

B.C.A.

Syllabus

AFFILIATED COLLEGES

Program Code: 32A

2023 – 2024 onwards



BHARATHIAR UNIVERSITY

(A State University, Accredited with “A++” Grade by NAAC,
Ranked 21st among Indian Universities by MHRD-NIRF)

Coimbatore - 641 046, Tamil Nadu, India

BHARATHIAR UNIVERSITY : COIMBATORE 641046

B.C.A. (CBCSPATTERN)

(For the students admitted from the academic year 2023-2024)

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	4	3	25	75	100	4
II	English-I	4	3	25	75	100	4
III	Core1: Computing Fundamentals and C Programming	5	3	25	75	100	4
III	Core2: Digital Fundamentals and Computer Architecture	5	3	25	75	100	4
III	Core Lab1: Programming Lab-C	5	3	40	60	100	4
III	Allied1: Mathematical Structures for Computer Science	5	3	25	75	100	4
IV	Environmental Studies*	2	3	-	50	50	2
	Total	30		165	485	650	26
	Semester II						
I	Language–II	4	3	25	75	100	4
II	English–II	4	3	12	38	50	2
III	Core3: C++ Programming	5	3	25	75	100	4
III	Core Lab2: Programming Lab - C++	5	3	20	30	50	2
III	CoreLab3: Internet Basics	3	3	20	30	50	2
III	Allied2: Discrete Mathematics	5	3	25	75	100	4
IV	Value Education – Human Rights*	2	3	-	50	50	2
	Naan Muthalvan –Skill Course Effective English http://kb.naanmudhalvan.in/images/c/c7/Cambri dge Course Details.pdf	2		12	38	50	2
	Total	30		139	411	550	22
	Semester III						
I	Language–III	4	3	25	75	100	4
II	English–III	4	3	25	75	100	4
III	Core 4: Data Structures	4	3	25	75	100	4
III	Core 5: Java Programming	4	3	25	75	100	4
III	Core Lab 4: Programming Lab - Java	3	3	20	30	50	2
III	Allied 3: Computer Based Optimization Techniques	5	3	12	38	50	2
III	Skillbased Subject 1: Web Programming	4	3	30	45	75	3
IV	Tamil**/ AdvancedTamil*(OR)Non-major elective-I (Yoga for Human Excellence) */ Women’s Rights*	2	3	-	50	50	2
	Total	30		162	463	625	25
	Semester IV						
I	Language – IV	4	3	25	75	100	4
II	English – IV	4	3	12	38	50	2
III	Core 6: System Software and Operating System	4	3	25	75	100	4
III	Core 7: Linux and Shell Programming	4	3	25	75	100	3
III	Core Lab 5: Linux and Shell Programming Lab	3	3	20	30	50	2
III	Allied 4 : Business Accounting	4	3	12	38	50	2
III	Skillbased Subject 2 Lab: Web Programming–Lab	3	3	20	30	50	2
IV	Tamil**/Advanced Tamil* (OR) Non-major elective-II(GeneralAwareness*)	2	3	-	50	50	2
	Naan Muthalvan – Skill Course	2	-	20	30	50	2

	Office Fundamentals - Lab http://kb.naanmudhalvan.in/Bharathiar University (BU)						
	Total	30		159	441	600	23
	Semester V						
III	Core 8: RDBMS & Oracle	6	3	25	75	100	4
III	Core 9: VisualBasic	6	3	25	75	100	4
III	Core Lab 6: Programming Lab –VB&Oracle	6	3	30	45	75	4
III	Elective–I: Introduction to Compiler Design/PHP & Scripting Language/ PYTHON Programming	6	3	25	75	100	4
III	Skill based Subject 3: CASE Tools Concepts and Applications	6	3	30	45	75	3
	Total	30		135	315	450	19
	Semester VI						
III	Core 10: Graphics & Multimedia	5	3	25	75	100	4
III	Core 11: Project Work Lab %%	5	-	25	75	100	4
III	Core 7: Programming Lab – Graphics & Multimedia	5	3	30	45	75	3
III	Elective–II: Computer Networks/Dot Net programming/ Distributed Computing	5	3	25	75	100	4
III	Elective–III: Internet of Things (IoT)/ Web Services/Software Testing	5	3	25	75	100	4
III	SkillBased Subject 4: CASE Tools Lab	3	3	20	30	50	2
V	Extension Activities**	-	-	50	-	50	2
	Naan Muthalvan – 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/AndroidApp_Dev.pdf	2	2	12 (or) 20	38 (or) 30	50	2
	Total	30		212/ 220	413/ 405	625	25
	GrandTotal			972/ 980	2528/ 2520	3500	140

*No Continuous Internal Assessment (CIA). Only University Examinations.

**NoUniversityExaminations. Only Continuous Internal Assessment (CIA).

➤ #Govt – Non-Autonomous Colleges, \$ Aided – Non-Autonomous Colleges, @ Self - Financing Colleges (Non –Autonomous) (For theory: CIA – 12, CEE – 38; For Practical: CIA – 20, CEE – 30).

First Semester

Course code		Computing Fundamentals and C Programming	L	T	P	C
Core/Elective/Supportive		Core Paper:1	5	0	0	4
Pre-requisite	Students should have basic Computer Knowledge		Syllabus Version			
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-Translation or Programs-Problem Solving Techniques -Over view 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-Multifile Programs.Structures and Unions		
Unit:5	Pointers&FileManagement	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 andStrings – Array of pointers – Pointers as Function Arguments Functions returning pointers –Pointersto Functions – Pointers and Structures.File Management inC.		
Unit:6	Contemporary Issues	3 hours
Problem Solving through C Programming-Edureka		
	TotalLecturehours	75 hours
TextBook(s)		
1	E Balagurusamy: Computing Fundamentals & C Programming – Tata Mc Graw-Hill, Second Reprint 2008	
ReferenceBooks		
1	Ashok NKamthane: Programming with ANSIand 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 DesignedBy:		

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/Supportie		Core Paper : 2	5	0	-	4
Pre-requisite	Students should have basic computer knowledge		Syllabus Version			
Course Objectives:						
On successful completion of this subject the students should have Knowledge on						
1. To familiarize with different number systems and digital arithmetic & logic circuits						
2. To understand the concepts of Combinational Logic and Sequential Circuits						
3. To impart the knowledge of buses,I/O devices ,flip flops,Memory and bus structure.						
4. To understand the concepts of memory hierarchy and memory organization						
5. To understand the various types of micro processor architecture						
Expected Course Outcomes:						
On the successful completion of the course,student will be able to:						
1	Learn the basic structure of number system method 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						
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						
Unit:2		Combinational Logic and Sequential Circuits			14 hours	
Combinational Logic Circuits: Boolean algebra– Karnaugh map – Canonical form Constructionand 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						
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:Pinout Diagram,Architecture,Organization and addressing modes of 80286-80386-80486-Introduction to micro controllers.		

