUX Operating System: Introduction - The LINUX Operating System.						
Unit:2						
MANAGING FILES AND DIRECTORIES			15 hours			
Managing Files and Directories: Introduction – Directory Commands in LINUX – File Commands in LINUX.						
Unit:3						
VI EDITOR			15 hours			
Creating files using the vi editor: Text editors – The vi editor. Managing Documents: Locating files in LINUX – Standard files – Redirection – Filters – Pipes.						
Unit:4						
SECURING FILES			15 hours			
Securing files in LINUX: File access permissions – viewing File access permissions – Changing File access permissions. Automating Tasks using Shell Scripts: Introduction – Variables- Local and Global Shell variables – Command Substitution.						
Unit:5						
CONDITIONAL EXECUTION IN SHELL SCRIPTS			15 hours			

Using Conditional Execution in Shell Scripts: Conditional Execution – The case...esac Construct. Managing repetitive tasks using Shell Scripts: Using Iteration in Shell Scripts – The while construct – until construct – for construct – break and continue commands – Simple Programs using Shell Scripts.		
Unit:6	Contemporary Issues	3 hours
Expert lectures, online seminars - webinars		
	Total Lecture hours	75 hours
Text Book(s)		
1	Operating System LINUX, NIIT, PHI, 2006, Eastern Economy Edition.	
2	N.B. Venkateswarlu , Introduction to Linux: Installation and Programming, BS Publications, 2008, 1 st Edition	
Reference Books		
1	Richard Petersen, Linux: The Complete Reference, Sixth Edition, Tata McGraw-Hill Publishing Company Limited, New Delhi, Edition 2008.	
2		
3		
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1	http://spoken-tutorial.org/	
2	https://www.tutorialspoint.com/linux/index.htm	
3		
Course Designed By:		

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	M	M	M	M	L
CO2	S	S	S	M	S	M	M	M	M	L
CO3	S	S	S	M	S	M	S	S	S	M
CO4	S	S	S	M	S	M	S	S	S	M
CO5	S	S	S	S	S	S	S	S	S	S

*S-Strong; M-Medium; L-Low

Course code		Programming Lab – LINUX and SHELL PROGRAMMING	L	T	P	C
Core/Elective/Supportive		Core Lab: 5	0	0	6	4
Pre-requisite		Students should have the prior basic knowledge in operating system.	Syllabus Version		2020-21 Onwards	
Course Objectives:						
The main objectives of this course are to:						
1. Describe the architecture and features of Linux Operating System						
2. To create programs in the Linux environment using Linux utilities and commands.						
3. Student is given an introduction of Linux shell commands and they will be able to write own shell scripts.						
4. Shell programming is dealt in depth which can be used to develop applications.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Develop Linux utilities to perform File processing, Directory handling and User Management					K1, K2
2	Understand and develop shell scripts using pipes, redirection, filters, Pipes and display system configuration					K2-K3
3	Develop simple shell scripts applicable to file access permission network administration					K3
4	Apply and change the ownership and file permissions using advance Unix commands.					K4-K5
5	Create shell scripts for real time applications.					K6
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Programs						
			36 hours			
1. Write a shell script to stimulate the file commands: rm, cp, cat, mv, cmp, wc, split, diff.						
2. Write a shell script to show the following system configuration :						
a. currently logged user and his log name						
b. current shell , home directory , Operating System type , current Path setting , current working directory						
c. show currently logged number of users, show all available shells						
d. show CPU information like processor type , speed						
e. show memory information						
3. Write a Shell Script to implement the following: pipes, Redirection and tee commands.						
4. Write a shell script for displaying current date, user name, file listing and directories by getting user choice.						
5. Write a shell script to implement the filter commands.						
6. Write a shell script to remove the files which has file size as zero bytes.						
7. Write a shell script to find the sum of the individual digits of a given number.						
8. Write a shell script to find the greatest among the given set of numbers using command line						

arguments.		
9. Write a shell script for palindrome checking.		
10. Write a shell script to print the multiplication table of the given argument using for loop.		
	Total Lecture hours	36 hours
Text Book(s)		
1	Operating System LINUX, NIIT, PHI, 2006, Eastern Economy Edition.	
2	N.B. Venkateswarlu , Introduction to Linux: Installation and Programming, BS Publications, 2008, 1 st Edition	
Reference Books		
1	Richard Petersen, Linux: The Complete Reference, Sixth Edition, Tata McGraw-Hill Publishing Company Limited, New Delhi, Edition 2008.	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1	https://www.w3resource.com/linux-exercises/	
2	http://spoken-tutorial.org/	
3		
Course Designed By:		

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	M	S	M	M	M
CO3	S	S	S	M	S	M	S	S	M	M
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

*S-Strong; M-Medium; L-Low

Course code		Lab - PHP Programming	L	T	P	C
Core/Elective/Supportive		Skill Based Subject 2 (Lab) :1	0	0	4	3
Pre-requisite		Students should have knowledge in PHP and SQL	Syllabus Version		2020-21 Onwards	
Course Objectives:						
The main objectives of this course are to:						
1. To enhance the knowledge of students in web programming and make them to do elegant applications in PHP using Array class, OOPs concepts, etc.						
2. To understand how to develop data centric web application using PHP and SQLite.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Understand the basics of PHP.					K1
2	Understand the programming concepts in PHP and create web applications					K1-K3
3	Knowledge on Array object, storing data in Arrays, processing Arrays with loops, functions of Array class and implementing applications.					K3-K4
4	Understand the OOPs concepts, Files and Directories					K1-K3
5	Knowledge on working database centric application using SQL, SQLite					K1-K4
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Programs					36 hours	
1. Develop a PHP program using controls and functions						
2. Develop a PHP program and check message passing mechanism between pages.						
3. Develop a PHP program using String function and Arrays.						
4. Develop a PHP program to display student information using MYSQL table.						
5. Develop a PHP program to design a college application form using MYSQL table.						
6. Develop a PHP program using parsing functions (use Tokenizing)						
7. Develop a PHP program and check Regular Expression, HTML functions, Hashing functions.						
8. Develop a PHP program and check File System functions, Network functions, Date and time functions.						
9. Develop a PHP program using session						
10. Develop a PHP program using cookie and session						
			Total Lecture hours		36 hours	
Text Book(s)						
1	Programming PHP, Rasmus Lerdorf and Levin Tatroe, O_Reilly, 2002					
2	Core Python Programming, Wesley J. Chun, Prentice Hall, 2001					
Reference Books						
1	PHP: The Complete Reference, 2nd Edn, Steve Holzner, TMH 2009.					
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]						
1	https://www.w3resource.com/linux-exercises/					
2	http://spoken-tutorial.org/					
3						

Course Designed By:

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	M	S	M	S	L
CO2	L	M	S	M	M	L	S	L	S	L
CO3	S	S	L	M	M	M	S	M	S	M
CO4	S	M	S	M	S	M	S	M	S	M
CO5	M	S	S	M	M	M	S	M	S	M

