

B. Sc. (Multimedia and Web Technology)

Syllabus

AFFILIATED COLLEGES

Program Code: 26M

2022– 2025 BATCH



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. Multimedia and Web Technology program describe accomplishments that graduates are expected to attain within five to seven years after graduation	
1	Acquire multiple skills that will enhance their employability in different segments of Animation, Gaming and Entertainment industry.
2	Understand the ongoing changing trends and keep them updated with the latest technology.
3	Use their critical thinking skills and problem solving strategies for overall development of the professional growth.
4	Graduates will have the expertise to be successful professionals in industry, government, academic research, entrepreneurial pursuit and consulting firms.
5	Graduates will excel in problem solving and programming skills in IT industries as well as in research institutions.



Program Specific Outcomes (PSOs)	
After the successful completion of B.Sc. Multimedia and Web Technology program, the students are expected to	
1	students will be equipped with creative and technical skills in various domains of Animation, Gaming, VFX and Web technology
2	Apply the knowledge of mathematics, science, and web fundamentals and an engineering specialization to the solution of complex problems.
3	The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future.
4	Accept cross cultural, social, professional, legal and ethical issues prevailing in local and global industry.
5	Students will become expert in the specific domain of Computer Games and will be able to work in top computer games based web industries.



Program Outcomes (POs)	
On successful completion of the B.Sc. Multimedia and Web Technology 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. Multimedia and Web Technology (CBCS PATTERN)

(For the students admitted from the academic year 2022-2023 and onwards)

Scheme of Examination

Part	Title of the Course	Hours/ Week	Examination				Credits
			Duration in Hours	Maximum Marks			
				CIA	CEE	Total	
Semester I							
I	Language - I	6	3	50	50	100	4
II	English - I	6	3	50	50	100	4
III	Core 1: Computing Fundamentals and C Programming	4	3	50	50	100	4
III	Core 2: Digital Fundamentals and Computer Architecture	4	3	50	50	100	4
III	Core Lab 1: Programming Lab - C	3	3	50	50	100	4
III	Allied 1: Mathematical Structures for Computer Science	5	3	50	50	100	4
IV	Environmental Studies*	2	3	-	50	50	2
Total		30		300	350	650	26
Semester II							
I	Language – II	6	3	50	50	100	4
II	English – II &	4	3	25	25	50	2
	Naan Mudhalvan Courses Effective English & <a href="http://kb.naanmudhalvan.in/images/c/c7/Cambri
dge_Course_Details.pdf">http://kb.naanmudhalvan.in/images/c/c7/Cambri dge_Course_Details.pdf	2		25	25	50	2
III	Core 3: C++ Programming	5	3	50	50	100	4
III	Core Lab 2: Programming Lab - C++	4	3	50	50	100	4
III	Core Lab 3: Internet Basics	2	3	25	25	50	2
III	Allied 2: Discrete Mathematics	5	3	50	50	100	4
IV	Value Education – Human Rights*	2	3	-	50	50	2
Total		30		275	325	600	24
Semester III							
I	Language – III	4	3	50	50	100	4
II	English – III &	4	3	25	25	50	2
III	Core 4: Data Structures	4	3	50	50	100	4
III	Core 5: Java Programming	4	3	50	50	100	3
III	Core Lab 4: Programming Lab - Java	3	3	25	25	50	2
III	Allied 3: Microprocessor & ALP	5	3	25	25	50	2
III	Skill based Subject1: Introduction to PHP Programming	4	3	30	45	75	3
IV	Tamil** / Advanced Tamil* (OR) Non-major elective - I (Yoga for Human Excellence)* / Women's Rights*	2	3	-	50	50	2
Total		30		255	320	575	21
Semester IV							
I	Language – IV	4	3	50	50	100	4
II	English – IV &	4	3	25	25	50	2
III	Core 6: System Software and Operating System	4	3	50	50	100	3
III	Core 7: Linux and Shell Programming	3	3	50	50	100	3
III	Core Lab 5: Linux and Shell Programming Lab	3	3	25	25	50	2

	Naan Mudhalvan Courses Office Fundamentals – Lab*** http://kb.naanmudhalvan.in/Bharathiar_University_(BU)	3	-	25	25	50	2
III	Allied 4: Mastering LAN and Trouble Shooting	4	3	25	25	50	2
III	Skill based Subject 2 Lab: PHP Programming - Lab	3	3	25	25	50	2
IV	Tamil**/Advanced Tamil* (OR) Non-major elective -II (General Awareness*)	2	3	-	50	50	2
	Total	30		275	325	600	22
Semester V							
III	Core 8: RDBMS & Oracle	6	3	50	50	100	4
III	Core 9: Visual Basic	6	3	50	50	100	4
III	Core Lab 6: Programming Lab – VB & Oracle	6	3	25	25	50	4
III	Elective – I : Web Technology / Software Engineering / CASE Tools Concepts and applications	6	3	50	50	100	4
III	Skill based Subject 3: Animation Techniques	6	3	30	45	75	3
	Total	30		205	220	425	19
Semester VI							
III	Core 10: Graphics &Multimedia	5	3	50	50	100	4
III	Core 11: Project Work Lab % %	5	3	60	90	150	6
	Naan Mudhalvan–Skill Course - Cyber Security @ http://kb.naanmudhalvan.in/images/7/71/Cybersecurity.pdf (or) Machine Learning # http://kb.naanmudhalvan.in/images/1/19/PBL_Google.pdf (or) Android APP Development \$ http://kb.naanmudhalvan.in/images/0/08/Android_App_Dev.pdf	2		25	25	50	2
III	Core Lab 7: Programming Lab – Graphics & Multimedia	5	3	25	25	50	3
III	Elective – II: Flash / Distributed Computing/Multimedia Systems	5	3	50	50	100	4
III	Elective – III: 3DS MAX Animation / Software Project Management / Organizational Behavior	5	3	50	50	100	4
III	Skill Based Subject 4 Animation Lab – Flash	3	3	25	25	50	2
V	Extension Activities**	-	-	50	-	50	2
	Total	30		335	315	650	27
	Grand Total			1645	1855	3500	140

Note:

*	No Continuous Internal Assessment (CIA), University Examinations Only.
**	No University Examinations, Continuous Internal Assessment (CIA) Only.
****	Naan Mudhalvan – Emerging Technology for Employability – II-Skill based Course external 25 marks will be assessed by Industry and internal will be offered by respective

	course teacher.
# Govt – Non-Autonomous Colleges, \$ Aided – Non-Autonomous Colleges, @ Self - Financing (Non – Autonomous).	
& The English II- University semester examination will be conducted for 50 marks (As per existing pattern of Examination) and it will be converted for 25 marks.	





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	2021-22 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
CO2	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	2021-22 Onwards		
Course Objectives:						
On successful completion of this subject the students should have Knowledge on						
<ol style="list-style-type: none"> To familiarize with different number systems and digital arithmetic & logic circuits To understand the concepts of Combinational Logic and Sequential Circuits To impart the knowledge of buses, I/O devices, flip flops, Memory and bus structure. To understand the concepts of memory hierarchy and memory organization 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
CO2	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

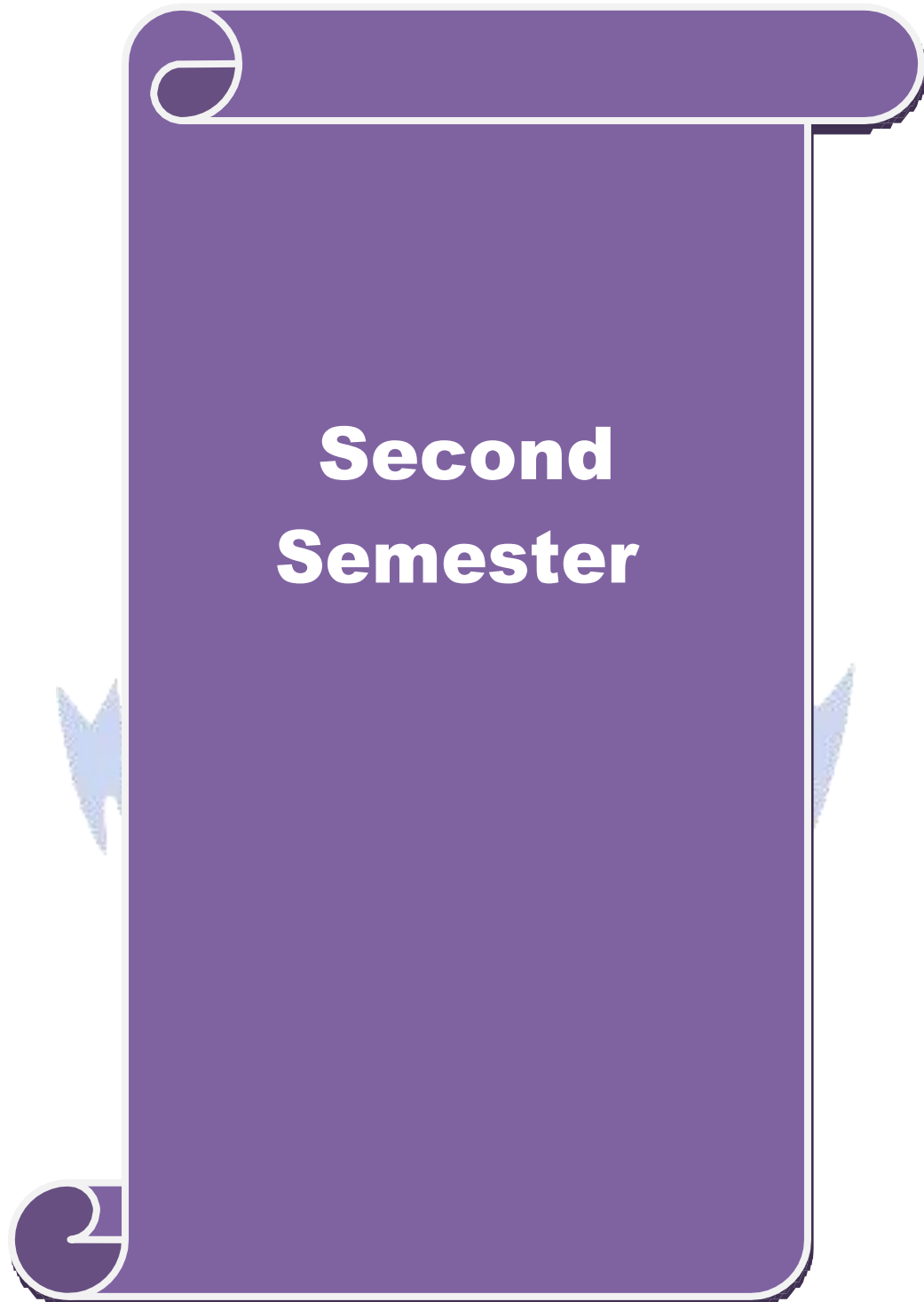
Course code	Programming Lab – C			L	T	P	C	
Core/Elective/Supportive	Core Lab: 1			0	0	3	4	
Pre-requisite	Students should have basic knowledge in C programming and algorithms			Syllabus Version	2021-22 Onwards			
Course Objectives:								
The main objectives of this course are to:								
1. To practice 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)						3&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