Unit:6	Contemporary Issues	2hours
Expert lectures, online seminars –webinars		

	Total Lecture hours	56hours
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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-L

Course code	Programming Lab–C		L	T	P	C
Core/Elective/Supportive	Core Lab:1		0	0	5	4
Prerequisite	Students should have basic knowledge in C programming and algorithms	SyllabusVersion				
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						
ExpectedCourseOutcomes:						
On the successful completion of the course,student will be able to:						
1	Remember and Understand the logic for a given problem and to generate Prime numbers & Fibonacci Series(Program-1,2,3)					K1, K2
2	Apply the concepts to print the Magic square,Sorting the data,Strings,Recursive functions and Pointers(Program-4,5,6,8,10)					K2, K3
3	Remember the logic used in counting the vowels in a sentence (Program-7)					K1
4	Apply and Analyze the concepts of Structures and File management (Program-9,11,12)					K3&K4
K1-Remember; K2-Understand; K3-Apply;K4-Analyze;K5 -Evaluate; K6 -Create						
Programs						
36 hours						
1. Write a C program to find the sum, average, standard deviation for a given set of numbers.						
2. Write a C program to generate n prime numbers.						
3. Write a C program to generate Fibonacci series.						
4. Write a C program to print magic square of order n where n>3 and n is odd.						
5. Write a C program to sort the given set of numbers in ascending order.						
6. Write a C program to check whether the given string is a palindrome or not using pointers.						
7. Write a C program to count the number of Vowels in the given sentence.						
8. Write a C program to find the factorial of a given number using a 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.						
1. Write a C program which receives two file names as arguments and check whether the file contents are same or not. If same delete the second file						
2. 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 Spirit of C, Jaico, 1996.
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	Introduction to Programming in C–NPTEL
2	Problem solving through Programming in C– SWAYAM
3	C for Everyone: Programming Fundamentals–Course
Course Designed By:	

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

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



Second Semester

Course code		C++ PROGRAMMING	L	T	P	C
Core/Elective/Supportive		Core:3	5	0	0	4
Prerequisite		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	SyllabusVersion			
Course Objectives:						
The main objectives of this course are to:						
1. Impart knowledge of object-oriented programming concepts and implement them in C++						
2. Enable to differentiate procedure oriented and object-oriented concepts.						
3. EquipwiththeknowledgeofconceptofInheritancesothatlearnerunderstandstheneedofinheritance.						
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 paradigms muchas 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 fora legacy system.					K2
3	Identify the concept so 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 inC++ - C++ Declarations. Control Structures: - Decision Making and Statements: If.. Else, jump,goto,break,continue,Switch case statements-Loops in C++:for,while,do-function 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,Hierarchical,Hybrid,Multipath						

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	ContemporaryIssues	2 hours
Expert lectures,online seminars –webinars		
	Tota lLecture hours	60 hours
TextBook(s)		
1	Ashok Kamthane,Object-OrientedProgramming with Ansi And Turbo C++,Pearson Education,2003.	
Reference Books		
1	E.Balagurusamy,Object-OrientedProgramming with C++,TMH,1998.	
2	MariaLitvin& GrayLitvin, C++ for you,Vikas publication, 2002.	
3	JohnRHubbard,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		CoreLab :2	0	0	5	2
Pre-requisite	Basic understanding of computer programs and computer programming languages like C.		SyllabusVersion			
Course Objectives:						
The main objectives of this course are to: 1. Impart knowledge of object oriented programming concepts and implementation 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 paradigms such as procedure oriented and object oriented methodologyandconceptualizeelementsofOOPmethodology					K1
2	Illustrateandmodelrealworldobjectsandmapitintoprogrammingobjectsforaregacysystem.					K2
3	Identifytheconceptsofinheritanceanditstypesanddevelopapplicationsusingoverloadingfeatures.					K3
4	Discover The Usage Of pointers with classes					K4
5	Explain the usage of Files, templates and understand the importance of exceptionHandling					K5
K1-Remember; K2-Understand; K3-Apply;K4-Analyze;K5 -Evaluate; K6 -Create						
Programs			36hours			
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..						
Write a C++ Program to create a class ARITHMETIC which consists of a FLOAT and an INTEGER variable.Write member functionsADD(),SUB(),MUL(),DIV()to perform addition,subtraction,multiplication,division respectively.Write a member function to get and display values.						
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.						
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						
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.						
Write a C++ Program to create a 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.	
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.	
Write a C++ Program to create two classes each class consists of two private variables, an 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.	
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 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 NKamthane, 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	
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	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	3	2
Prerequisite	Knowledge of WINDOWS Operating Systems		SyllabusVersion			
Course Objectives:						
The main objectives of this course are to:						
1. Introduce the fundamentals of Internet and the Web functions.						
2. Impart knowledge and essential skills necessary to use the internet and its various components.						
3. Find,evaluate,and use online information resources.						
4. Use Google Apps for education effectively.						
Expected Course Outcomes:						
On the successful completion of the course,student will be able to:						
1	Understand the fundamentals of Internet and the Web concepts			K2		
2	Explain the usage of internet concepts and analyze its components.			K2		
3	Identify and apply the online information resources			K3		
4	Inspect and utilize the appropriate Google App for education effectively			K3,K4		
K1-Remember; K2-Understand; K3-Apply;K4-Analyze;K5 -Evaluate; K6 -Create						
Programs				36 hours		
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.						
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.						
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.						
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 alabeland upload bulk contacts using import option in Google Contacts.						
Create your own Google classroom and invite all your friends through email						
.Post study material in Google classroom using Google drive.Create a separate folder for every subject and upload all unit wise E-Content Materials.						
Create and share a folder in Google Drive using the share a link option and set the permission to access that folder by your friends only.						
Create a one page story in your mother tongue by using the voice recognition facility of Google docs.						
9.Create a registration form for your Department Seminar or Conference using Google Forms.						
0.Create a question paper with multiple choice types of questions for a subject of your choice,using Google Forms.						
1.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 atopicand share the same with your friends.	
14.Create a template for a seminar certificate using Google Slides.	
15.Create a sheet to illustrate simple mathematical calculations using Google Sheets.	
16.Create a student's internal marks statement and share the Google sheets vialink.	
17.Create Different Types Of charts for arranging CIA mark statements using Google Sheets.	
18.Create a mark statement in Google Sheets and download it as PDF, .xlsand.csv files.	
Text Book(s)	
1	IanLamont, 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	Effective English	L	T	P	C
Core/Elective/Supportive	Naan Mudhalvan Skill Based Course	2	0	0	2
b.naanmudhalvan.in/images/c/c7/Cambridge_Course_Details.pdf Refer the Content of the					
Serial.No.6					