*S-Strong; M-Medium; L-Low





Fifth Semester

Course code		RDBMS & Oracle	L	T	P	C
Core/Elective/Supportive		Core : 8	6	0	0	4
Pre-requisite	Basic knowledge about the data, table and database in computers		Syllabus Version		2020-21 Onwards	
Course Objectives:						
The main objectives of this course are to: 1. The course describes the data, organizing the data in database, database administration. 2. To grasp the different issues involved in the design of a database system. 3. To study the physical and logical database designs and database modeling like relational, Hierarchical, network models, database security, integrity and normalization. 4. It also gives introduction to SQL language to retrieve the data from the database with suitable application development. 5. Provide strong foundation of database concepts and to introduce students to application development in DBMS.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Understand the basic concepts of Relational Data Model, Entity-Relationship Model and process of Normalization					K1-K2
2	Understand and construct database using Structured Query Language (SQL) in Oracle9i environment.					K1-K3
3	Learn basics of PL/SQL and develop programs using Cursors, Exceptions, Procedures and Functions.					K1-K4
4	Understand and use built-in functions and enhance the knowledge of handling multiple tables					K1-K3
5	Attain a good practical skill of managing and retrieving of data using Data Manipulation Language (DML)					K2-K4
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1	DATABASE CONCEPTS				15 hours	
Database Concepts: A Relational approach: Database – Relationships – DBMS – Relational Data Model – Integrity Rules – Theoretical Relational Languages. Database Design: Data Modeling and Normalization: Data Modeling – Dependency – Database Design – Normal forms – Dependency Diagrams – De-normalization – Another Example of Normalization.						
Unit:2	ORACLE9i				15 hours	
Oracle9i: Overview: Personal Databases – Client/Server Databases – Oracle9i an introduction – SQL *Plus Environment – SQL – Logging into SQL *Plus - SQL *Plus Commands – Errors & Help – Alternate Text Editors - SQL *Plus Worksheet - iSQL *Plus. Oracle Tables: DDL: Naming Rules and conventions – Data Types – Constraints – Creating Oracle Table – Displaying Table Information – Altering an Existing Table – Dropping, Renaming, Truncating Table – Table Types – Spooling – Error codes.						
Unit:3	WORKING WITH TABLE				15 hours	
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. Multiple Tables: Joins and Set operations: Join – Set operations.		
Unit:4	PL/SQL	15 hours
PL/SQL: A Programming Language: History – Fundamentals – Block Structure – Comments – Data Types – Other Data Types – Declaration – Assignment operation – Bind variables – Substitution Variables – Printing – Arithmetic Operators. Control Structures and Embedded SQL: Control Structures – Nested Blocks – SQL in PL/SQL – Data Manipulation – Transaction Control statements. PL/SQL Cursors and Exceptions: Cursors – Implicit & Explicit Cursors and Attributes – Cursor FOR loops – SELECT...FOR UPDATE – WHERE CURRENT OF clause – Cursor with Parameters – Cursor Variables – Exceptions – Types of Exceptions.		
Unit:5	PL/SQL COMPOSITE DATA TYPES	12 hours
PL/SQL Composite Data Types: Records – Tables – arrays. Named Blocks: Procedures – Functions – Packages –Triggers –Data Dictionary Views.		
Unit:6	Contemporary Issues	3 hours
Expert lectures, online seminars - webinars		
	Total Lecture hours	75 hours
Text Book(s)		
1	Database Systems using Oracle, Nilesh Shah, 2nd edition, PHI.	
2	E-Book : Diana Lorentz, “Oracle® Database SQL Reference”, ORACLE, Dec, 2005.	
3	E-Book : Bill Pribyl, Steven Feuerstein, “Oracle PL/SQL Programming”, O'Reilly Media, Inc., 6 th Edition, February 2014.	
Reference Books		
1	Database Management Systems, Majumdar & Bhattacharya, 2007, TMH.	
2	Database Management Systems, Gerald V. Post, 3rd edition, TMH.	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1	http://www.digimat.in/nptel/courses/video/106105175/L01.html	
2	https://www.tutorialspoint.com/oracle_sql/index.htm	
3		
Course Designed By:		

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	M	M	M	M	L
CO2	S	S	S	M	S	M	M	M	M	L
CO3	S	S	S	S	S	S	S	S	M	M
CO4	S	S	S	S	S	M	S	S	M	L
CO5	S	S	S	S	S	M	S	S	M	L

*S-Strong; M-Medium; L-Low

Course code		Visual Basic	L	T	P	C
Core/Elective/Supportive		Core : 9	6	0	0	4
Pre-requisite		Knowledge in programming language and oops concept.	Syllabus Version	2020-21 Onwards		
Course Objectives:						
The main objectives of this course are to:						
1. The main aim of the course is to cover visual basic programming skills required for modern software development.						
2. To study the advantages of Controls available with visual basic.						
3. To gain a basic understanding of database access and management using data controls.						
4. To facilitate the learner to carry out project works using the tools available in VB and MS Access.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Demonstrate fundamental skills in utilizing the tools of a visual environment such as command, menus and toolbars.					K1
2	Implement SDI and MDI applications using forms, dialogs and other types of GUI components.					K2
3	Understand the connectivity between VB with MS-ACCESS database.					K3
4	Implement the methods and techniques to develop projects.					K4
5	Attain a good practical skill of managing ODBC and Data Access Objects					K2-K4
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1						
INTRODUCTION TO VB						
15 hours						
Getting Started with VB6, Programming Environment, working with Forms, Developing an application, Variables, Data types and Modules, procedures and control structures, arrays. Working with Controls: Creating and using controls, working with control arrays.						
Unit:2						
MENUS IN VB						
15 hours						
Menus, Mouse events and Dialog boxes: Mouse events, Dialog boxes, MDI and Flex grid: MDI, Using the Flex grid control.						
Unit:3						
ODBC AND DATA ACCESS OBJECTS						
15 hours						
ODBC and Data Access Objects: Data Access Options, ODBC, Remote data objects, ActiveX EXE and ActiveX DLL: Introduction, Creating an ActiveX EXE Component, Creating ActiveX DLL Component.						
Unit:4						
OBJECT LINKING AND EMBEDDING						
15 hours						
Object Linking and Embedding: OLE fundamentals, Using OLE Container Control, Using OLE Automation objects, OLE Drag and Drop, File and File System Control: File System Controls, Accessing Files.						
Unit:5						
CONTROLS IN VB						
12 hours						
Additional controls in VB: sstab control, setting properties at runtime, adding controls to tab, list control, tabstrip control, MS Flexgrid control, Why ADO, Establishing a reference, Crystal and Data reports.						

Unit:6	Contemporary Issues	3 hours
Expert lectures, online seminars - webinars		
	Total Lecture hours	75 hours
Text Book(s)		
1	Visual Basic 6.0 Programming, Content Development Group, TMH, 8th reprint, 2007. (Unit I to Unit IV)	
2	Programming with Visual Basic 6.0, Mohammed Azam, Vikas Publishing House, Fourth Reprint, 2006. (Unit V)	
3		
Reference Books		
1	Gray Cornell (2003), "Visual Basic 6 from ground up" TMH, New Delhi, 1st Edition,	
2	Deitel and Deitel, T.R.Nieto (1998), "Visual Basic 6 - How to Program", Pearson Education. First Edition.	
3		
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
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Course Designed By:		

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	L	M	M	M	M	M	L
CO2	S	S	S	M	M	M	S	S	M	L
CO3	S	S	S	S	S	M	S	S	S	M
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

*S-Strong; M-Medium; L-Low

Course code		Programming Lab – VB & Oracle	L	T	P	C
Core/Elective/Supportive		Core Lab : 6	0	0	6	4
Pre-requisite	Students should have the theoretical knowledge in visual basic and oops concept.		Syllabus Version		2020-21 Onwards	
Course Objectives:						
The main objectives of this course are to:						
1. To develop applications using Graphical User Interface tools.						
2. To understand the design concepts.						
3. To design and build database systems and demonstrate their competence.						
4. To create requirement analysis and specification for software applications.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Understand the concepts of Visual Basic.					K1
2	Learn the advantages of Controls in VB					K2
3	Design and develop the event- driven applications using Visual Basic framework.					K3
4	Apply the knowledge of database methods.					K4
5	Learn basics of PL/SQL and develop programs using Cursors, Exceptions, Procedures and Functions					K6
K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create						
Programs						
36 hours						
1. Construction of an Arithmetic Calculator (Simple).						
2. Writing simple programs using loops and decision-making statements.						
a. Generate Fibonacci series.						
b. Find the sum of N numbers.						
3. Write a program to create a menu and MDI Forms.						
4. Write a program to display files in a directory using DriveListBox, DirListBox and FileListBox control and open, edit and save text file using Rich text box control.						
5. Write a program to illustrate Common Dialog Control and to open, edit and save text file.						
6. Write a program to implement animation using timers.						
7. Write a simple VB program to accept a number as input and convert it into						
a. Binary b. Octal c. Hexa-decimal						
8. Create a table for Employee details with Employee Number as primary key and following fields:						
Name, Designation, Gender, Age, Date of Joining and Salary. Insert at least ten rows and perform various queries using any one Comparison, Logical, Set, Sorting and Grouping operators.						
9. Write a PL/SQL to update the rate field by 20% more than the current rate in inventory table which has the following fields: Prono, ProName and Rate. After updating the table a new field (Alter) called for Number of item and place for values for the new field without using PL/SQL block.						