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		2021-22 Onwards	
Course Objectives:							
The main objectives of this course are to:							
<ol style="list-style-type: none"> 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	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	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	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.	
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		2021-22 Onwards	
Course Objectives:							
The main objectives of this course are to:							
<ol style="list-style-type: none"> 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 strings. 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, TRIANGLE 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.
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.]	
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4	
Course Designed By:	

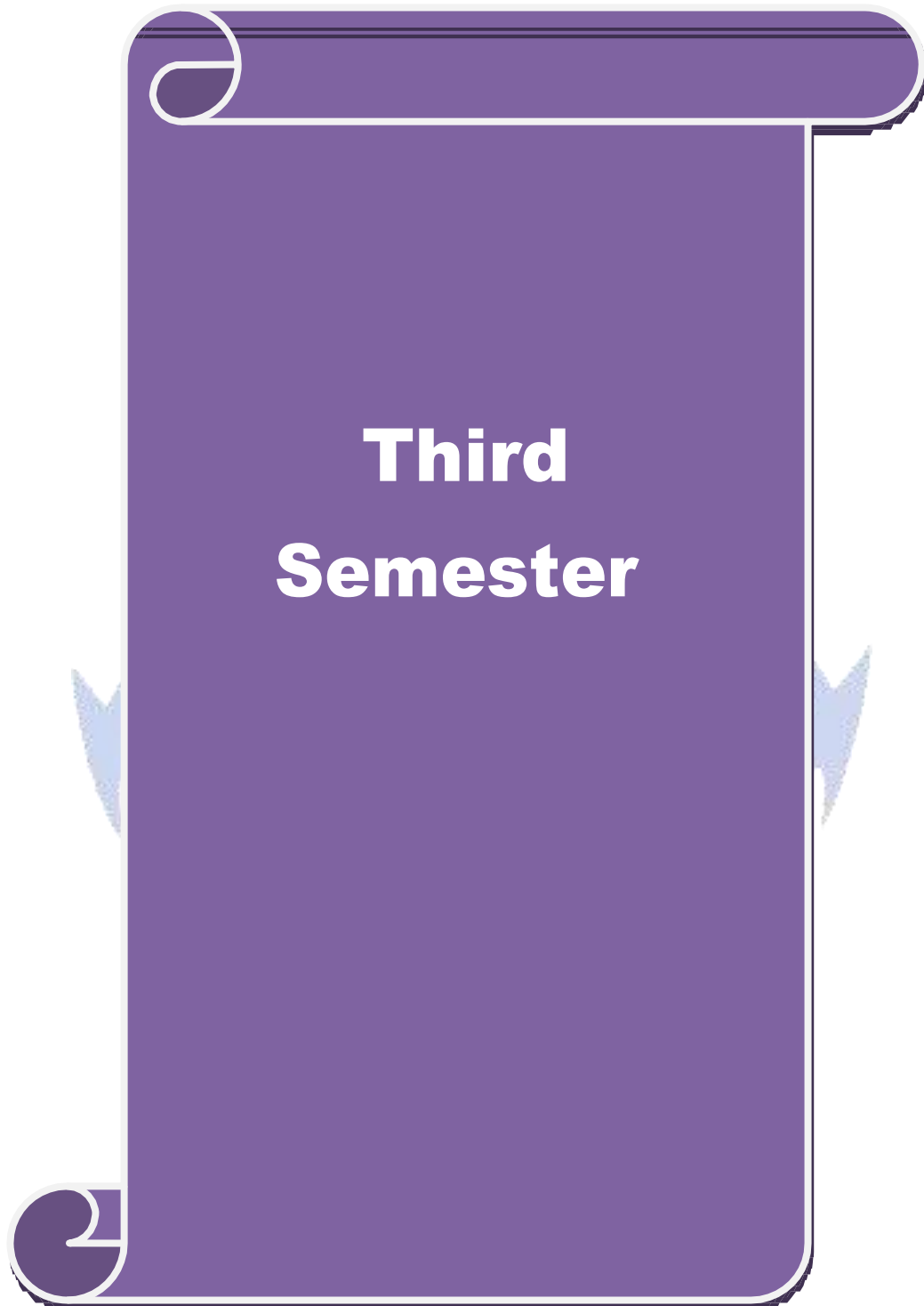
Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	M	M	M	M	L
CO2	S	S	S	S	S	S	S	M	M	M
CO3	S	S	S	S	S	S	S	M	M	M
CO4	S	S	S	S	S	S	S	M	M	S
CO5	S	S	S	S	S	S	S	M	M	S

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		2021-22 Onwards	
Course Objectives:						
The main objectives of this course are to:						
<ol style="list-style-type: none"> 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



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		2021-22 Onwards		
Course Objectives:								
The main objectives of this course are to:								
<ol style="list-style-type: none"> To introduce the fundamental concept of data structures To emphasize the importance of data structures in developing and implementing efficient algorithms. Understand the need for Data Structures when building application Ability to calculate and measure efficiency of code 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	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	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	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	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		2021-22 Onwards		
Course Objectives:								
The main objectives of this course are to:								
<ol style="list-style-type: none"> To expose the students with the introduction to OOPs and advantages of object oriented programming. The concepts of OOPs make it easy to represent real world entities. 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. 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