Third Semester

Course code		Data Structures	L	T	P	C
Core/Elective/Supportive		Core:4	4	0	0	4
Pre-requisite		Basic understanding of Data Storage,retrieval and algorithms.	SyllabusVersion			
CourseObjectives:						
The main objectives of this course are to: 1. To introduce the fundamental concept of data structures 2. To emphasize the importance of data structures in developing and implementing efficient algorithms. 3. Understand the need for DataStructures when building application 4. Ability to calculate and measure efficiency of code 5. Improve programming logic skills.						
Expected Course Outcomes:						
On the successful completion of the course,student will be able to:						
1	Understand the basic concepts of data structures and algorithms			K1-K2		
2	Construct and analyze of stack and queue operations with illustrations			K2-K4		
3	Enhance the knowledge of Linked List and dynamic storage management.			K2-K3		
4	Demonstrate the concept of trees and its applications			K2-K3		
5	Design and implement various sorting and searching algorithms for applications and understand the concept of file organizations			K1-K4		
K1–Remember;K2 –Understand;K3 –Apply;K4– Analyze;K5– Evaluate; K6–Create						
Unit:1	INTRODUCTION			15 hours		
Introduction of Algorithms,AnalysingAlgorithms.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 TreeTables–Hash Tables:Hashing Functions–Overflow Handling.		
Unit:5	INTERNAL SORTING	15 hours
InsertionSort–QuickSort–2WayMergeSort–HeapSort–ShellSort–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.LovelynRose,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 Mc Graw Hill Company 2008, 2nd Edition.	
2	Samanta.D,Classic Data Structure Prentice Hall of India PvtLtd 2007,9 th Edition	
3	SeymourLipschutz,Data Structures McGraw Hill Publications,2014,1 st Edition	
Related Online Contents[MOOC,SWAYAM,NPTEL,Websites etc.]		
1		
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	4	0	0	4
Pre-requisite		Students Should have the basic understanding of oops concept.	SyllabusVersion			
CourseObjectives:						
The main objectives of this course are to:						
1. To expose the students with the introduction to OOPs and advantages of object oriented programming.						
2. The Concepts Of OOPs make it easy to represent real world entities.						
3. The course introduces the concepts of converting the real time problems into objects and methods and their interaction with one another to attain a solution.						
4. Simultaneously it provides the syntax of programming languageJava for solving 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–JumpsinLoops – Labeled Loops– Classes, Objects and Methods.						
Unit:3	ARRAYS AND INTERFACES				15 hours	
Arrays,Strings and Vectors–Interfaces:Multiple Inheritance–Packages:PuttingClasses 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– APrimer–E. Balagurusamy,5 th Edition,TMH.	
2	Herbert Schildt , Java: The Complete Reference, McGraw Hill Education, Oracle Press 10 th Edition, 2018	
3	Programmingwith 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– JohnR.Hubbard,2 nd 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	3	2
Pre-requisite		Students should know about the OOPs concept and basic knowledge in java theory.	SyllabusVersion			
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 of 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 application 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 Application 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 appear in the text fields.						
7.Write a Java Program to demonstrate the Multiple Selection List-box.						

8. Write a Java Program 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 opens an existing file and appends 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 Java2– 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		Web Programming	L	T	P	C
Core/Elective/Supportive		Skill based Subject –1	4	0	0	3
Pre-requisite		Students should have basic knowledge on internet and world wide web.	SyllabusVersion			
Course Objectives:						
The main objectives of this course are to: 1.To enhance the knowledge of students in web programming 2.To learn about the scripting languages HTML and its elements 3.To understand concept of DHTML to integrate dynamic web pages 4.To understand XML, CSS and XSL for formatting the web pages						
Expected Course Outcomes:						
On the successful completion of the course,student will be able to:						
1	Understand the basic concepts of Internet,WWW,browsers and Email and protocols.					K1
2	Understand and apply the HTML,HTML elements and formatting styles					K1-K3
3	Knowledge on creating tables,forms and DHTML					K3
4	Understand the structure of XML document,DTD and Schema					K1-K3
5	Knowledge on working with SML, Stylesheet sand XSL					K1-K4
K1–Remember;K2 –Understand;K3 –Apply;K4– Analyze;K5– Evaluate; K6–Create						
Unit:1	Introducution to Internet				15 hours	
Introduction to Internet – World Wide Web – Browsers: Introduction – Popular Web Browsers –know your browsers – Electronic Mail : Introduction – E-mail networks and servers – E-mailprotocols– Structureof an E-mail.						
Unit:2	HTML				12hours	
HTML:Introduction–Getting started–Creating and saving an HTML document–Document Layout of HTML Page–HTML elements– Some other formatting Styles–Hypertext Links.						
Unit:3	HTML&DHTML				15 hours	
HTML (contd) : URLs – Images – HTML tables – Forms – Special Characters – Metatages.Interactivity Tools and Multimedia : Introduction– DHTML – Scripting Languages – Java –ASP.						
Unit:4	XML basics and DTD				15 hours	
XML:XML basics–Introduction–need for XML–Advantages–Working with an XML Document– Structure of an XML Document–DTD-XML Schema.						
Unit:5	XML Schema and XSL				15 hours	

XML(contd) :Working with XML Schema –Declaring Attributes–XML name spaces–Reusing Schema Components–Grouping elements and attributes.XML Stylesheets:Introduction–CSS –eXtensible StyleSheet language–Formatting Data based on controls–Displaying data in a Tabular Format.		
Unit:6	Contemporary Issues	3 hours
Expert lectures,online seminars–webinars		
	Total Lecture hours	75 hours
Text Book(s)		
1	Internet and Web Design,ITLEducation,Macmillan India Ltd.	
2	HTML and XML an Introduction,NIIT,Prentice Hall of India Pvt.Ltd	
3		
Reference Books		
1	World Wide Web Design with HTML, C.Xavier,2007,TMH.	
2		
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	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