10. Write a PL/SQL program to implement the concept of Triggers		
11. Write a PL/SQL program to implement the concept “Procedures”.		
12. Write a VB program to manipulate the student mark list with oracle database connectivity program.		
	Total Lecture hours	36 hours
Text Book(s)		
1	Visual Basic 6.0 Programming, Content Development Group, TMH, 8 th reprint, 2007. (Unit I to Unit IV)	
2	Programming with Visual Basic 6.0, Mohammed Azam, Vikas Publishing House, Fourth Reprint, 2006. (Unit V)	
3	E-Book : Bill Pribyl, Steven Feuerstein, “Oracle PL/SQL Programming”, O’Reilly Media, Inc., 6 th Edition, February 2014.	
Reference Books		
1	Gray Cornell (2003), ”Visual Basic 6 from ground up” TMH, New Delhi, 1 st Edition,	
2	Deitel and Deitel, T.R.Nieto (1998), “Visual Basic 6 – How to Program”, Pearson Education. First Edition.	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
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Course Designed By:		

Mapping with Programme Outcomes										
Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	L	M	L	S	M	M	L
CO3	S	S	S	L	M	M	S	M	S	L
CO3	S	S	S	M	S	M	S	S	S	M
CO4	S	S	S	M	S	M	S	S	M	M
CO5	S	S	S	S	S	S	S	S	S	M

*S-Strong; M-Medium; L-Low

Course code		CLIENT/SERVER COMPUTING	L	T	P	C
Core/Elective/Supportive		Elective: I	6	0	0	4
Pre-requisite		Basic knowledge in computer and computing	Syllabus Version		2020-21 Onwards	
Course Objectives:						
The main objectives of this course are to:						
1. To enable the students to learn the basics of client/server computing and applications of client/server computing.						
2. To understand the connectivity components, software and hardware components of client/server applications.						
3. To learn future enabling technologies for client/server computing.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Understand the basics of client/server applications, advantages and improve performance and reduce the network traffic.					K1-K2
2	Knowledge in client and server role, the networking operating system and the server operating system.					K2
3	Understanding the connectivity components of client/server applications, open system interconnect and WAN technologies.					K2-K3
4	Understanding the software and hardware components of client/server applications.					K2-K3
5	Knowledge in components of client/server applications and future enabling technologies for client/server computing.					K2-K4
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1		CLIENT / SERVER COMPUTING	15 hours			
Client / Server Computing – Advantages of Client / Server Computing – Technology Revolution – Connectivity – Ways to improve Performance – How to reduce network Traffic.						
Unit:2		COMPONENTS OF CLIENT / SERVER APPLICATIONS – THE CLIENT	12 hours			
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.						
Unit:3		COMPONENTS OF CLIENT / SERVER APPLICATIONS – CONNECTIVITY	15 hours			
Components of Client / Server Applications – Connectivity: Open System Interconnect – Communications Interface Technology – Inter-process communication – WAN Technologies.						
Unit:4		COMPONENTS OF CLIENT / SERVER APPLICATIONS	15 hours			
Components of Client / Server Applications – Software. Components of Client / Server Applications – Hardware.						

Unit:5	COMPONENTS OF CLIENT / SERVER APPLICATIONS	15 hours
Components of Client / Server applications – Service and Support: System Administration. The Future of Client / Server Computing: Enabling Technologies – Transformational Systems.		
Unit:6	Contemporary Issues	3 hours
Expert lectures, online seminars - webinars		
	Total Lecture hours	75 hours
Text Book(s)		
1	Client /Server Computing, Patrick Smith, Steve Guenferich, 2nd edition, PHI.	
Reference Books		
1	Robert Orfali, Dan Harkey, Jeri Edwards: The Essential Client/Server Survival Guide, 2nd edition, Galgotia Publications.	
2	Dewire and Dawana Travis, Client/ Server Computing, TMH.	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
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Course Designed By:		

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	L	S	S	M	S	M	M	M
CO2	S	S	S	M	M	M	S	S	M	M
CO3	S	S	S	M	S	M	M	M	M	L
CO4	S	S	M	S	M	M	S	S	M	M
CO5	S	S	S	M	M	S	S	M	M	S

*S-Strong; M-Medium; L-Low

Course code		E Commerce	L	T	P	C
Core/Elective/Supportive		Elective: I	6	0	0	4
Pre-requisite		Basic understanding in use of internet in commercial applications	Syllabus Version		2020-21 Onwards	
Course Objectives:						
The main objectives of this course are to: 1. To enable the students to learn and understand the E-Commerce strategies. 2. To understand the E-Market and EDI standards and implementations. 3. To study and understand the online payments in E-Commerce applications and other E-Commerce applications used in the internet.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Understanding the basics of E-Commerce and its strategies.					K1, K2
2	Knowledge in basics of business strategy, E-Commerce implementation, the credit transaction trade cycle.					K2
3	Understand the E-markets, EDI standards, communication and implementations.					K3
4	Understand the internet, HTML, server side scripting and client side scripting languages, online payments in E-Commerce applications.					K4
5	Knowledge in the internet bookshops, electronic newspapers, virtual auctions gambling on the Net and e-diversity.					K4
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1						
Introduction to E-Commerce			10 hours			
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						
Unit:2						
The Introduction to Business Strategy			10 hours			
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 – The Credit Transaction Trade Cycle. A Variety of Transactions – Pens & Things.						
Unit:3						
E-Markets			10 hours			
Markets – E-Markets-Usage of E-Markets-Advantages & Disadvantages of E-Markets. EDI: Introduction – Definition - Benefits of EDI – EDI Standards – EDI Communication EDI Implementation – EDI Agreement – EDI Security						
Unit:4						
The Internet			12 hours			
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 .		
Unit:5	E-Business: Introduction	12 hours
- The Internet Bookshops – Grocery Supplies - Software Supplies and Support – Electronic Newspapers – The Internet Banking - The Virtual Auctions – Online Share Dealing – Gambling on the Net – e-Diversity.		
Unit:6	Contemporary Issues	3 hours
Expert lectures, online seminars - webinars		
	Total Lecture hours	55 hours
Text Book(s)		
1	David Whiteley, E-Commerce – Strategy, Technology & Applications, Tata McGrawHill.	
2		
Reference Book(s)		
1	E-Commerce - An Indian Perspective, P.T.Joseph, S.J., Fourth Edition, PHI 2012.	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
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Course Designed By:		

Mapping with Programme Outcomes										
Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	L	M	L	S	M	M	L
CO3	S	S	S	L	M	M	S	M	S	L
CO3	S	S	S	M	S	M	S	S	S	M
CO4	S	S	S	M	S	M	S	S	M	M
CO5	S	M	M	M	M	S	S	S	S	M

*S-Strong; M-Medium; L-Low

Course code		Software Engineering	L	T	P	C
Core/Elective/Supportive		Elective: I	6	0	0	4
Pre-requisite	Basic understanding in software project and system analysis and design concepts		Syllabus Version		2020-21 Onwards	
Course Objectives:						
The main objectives of this course are to: 1. To introduce the fundamentals of Python Programming. 2. To teach about the concept of Functions in Python. 3. To impart the knowledge of Lists, Tuples, Files and Directories. 4. To learn about dictionaries in python. 5. To explores the object-oriented programming, Graphical programming aspects of python with help of built in modules..						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Understanding the basics of software engineering, planning a software project.					K1-K2
2	Obtain the knowledge in software cost estimation and techniques.					K2-K3
3	Knowledge on software requirements specification, formal specification techniques, and software design.					K3
4	Understanding the design notation, techniques, structured coding techniques, standards and guidelines.					K4
5	Knowledge on verification and validation techniques, software maintenance and configuration management.					K2-K4
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1 INTRODUCTION TO SOFTWARE ENGINEERING 10 hours						
Introduction to Software Engineering: Definitions – Size Factors – Quality and Productivity Factors. Planning a Software Project: Planning the Development Process – Planning an Organizational Structure.						
Unit:2 SOFTWARE COST ESTIMATION 10 hours						
Software Cost Estimation: Software cost Factors – Software Cost Estimation Techniques – Staffing-Level Estimation – Estimating Software Estimation Costs.						
Unit:3 SOFTWARE REQUIREMENTS 10 hours						
Software Requirements Definition: The Software Requirements specification – Formal Specification Techniques. Software Design: Fundamental Design Concepts – Modules and Modularization Criteria.						
Unit:4 DESIGN NOTATIONS 12 hours						
Design Notations – Design Techniques. Implementation Issues: Structured Coding Techniques – Coding Style – Standards and Guidelines – Documentation Guidelines.						
Unit:5 VERIFICATION AND VALIDATION TECHNIQUES 12 hours						