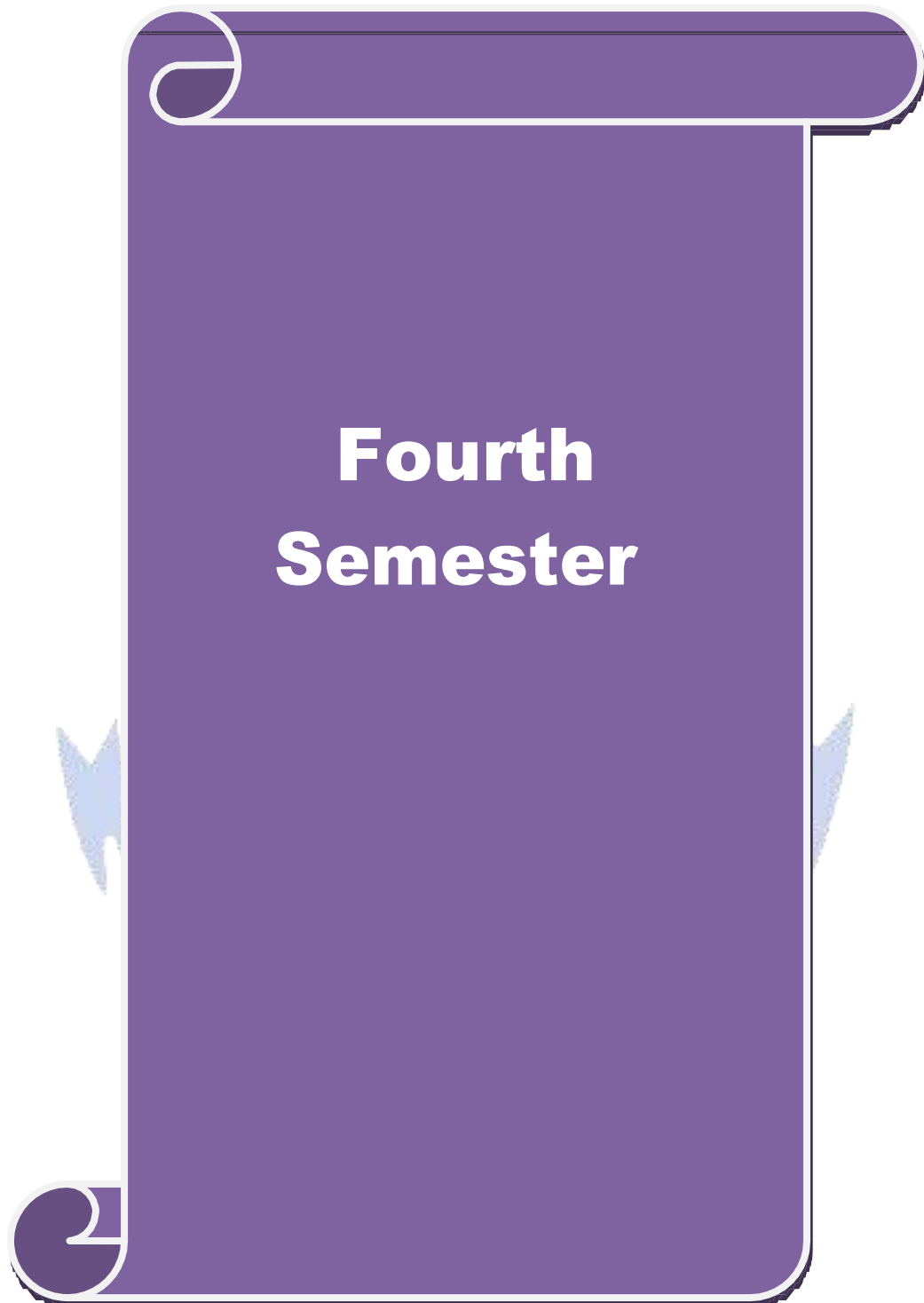
*S-Strong; M-Medium; L-Low

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		2021-22 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
CO2	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	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	2021-22 Onwards			
Course Objectives:						
The main objectives of this course are to:						
<ol style="list-style-type: none"> 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		2021-22 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.	
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	3	2
Pre-requisite	Students should have the prior basic knowledge in operating system.		Syllabus Version		2021-22 Onwards	
Course Objectives:						
The main objectives of this course are to:						
<ol style="list-style-type: none"> 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 simulate 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	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		2021-22 Onwards		
Course Objectives:								
The main objectives of this course are to: <ol style="list-style-type: none"> 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 – SQ L 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		2021-22 Onwards	
Course Objectives:						
The main objectives of this course are to:						
<ol style="list-style-type: none"> 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, 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)	
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	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		2021-22 Onwards	
Course Objectives:						
The main objectives of this course are to:						
<ol style="list-style-type: none"> To develop applications using Graphical User Interface tools. To understand the design concepts. To design and build database systems and demonstrate their competence. 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.						
<ol style="list-style-type: none"> Generate Fibonacci series. 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						
<ol style="list-style-type: none"> Binary Octal 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



**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	2021-22 Onwards			
Course Objectives:						
The main objectives of this course are to: <ol style="list-style-type: none"> 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.]		
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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	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	6	6
Pre-requisite	Students should have the strong knowledge in any one of the programming languages in this course.			Syllabus Version		2021-22 Onwards	
Course Objectives:							
The main objectives of this course are to: <ol style="list-style-type: none"> To understand and select the task based on their core skills. To get the knowledge about analytical skill for solving the selected task. To get confidence for implementing the task and solving the real time problems. Express technical and behavioral ideas and thought in oral settings. 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							
<ol style="list-style-type: none"> The aim of the project work is to acquire practical knowledge on the implementation of the programming concepts studied. 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. The project work should be compulsorily done in the college only under the supervision of the department staff concerned. 							
Viva Voce							
<ol style="list-style-type: none"> 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 150 marks at the last day of the practical session. Out of 150 marks, 60 marks for CIA and 90 for CEE (60 evaluation of project report + 30 Viva Voce). 							

Project Report Format

PROJECT WORK

TITLE OF THE DISSERTATION

Bonafide Work Done by

STUDENT NAME

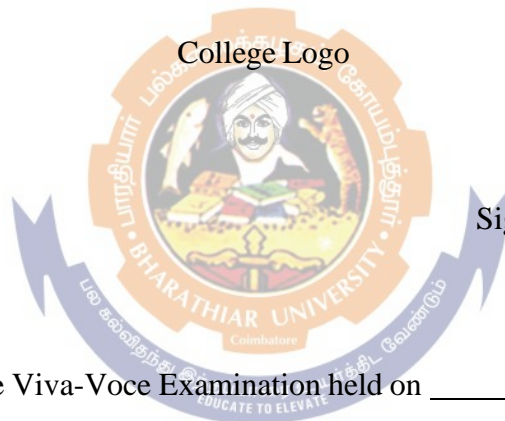
REG. NO.

Dissertation submitted in partial fulfillment of the requirements for the award of

<Name of the Degree>

of Bharathiar University, Coimbatore-46.

College Logo



Signature of the Guide

Signature of the HOD

Submitted for the Viva-Voce Examination held on _____

Internal Examiner

External Examiner

Month – Year

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Acknowledgement

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1. Introduction

- 1.1 Organization Profile
- 1.2 System Specification
 - 1.2.1 Hardware Configuration
 - 1.2.2 Software Specification