Fourth Semester

Course code		System Software and Operating Systems	L	T	P	C
Core/Elective/Supportive		Core:6	4	0	0	4
Pre-requisite		Students Should have the basic knowledge in computers.	SyllabusVersion			
Course Objectives:						
The main objectives of this course are to:						
1. To understand the processing of programs on a computer system to design and implementation of language processor.						
2. To enhance the ability of program generation through expansion and gain knowledge about Code optimization using software tools.						
3. Students will gain knowledge of basic operating system concepts.						
4. To have an in-depth understanding of process concepts, deadlock and memory management.						
5. To provide an exposure to scheduling algorithms, devices and information management.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Know the program generation and program execution activities in detail					K1
2	Understand the concepts of Macro Expansions and Gain the knowledge of Editing processes					K2-K3
3	Remember the basic concepts of operating system					K1
4	Understand the concepts like interrupts, deadlock , memory management and filemanagement					K2
5	Analyze the need for scheduling algorithms and implement different algorithms used for representation, scheduling, and allocation in DOS and UNIX operating systems.					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	LelandL.Beck,System Software:An Introduction to Systems Programming,Pearson,Third Edition.	
2	H.M.Deitel,Operating Systems, 2 nd Edition,Perason, 2003.	
Reference Books		
1	Achy8utS.Godbole, Operating Systems, TMH,2002.	
2	JohnJ.Donovan, Systems Programming, TMH,1991.	
3	D.M.Dhamdhere, SystemsProgramming and Operating Systems,2 nd Revised Edition,TMH.	
Related Online Contents[MOOC,SWAYAM,NPTEL,Websites etc.]		
1		
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	4	0	0	4
Pre-requisite		Before starting the course students should have the basic knowledge about operating systems and C programming.	SyllabusVersion			
Course Objectives:						
The main objectives of this course are to:						
1. Linux is a multiuser and multitasking operating system and after learning the concepts of an operating system						
2. Students 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 shells are also discussed which make the users 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 Systems.					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 advanceUnix 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 inLINUX–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 prior basic knowledge in operating systems.	SyllabusVersion			
Course Objectives:						
The main objectives of this course are to:						
1. Describe the architecture and features of Linux Operating System						
2. To create programs in theLinux environment using Linux utilities and commands.						
3. Students are given an introductory Linux shell command and they will be able to write their 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 advanced Unix commands.					K4-K5
5	Create shell scripts for real time applications.					K6
K1–Remember;K2 –Understand;K3 –Apply;K4– Analyze;K5– Evaluate; K6–Create						
Programs			36 hours			
1. Write a shell script to stimulate the file commands: rm,cp,cat, mv,cmp,wc,split, diff.						
2. Write a shell script to show the following system configuration:						
a. currently logged user and his log name current shell,home directory,OperatingSystem type,current Path setting,current working directory						
b. show currently logged number of users,show all available shells						
c. show CPU information like processor type ,speed						
d. 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,username,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 have 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 event argument using a for loop.	
Total Lecture hours	
36 hours	
Text Book(s)	
1	Operating System LINUX, NIIT, PHI, 2006, Eastern Economy Edition.
2	N.B. Venkateswarlu, Introduction to Linux: Installation and Programming, BS Publications, 2008, 1 st Edition
Reference Books	
1	Richard Petersen, Linux: The Complete Reference, Sixth Edition, Tata McGraw-Hill Publishing Company Limited, New Delhi, Edition 2008.
Related Online Contents[MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://www.w3resource.com/linux-exercises/
2	http://spoken-tutorial.org/
3	
Course Designed By:	

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

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

Course code		Lab –Web Programming	L	T	P	C
Core/Elective/Supportive		Skill Based Subject 2 (Lab):1	0	0	3	2
Pre-requisite		Basic knowledge of the internet and basic html.	Syllabus Version			
Course Objectives:						
The main objectives of this course are to: 1. To gain knowledge about how to develop web applications 2. To create web applications using HTML 3. To create web applications using HTML with Style sheets 4. To design interactive web sites with all the features given in Web programming						
Expected Course Outcomes:						
On the successful completion of the course,student will be able to:						
1	Understand the problems and create applications in basics of web programming			K2-K4,K6		
2	Understand and develop Web pages with formatting styles.			K2-K3		
3	Apply the features in HTML to present the details given			K3		
4	Analyze the problem, apply the concept for developing applications			K4-K5		
5	Create websites of real time applications			K6		
K1–Remember; K2–Understand; K3–Apply; K4–Analyze; K5–Evaluate; K6–Create						
Programs			36hours			
1. Develop a HTML document which displays your name as <h1> heading and displays any four of your friends. Each of your friend’s names must appear as hot text. When you click your friend's name, it must open another HTML document, which tells you about your friend.						
2. Write names of several countries in a paragraph and store it as an HTML document, world.html. Each country name must be a hot text. When you click India (for example), it must open india.html and it should provide a brief introduction about India.						
3. Design a HTML document describing you. Assign a suitable background design and background and background color and text color.						
4. Develop a HTML document to print the following: Who can use the solar heaters? Any body with a regular hot water demand. In houses for domestic purposes (cooking, bathing and washing). □ For Engineering/chemical industries, dairies and textile/leather process plants, to –preheat boiler feed water. For hostels, hospitals, guest houses and industrial canteens. □ For food-processing plants and for process applications.						
5. Write a HTML document to print the following: The family has the following facilities: 1. Own House Living area 2400 square feet, Separate bungalow, Car shed, 2 Car Maruti Esteem, Registration Number TN 38 A 9650, 1996 Model, Farm, 35 acres Coconut Groves, 10 acres Mango Groves.						
6. Write a HTML document to print your class Time Table.						
7. Develop a Complete Web Page using Frames and Framesets which gives the Information						

about a Hospital usingHTML.	
8. Write a HTML document to print your Bio-Data in the following format: NAME Religion Community Street Town District State Address PIN Code Office Phone Residence Mobile Educational Qualification Degree University/ Institute Month & year Grade / Mark	
9. Develop complete set of webpages to describe your skills in various areas as using HTML.	
10. Develop a website to publish your family and the details of each member using HTML.	
11. Develop a HTML document to display a Registration Form for an inter-collegiate function.	
12. Develop a HTML document to design Alumni Registration form of your college.	
	Total Lecture hours
	36 hours
Text Book(s)	
1	Internet and Web Design, IT Education, Macmillan India Ltd.
2	HTML and XML an Introduction, NIIT, Prentice Hall of India Pvt. Ltd
Reference Books	
1	World Wide Web Design with HTML, C. Xavier, 2007, TMH.
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
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Course Designed By:	

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

Course code	Office Fundamentals	L	T	P	C
Core/Elective/Supportive	Naan Mudhalvan Skill Based Course	0	0	3	2
http://kb.naanmudhalvan.in/Bharathiar_University_(BU) Refer the Content of the Serial.No.2					

Fifth Semester

Course code		RDBMS & Oracle	L	T	P	C
Core/Elective/ Supportive		Core:8	6	0	0	4
Pre-requisite		Basic knowledge about the data, table and database in computers	Syllabus Version			
CourseObjectives:						
The main objectives of this course are to: 1.The course describes the data,organizing the data in database,database administration. 2.To grasp the different issues involved in the design of a database system. 3.To study the physical and logical database designs and database modeling like relational, Hierarchical,network models, database security, integrity and normalization. 4.ItalsogivesintroductiontoSQLlanguage 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.						
ExpectedCourseOutcomes:						
On the successful completion of the course,student will be ablet o:						
1	Understand the basic concepts of Relational Data Model, Entity-RelationshipModel 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 usebuilt -infunctions and enhancetheknowledgeofhandlingmultiple tables					K1-K3
5	Attainagoodpracticalskillofmanagingandretrievingofdatausing DataManipulation 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 DataModel – Integrity Rules – Theoretical Relational Languages. Database Design: Data Modeling andNormalization: Data Modeling – Dependency – Database Design – Normal forms – DependencyDiagrams– De–normalization– AnotherExampleof Normalization.						
Unit:2 ORACLE9i 15hours						
Oracle9i: Overview: Personal Databases – Client/Server Databases – Oracle9i an introduction –SQL *Plus Environment – SQL – Logging into SQL *Plus – SQL *Plus Commands – Errors &Help – Alternate TextEditors – SQL *Plus Worksheet– iSQL *Plus. Oracle Tables: DDL:Naming Rules and conventions – Data Types – Constraints – Creating Oracle Table – DisplayingTable Information – Altering an Existing Table – Dropping, Renaming, Truncating Table – TableTypes– Spooling – Error codes.						