Verification and Validation Techniques: Quality Assurance – Walkthroughs and Inspections – Unit Testing and Debugging – System Testing. Software Maintenance: Enhancing Maintainability during Development – Managerial Aspects of Software Maintenance – Configuration Management.		
Unit:6	Contemporary Issues	3 hours
Expert lectures, online seminars - webinars		
	Total Lecture hours	55 hours
Text Book(s)		
1	Software Engineering Concepts, Richard Fairley, 1997, TMH. (UNIT-I: 1.1-1.3, 2.3-2.4 UNIT-II: 3.1-3.4 UNIT III: 4.1-4.2, 5.1-5.2 UNIT-IV: 5.3-5.4, 6.1-6.4 UNIT-V: 8.1-8.2, 8.5-8.6, 9.1-9.3)	
Reference Books		
1	Software Engineering for Internet Applications, Eve Anderson, Philip Greenspun, Andrew Grumet, 2006, PHI.	
2	Software Engineering Project Management – 2nd Edition, Wiley India.	
3	Software Quality Engineering, Jeff Tian, Student Edition, 2006, Wiley India.	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
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Course Designed By:		

Mapping with Programme Outcomes										
Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	L	S	L	L	L	S	S
CO2	M	S	S	M	S	M	L	L	S	S
CO3	S	M	M	L	S	M	M	M	S	S
CO4	M	S	S	M	S	L	M	L	S	S
CO5	S	S	S	L	S	L	M	L	M	M

*S-Strong; M-Medium; L-Low

Course code		WEB DESIGNING WITH ASP AND ASP .NET	L	T	P	C
Core/Elective/Supportive		Skill based Subject: 3	6	0	0	3
Pre-requisite		Students should have basic Computer Knowledge and web applications	Syllabus Version		2020-21 Onwards	
Course Objectives:						
The main objectives of this course are to: 1. To enable the students to learn basics of web designing with ASP.NET and VB script. 2. To learn the ADO.NET model to develop data base web applications.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Understand the basics of web design and web design process.					K2
2	Understand the ASP and VB script, ASP objects, and server side components.					K2,K4
3	Understand the basics of ASP.NET, program flow , coding techniques, ASP.NET objects and components.					K2-K4
4	Knowledge on web services ActiveX data objects, ADO.NET model, and developing data base applications.					K4
5	Knowledge on working with ADO.NET and SQL server and creating web application using it.					K2-K4
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1 INTRODUCTION TO WEB DESIGN 12 hours						
Introduction to web design : what is web design – the web design process – frames – LINKING : text – buttons – icons & graphics – search & designing – text : fonts –text layout – colors – images and backgrounds – cookies						
Unit:2 ASP AND VB SCRIPT 15 hours						
Introduction to ASP VB Script –active server objects: Applications, server, session, response, request - active server components: server side components.						
Unit:3 ASP.NET 15 hours						
Introduction to ASP.Net: what is ASP.Net – setting up for ASP.Net – Programming basics: basics of programming –program flow – effective coding techniques –processing ASP.Net applications. Web founds and ASP.Net – ASP.Net and state – scope – ASP.Net objects and components.						
Unit:4 WEB SERVICES AND ASP.NET WITH SQL SERVER 15 hours						
Web services and ASP.Net –ASP.Net and SQL server –using SQL server –using database in ASP.Net applications – ActiveX data objects –ADO.Net object model.						
Unit:5 ADO AND ADO.NET 15 hours						
Introduction to ADO- working with ADO connection object, command object and record set objects – over view of ADO and ADO.Net – ADO.Net providers , process – editing data with ADO.Net – ADO and SQL server.						
Unit:6 Contemporary Issues 3 hours						

Expert lectures, online seminars - webinars		
	Total Lecture hours	75 hours
Text Book(s)		
1	The Complete reference WEB design by Thomos A Powel TMH Publications 2000 Edn.	
2	Using Active server pages by Scot Johnson PHI Spl Edn.	
3	ASP.Net a beginners guide by Dave Merces TMH 2002 Edn.	
4	ADO & ADO.Net programming by Mike Yenderloy BPB publications 2002 Edn.	
Reference Books		
1	Internet and Web Design, ITL Education, Macmillan India Ltd.	
2		
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
Course Designed By:		

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	M	M	S	M	S	L
CO3	S	M	S	S	M	M	S	M	M	L
CO3	M	S	S	S	M	M	M	M	M	M
CO4	S	M	M	M	S	M	M	M	S	M
CO5	M	S	S	M	M	M	S	S	S	M

*S-Strong; M-Medium; L-Low



Sixth Semester

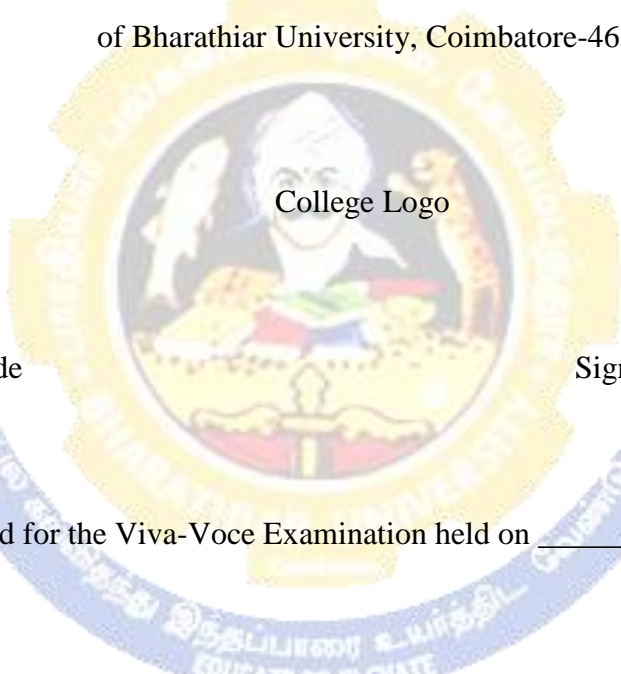
Course code		Graphics & Multimedia	L	T	P	C
Core/Elective/Supportive		Core: 10	5	0	0	4
Pre-requisite		Basic knowledge in 2D, 3D and multimedia file formats	Syllabus Version		2020-21 Onwards	
Course Objectives:						
The main objectives of this course are to: 1. Design and apply two dimensional graphics and transformations. 2. Design and apply three dimensional graphics and transformations. 3. Apply Illumination, color models and clipping techniques to graphics. 4. Understood Different types of Multimedia File Format.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Explain applications, principles ,commonly used and techniques of computer graphics and algorithms for Line-Drawing, Circle- Generating and Ellipse-Generating.					K2
2	Students will get the concepts of 2D and 3D, Viewing, Curves and surfaces, Hidden Line/surface elimination techniques					K3
3	Studies concepts of Multimedia Systems, Text, Audio and Video tools					K3
4	Compressing audio and video using MPEG-1 and MPEG-2					K4
5	Creates Animation with special effects using algorithms					K6
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1		OUTPUT PRIMITIVES			15 hours	
Output Primitives: Points and Lines – Line-Drawing algorithms – Loading frame Buffer – Line function – Circle-Generating algorithms – Ellipse-generating algorithms. Attributes of Output Primitives: Line Attributes – Curve attributes – Color and Grayscale Levels – Area-fill attributes – Character Attributes.						
Unit:2		2D GEOMETRIC TRANSFORMATIONS			15 hours	
2D Geometric Transformations: Basic Transformations – Matrix Representations – Composite Transformations – Other Transformations. 2D Viewing: The Viewing Pipeline – Viewing Co-ordinate Reference Frame – Window-to-Viewport Co-ordinate Transformation - 2D Viewing Functions – Clipping Operations.						
Unit:3		TEXT			15 hours	
Text: Types of Text – Unicode Standard – Font – Insertion of Text – Text compression – File formats. Image: Image Types – Seeing Color – Color Models – Basic Steps for Image Processing – Scanner – Digital Camera – Interface Standards – Specification of Digital Images – CMS – Device Independent Color Models – Image Processing software – File Formats – Image Output on Monitor and Printer.						
Unit:4		AUDIO			15 hours	
Audio: Introduction – Acoustics – Nature of Sound Waves – Fundamental Characteristics of Sound – Microphone – Amplifier – Loudspeaker – Audio Mixer – Digital Audio – Synthesizers – MIDI –						