2. System Study

- 2.1 Existing System

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

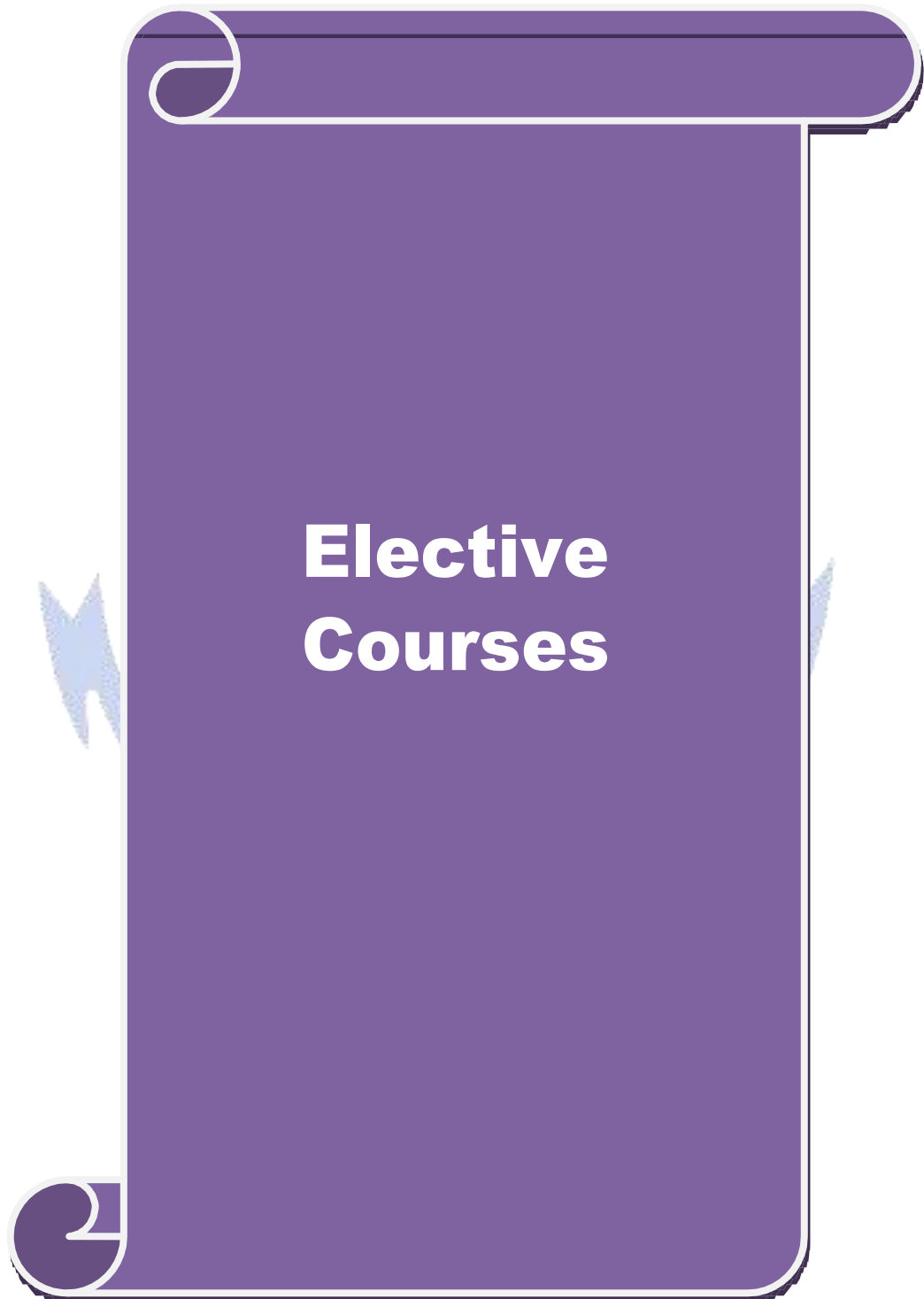


Course code		Programming Lab – Graphics & Multimedia	L	T	P	C
Core/Elective/Supportive		Core Lab : 7	0	0	6	4
Pre-requisite	Students should have the basic knowledge on C and C++ to do computer graphics and multimedia applications.		Syllabus Version		2021-22 Onwards	
Course Objectives:						
The main objectives of this course are to:						
<ol style="list-style-type: none"> 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	Computer Graphics, Donald Hearn, M.Pauline Baker, 2nd edition, PHI. (UNIT-I: 3.13.6,4.1-4.5 & 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 UNITIV: 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.]	
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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	Web Technology			L	T	P	C	
Core/Elective/Supportive	Elective: I			6	0	0	4	
Pre-requisite	Basic knowledge in web server, browser and web application			Syllabus Version		2021-22 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 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	2021-22 Onwards			
Course Objectives:								
The main objectives of this course are to: <ol style="list-style-type: none"> 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	CASE Tools Concepts and Applications		L	T	P	C
Core/Elective/Supportive	Elective-I		6	0	0	4
Pre-requisite	Basic knowledge in software project, testing in SDLC	Syllabus Version	2021-22 Onwards			
Course Objectives:						
The main objectives of this course are to:						
<ol style="list-style-type: none"> 1. To enhance the basic software engineering methods and practices. 2. To learn the techniques for developing software systems. 3. To understand the object oriented design. 4. To understand software testing approaches 						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Understand the basic concepts of software engineering					K1
2	Apply the software engineering models in developing software applications					K2-K3
3	Implement the object oriented design in various projects					K4
4	Knowledge on how to do a software project with in-depth analysis.					K3
5	To inculcate knowledge on Software engineering concepts in turn gives a roadmap to design a new software project.					K1-K4
K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create						
Unit:1	SOFTWARE ENGINEERING				15 hours	
Data Modeling: Business Growth-Organizational Model-Case Study of student MIS-What is the purpose of such Models-Understanding the business-Types of models-model development approach-the case for structural development-advantages of using a case tool. System analysis and design-what is DFD-General Rules for Drawing DFD-Difference Between Logical data flow diagram and Physical data flow diagram-Software verses Information Engineering-How case tools store information.						
Unit:2	SOFTWARE DESIGN				12 hours	
Approach used to solve the problem statement: How to deal with a problem statement-Data flow diagram for Payroll System-Presentation Diagram for Payroll System-sehematics of the model-Forms-Screens-Menu Screens-Data entry Screens-Report Output Format-Utilities. Installation of Ubridge and Synthesis: How to use the tools in Ubridge Synthesis for case-Installation of Ubridge Synthesis-Computer Aided Software Engineering-Getting Ubridge to work-Setup-Assign-Housekeep-The Ubridge page.						
Unit:3	SOFTWARE TESTING				15 hours	
Introduction to Ubridge: Introduction – Main flow of the system prototyping your Report-Introducing the Novice Model of the Operation. Introducing Synthesis – Synthesis basic – Synthesis – Menu Drawing the screen-Requirement Definition-Diagram-Data Dictionary-Document-Synthesis Main Administration – Synthesis reference – importing and exporting screen.						
Unit:4	SOFTWARE CONFIGURATION MANAGEMENT				15 hours	
Diagram definition tool: Introduction-Starting DDT-Drawing your own Icon – Defining the						

connection rules-Rebuilding your icon. Object oriented methodologies: Rambaugh et.al.,s object modeling techniques-The Booch methodology –The Jacobson et.al. Methodologies-Pattern-Frame works-The Unified Approach.		
Unit:5	ESTIMATION	15 hours
Introduction to UML-UML Diagram-Class Diagram-Use Case Diagram-Interaction Diagram-Sequence Diagram-Collaboration Diagram-State Chart Diagram-Activity Diagram-Component Diagram-Deployment Diagram.		
Unit:6	Contemporary Issues	3 hours
Expert lectures, online seminars – webinars		
	Total Lecture hours	75 hours
Text Book(s)		
1	Case Tools Concepts and Applications, Ivan N Bayross, BPB Publications	
2	Object Oriented System Development using the Unified Modeling Language, McGraw Hill International edition.	
3		
Reference Books		
1	Software Engineering: A Practitioner's Approach, Roger S Pressman, McGraw Hill International Edition.	
2		
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	L	M	M	M	M	M	L
CO2	S	S	L	S	M	S	S	S	M	L
CO3	M	M	M	M	S	M	M	L	S	M
CO4	M	S	M	S	S	S	M	S	M	S
CO5	S	L	S	S	M	S	S	M	M	M

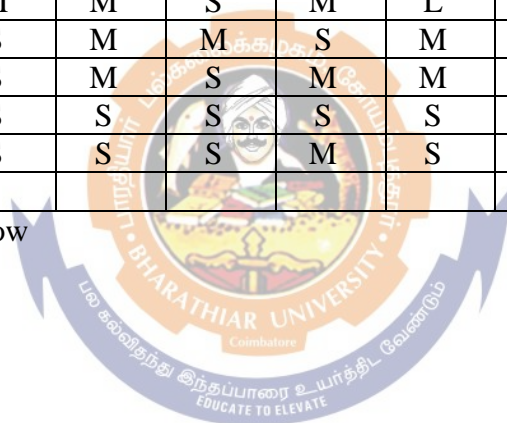
*S-Strong; M-Medium; L-Low

*Course code	FLASH			L	T	P	C	
Core/Elective/Supportive	Elective-II			5	0	0	4	
Pre-requisite	Basics of 2D and 3D animations			Syllabus Version	2021-22 Onwards			
Course Objectives:								
The main objectives of this course are to:								
1. To enable the students to learn 3DS Max animation software and make them to design animated applications.								
2. To learn adding and optimization sounds, video and tween for creating 3D animations								
3. To enrich the students knowledge in animating with action script primer								
Expected Course Outcomes:								
On the successful completion of the course, student will be able to:								
1	Remembering the features in Flash, menu items, apply these to draws simple animation problems.						K1,K3	
2	Understanding the time line animation concepts.						K2	
3	Understanding on adding and optimizing sounds, importing and using video, also tweens.						K3	
4	Understanding masking techniques, optimizing the movies using flash for pocket PC.						K4	
5	Knowledge on action script primer, applying action script to applications.						K4-K6	
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create								
Unit:1	INTRODUCTION TO FLASH					10 hours		
An Introduction to Flash – What's New in Flash MX 2004 – Simple Drawing Techniques – Adding Some Easy Animation – Learning about the Tools.								
Unit:2	USING THE TIMELINE					10 hours		
Using the TimeLine – Controlling Drawn Objects – Creating Symbols – Using the Library – Importing & Optimizing Graphics								
Unit:3	ADDING & OPTIMIZING SOUNDS					10 hours		
Adding & Optimizing Sounds – Importing & Using Video – Understanding Tweens - Adding Interactions.								
Unit:4	USING MASKING TECHNIQUES					12 hours		
Using Masking Techniques – Guiding Animations – Optimizing Your Movies – Creating Flash Movies - Creating Flash Movies for the Pocket PC .								
Unit:5	ACTION SCRIPT PRIMER					12 hours		
An Action Script Primer – Applying Action Script – Intermediate Action Script Examples.								
Unit:6	Contemporary Issues					3 hours		
Expert lectures, online seminars - webinars								

		Total Lecture hours	55 hours
Text Book(s)			
1	Brian Underdahl, The Complete Reference – Macromedia Flash Mx2004, 2nd edition – TMH.		
Reference Books			
1	Flash MX 2004, Thyagarajan Anbumani, 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	S	M	S	M	L
CO3	S	S	S	M	S	M	M	M	M	L
CO4	S	S	S	S	S	S	S	M	M	M
CO5	S	S	S	S	S	M	S	S	S	M

*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	2021-22 Onwards			
Course Objectives:								
The main objectives of this course are to:								
<ol style="list-style-type: none"> To enable the students to learn the concepts and techniques in distributed computing and client server computing. To learn the pros and cons of distributed computing, distributed databases. To familiar with design considerations in distributed computing 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.Crichllow , 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.]		
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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	MULTIMEDIA SYSTEMS			L	T	P	C
Core/Elective/Supportive	Elective-II			5	0	0	4
Pre-requisite	Basics of multimedia concepts			Syllabus Version		2021-22 Onwards	
Course Objectives:							
The main objectives of this course are to:							
1. To introduce the fundamentals multimedia systems.							
2. To learn about the concept of data compression techniques, audio, video and computer based animation							
3. To impart the knowledge of multimedia communication systems.							
Expected Course Outcomes:							
On the successful completion of the course, student will be able to:							
1	Remembering the basic concepts of multimedia						K1
2	Knowledge on sound/audio concepts, video and animation, computer based animation.						K2
3	Understanding the data compression techniques to compress the multimedia animated file.						K3
4	Understanding the networking system, protocols and services, LAN, VAN, MAN, and multimedia communication systems.						K3
5	Knowledge on user interfaces, synchronization, abstraction for multimedia applications.						K4-K6
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create							
Unit:1	BASICS OF MULTIMEDIA					10 hours	
Introduction – Branch Overlapping Aspects of Multimedia Content – Global Structure – Multimedia Literature . Multimedia – Media and Data Streams – Medium.							
Unit:2	SOUND/AUDIO					10 hours	
Sound/Audio: Basic Sound Concepts – Music –Speech , Images and Graphics : Basic Concepts – Computer Image Processing – Video and Animation : Basic Concepts – Television – Computer Based Animation .							
Unit:3	DATA COMPRESSION					10 hours	
Data Compression: Storage Space – Coding Requirements – JPEG – MPEG – DVI , Optical Storage Media , Computer Technology – Multimedia Operating System.							
Unit:4	NETWORKING SYSTEM					12 hours	
Networking System: Layers, Protocols and Services, Networks, Metropolitan Area Networks, WAN, Multimedia Communication System							
Unit:5	USER INTERFACES, SYNCHRONIZATION, ABSTRACTION FOR PROGRAMMING					12 hours	
User Interfaces, Synchronization, Abstraction for Programming: Abstraction Levels – Libraries – System Software – Toolkit – Higher Programming Languages. Multimedia Application: Introduction – Media Population – Media Composition – Media Communication – Trends.							