Unit:3	WORKINGWITHTABLE	15hours
WorkingwithTable:DataManagementandRetrieval:DML–addinganewRow/Record–CustomizedPrompts–UpdatingandDeletinganExistingRows/Records–retrievingDatafrom		
Table – Arithmetic Operations – restricting Data with WHERE clause – Sorting – RevisitingSubstitution Variables – DEFINE command – CASE structure. Functions and Grouping: Built-infunctions–GroupingData. MultipleTables: Joinsand Setoperations:Join–Set operations.		
Unit:4	PL/SQL	15hours
PL/SQL: A Programming Language: History – Fundamentals – Block Structure – Comments – DataTypes–OtherDataTypes–Declaration–Assignmentoperation–Bindvariables–Substitution Variables – Printing – Arithmetic Operators. Control Structures and Embedded SQL:ControlStructures–NestedBlocks–SQLinPL/SQL–DataManipulation–TransactionControl statements. PL/SQL Cursors and Exceptions: Cursors – Implicit & Explicit Cursors andAttributes – Cursor FOR loops – SELECT...FOR UPDATE – WHERE CURRENT OF clause –Cursorwith Parameters –CursorVariables – Exceptions – Types of Exceptions.		
Unit:5	PL/SQLCOMPOSITEDATATYPES	12hours
PL/SQLCompositeDataTypes:Records–Tables–arrays.NamedBlocks:Procedures–Functions–Packages –Triggers–DataDictionaryViews.		
Unit:6	ContemporaryIssues	3hours
Expertlectures,onlineseminars –webinars		
	Tota lLecture hours	75hours
TextBook(s)		
1	DatabaseSystemsusingOracle, NileshShah,2 nd edition,PHI.	
2	E-Book:DianaLorentz,“Oracle®DatabaseSQLReference”,ORACLE,Dec,2005.	
3	E-Book:BillPribyl,StevenFeuerstein,“Oracle PL/SQLProgramming”,O’ReillyMedia, Inc.,6 th Edition, February 2014.	
ReferenceBooks		
1	DatabaseManagementSystems,Majumdar&Bhattacharya,2007,TMH.	
2	DatabaseManagementSystems, GeraldV. Post,3 rd edition,TMH.	
RelatedOnlineContents[MOOC,SWAYAM,NPTEL,Websitesetc.]		
1	http://www.digimat.in/nptel/courses/video/106105175/L01.html	
2	https://www.tutorialspoint.com/oracle_sql/index.htm	

MappingwithProgrammeOutcomes										
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

Coursecode	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			
Course Objectives:					
The main objectives of this course are to: 1. The main aim of the course is to cover visual basic programming skills required for modern software development. 2. To study the advantages of Controls available with visual basic. 3. To gain a basic understanding of database access and management using data controls. 4. To facilitate the learner to carry out project works using the tools available in VB and MS Access.					
Expected Course Outcomes:					
On the successful completion of the course, student will be able to:					
1	Demonstrate fundamental skills in utilizing the tools of a visual environments such as command, menu 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		
ODB and Data Access Objects :Data Access Options ,ODBC, Remote data objects,ActiveX EXE and Active XDLL :Introduction, Creating an Active XEXE Component, Creating ActiveXDLL 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 inVB: sstab control, setting properties at runtime, adding controls to tab ,listcontrol, tabstrip control, MSFl exgrid control, Why A DO, Establishing a reference, Crystaland Data reports.		
Unit:6	ContemporaryIssues	3 hours
Expertlectures,online seminars –webinars		
	TotalLecturehours	75 hours
TextBook(s)		
1	Visual Basic 6.0 Programming, Content Development Group, TMH, 8 th reprint, 2007. (Unit ItoUnit IV)	
2	Programming with VisualBasic 6.0, MohammedAzam, Vikas Publishing House, Fourth Reprint, 2006. (Unit V)	
ReferenceBooks		
1	GrayCornell(2003),”VisualBasic6fromgroundup”TMH,New Delhi,1 st Edition,	
2	Deitel and Deitel, T.R.Nieto (1998), “Visual Basic 6 – How to Program”, Pearson Education. Firs tEdition.	
RelatedOnlineContents[MOOC,SWAYAM,NPTEL,Websitesetc.]		
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CourseDesignedBy:		

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

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

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

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

Course code	Introduction to Compiler Design	L	T	P	C
Core/Elective/ Supportive	Elective:I	6	0	0	4
Pre-requisite	Basic knowledge in translators, compilation of high level language programming	SyllabusVersion			
CourseObjectives:					
The main objectives of this course are to: 1.To understand the use of translator sand compiler 2.To enable students to learn the phases of a compiler 3.To familiar with context free grammars ,regular expressions and parsing techniques 4.To learn about the intermediate code in translation 5.To enable the students to learn about code generations					
ExpectedCourseOutcomes:					
On The Successful completion of the course,student will be able to:					
1	Understand the use of translators and complier,structure of a compiler				K1
2	Understand and apply the context free grammars and parsing techniques				K1-K4
3	Understandandrememberthesyntaxdirectedtranslations,intermediate codes				K2
4	Understand the runtime storages chems, error detection and recovery				K3
5	Understand and apply knowledge on code optimization and code generator				K2-K4
K1–Remember;K2 –Understand;K3 –Apply;K4– Analyze;K5– Evaluate; K6–Create					
Unit:1					
Introduction to Compilers		15 hours			
Introduction to Compilers: Compilers and Translator – Need of Translator – The structure of aCompiler –Lexical Analysis– Syntax analysis– Intermediate code generation–optimization –code generation – Compiler – writing tools. Finite automata and lexical Analysis: The role of the lexical analysis–A simple approach to the design of lexical analyzers- Regular expressions to finite automata– Minimizing the number of states of aDFA.					
Unit:2					
programming languages and ParsingTechniques		15 hours			
The Syntactic specification of programming languages: context free grammars – derivations and parse trees – capabilities of context free grammars. Basic parsing techniques: Parsers – shift –reduce parsing – operator– precedence parsing –top down parsing –predictive parsers.					
Unit:3					
Syntax directed Translation and Symbol Table		15 hours			
Syntax – directed translation: syntax – directed translation schemes – implementation of syntax – directed translators – intermediate code – postfix notation – parse trees and syntax trees – 3 address code – quadruples and triples – translation of assignment statements – Boolean expressions –statements that alter the flow of control. Symbol tables: the contents of a symbol table – data structures for symbol table – representing scope information.					
Unit:4					
Storage allocation and Error detection and recovery		15 hours			