Basics of Staff Notation – Sound Card – Audio Transmission – Audio File formats and CODECs – Audio Recording Systems – Audio and Multimedia – Voice Recognition and Response - Audio Processing Software.		
Unit:5	VIDEO AND ANIMATION	12 hours
Video: Analog Video Camera – Transmission of Video Signals – Video Signal Formats – Television Broadcasting Standards – PC Video – Video File Formats and CODECs – Video Editing – Video Editing Software. Animation: Types of Animation – Computer Assisted Animation – Creating Movement – Principles of Animation – Some Techniques of Animation – Animation on the Web – Special Effects – Rendering Algorithms. Compression: MPEG-1 Audio – MPEG-1 Video - MPEG-2Audio – MPEG-2 Video.		
Unit:6	Contemporary Issues	3 hours
Expert lectures, online seminars - webinars		
	Total Lecture hours	75 hours
Text Book(s)		
1	Computer Graphics, Donald Hearn, M.Pauline Baker, 2nd edition, PHI. (UNIT-I: 3.1-3.6,4.1-4.5 & UNIT-II: 5.1-5.4,6.1-6.5)	
2	Principles of Multimedia, Ranjan Parekh, 2007, TMH. (UNIT III: 4.1-4.7,5.1-5.16 UNIT-IV: 7.1-7.3,7.8-7.14,7.18-7.20,7.22,7.24,7.26-28 UNIT-V: 9.5-9.10,9.13,9.15,10.10-10.13)	
Reference Books		
1	Computer Graphics, Amarendra N Sinha, Arun D Udai, TMH.	
2	Multimedia: Making it Work, Tay Vaughan, 7th edition, TMH.	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1		
2		
3		
Course Designed By:		

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	M	S	S	S	M
CO2	S	S	S	M	S	M	M	M	S	M
CO3	S	M	M	M	S	M	M	M	S	M
CO4	S	S	S	M	S	M	M	M	S	M
CO5	S	S	S	M	S	M	S	S	S	M

*S-Strong; M-Medium; L-Low

Course code		Project Work Lab	L	T	P	C
Core/Elective/Supportive		Core: 11	0	0	5	8
Pre-requisite		Students should have the strong knowledge in any one of the programming languages in this course.	Syllabus Version		2020-21 Onwards	
Course Objectives:						
The main objectives of this course are to: 1. To understand and select the task based on their core skills. 2. To get the knowledge about analytical skill for solving the selected task. 3. To get confidence for implementing the task and solving the real time problems. 4. Express technical and behavioral ideas and thought in oral settings. 5. Prepare and conduct oral presentations						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Formulate a real world problem and develop its requirements develop a design solution for a set of requirements.					K3
2	Test and validate the conformance of the developed prototype against the original requirements of the problem.					K5
3	Work as a responsible member and possibly a leader of a team in developing software solutions.					K3
4	Express technical ideas, strategies and methodologies in written form. Self-learn new tools, algorithms and techniques that contribute to the software solution of the project.					K1-K4
5	Generate alternative solutions, compare them and select the optimum one.					K6
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
AIM OF THE PROJECT WORK						
1. The aim of the project work is to acquire practical knowledge on the implementation of the programming concepts studied.						
2. Each student should carry out individually one project work and it may be a work using the software packages that they have learned or the implementation of concepts from the papers studied or implementation of any innovative idea focusing on application oriented concepts.						
3. The project work should be compulsorily done in the college only under the supervision of the department staff concerned.						
Viva Voce						
1. Viva-Voce will be conducted at the end of the year by both Internal (Respective Guides) and External Examiners, after duly verifying the Annexure Report available in the College, for a total of 200 marks at the last day of the practical session.						
2. Out of 200 marks, 160 marks for project report and 40 marks for Viva Voce.						

Project Report Format	
<p align="center">PROJECT WORK</p> <p align="center">TITLE OF THE DISSERTATION</p> <p align="center">Bonafide Work Done by</p> <p align="center">STUDENT NAME</p> <p align="center">REG. NO.</p> <p align="center">Dissertation submitted in partial fulfillment of the requirements for the award of</p> <p align="center"><Name of the Degree></p> <p align="center">of Bharathiar University, Coimbatore-46.</p> <div align="center">  <p>College Logo</p> </div> <div> <p>Signature of the Guide</p> <p>Signature of the HOD</p> </div> <p align="center">Submitted for the Viva-Voce Examination held on _____</p> <div> <p>Internal Examiner</p> <p>External Examiner</p> </div> <p align="center">Month – Year</p>	
<p>CONTENTS</p> <p>Acknowledgement</p> <p>Contents</p> <p>Synopsis</p> <p>1. Introduction</p> <p>1.1 Organization Profile</p> <p>1.2 System Specification</p> <p>1.2.1 Hardware Configuration</p> <p>1.2.2 Software Specification</p> <p>2. System Study</p> <p>2.1 Existing System</p>	

2.1.1 Drawbacks
2.2 Proposed System
2.2.1 Features
3. System Design and Development
3.1 File Design
3.2 Input Design
3.3 Output Design
3.4 Database Design
3.5 System Development
3.5.1 Description of Modules (Detailed explanation about the project work)
4. Testing and Implementation
5. Conclusion
Bibliography
Appendices
A. Data Flow Diagram
B. Table Structure
C. Sample Coding
D. Sample Input
E. Sample Output
Course Designed By:

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1										
CO2										
CO3										
CO4										
CO5										

*S-Strong; M-Medium; L-Low

Course code		Programming Lab – Graphics & Multimedia	L	T	P	C
Core/Elective/Supportive		Core Lab : 7	0	0	6	4
Pre-requisite		Students should have the basic knowledge on C and C++ to do computer graphics and multimedia applications.	Syllabus Version		2020-21 Onwards	
Course Objectives:						
The main objectives of this course are to:						
1. To learn the basic principles of 2-dimensional computer graphics.						
2. Provide an understanding of how to scan convert the basic geometrical primitives, how to transform the shapes to fit them as per the picture definition.						
3. Provide an understanding of mapping from a world coordinates to device coordinates, clipping and projections.						
4. To be able to discuss the application of computer graphics concepts in the development of computer games, information visualization and business applications.						
5. To comprehend and analyse the fundamentals of animation, virtual reality, underlying technologies, principles and applications.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Understand the basic concepts of computer graphics.					K1
2	Design scan conversion problems using C and C++ programming.					K2
3	Apply clipping and filling techniques for modifying an object.					K3
4	Understand the concepts of different type of geometric transformation of objects in 2D.					K4
5	Understand and develop the practical implementation of modeling, rendering, viewing of objects in 2D					K6
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Programs			36 hours			
Graphics						
1. Write a program to rotate an image.						
2. Write a program to drop each word of a sentence one by one from the top.						
3. Write a program to drop a line using DDA Algorithm.						
4. Write a program to move a car with sound effect.						
5. Write a program to bounce a ball and move it with sound effect.						
6. Write a program to test whether a given pixel is inside or outside or on a polygon.						
Multimedia						
7. Create Sun Flower using Photoshop.						
8. Animate Plane flying in the Clouds using Photoshop.						
9. Create Plastic Surgery for the Nose using Photoshop.						
10. Create See-through text using Photoshop.						
11. Create a Web Page using Photoshop.						
12. Convert Black and White Photo to Color Photo using Photoshop.						
			Total Lecture hours		36 hours	
Text Book(s)						

1	
Reference Books	
1	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
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Course Designed By:	

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	M	L	L	M	L
CO3	S	S	S	M	M	M	M	M	M	L
CO3	S	S	S	M	S	M	M	M	M	L
CO4	S	S	S	S	S	M	M	M	M	M
CO5	S	S	S	S	S	M	S	S	S	M

*S-Strong; M-Medium; L-Low



Course code		Network Security and Cryptography	L	T	P	C
Core/Elective/Supportive	Elective: II		5	0	0	4
Pre-requisite	Basics of computer networks		Syllabus Version		2020-21 Onwards	
Course Objectives:						
The main objectives of this course are to:						
1. To learn the need for network security and security approaches.						
2. To inculcate the concept of transferring authentic data along the network with several methods and algorithms.						
3. To enrich the knowledge on different types of Internet Security Protocols.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Remember the basic concept of Cryptography and various types of attacks.					K1
2	Understand about various types of protocols for Internet Security.					K2
3	Implement various algorithms for Cryptography					K3
4	Review Firewall and IP security					K4
5	To be familiar with network security threats and countermeasure					K3-K5
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1						
SERVICE MECHANISM			15 hours			
Service mechanism and attacks – The OSI security architecture – A model for network security – symmetric Cipher model – Substitution techniques – transposition techniques – simplified des – block chipper principles – the strength of des – block chipper design principles and modes of operation.						
Unit:2						
TYPES OF DES			12 hours			
Triple des-blow fish – RCS Advanced Symmetric Block Ciphers –RC4 stream Cipher confidentially using symmetric encryption – introduction to number theory – public – key cryptography and RSA.						
Unit:3						
KEY MANAGEMENT			15 hours			
Key management – Diffie Hellman key exchange – message authentication and hash function – hash algorithm – digital signature and authentication protocols – digital signature standard.						
Unit:4						
AUTHENTICATION			15 hours			
Authentication application – pretty good privacy – S/MIME – ip security – web security considerations –secure socket layer transport layer security –secure electronic transaction.						
Unit:5						
INTRUDERS			15 hours			
Intruders –intrusion detection – password management –viruses and related threats – virus countermeasures – fire wall design principles – trusted systems						
Unit:6						
Contemporary Issues			3 hours			
Expert lectures, online seminars – webinars						
			Total Lecture hours		75 hours	
Text Book(s)						