Unit:6	Contemporary Issues	3 hours
Expert lectures, online seminars - webinars		
Total Lecture hours		55 hours
Text Book(s)		
1	Ralf Steinmetz & Klara Nahrstedt, Multimedia Computing, Communication & Applications — Pearson Education.	
Reference Books		
1	Multimedia: Making it Work, Tay Vaughan, 7th 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	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	S	L	M	S	L
CO4	S	S	S	S	S	S	M	M	M	M
CO5	S	S	S	S	S	M	S	S	S	M

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

Course code	3DS MAX ANIMATION			L	T	P	C	
Core/Elective/Supportive	Elective-III			5	0	0	4	
Pre-requisite	Basics of multimedia concepts			Syllabus Version	2021-22 Onwards			
Course Objectives:								
The main objectives of this course are to:								
4. To enable the students to learn 3DS Max animation software and make them to design animated applications.								
5. To learn Space Warps and Gizmos for creating 3D animations								
6. To enrich the students knowledge in animating with cameras and rendering techniques.								
Expected Course Outcomes:								
On the successful completion of the course, student will be able to:								
1	Remembering the basics of animations, tools and controls, modifiers, controllers.						K1-K2	
2	Understanding the constraints in animations, particle systems, types of particle systems in 3D Max.						K2	
3	Knowledge in space warps and gizmos, create the animated application using space warps and gizmos.						K3	
4	Understand the concepts of animating with cameras, cameras in animation, animating with target and free cameras.						K4	
5	Knowledge on rendering animation, rendering techniques, rendering effects and RAM player						K4-K6	
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create								
Unit:1	INTRODUCING ANIMATIONS					10 hours		
Introducing Animations – Types of Animations – Animation Methods – Storyboarding - Introducing 3Ds Max – Interface Basics – Animation Tools & Controls – Creating a Simple Animation – Modifiers in Animations – Applying Modifiers to Animations – Controllers in Animations – Applying Controllers Using the Motions Panel – Applying Controllers Using the Track View Dialog Box.								
Unit:2	ANIMATING USING CONSTRAINTS					10 hours		
Animating using Constraints – Constraints in Animations – Applying Constraints to Animations – Introducing a Hierarchy – Animating Hierarchies – Particle Systems – Basics of Particle System – Creating Particle Systems in 3Ds Max – Types of Particle Systems in 3Ds Max – Creating Basic Particle Systems – Creating Advanced Particle Systems.								
Unit:3	SPACE WARPS AND GIZMOS					10 hours		
Space Warps and Gizmos – Space Warps – Types of Space Warps in 3Ds Max – Applying Space Warps – Creating a Dynamic Simulation in 3Ds Max – Gizmos – Creating Gizmos – Animating with Lights – Lights in 3Ds Max –Adjusting Light Parameters – Additional Light Controllers – Animating Lights – Applying Lights to Create Animation.								
Unit:4	ANIMATING WITH CAMERAS					12 hours		
Animating with Cameras – Types of Cameras – Camera View Port – Camera Parameters –								

Cameras in Animations – Animating with the Target and Free Cameras – Camera Matching.		
Unit:5	RENDERING ANIMATIONS	12 hours
Rendering Animations – Rendering – Rendering Methods – Render Scene Dialog Box – Rendering Tools – Rendering an Animation – Previewing Animations – Using the RAM Player – Adding Effects to Animations – Environments Effects – Rendering Effects – Video Post.		
Unit:6	Contemporary Issues	3 hours
Expert lectures, online seminars - webinars		
Total Lecture hours		55 hours
Text Book(s)		
1	3D Animation: An Overview, Prentice Hall India..	
Reference Books		
1	George Avgerakis, Digital Animation Bible, TMH, 2005.	
2	Barrett Fox, 3D S Max 6 Animation, TMH, 2005.	
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	S	L	M	S	L
CO4	S	S	S	S	S	S	M	M	M	M
CO5	S	S	S	S	S	M	S	S	S	M

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

Course code	SOFTWARE PROJECT MANAGEMENT			L	T	P	C	
Core/Elective/Supportive	Elective-III			5	0	0	4	
Pre-requisite	Basics of software project and SDLC			Syllabus Version	2021-22 Onwards			
Course Objectives:								
The main objectives of this course are to:								
<ol style="list-style-type: none"> 1. To enable the students to learn the concept of software project management. 2. To learn the steps in software project management. 3. To learn managing contracts, risk management and monitoring and control. 4. To understand the software quality and enhance the software quality. 								
Expected Course Outcomes:								
On the successful completion of the course, student will be able to:								
1	Understanding the basics of software project management and activities covered by software project management						K1-K2	
2	Understanding the concepts of software effort estimation, software estimation techniques, sequencing and scheduling, and risk management.						K2	
3	Understanding the concepts of resource allocation, scheduling, resource, Monitoring and Control.						K3	
4	Understand the concept of managing contracts, type of contracts, organizational behavior, working in group and health and safety.						K4	
5	Knowledge on software quality, defining software quality, techniques to enhance the software quality.						K2-K4	
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create								
Unit:1	INTRODUCTION TO SOFTWARE PROJECT MANAGEMENT					10 hours		
Introduction to Software Project management: Introduction – Why is Software project management is important? – What is a project? – Software project versus other types of project – Contract Management and technical project management – Activities covered by software project management – plans, methods, methodologies – some ways of categorizing software projects. Stepwise: an overview of project planning. Programme Management and Project Evaluation: Programme Management – Managing the Allocation of resources within programmes – strategic programme management – creating a programme – aids to programme management – Benefits Management – Evaluation of Individual projects –technical assessment – cost-benefit analysis - cash flow forecasting – cost-benefit evaluation techniques – risk evaluation.								
Unit:2	SOFTWARE EFFORT ESTIMATION					10 hours		
Software Effort Estimation: Where are estimation done? – Problem with over and under-estimates – basis for software estimating – software effort estimation techniques – expert judgment – estimating by analogy. Activity Planning: The objectives – When to plan? – Project schedules – project and activities – sequencing and scheduling activities – Network Planning models – formulating a network model – adding time dimension – forward pass – backward pass. Risk Management: Risk – Categories – Dealing with risk – Risk identification, assessment, planning and management – Evaluating risk to schedule.								

Unit:3	RESOURCE ALLOCATION	10 hours
Resource Allocation: Introduction - Nature of resources – identifying the resource requirements – scheduling resources – creating critical path – counting the cost – being specific – publishing the resource schedule – cost schedules – scheduling the sequence. Monitoring and Control: Creating framework – collecting the data – visualizing progress – cost monitoring – earned value analysis – prioritizing monitoring – getting the project back to target – change control.		
Unit:4	MANAGING CONTRACTS	12 hours
Managing Contracts: ISO 12207 approach – supply process – types of contract – stages in contract placement, management – acceptance. Managing People and Organizing Terms: understanding behavior – organizational behavior – selecting the right person for the job – instruction in the best methods – Motivation – Working in groups – becoming a team – decision making – Leadership – organizational structures – dispersed and virtual teams - influence of culture – stress – health and safety.		
Unit:5	SOFTWARE QUALITY	12 hours
Software Quality: The place of software quality in project planning – importance of software quality – defining software quality – ISO 9126 - practical software quality measures – product vs process quality management – external standards – techniques to help enhance software quality-quality plans. Small Projects: Introduction – Some problems with student projects – content of a project plan – conclusion.		
Unit:6	Contemporary Issues	3 hours
Expert lectures, online seminars - webinars		
	Total Lecture hours	55 hours
Text Book(s)		
1	Software Project Management, Bob Hughes & Mike Cotterell, 4th Ed, PHI.	
Reference Books		
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	S	L	M	S	L
CO4	S	S	S	S	S	S	M	M	M	M
CO5	S	S	S	S	S	M	S	S	S	M

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



Course code	Organizational Behaviour		L	T	P	C
Core/Elective/Supportive	Elective : III		5	0	0	4
Pre-requisite	Basic knowledge in human behavior skills		Syllabus Version		2021-22 Onwards	
Course Objectives:						
The main objectives of this course are to:						
1. To help the students to develop cognizance of the importance of human behaviour.						
2. To enable students to describe how people behave under different conditions and understand why people behave as they do.						
3. To provide the students to analyses specific strategic human resources demands for future action.						
4. To enable students to synthesize related information and evaluate options for the most logical and optimal solution such that they would be able to predict and control human behaviour and improve results.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Demonstrate the applicability of the concept of organizational behavior to understand the behavior of people in the organization.					K1
2	Develop Managerial skills for Individual Behaviors.					K2
3	Analyze the complexities associated with management of the group behavior in the organization. Analyze how to manage the Stress during a job.					K3
4	Develop an Organizational Behaviour model for any type of Organization.					K3
5	Analyze the Common biases and eradication in Decision Making Process.					K4
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1	INTRODUCTION				15 hours	
Introduction to Organizational Behavior –Related Disciplines – Theoretical Framework – Organizational Approaches – Modern Organizational Scenario: Impact of Globalization						
Unit:2	INDIVIDUAL BEHAVIOR				15 hours	
Individual Behavior – Perception – Process – Changes - Personality and Attitudes – Job Satisfaction						
Unit:3	MOTIVATION				15 hours	
Motivation: Needs, Content and Process: Motivation: Content Theories -ghh– Process Theories – Contemporary Theories – Motivation Applied – Job Design and Goal setting. Leadership – Background – Process- Styles – Activities – Skills						
Unit:4	GROUP				15 hours	
Group Dynamics – The nature of Informal Organizations – Formal Groups – Interactive conflict: Interpersonal conflict – Inter-group behavior and conflict – Negotiation Skills: Going beyond conflict management – Traditional Negotiation Approaches - Contemporary negotiation skills.						
Unit:5	COMMUNICATION				12 hours	
Communication – Role and background – Interpersonal communication – Informal						