Runtime storage administration: Implementation of a simple stack allocation scheme–implementation of block-structured languages – storage allocation in block structured languages. Error deduction and recovery: errors–lexical phase errors–syntactic phase errors–semantic errors.		
Unit:5	Code Optimization and Generation	12 hours
Introduction of code optimization: The principle sources of optimization – loop optimization – the DAG representation of basic blocks– value numbers and algebraic laws– Global data flow analysis. Code generation: Object programs – problems in code generation – a machine model – a simple code generator–registeral location and assignment–code generation from DAGs–peephloes optimization.		
Unit:6	ContemporaryIssues	3 hours
Expertlectures,online seminars–webinars		
	Total Lecture hours	75 hours
Text Book (s)		
1	Principles of Compiler Design,AlfredV.Aho,JeffreyD.Ullman,NarosaPublishingHouse.	
Reference Books		
1	Steven S. Muchnick, “Advanced Compiler Design and Implementation”, Morgan Kaufmann Publishersan imprint of Elsevier 2014.	
2		
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Related Online Contents[MOOC,SWAYAM,NPTEL,Websitesetc.]		
1		
CourseDesignedBy:		

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	M	S	M	M	M	M	S	S	M	L
CO3	S	M	S	S	S	M	S	L	S	M
CO4	M	S	M	S	S	S	M	S	M	S
CO5	S	L	S	M	M	S	S	S	S	M

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

Course code	PHP &Scripting Languages	L	T	P	C
Core/ Elective/ Supportive	Elective:I	6	0	0	4
Pre-requisite	Basic knowledge on HTML and CSS and OOPs concept.	SyllabusVersion			
CourseObjectives:					
The main objectives of this course are to: 1.To understand the scripting languages used while developing web applications 2.To enable students to learnVBscript and Javascript for implementing event procedures. 3.To familiar SSI and Cookie sand plugins 4.To learn about the server side scripting language to build web applications 5.To enable the students to learn how to build applications in PHP with database.					
ExpectedCourseOutcomes:					
On the successful completion of the course,student wil lbe able to:					
1	Understand the basics of.VB script and Javascript				K1
2	Understand the I/O handling, data validation, Activex control and validation				K2
3	Understand and remember the javascript objects,form validations, cookies and plugins				K2
4	Understand the sever side scripting language basics				K3
5	Knowledge on PHP objects, cookies, connecting remote files, and database connections				K2-K4
K1–Remember;K2 –Understand;K3 –Apply;K4– Analyze;K5– Evaluate; K6–Create					
Unit:1	Introductionto.NETFramework	15 hours			
VB Script andJ avaScript:Language structure– control structure–Procedures and functions–Error handling.					
Unit:2	File I/O, Object Oriented Concepts and Message Queues	15 hours			
VBScript:Input & Output–Data Validation–Integration with Forms–Activex Control & Scripting					
Unit:3	VB.NETIDEandControls	15 hours			
JavaScript:Form Validation–SSIand Cookies –Frames and Windows–MIME Types–Plugins					
Unit:4	VB.NET & ASP.NET	15 hours			
PHP:Server Side Scripting Language:Basic syntax–Types–Variables–Constants–Expressions –Operators–Control Structures.					
Unit:5	WebServices	12 hours			
PHP:Functions–Classes and Objects–HTMLforms–HTTP authentication with PHP– Cookies –Handling file uploads – Using remote files–Connection handling –DatabaseConnections.					
Unit:6	Contemporary Issues	3 hours			
Expert lectures, online seminars –webinars					

	Tota lLecture hours	75 hours
TextBook(s)		
1	ChristopherJ.Goddard,MarkWhite,MasteringVBScript,GalgotiaPublications,NewDelhi.	
2	LeePurcell,MaryJane Mara,TheABCsofJavascript.	
Reference Books		
1	Steven Holzner, PHP:The Complete Reference.	
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RelatedOnlineContents[MOOC,SWAYAM,NPTEL, Websitesetc.]		
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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	M	M	S	S	M	M	L
CO3	M	M	S	M	S	M	M	L	S	M
CO4	M	S	M	S	S	S	M	S	M	S
CO5	S	L	S	M	M	S	S	M	S	M

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

Course code	PYTHON Programming	L	T	P	C
Core/ Elective /Supportive	Elective:I	6	0	0	4
Pre-requisite	Knowledge on logic of the programs and oops concept.	SyllabusVersion			
CourseObjectives:					
The main objectives of this course are to: 1. To introduce the fundamentals of PythonProgramming. 2. To Teach About the concept o f Functions in Python. 3. To impart the knowledge of Lists,Tuples,FilesandDirectories. 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..					
ExpectedCourseOutcomes:					
On the successful completion of the course, student will beable to:					
1	Remembering the concept of operators,datatypes,loopingstatementsinPython programming.				K1
2	Understanding the conceptsofInput/ Output operations in file..				K2
3	Applying the concept of function sand exception handling				K3
4	Analyzing the structures of list,tuples and maintaining dictionaries				K4
5	Demonstrate significant experience with python program development environment				K4-K6
K1–Remember;K2 –Understand;K3 –Apply;K4– Analyze;K5– Evaluate; K6–Create					
Unit:1	BASICS OF PYTHON	10 hours			
BASICS:Python–Variables–Executing Python from the Command Line–EditingPythonFiles –PythonReservedWords–BasicSyntax–Comments–StandardDataTypes–RelationalOperators– Logical Operators–Bit Wise Operators – Simple Input and Output.					
Unit:2	CONTROL STATEMENTS	10 hours			
CONTROL STATEMENTS: Control Flow and Syntax – Indenting – if Statement – statements and expressions- string operations- Boolean Expressions –while Loop – break and continue – for Loop.LISTS: List-list slices – list methods – list loop – mutability – aliasing – cloning lists – list parameters.TUPLES: Tuple assignment,tuple as return value–Sets –Dictionaries					
Unit:3	FUNCTIONS	10 hours			
FUNCTIONS: Definition– Passing parameters to a Function –Built- in functions- Variable Number of Arguments–Scope–Type conversion-Type coercion–Passing Functions to a Function – Mapping Functions in a Dictionary–Lambda–Modules–Standard Modules–sys–math–time–dir– help Function.					
Unit:4	ERROR HANDLING	12 hours			