1	William Stallings, Cryptography and Network Security Principles and Practices, Fourth edition, PHI Education Asia
Reference Books	
1	Atul Kahate, Cryptography and Network Security, 2 nd Edition, TMH.
2	Behrouz A.Forouzan, Cryptography and Network Security, TMH.
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
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Course Designed By:	

Mapping with Programme Outcomes										
Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	L	S	L	L	L	S	S
CO2	S	M	S	L	S	L	M	L	S	S
CO3	S	S	S	L	S	L	M	L	S	S
CO4	S	M	S	L	S	L	M	L	S	S
CO5	S	S	S	L	S	L	M	L	S	S

*S-Strong; M-Medium; L-Low

Course code		Distributed Computing	L	T	P	C
Core/Elective/Supportive		Elective: II	5	0	0	4
Pre-requisite	Basic knowledge in databases, client and server		Syllabus Version		2020-21 Onwards	
Course Objectives:						
The main objectives of this course are to:						
1. To enable the students to learn the concepts and techniques in distributed computing and client server computing.						
2. To learn the pros and cons of distributed computing, distributed databases.						
3. To familiar with design considerations in distributed computing						
4. To understand the client server models and R* projection techniques						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Understand the concepts and techniques in distributed computing and client server computing.					K1
2	Understand the pros and cons of distributed processing, databases, challenges.					K2
3	Understand the design considerations in distributed computing					K2
4	Understand and analyse the client server network model, file server, printer server and email server.					K3
5	Understand and obtaining the Knowledge on distributed databases, R* project techniques.					K2-K4
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1	Introduction to Distributed Systems				15 hours	
Distributed Systems: Fully Distributed Processing systems – Networks and interconnection structures – designing a distributed processing g system.						
Unit:2	Challenges and Managing Distributed Resources				15 hours	
Distributed systems: Pros and Cons of distributed processing – Distributed databases – the challenges of distributed data – loading, factors – managing the distributed resources division of responsibilities.						
Unit:3	Design Considerations				15 hours	
Design considerations: Communication Line loading – line loading calculations- partitioning and allocation - data flow systems – dimensional analysis- network database design considerations- ration analysis- database decision trees- synchronization of network databases						
Unit:4	Client Server Network Model				15 hours	
Client server network model: Concept – file server – printer server and e-mail server.						
Unit:5	Distributed Databases				12 hours	
Distributed databases: An overview, distributed databases- principles of distributed databases – levels of transparency- distributed database design- the R* project techniques problem of heterogeneous distributed databases.						

Unit:6		Contemporary Issues	3 hours
Expert lectures, online seminars – webinars			
		Total Lecture hours	75 hours
Text Book(s)			
1	John A. Sharp, An introduction to distributed and parallel processing, Blackwell Scientific Publication(Unit I & III)		
2	Uyless D. Black, Data communication and distributed networks (unit II)		
3	Joel M.Crichlow , Introduction to distributed & parallel computing (Unit IV)		
Reference Books			
1	Stefans Ceri, Ginseppe Pelagatti , Distributed database Principles and systems, McGraw Hill		
2			
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]			
1			
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Course Designed By:			

Mapping with Programme Outcomes										
Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	M	L	L	M	L
CO2	S	S	S	M	M	M	M	M	M	L
CO3	S	S	S	M	S	M	L	M	L	L
CO4	S	S	S	S	S	M	M	M	M	M
CO5	S	S	S	S	S	M	S	S	S	M

*S-Strong; M-Medium; L-Low

Course code		Computer Networks	L	T	P	C
Core/Elective/Supportive		Elective: II	5	0	0	4
Pre-requisite	Students should have the knowledge on computer connectivity and connectivity peripherals.		Syllabus Version		2020-21 Onwards	
Course Objectives:						
The main objectives of this course are to:						
1. To identify various components in a data communication system and understand state-of-the-art in network protocols, architectures and applications.						
2. To enable students through the concepts of computer networks, different models and their involvement in each stage of network communication.						
3. To educate the concepts of terminology and concepts of the OSI reference model and the TCP/IP reference model and protocols such as TCP, UDP and IP.						
4. To be familiar with the concepts of protocols, network interfaces, and design/performance issues in local area networks and wide area networks.						
5. Introduce the student to a network routing for IP networks and how a collision occurs and how to solve it and how a frame is created and character count of each frame.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Remember the organization of computer networks, factors influencing computer network development and the reasons for having variety of different types of networks.					K1
2	Understand Internet structure and can see how standard problems are solved and the use of cryptography and network security.					K2
3	Apply knowledge of different techniques of error detection and correction to detect and solve error bit during data transmission.					K3
4	Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies					K4
5	Knowledge about different computer networks, reference models and the functions of each layer in the models					K2-K4
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1						
BASICS OF NETWORKS AND OSI MODEL		15 hours				
Network Hardware: LAN – WAN – MAN – Wireless – Home Networks. Network Software: Protocol Hierarchies – Design Issues for the Layers – Connection-oriented and connectionless services – Service Primitives – The Relationship of services to Protocols. Reference Models: OSI Reference Model – TCP/IP reference Model – Comparison of OSI and TCP/IP -Critique of OSI and protocols – Critique of the TCP/IP Reference model.						
Unit:2						
PHYSICAL LAYER		15 hours				
PHYSICAL LAYER - Guided Transmission Media: Magnetic Media – Twisted Pair – Coaxial Cable – Fiber Optics. Wireless Transmission: Electromagnetic Spectrum – Radio Transmission – Microwave Transmission – Infrared and Millimeter Waves – Light Waves. Communication Satellites: Geostationary, Medium-Earth Orbit, Low Earth-orbit Satellites – Satellites versus Fiber.						

Unit:3	DATA-LINK LAYER	15 hours
DATA-LINK LAYER: Error Detection and correction – Elementary Data-link Protocols – Sliding Window Protocols. MEDIUM-ACCESS CONTROL SUB LAYER: Multiple Access Protocols – Ethernet – Wireless LANs - Broadband Wireless – Bluetooth.		
Unit:4	NETWORK LAYER	15 hours
NETWORK LAYER: Routing algorithms – Congestion Control Algorithms. TRANSPORT LAYER: Elements of Transport Protocols – Internet Transport Protocols: TCP.		
Unit:5	APPLICATION LAYER	12 hours
APPLICATION LAYER: DNS – E-mail. NETWORK SECURITY: Cryptography – Symmetric Key Algorithms – Public Key Algorithms – Digital Signatures.		
Unit:6	Contemporary Issues	3 hours
Expert lectures, online seminars - webinars		
	Total Lecture hours	75 hours
Text Book(s)		
1	Computer Networks, Andrew S. Tanenbaum, 4th edition, PHI. (UNIT-I:1.2-1.4 UNIT-II:2.2-2.4 UNIT-III:4.2-4.6 UNIT-IV:5.2,5.3,6.2,6.5 UNIT-V:7.1,7.2,8.1-8.4)	
Reference Books		
1	Data Communication and Networks, Achyut Godbole, 2007, TMH.	
2	Computer Networks: Protocols, Standards, and Interfaces, Uyless Black, 2nd ed, PHI	
3		
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1		
2		
3		
Course Designed By:		

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	L	S	M	L	M	S	S
CO2	S	M	S	L	S	M	L	M	S	S
CO3	S	M	S	L	S	M	L	M	S	S
CO4	S	M	S	L	S	M	L	M	S	S
CO5	S	M	S	L	S	M	L	M	S	S