communication- The Decision Making process – Participative Decision making techniques – Organization design – culture – Organization change and development		
Unit:6	Contemporary Issues	3 hours
Expert lectures, online seminars - webinars		
Total Lecture hours		75 hours
Text Book(s)		
1	Fred Luthans, Organizational Behavior, 9th Edition, McGraw Hill Irwin, 2002.	
2	John W. Newstorm and Keith Davis, Organizational Behavior, 10th Edition.	
Reference Books		
1	Robbins, S. P., & Judge, T. (2013). Organizational behavior (15th ed.). Boston: Pearson.	
2	Newstrom J. W., & Davis, K. (2011). Human behavior at work (12th ed.). Tata McGraw Hill	
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	L	M	M	S	L	S	S	S	M	M
CO2	L	L	S	M	L	M	S	M	S	S
CO3	L	M	S	L	L	M	S	M	S	S
CO4	L	L	M	L	M	M	S	M	S	S
CO5	L	M	S	L	L	M	S	M	S	S

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



Course code	Animation Lab – Flash		L	T	P	C
Core/Elective/Supportive	Skill Based Subject 4 (Lab) :2		0	0	4	3
Pre-requisite	Students must have the basic understanding animation	Syllabus Version	2021-22 Onwards			
Course Objectives:						
The main objectives of this course are to:						
<ol style="list-style-type: none"> To enable the students to learn 3DS Max animation software and make them to design animated applications. To learn adding and optimization sounds, video and tween for creating 3D animations. 						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Remembering the features in Flash, menu items, apply these to draws simple animation problems.				K1,K3	
2	Understanding the time line animation concepts.				K2	
3	Understanding on adding and optimizing sounds, importing and using video, also tweens.				K3	
4	Understanding masking techniques, optimizing the movies using flash for pocket PC.				K4	
5	Knowledge on action script primer, applying action script to applications.				K4-K6	
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create						
Programs					36 hours	
1. Create Shapes and Drawings in Flash.						
2. Change a Shape to Another Shape. (Shape Animation)						
3. Create a Man to walk with the help of Key Frame Animation.						
4. Draw a Bird with Flash tools and make it fly with key Frame Animation.						
5. Change the Colors of an object with the help of Animation.						
6. Animate a Ball with the help of Guide line Animation.(Path Animation)						
7. Create a Shining Stores with the help of Movie Clip.						
8. Create Buttons & Link with other Frames.						
9. Create an Album with the help of Buttons.						
10. Create a 3D Rotation of a Box with the Help of Shape Animation.						
					Total Lecture hours	36 hours
Text Book(s)						
1	Brian Underdahl, The Complete Reference – Macromedia Flash Mx2004, 2nd edition – TMH.					
Reference Books						
1	Flash MX 2004, Thyagarajan Anbumani, 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	S	M	S	M	L
CO3	S	S	S	M	S	M	M	M	M	L
CO4	S	S	S	S	S	S	S	M	M	M
CO5	S	S	S	S	S	M	S	S	S	M

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



Course code	ANIMATION TECHNIQUES			L	T	P	C	
Core/Elective/Supportive	Skill based Subject -3			6	0	0	3	
Pre-requisite	Basic knowledge in 2D and 3D animations			Syllabus Version	2021-22 Onwards			
Course Objectives:								
The main objectives of this course are to:								
<ol style="list-style-type: none"> To learn the animation and its uses, types and techniques of animation. To enable the students to learn 3D animation in FLASH. To understand the concept of motion in 3D animation To make the student to create 3D animated movies. 								
Expected Course Outcomes:								
On the successful completion of the course, student will be able to:								
1	Understand the basics of animation, need of animations, types of animation, techniques of animation and special effects.						K2	
2	Understand and apply animations in flash, working with time time-line and frame based animations, tween-based animations and layers.						K3	
3	Knowledge on working with time-line, frame-based and tween-based animation.						K3	
4	Understanding the motion caption, software to capture the motion.						K4	
5	Apply the animation concepts and concept development to develop or create 3D animated movies.						K4-K6	
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create								
Unit:1	BASICS					15 hours		
What is meant by Animation – Why we need Animation – History of Animation – Uses of Animation – Types of Animation – Principles of Animation – Some Techniques of Animation – Animation on the WEB – 3D Animation – Special Effects - Creating Animation.								
Unit:2	CREATING ANIMATION IN FLASH					15 hours		
Creating Animation in Flash: Introduction to Flash Animation – Introduction to Flash – Working with the Timeline and Frame-based Animation - Working with the Timeline and Tween-based Animation – Understanding Layers - Actionscript.								
Unit:3	3D ANIMATION & ITS CONCEPTS					15 hours		
3D Animation & its Concepts – Types of 3D Animation – Skeleton & Kinetic 3D Animation – Texturing & Lighting of 3D Animation – 3D Camera Tracking – Applications & Software of 3D Animation.								
Unit:4	MOTION CAPTION					15 hours		
Motion Caption – Formats – Methods – Usages – Expression – Motion Capture Software_s – Script Animation Usage – Different Language of Script Animation Among the Software.								
Unit:5	CONCEPT DEVELOPMENT					12 hours		
Concept Development –Story Developing –Audio & Video – Color Model – Device Independent Color Model – Gamma and Gamma Correction - Production Budgets - 3D Animated Movies.								

		Total Lecture hours	75 hours
Text Book(s)			
1	Principles of Multimedia, Ranjan Parekh, 2007, TMH. (Unit I, Unit V)		
2	Multimedia Technologies, Ashok Banerji, Ananda Mohan Ghosh, McGraw Hill Publication		
Reference Books			
1	Ze-Nian Li and Mark S.Drew, “Fundamentals of Multimedia”, First Edition, Pearson Education, 2007		
2	Prabhat K Andleigh, Kiran Thakrar, “Multimedia systems design”, First Edition, PHI, 2007		
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	M	S	L	S	M	L	M	S	S
CO3	S	S	S	L	M	M	L	M	M	S
CO4	S	S	S	M	S	M	L	M	M	S
CO5	S	S	S	L	S	M	L	M	M	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	2021-22 Onwards		
Course Objectives:							
The main objectives of this course are to:							
<ol style="list-style-type: none"> To enhance the knowledge of students in web programming and make them to do elegant applications in PHP using Array class, OOPs concepts, etc. 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



Course code	Introduction to PHP Programming			L	T	P	C
Core/Elective/Supportive	Skill based Subject – 1			5	0	0	3
Pre-requisite	Students should have basic knowledge on web page, web server and browser			Syllabus Version		2021-22 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 working with Dates and Times.						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, XML and DOM						K1-K4
K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create							
Unit:1	Introduction to PHP					15 hours	
Introducing PHP – Basic development Concepts – Creating first PHP Scripts – Using Variable and Operators – Storing Data in variable – Understanding Data types – Setting and Checking variables Data types – Using Constants – Manipulating Variables with Operators.							
Unit:2	Programming in PHP					12 hours	
Controlling Program Flow: Writing Simple Conditional Statements - Writing More Complex Conditional Statements – Repeating Action with Loops – Working with String and Numeric Functions.							
Unit:3	Working with Arrays, Dates and Times					15 hours	
Working with Arrays: Storing Data in Arrays – Processing Arrays with Loops and Iterations – Using Arrays with Forms - Working with Array Functions – Working with Dates and Times.							
Unit:4	OOPs Concepts and Working with Files and Directories					15 hours	
Using Functions and Classes: Creating User-Defined Functions - Creating Classes – Using Advanced OOP Concepts. Working with Files and Directories: Reading Files, Writing Files-Processing Directories.							
Unit:5	Working with Database and SQL					15 hours	
Working with Database and SQL : Introducing Database and SQL- Using MySQL Adding and modifying Data-Handling Errors – Using SQLite Extension and PDO Extension. Introduction							

XML—Simple XML and DOM Extension.		
Unit:6	Contemporary Issues	3 hours
Expert lectures, online seminars – webinars		
	Total Lecture hours	75 hours
Text Book(s)		
1	PHP A Beginner's Guide, Vikram Vaswani, Tata McGraw-Hill	
2		
3		
Reference Books		
1	The PHP Complete Reference – Steven Holzner, Tata McGraw Hill Edition.	
2	The PHP Complete Reference – Steven Holzner, Tata McGraw Hill Edition. 2. Spring into PHP5 – Steven Holzer, Tata McGraw Hill 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	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

Course Code	Cyber Security	L	T	P	C
Core/elective/Supportive	Naan Mudhalvan Skill based Course-I	2	0	0	2

Cyber Security course contents

1. **Course 1:** Information Security Fundamentals
2. **Course 2:** Cyber Security Introduction
3. **Course 3:** Technologies in Cybersecurity eco-system
4. **Course 4:** Core Threat Intelligence Engineering
5. **Course 5:** Core Vulnerability Management Engineering
6. **Course 6:** Core Penetration Management Techniques
7. **Course 7:** Core Cyber Exploitations
8. **Course 8:** Global Cyber Attack Trends
9. **Course 9:** Security Operations Management
10. **Course 10:** Incident Management
11. **Course 11:** Web and Mobile security Techniques
12. **Course 12:** Privacy and Online Rights
13. **Course 13:** Best Practices for keeping Systems and Data safe
14. **Course 14:** Cloud Security Engineering
15. **Course 15:** Industry Infosec Governance