ERROR HANDLING: Run Time Errors – Exception Model – Exception Hierarchy – Handling Multiple Exceptions –Data Streams –AccessModes Writing –Data to a File Reading–DataFrom a File – Additional File Methods – Using Pipes as Data Streams – Handling IO Exceptions –Working with Directories.		
Unit:5	OBJECT ORIENTED FEATURES	12 hours
OBJECT ORIENTED FEATURES: Classes Principles of Object Orientation – Creating Classes – Instance Methods–File Organization–Special Methods–Class Variables– Inheritance– Polymorphism – Type Identification – Simple Character Matches – Special Characters – CharacterClasses – Quantifiers – Dot Character – Greedy Matches – Grouping – Matching at Beginning orEnd–Match Objects– Substituting–Splitting a String–CompilingRegularExpressions.		
Unit:6	Contemporary Issues	3 hours
Expertlectures,online seminars –webinars		
	Total Lecture hours	55 hours
TextBook(s)		
1	Mark Summerfield, Programming in Python 3: A Complete introduction to the PythonLanguage, Addison-Wesley Professional, 2009.	
2	MartinC.Brown,PYTHON:TheCompleteReference,McGraw-Hill,2001	
3	E. Balagurusamy (2017), “Problem Solving and Python Programming”, McGraw-Hill, FirstEdition.	
ReferenceBooks		
1	Allen B. Downey, “Think Python: How to Think Like a Computer Scientist”, 2 nd edition, Updated for Python 3, Shroff/O‘Reilly Publishers, 2016	
2	Guido van Rossum and Fred L. Drake Jr, —An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011	
3	WesleyJChun,—CorePythonApplicationsProgramming,PrenticeHall,2012.	
RelatedOnlineContents[MOOC,SWAYAM,NPTEL,Websites etc.]		
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Mapping with Programme Outcomes										
Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	L	S	M	L	M	S	S
CO2	S	S	S	L	S	M	L	M	S	S
CO3	S	S	S	L	S	M	L	M	S	S
CO4	S	S	S	L	S	M	L	M	S	S
CO5	S	S	S	L	S	M	L	M	S	S

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

Course code	CASE Tools Concepts and Applications	L	T	P	C
Core/Elective/ Supportive	Skill based Subject –3	6	0	0	3
Pre-requisite	Basic knowledge in software project,testinginSDLC	Syllabus Version			
CourseObjectives:					
The main objectives of this course are to: 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 within-depth analysis.				K3
5	To inculcate knowledge on Software engineering concepts in turn gives a road map 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 versus 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-schematics 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 - Frameworks-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, McGrawHill International edition.	
3		
Reference Books		
1	Software Engineering: A Practitioner's Approach, Roger S Pressman, McGraw Hill International Edition.	
Related Online Contents[MOOC,SWAYAM,NPTEL,Websitesetc.]		
1		
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

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		SyllabusVersion			
CourseObjectives:						
The main objectives of this course are to: 1. Design and apply two dimensional graphics and transformations. 2. Design and apply three dimensional graphics and transformations. 3. ApplyI llumination, 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 beable to:						
1	Explainapplications,principles,commonlyusedandtechniquesofcomputergraphicsandalg orithmsforLine-Drawing,Circle-GeneratingandEllipse-Generating.					K2
2	Studentswillgettheconceptsof2Dand3D,Viewing,Curves and surfaces,Hidden Line/surface elimination techniques					K3
3	Studies concepts of Multimedia Systems,Text, Audioand Videotools					K3
4	Compressing audio and video using MPEG-1andMPEG-2					K4
5	Create 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	2 D GEO METRICTRANS FORMATIONS			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:AnalogVideoCamera–Transmission of Video Signals–VideoSignalFormats–Television Broadcasting Standards– PC Video – Video File Formats and CODECs– VideoEditing–VideoEditingSoftware.Animation:TypesofAnimation–ComputerAssistedAnimation – Creating Movement – Principles of Animation – Some Techniques of Animation –Animation on the Web – Special Effects – Rendering Algorithms. Compression: MPEG-1 Audio –MPEG-1Video – MPEG- 2 Audio – MPEG-2 Video.		
Unit:6	ContemporaryIssues	3 hours
Expertlectures, online seminars –webinars		
	TotalLecturehours	75 hours
TextBook(s)		
1	Computer Graphics, Donald Hearn, M.Pauline Baker, 2 nd 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)	
ReferenceBooks		
1	Computer Graphics, Amarendr aNSinha,ArunD Udai,TMH.	
2	Multimedia: Making it Work, TayVaughan, 7 th edition, TMH.	
Related Online Contents[MOOC,SWAYAM,NPTEL,Websites etc.]		
1		
CourseDesignedBy:		

Mapping with Program 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		ProjectWorkLab	L	T	P	C
Core/Elective/Supportive	Core:11		0	0	5	4
Pre-requisite	Students should have the strong knowledge in any one of the programming languages in this course.		Syllabus Version			
Course Objectives:						
The main objectives of this course are to: 1. To understand and select the task based on their core skills. 2. To get the knowledge about analytical skill for solving the selected task. 3. To get confidence for implementing the task and solving their time problems. 4. Express technical and behavioral ideas and thought in oral settings. 5. Prepare and conduct oral presentations						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Formulate a real world problem and develop its requirements develop 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						
6. The aim of the project work is to acquire practical knowledge on the implementation of the programming concepts studied.						
7. 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.						
8. The project work should be compulsorily done in the college only under the supervision of the department staff concerned.						
VivaVoce						
1. Viva-Voce will be conducted at the end of the year by both Internal (Respective Guides) and External Examiners, after duly verifying the Annexure Report available in the College , for a total of 200 marks at the last day of the practical session.						
2. Out of 200 marks, 160 marks for project report and 40 marks for VivaVoce.						

Project Report Format

PROJECT WORK

TITLE OF THE DISSERTATION

Bonafide Work Done by
STUDENT
NAMEREG.NO.

Dissertation submitted in partial fulfillment of the requirements for the award of
<NameoftheDegree>
of Bharathiar University,Coimbatore-46.

CollegeLogo

Signature of the Guide

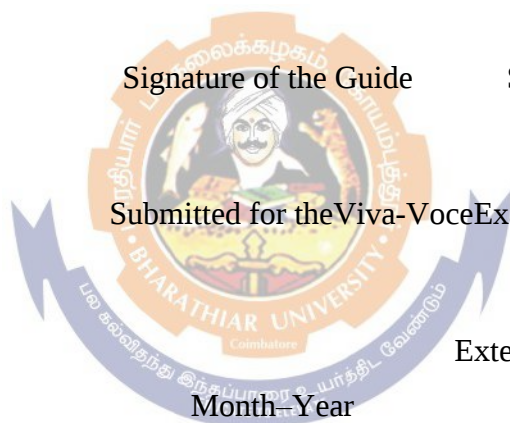
Signature of the HOD

Submitted for the Viva-Voce Examination held on ____

Internal Examiner

External Examiner

Month-Year



CONTENTS

AcknowledgementContents

Synopsis

1. Introduction

1. OrganizationProfile
2. SystemSpecification
1. Hardware Configuration
2. Software Specification

2. System Study

1. Existing System
1. Drawbacks

2. Proposed System

1. Features

3. System Design and Development

1. File Design
2. Input Design
3. Output Design
4. Database Design
5. System Development

1. Description of Modules(Detailed explanation about the project work)

4. TestingandImplementation

5. Conclusion

BibliographyAppe

ndices

- A. Data Flow Diagram
- B. Table Structure
- C. Sample Coding
- D. Sample Input
- E. Sample Output