*S-Strong; M-Medium; L-Low

Course code		Mobile Computing	L	T	P	C
Core/Elective/Supportive		Elective: III	5	0	0	4
Pre-requisite		Basic knowledge on mobile technologies	Syllabus Version	2020-21 Onwards		
Course Objectives:						
The main objectives of this course are to:						
1. To enable the students to study on the emerging technologies in mobile computing.						
2. To learn the basics of mobile computing and IVR application						
3. To make the students to learn about the architecture of mobile computing						
4. To understand the mobile technologies GPRS,CDMA and 3G						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Understand the history of mobile computing, applications, standards and mobile computing architecture.					K1-K2
2	Understand the mobile computing techniques related to telephone, access procedures, IVR applications and Voice XML.					K2
3	Understand and analyse the emerging technologies Bluetooth, RFID, WiMAX, etc. also GSM.					K1-K3
4	Knowledge on GPRS, GPRS network architecture, Data services, applications for GPRS and limitations.					K4
5	Knowledge on CDMA and 3G, CDMA Vs GSM, applications of 3G wireless LAN, Architecture, Adhoc and sensor networks and security features.					K1-K4
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1	INTRODUCTION				10 hours	
Introduction: Mobility of Bits and Bytes –Wireless The Beginning – Mobile Computing – Dialogue Control – Networks – Middleware and Gateways – Application and services- Developing Mobile computer Applications – security in mobile computing – Standards _ Why is it necessary – Standard bodies. MOBILE COMPUTING ARCHITECTURE: History of computers and Internet – Architecture for mobile computing – Three-tier architecture – Design considerations for mobile computing – Mobile computing through Internet – Making exiting applications mobile enabled						
Unit:2	MOBILE COMPUTING THROUGH TELEPHONY				10 hours	
UNIT II: MOBILE COMPUTING THROUGH TELEPHONY: Evaluation of telephony – Multiple access procedures – Mobile computing through telephone – IVR Application –Voice XML – TAPI						
Unit:3	EMERGING TECHNOLOGIES				10 hours	
EMERGING TECHNOLOGIES: Blue Tooth – RFID – WiMAX – Mobile IP – IPv6 – Java Card. GSM : Global System for mobile communications – GSM Architecture – GSM Entities – Call routing in GSM – PLMN Interfaces – GSM Addresses and Identifiers – Network Aspects in GSM – GSM Frequency allocations – Authentications and Security. SMS						
Unit:4	GPRS				12 hours	
GPRS – GPRS and packet data network – GPRS network architecture – GPRS network operations						

– Data services in GPRS – Application for GPRS- Limitations – Billing and Charging. WAP : MMS – GPRS Applications		
Unit:5	CDMA and 3G	12 hours
CDMA and 3G: Spread spectrum technology – Is 95 – CDMA vs GSM – Wireless Data – Third generation networks – Applications on 3G WIRELESS LAN: Wireless LAN advantages – IEEE 802.11 standards – Architecture – Mobile in Wireless LAN – Deploying wireless LAN – Mobile adhoc networks and sensor networks – Wireless LAN Security – WiFi vs 3G.		
	Total Lecture hours	55 hours
Text Book(s)		
1	MOBILE COMPUTING, Asoke K Talukder , Roopa R Yavagal, TMH, 2005	
Reference Books		
1	Jochen H. Schller, “Mobile Communications”, Second Edition, Pearson Education, New Delhi, 2007.	
2	Dharma Prakash Agarval, Qing and An Zeng, “Introduction to Wireless and Mobile systems”, Thomson Asia Pvt Ltd, 2005.	
3	Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, “Principles of Mobile Computing”, Springer, 2003.	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
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Course Designed By:		

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	L	S	M	L	M	S	S
CO2	S	S	S	L	S	M	L	M	S	M
CO3	S	S	S	L	S	L	L	M	M	M
CO4	S	S	S	L	S	L	L	M	M	M
CO5	S	S	S	L	S	M	L	M	S	M

*S-Strong; M-Medium; L-Low

Course code		Web Technology	L	T	P	C
Core/Elective/Supportive		Elective: III	5	0	0	4
Pre-requisite		Basic knowledge in web server, browser and web application	Syllabus Version		2020-21 Onwards	
Course Objectives:						
The main objectives of this course are to:						
1. On completion of this course, a student will be familiar with client server architecture and able to develop a web application using java technologies.						
1. Students will gain the skills and project-based experience needed for entry into web application and development careers						
3. Understand best technologies for solving web client/server problems						
4. Use Java script for dynamic effects and to validate form input entry						
5. Analyze to Use appropriate client-side or Server-side applications						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Understand and analyse the TCP/IP basics.					K1
2	Understand Domain server name, FTP, TFTP, basics of WWW, web browser architecture.					K2
3	Knowledge of Microsoft and java technologies, dynamic web pages, DHTML, ASP and JSP.					K2-K3
4	Understanding active web pages, Java Applet, Java bean, CORBA, RMI and EDI architecture					K2-K3
5	Knowledge on XML, XML parser, WAP					K4-K6
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create						
Unit:1						
TCP/IP			15 hours			
TCP/IP: TCP/IP Basics – Why IP address – Logical Address - TCP/IP Example- The concept of IP address – Basics of TCP – Features of TCP – Relationship between TCP and IP – Ports and Sockets – Active Open and Passive Open - TCP Connections – What makes TCP reliable? – TCP Packet format - Persistent TCP connections – UDP – Differences between TCP and UDP.						
Unit:2						
DNS			12 hours			
DNS – E-mail – FTP – TFTP – History of WWW – Basics of WWW and Browsing - Local information on the internet – HTML – Web Browser Architecture – Web Pages and Multimedia – Remote Login (TELNET).						
Unit:3						
INTRODUCTION TO WEB TECHNOLOGY			15 hours			
Introduction to Web Technology: Web pages – Tiers – Concept of a Tier – Comparison of Microsoft and Java Technologies – Web Pages – Static Web Pages – Plug-ins – Frames – Forms. Dynamic Web Pages: Need – Magic of Dynamic Web Pages – Overview of Dynamic Web Page Technologies – Overview of DHTML – Common Gateway Interface – ASP – ASP Technology – ASP Example – Modern Trends in ASP – Java and JVM – Java Servlets – Java Server Pages.						

Unit:4	ACTIVE WEB PAGES	15 hours
Active Web Pages: Active Web Pages in better solution – Java Applets – Why are Active Web Pages Powerful? – Lifecycle of Java Applets – ActiveX Controls – Java Beans. Middleware and Component-Based E-Commerce Architectures: CORBA – Java Remote Method Invocation – DCOM. EDI: Overview – Origins of EDI – Understanding of EDI – Data Exchange Standards – EDI Architecture – Significance of EDI – Financial EDI – EDI and internet.		
Unit:5	XML	15 hours
XML: SGML – Basics of XML – XML Parsers – Need for a standard. WAP: Limitations of Mobile devices – Emergence of WAP – WAP Architecture – WAP Stack – Concerns about WAP and its future – Alternatives to WAP.		
Unit:6	Contemporary Issues	3 hours
Expert lectures, online seminars – webinars		
	Total Lecture hours	75 hours
Text Book(s)		
1	Web Technologies: TCP/IP to Internet Applications Architectures – Achyut S Godbole & Atul Kahate, 2007, TMH. (UNIT-I: 3.1-3.5,4.1-4.12 UNIT-II: 5.1-5.4,6.1-6.7 UNIT III:8.1-8.1,9.1-9.13 UNIT IV: 10.1-10.7,15.1-15.3,16.1-16.8 UNIT-V: 17.1-17.4,18.1-18.6)	
Reference Books		
1	Internet and Web Technologies, Rajkamal, TMH.	
2	TCP/IP Protocol Suite, Behrouz A. Forouzan, 3rd edition, TMH.	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
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Course Designed By:		

Mapping with Programme Outcomes										
Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	L	S	L	L	L	S	S
CO2	S	S	S	M	S	M	L	L	S	S
CO3	S	S	S	L	S	M	M	M	S	S
CO4	S	S	S	M	S	L	M	L	S	S
CO5	S	S	S	L	S	L	M	L	S	S

*S-Strong; M-Medium; L-Low

Course code		Software Testing	L	T	P	C
Core/Elective/Supportive		Elective - III	5	0	0	4
Pre-requisite	Students should know about the software and Software Development Life Cycle.		Syllabus Version		2020-21 Onwards	
Course Objectives:						
The main objectives of this course are to: 1. To study fundamental concepts in software testing 2. To discuss various software testing issues and solutions in software unit test, integration and system testing. 3. To expose the advanced software testing topics, such as object-oriented software testing methods. 4. List a range of different software testing techniques and strategies and be able to apply specific automated unit testing method to the projects.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Explain the basic concepts and the processes that lead to software testing					K2
2	Design test cases from the given requirements using Black box testing techniques					K3
3	Identify the test cases from Source code by means of white box testing techniques					K3
4	Know about user acceptance testing and generate test cases for it					K4
5	Examine the test adequacy criteria to complete the testing process					K4
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1 SOFTWARE DEVELOPMENT LIFE CYCLE MODELS 15 hours						
Software Development Life Cycle models: Phases of Software project – Quality, Quality Assurance, Quality control – Testing, Verification and Validation – Process Model to represent Different Phases - Life Cycle models. White-Box Testing: Static Testing – Structural Testing – Challenges in White-Box Testing.						
Unit:2 BLACK-BOX TESTING 15 hours						
Black-Box Testing: What is Black-Box Testing? - Why Black-Box Testing? – When to do Black-Box Testing? – How to do Black-Box Testing? – Challenges in White Box Testing - Integration Testing: Integration Testing as Type of Testing – Integration Testing as a Phase of Testing – Scenario Testing – Defect Bash.						
Unit:3 SYSTEM AND ACCEPTANCE TESTING 15 hours						
System and Acceptance Testing: system Testing Overview – Why System testing is done? – Functional versus Non-functional Testing - Functional testing - Non-functional Testing – Acceptance Testing – Summary of Testing Phases.						
Unit:4 PERFORMANCE TESTING 15 hours						
Factors governing Performance Testing – Methodology of Performance Testing – tools for Performance Testing – Process for Performance Testing – Challenges. Regression Testing: What is Regression Testing? – Types of Regression Testing – When to do Regression Testing – How to do Regression Testing – Best Practices in Regression Testing.						