Course 1 - Information Security Fundamentals : Broad Overview of Information Security will cover the following topics:

- 1.1 Information Security, 1.2 Computer Security, 1.3 CIA Triad/Principles, 1.4 Non-repudiation, 1.5 Risk Management
- 1.6 Cryptography Basics, 1.7 Authentication, 1.8 Authorization, 1.9 Access Control, 1.10 Security Policies
- 1.11 Security Auditing, 1.12 Security Laws and Regulations, 1.13 Defense, 1.14 Security Monitoring, 1.15 ISO 27000 framework
- 1.16 Information Security use case demonstration as per industry verticals, 1.17 Policy, Process, Procedures, Standards, Guidelines, Baselines

Case Study / Demo / Role Play / Discussion / Quiz will cover the following topics:

- Case structure – Objectives, Target audience, Executive summary, Background, Your evaluation, Proposed solution, Conclusion
- **Case Study #1:** List Foundations of HealthCare Industries
 - Patient medical records contain sensitive information that must be protected from unauthorized access.
- **Case Study #2:** List Strong Foundations of Fintech Industries
 - Financial institutions handle large amounts of sensitive financial data, such as account numbers and

transaction history, which must be protected from cyber threats

- Demo
- Scenario based role play (Cybersecurity strategy development, Incident response plan)
- Group discussion
- Quiz

Course 2 - Cyber Security Introduction : Broad Overview of Cyber Security will cover the following topics:

- 2.1 Cybersecurity, 2.2 Cybers attacks, 2.3 Social Engineering, 2.4 Cybersecurity Defences (Firewall, AV, SIEM, Patch, Password etc), 2.5 Cloud security, 2.6 Endpoint security, 2.7 Mobile security, 2.8 Zero trust, 2.9 IOT, 2.10 Layers of cybersecurity, 2.11 Hacking, 2.12 Incident management, 2.13 Security operations

Case Study / Demo / Role Play / Discussion / Quiz will cover the following topics:

- **Case Study #3: Define cyber security governance structure for CISO in bank**
- **Case Study #4: Define cyber security structure for CISO in Auto manufacturing**
- Scenario based role play (Cybersecurity strategy development, Incident response plan)
- Group discussion
- Quiz



Course 3 - Technologies in Cybersecurity eco-system: Broad Overview of Technologies will cover the following topics:

- 3.1 Network security – Architecture and Standards, Wireless security, Network Vulnerabilities, Threats – Password cracking, Spoofing, Packet sniffing, Port scanning, Poisoning
 - 3.2 System security - Asset classification, Asset accountability, Configuration management, Privilege access control, Virtualization security, System hardening, End-point security, System upgrades and patches, Backup and recovery, Systems Auditing, Threats – Denial of Service (DOS), DHCP spoofing, Dictionary attack, Email spoofing
 - 3.3 Software security – Secure Design, Secure Coding, Static Security, Dynamic Security, Opensource governance, Software composition analysis, Log and audit trail, OWASP Top10 Threats
- SQL Injection, Cross Site Scripting (XSS), Cross Site Request Forgery (CSRF)
- 3.4 Cryptography Basics – Security by Obscurity, Cryptographic Keys, Asymmetric, Symmetric, Hashing, Public Key Infrastructure (PKI), Challenges in cryptography
 - 3.5 Application of Cryptography – Virtual Private Network (VPN), Secure Socket Layer (SSL), Digital Signature
 - 3.6 Cloud security – Identity and Access management (IAM), Key management, Governance, Risk and Compliance (GRC), Legal, Data sovereignty, Business continuity, Disaster recovery, Cloud security models
 - 3.7 Block chain security, 3.8 Zero Trust, 3.9 XDR, 3.10 AI, 3.11 MUD, 3.12 Context aware

Case Study / Demo / Role Play / Discussion / Quiz will cover the following

topics:

- **Case Study #5:** What are the Fundamental Network protections used in Any Industry
 - Firewalls, IDS, IPS, VPN, Antivirus, SIEM
 - **Case Study #6:** List methods to Secure Data in transit and Data at rest
 - Encryption, Hashing,
 - **Case Study #7:** How many ways can you protect any user account in applications
 - 2FA, MFA, Password Management
 - Demo
 - Scenario based role play (Cybersecurity strategy development, Incident response plan)
 - Group discussion
 - Quiz
-

Course 4 - Core Threat Intelligence Engineering: Broad Overview of threat intelligence will cover the following topics:

- 4.1 Threat model, 4.2 Tactical, operations and strategic threat intelligence, 4.3 How to detect, respond and defeat threats, 4.4 Adversary data, 4.5 Reactive and proactive threat approach , 4.6 IOC, 4.7 Cyber kill chain,. 4.8 MITRE ATT@ACK

Case Study / Demo / Role Play / Discussion / Quiz will cover the following topics:

- **Case Study #8:** How many Levels of User expertise are involved to form an Threat Intelteam
 - **Case Study #9:** What are the roles included in Threat Intelligence at Industry level
 - Demo
 - Scenario based role play (Cybersecurity strategy development, Incident response plan)
 - Group discussion
 - Quiz
-

Course 5 - Core Vulnerability Management Engineering: Broad Overview of Vulnerability management will cover the following topics:

- 5.1 what is vulnerability, Threats, Risks, Exploitation, 5.2 Computer ports / protocols, 5.3 Ethical hack, Recon, Enumeration, Port Scanning, 5.4 Tools, 5.5 Attack Toolset – Metasploit, Nessus, nmap, Burpsuite, 5.6 Basic defence measures - Antivirus, Intrusion Detection / Prevention systems

Case Study / Demo / Role Play / Discussion / Quiz will cover the following topics:

- **Case Study #10:** What are few examples of an Vulnerability as per Industry oriented applications

- **Case Study #11: Explain RACI Matrix in banking environment**

- Demo
 - Scenario based role play (Cybersecurity strategy development, Incident response plan)
 - Group discussion
 - Quiz
-

Course 6 - Core Penetration test techniques: Broad Overview of penetration test techniques will cover the following topics:

- 6.1 what is penetration testing, vulnerability, Threats, Risks, Exploitation, 6.2 Computer ports / protocols, 6.3 Port Scanning, 6.4 Tools, 6.5 Attack Toolset – Metasploit, Nessus, nmap, Burpsuite, 6.6 Basic defence measures - Antivirus, Intrusion Detection / Prevention systems,
- 6.7 Penetration test approach, tools, 6.8 Pen test reporting, 6.9 Pen test rules, 6.10 Gray box, White box, Black box , 6.11 Sniffing, 6.12 DOS, 6.12 Social engineering, 6.13 Session hijacking, SQL Injection

Case Study / Demo / Role Play / Discussion / Quiz will cover the following topics:

- **Case Study #12: How to do network scanning in banking industry**
 - **Case Study #13: How to do social engineering (email phishing) in auto manufacturing**
 - Demo
 - Scenario based role play (Cybersecurity strategy development, Incident response plan)
 - Group discussion
 - Quiz
-

Course 7 - Core Cyber Exploitations: Broad Overview of cyber exploitation will cover the following topics:

- 7.1 Exploitation, 7.2 Types of exploits, 7.3 Identify, Protect, Detect, Respond, Recover, 7.3Honey pot, 7.4 Data collection, analytics 7.5 Proactive and reactive exploitation, 7.6 Red , blue team, and purple team, 7.7 Incident management, 7.8 Data breach, 7.9 Ransomware,
- 7.10 Zero day attack, 7.11 Man in the middle

Case Study / Demo / Role Play / Discussion / Quiz will cover the following topics:

- **Case Study #14: Difference between Vulnerability and Exploitations. How to identify exploitation in banking industry**
- **Case Study #15: What Network vectors are considered for**

exploitation. How to implement in healthcare

- Demo
 - Scenario based role play (Cybersecurity strategy development, Incident response plan)
 - Group discussion
 - Quiz
-

Course 8 – Global attack trends: Broad Overview of cyber-attack trends will cover the following topics:

- 8.1 Past, present & future trends of cyber threat landscape (Worldwide)
- 8.2 Cybercrime landscape in Asia Pacific
- 8.3 Organizational processes, Security roles and responsibilities, Due care and Due diligence
- 8.4 Cybersecurity threats – Malware, Viruses and Worms, Trojan horses, Botnets, Zero-day exploits, Phishing, Spear phishing, Whaling, Social engineering, etc.
- 8.5 Risk management concepts, Personnel security policies, Information security training and awareness
- 8.6 Critical infrastructure protection, Privacy by design

Case Study / Demo / Role Play / Discussion / Quiz will cover the following topics:

- Case Study #16: Explain Ransomware behaviour and impact within the industries.
 - **Case Study #17: What is a Malware and how to setup malware protection in hospital**
 - Case Study #18: Will Linux and Mac have any Attacks and Malware. Consider e-commerce services
 - Demo
 - Scenario based role play (Cybersecurity strategy development, Incident response plan)
 - Group discussion
 - Quiz
-

Course 9 – Security Operations Management : Broad Overview of SOC will cover the following topics:

- 9.1 SOC security operations centre concept, 9.2 Logging, Attack methodology and monitoring, 9.3 Incident detection and Reporting, 9.4 SIEM, 9.5 Threat intelligence feed , 9.6 24x7 monitoring

Case Study / Demo / Role Play / Discussion / Quiz will cover the following topics:

- Case Study #19: What is Security posture for any healthcare industry
- **Case Study #20: What is SOC in food chain industry**
- Demo
- Scenario based role play (Cybersecurity strategy development, Incident response plan)
- Group discussion

- Quiz

Course 10 – Security Incident Management Broad Overview of incident management will cover the following topics:

- 10.1 Incident handling and response, 10.2 Incident RACI, 10.3 Forensic package , critical incident package, 10.4 Malware incidents, 10.5 Email security and phishing incidents , 10.6 Threat reporting, 10.7 Third party incidents, 10.8 Feedback process, 10.9 TTX

Case Study / Demo / Role Play / Discussion / Quiz will cover the following topics:

- **Case Study #21: What is Zero Day? Does it have any impact on any industry applications. Define process framework**
- **Case Study #22: How are Incidents managed for HealthCare , FinTech, SCADA and Automotive industries**
- Demo
- Scenario based role play (Cybersecurity strategy development, Incident response plan)
- Group discussion
- Quiz

Course 11 – Web and Mobile security Techniques: Broad Overview of web and mobile security techniques will cover the following topics:

- 11.1 Web environment setup for scan and tools, 11.2 Scan web application, 11.3 Exploitvulnerabilities, 11.4 Deep analysis, 11.5 Reporting
- 11.6 Mobile environment setup for scan and tools, 11.7 Scan mobile application, 11.8 Exploitvulnerabilities, 11.9 Deep analysis, 11.10 Reporting

Case Study / Demo / Role Play / Discussion / Quiz will cover the following topics:

- Cyber breach case study (Equifax, Uber, Target, Stuxnet, SWIFT)
- **Case Study #23: What's the Top standard followed in Web Applications**
- **Case Study #24: What the Top standard followed in Mobile Applications**
- **Case Study #25: List secure frameworks used in Mobile App Development**
- Demo
- Scenario based role play (Cybersecurity strategy development, Incident response plan)
- Group discussion

- Quiz

Course 12 – Privacy and online rights: Broad Overview of privacy techniques will cover the following topics:

- 12.1 Privacy concept, 12.2 Privacy regulations, 12.3 GDPR, 12.4 Online privacy challenges
- 12.5 Online marketing/ sales privacy challenges, 12.6 Privacy protection and penalties

Case Study / Demo / Role Play / Discussion / Quiz will cover the following topics:

- Cyber breach case study (Equifax, Uber, Target, Stuxnet, SWIFT)
- **Case Study #26: What data is considered as Privacy issue in online ecommerce**
- **Case Study #27: Whats the impact if your company related data is available online?**
- Demo
- Scenario based role play (Cybersecurity strategy development, Incident response plan)
- Group discussion
- Quiz

Course 13 – Best Practices for keeping Systems and Data safe: Broad overview of Security best practices will cover the following topics:

- 13.1 Understand your data and risk, 13.2 Protect your systems, 13.3 Cyber Insurance, 13.4 AV, 13.5 Data leakage, 13.6 Security guidelines – NIST, ISO 27001, GDPR, 13.7 Risk Management Frameworks and Security Standards
 - NIST SP800-30: Evaluating security risks
 - ISO 27000 - Information Security Management Standards (ISMS)
 - DO-178C - Software Considerations in Airborne Systems and Equipment Certification
 - ISO/IEC 27034 – Application security guidelines
 - SS 584 : Singapore Standard for Multi Tier Cloud Security

Case Study / Demo / Role Play / Discussion / Quiz will cover the following topics:

- **Case Study #28: How can you assure your data is safe in Public network and corporatenetwork**
- **Case Study #29: List 3 simple methods to keep your system safe from malware**
- Demo
- Scenario based role play (Cybersecurity strategy development, Incident response plan)
- Group discussion
- Quiz

Course 14 – Cloud security engineering: Broad Overview of cloud security will cover the following topics:

- 14.1 Cloud security fundamentals, 14.2 Cloud providers, 14.3 Tools for cloud security, 14.4 Cloud recovery, 14.5 Cloud Monitoring, 14.6 Cloud compliance, certification, audit and compliance, Pen test

Case Study / Demo / Role Play / Discussion / Quiz will cover the following topics:

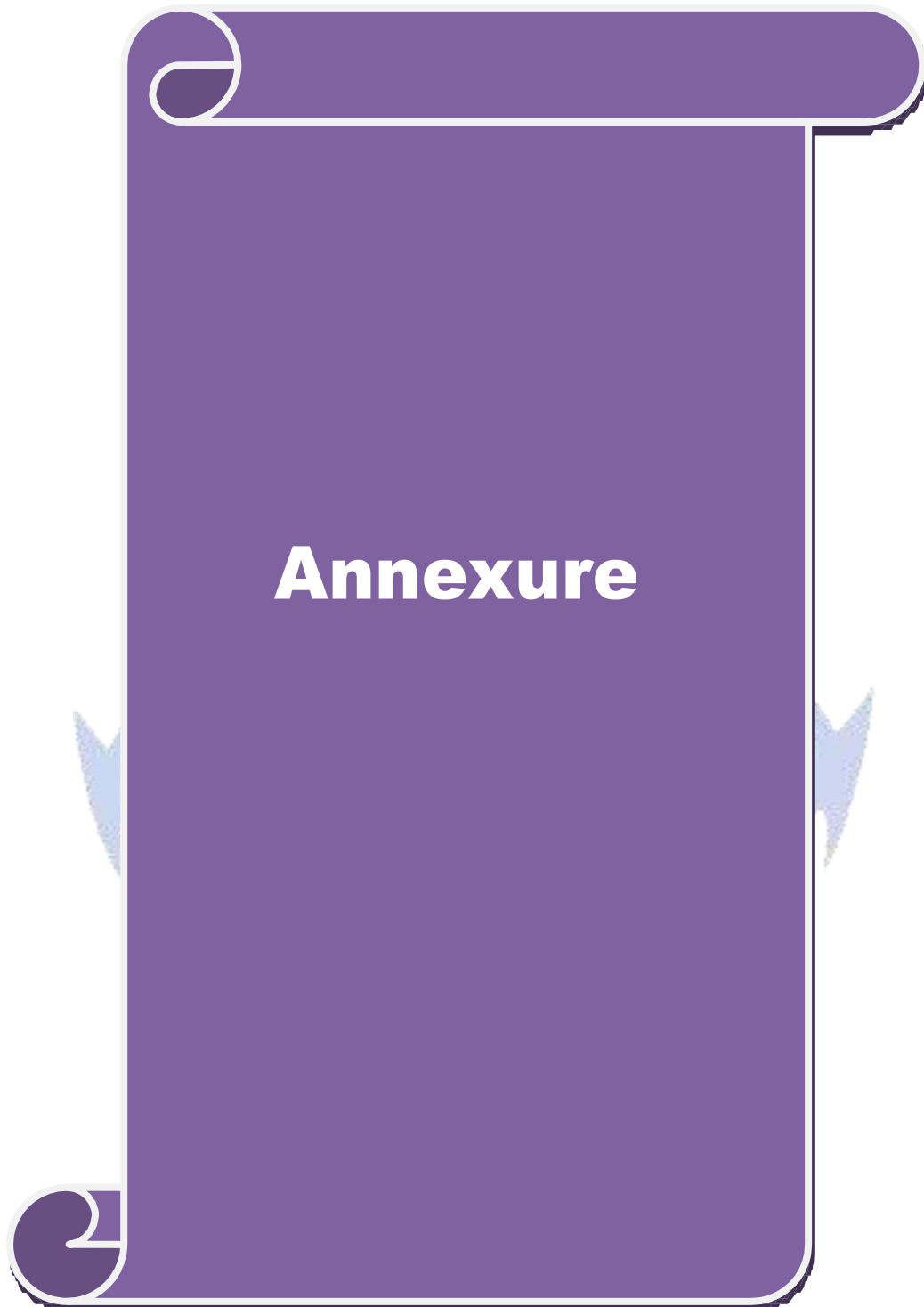
- Case Study #30: How the Cloud services or applications can be targeted to hackers
- **Case Study #31: What are the Different methods to store data safe**
- Demo
- Scenario based role play (Cybersecurity strategy development, Incident response plan)
- Group discussion
- Quiz

Course 15 – Industry Infosec Governance: Broad Overview of Industry security governance will cover the following topics:

- 15.1 Industry roles and student skill identification, 15.2 Industry training, certification, 15.3 Industry career path, 15.4 How to become industry cybersecurity expert, 15.5 Job application process, 15.6 Salary / perks, 15.7 Working in healthcare industry

Case Study / Demo / Role Play / Discussion / Quiz will cover the following topics:

- Cyber breach case study (Equifax, Uber, Target, Stuxnet, SWIFT)
- **Case Study #32: Abbreviated CIA and give one example for Healthcare industry**
- **Case Study #33: Are Policies, procedures and standards important to protect CIA for an Industry**
- Demo
- Scenario based role play (Cybersecurity strategy development, Incident response plan)
- Group discussion
- Quiz



B.Sc. MULTIMEDIA AND WEB TECHNOLOGY

Syllabus

(With effect from 2021 -2022)

Program Code :



DEPARTMENT OF COMPUTER TECHNOLOGY

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 MULTIMEDIA AND WEB TECHNOLOGY

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.