Unit:5	TEST PLANNING, MANAGEMENT, EXECUTION AND REPORTING	12 hours
Test Planning, Management, Execution and Reporting: Test Planning – Test Management – Test Process – Test Reporting –Best Practices. Test Metrics and Measurements: Project Metrics – Progress Metrics – Productivity Metrics – Release Metrics.		
Unit:6	Contemporary Issues	3 hours
Expert lectures, online seminars - webinars		
	Total Lecture hours	75 hours
Text Book(s)		
1	Software Testing Principles and Practices, Srinivasan Desikan & Gopalswamy Ramesh, 2006, Pearson Education. <i>(UNIT-I: 2.1-2.5, 3.1-3.4 UNIT-II: 4.1-4.4, 5.1-5.5 UNIT III: 6 .1-6.7 (UNIT IV: 7.1-7.6, 8.1-8.5 UNIT-V: 15.1-15.6, 17.4-17.7)</i>	
2	Limaye M.G., “Software Testing Principles, Techniques and Tools”, Second Reprint, TMH Publishers, 2010.	
3	Aditya P.Mathur, “Foundations of Software Testing”, 2nd Edition, Pearson Education, 2013.	
Reference Books		
1	Effective Methods of Software Testing, William E. Perry, 3rd ed, Wiley India.	
2	Software Testing, Renu Rajani, Pradeep Oak, 2007, TMH.	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
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Course Designed By:		

Mapping with Programme Outcomes										
Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	M	L	L	M	L
CO2	S	S	S	M	M	M	M	M	M	L
CO3	S	S	S	M	S	M	M	M	M	L
CO4	S	S	S	S	S	M	M	M	M	M
CO5	S	S	S	S	S	M	S	S	S	M

*S-Strong; M-Medium; L-Low

Course code		ASP LAB	L	T	P	C
Core/Elective/Supportive		Skill Based Subject: 4	0	0	4	3
Pre-requisite		Basic knowledge in web pages, web server and client.	Syllabus Version		2020-21 Onwards	
Course Objectives:						
The main objectives of this course are to:						
1. To enable the students to learn basics of web designing with ASP.NET and VB script.						
2. To learn the ADO.NET model to develop data base web applications.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Understand the basics of web design and web design process.					K2
2	Understand the ASP and VB script, ASP objects, and server side components.					K2,K4
3	Understand the basics of ASP.NET, program flow, coding techniques, ASP.NET objects and components.					K2-K4
4	Knowledge on web services ActiveX data objects, ADO.NET model, and developing data base applications.					K4
5	Knowledge on working with ADO.NET and SQL server and creating web application using it.					K2-K4
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Programs			36 hours			
19. Design a personal web page using ASP.						
20. Design a data entry form in ASP.						
21. Write a Program in ASP to get data using a form, validate the data and returns the same data for correction if any using the same form.						
22. Write a program in ASP to display the Session properties.						
23. Write a program in ASP that makes use of Ad Rotator component.						
24. Write a program in ASP that makes use of Browser Capabilities component.						
25. Write a program in ASP that makes use of Content Rotator component.						
26. Write a program in ASP that makes use of page counter component.						
27. Write a program in ASP to get the data of students using forms and stores them in database.						
28. Write a program in ASP to perform record navigation using a form.						
Text Book(s)						
1	The Complete reference WEB design by Thomos A Powel TMH Publications 2000 Edn					
2	Using Active server pages by Scot Johnson PHI Spl Edn.					
Reference Books						
1	ASP.Net a beginners guide by Dave Mercas TMH 2002 Edn.					
2	ADO & ADO.Net programming by Mike Yenderloy BPB publications 2002 Edn.					

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
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Course Designed By:	

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	S	S	S	M	M	S	L
CO2	S	M	S	S	S	S	S	S	S	M
CO3	S	S	S	S	M	S	S	S	M	S
CO4	S	S	S	S	M	S	S	S	M	S
CO5	S	M	S	S	S	S	S	S	S	M

*S-Strong; M-Medium; L-Low

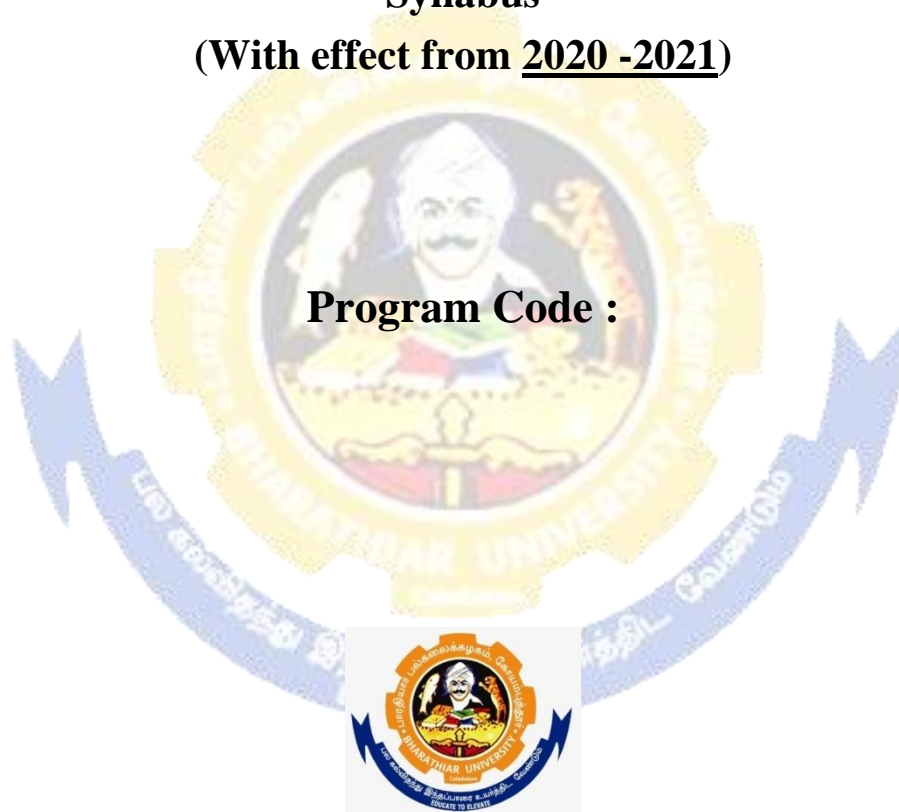


Annexure

B. Sc. Computer Science and Applications

**Syllabus
(With effect from 2020 -2021)**

Program Code :



DEPARTMENT OF Computer Science and Applications

Bharathiar University

(A State University, Accredited with “A” Grade by NAAC and
13th Rank among Indian Universities by MHRD-NIRF)

Coimbatore 641 046, INDIA

BHARATHIAR UNIVERSITY : : COIMBATORE 641046

DEPARTMENT OF Computer Science and Applications

MISSION

- ✓ To develop IT professionals with ethical and human values.
- ✓ To organize, connect, create and communicate mathematical ideas effectively, through industry 4.0.
- ✓ To provide a learning environment to enhance innovations, problem solving abilities, leadership potentials, team-spirit and moral tasks.
- ✓ To nurture the research values in the developing areas of Computer Science and interdisciplinary fields.
- ✓ Promote inter-disciplinary research among the faculty and the students to create state of art research facilities.
- ✓ To promote quality and ethics among the students.
- ✓ Motivate the students to acquire entrepreneurial skills to become global leaders.