CourseDesignedBy:

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

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

Course code		Programming Lab–Graphics & Multimedia	L	T	P	C
Core/Elective/Supportive		CoreLab :7	0	0	5	3
Pre-requisite		Students should have the basic knowledge on CandC++to do computer graphics and multimedia applications.	SyllabusVersion			
CourseObjectives:						
The main objectives of this course are to: 1. To learn the basic principles of 2-dimensional computer graphics. 2. Provide an understanding of how to scan convert the basic geometrical primitives, how to transform the shapes to fit them as per the picture definition. 3. Provideanunderstandingofmappingfromaworldcoordinatestodevicecoordinates,clippingand projections. 4. To be able to discuss the application of computer graphics concepts in the development of computer games, information visualization and business applications. 9.To comprehend and analyse the fundamental sof 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	Designs can conversion problems using Cand 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 dropeach word of a sentence one by one from the top.						
3.Write a program to dropa line using DDAAgorithm.						
4.Write a program to move acar with sound effect.						
5.Write a program to bouncea 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.CreateSun Flower using Photoshop.						
8.AnimatePlane 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 WebPageusingPhotoshop.						
12.ConvertBlack andWhite Photo toColorPhoto usingPhotoshop.						

	Total Lecture hours	36 hours
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Text Book(s)	
1	Computer Graphics, Donald Hearn, M. Pauline Baker, 2 nd edition, PHI.
2	Principle of Multimedia, Ranjan Parekh, 2007, TMH.
Reference Books	
1	Computer Graphics, Amarendra N Sinha, Arun D Uday, TMH.
2	Multimedia: Making it Work, Tay Vaughan, 7 th 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	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	Computer Networks	L	T	P	C
Core/ Elective/ Supportive	Elective:II	5	0	0	4
Pre-requisite	Students should have the knowledge on computer connectivity and connectivity peripherals.	SyllabusVersion			
CourseObjectives:					
The main objectives of this course are to: 1.To identify various components in a data communication system and understand state-of-the-art in network protocols, architectures and applications. 2.To enable students through the concepts of computer networks, different models and their involvement in each stage of network communication. 3.To educate the concepts of terminology and concept of the OSI reference model and the TCP/IP reference model and protocols such as TCP,UDP and IP. 4.To be familiar with the concept of protocols, network interfaces, and design /performance issues in local area networks and wide area networks. 5.Introduce the student to network routing for IP networks and how a collision occurs and how to solve it and how a frame is created and character count of each frame.					
Expected Course Outcomes:					
On the successful completion of the course, student will be able to:					
1	Remember the organization of computer networks, factors influencing computer network development and there reasons for having variety of different type of networks.				K1
2	Understand Internet structure and can see how standard problems are solved and the use of cryptography and network security.				K2
3	Apply knowledge of different techniques of error detection and correction to detect and solve error bit during data transmission.				K3
4	Analyze the requirements for a given organizational structure and select the most appropriate net working architecture and technologies				K4
5	Knowledge about different computer networks, reference models and the functions of each layer in the models				K2-K4
K1–Remember;K2 –Understand;K3 –Apply;K4– Analyze;K5– Evaluate; K6–Create					
Unit:1	BASICS OF NETWORKS AND OSI MODEL		15 hours		
Network Hardware: LAN – WAN – MAN – Wireless – Home Networks. Network Software: Protocol Hierarchies – Design Issues for the Layers – Connection-oriented and connection less services – Service Primitives – The Relationship of services to Protocols. Reference Models: SI Reference Model–TCP/IP reference Model–Comparison of OSI and TCP/IP–Critique of OSI and protocols– Critique of the TCP/IP Reference model.					
Unit:2	PHYSICAL LAYER		15 hours		
PHYSICAL LAYER – Guided Transmission Media: Magnetic Media – Twisted Pair – Coaxial Cable – Fiber Optics. Wireless Transmission: Electromagnetic Spectrum – Radio Transmission–Microwave Transmission–Infrared and Millimeter Waves–Light Waves. Communication Satellites: Geostationary, Medium-Earth Orbit, Low Earth-orbit Satellites–Satellites versus Fiber.					

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

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

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

Course code	Dot Net Programming	L	T	P	C
Core / Elective / Supportive	Elective:II	5	0	0	4
Pre-requisite	Basic knowledge in web programming and VB programming	SyllabusVersion			
Course Objectives:					
The main objectives of this course are to:					
6. To understand.NET framework to develop web centric applications.					
7. To enable students to learn the basics of I/O and object oriented programming.					
8. TofamiliarwithVB.NETandASP.NET IDE					
9. To learn about the ASP.NET controlsandADO.NET.					
10. Toenablethestudentstolearn howtobuild anddeploymentof webservices.					
Expected Course Outcomes:					
On the successful completion of the course,student will be able to:					
1	Understand the basics of .NET framework and the object oriented programming.				K1
2	Understand the procedures, File I/O,Error handling and Message queues.				K2
3	Understand and remember the components inVB.NETIDE,ADO.NETandalso the window forms.				K2
4	Understand the HTML server controls,Web controls, Validation controls and state management and tracing.				K3
5	Knowledge on SOAP, building web services and deploying and publishing web services,Finding and consuming web services.				K2-K4
K1–Remember;K2 –Understand;K3 –Apply;K4– Analyze;K5– Evaluate; K6–Create					
Unit:1	Introduction to.NETFramework			15 hours	
Introduction to .Net:.NET framework -difference between VB6 and VB.Net-Object-Oriented programming and VB.Net-Data types-Variables-Operators-Arrays-Condition allogic.					
Unit:2	FileI/O, Object Oriented Concepts and Message Queues			15 hours	
Procedures-Dialog boxes-File IOa nd System objects-Error handling-Name spaces-Classes and Objects-Multithreading-Message Queue-Programming MSMQ.					
Unit:3	VB.NET IDE and Controls			15 hours	
VB.NetIDE-Compiling and Debugging-Customizing-Data access : ADO.Net -Visualstudio. NetandADO .Net. Windows Forms: Controls-Specific controls-Irregular forms.					
Unit:4	VB.NET&ASP.NET			15 hours	
VB.Net and web: Introduction to ASP .Net page framework- HTML server controls- Web controls- Validation controls-Events-CSS-Statemanagement-Tracing- Security.					
Unit:5	WebServices			12 hours	
UNITV: Web Services:Introduction-Infrastructure-SOAP-Building web services-Deploying and publishing web services-Finding and consuming web services					

Unit:6	Contemporary Issues	3hours
Expertlectures,online seminars –webinars		
	Total Lecture hours	75h ours
TextBook(s)		
1	Bill Evjen, JasonBeres, et.al, VisualBasic.Net programming,WileyDreamtech India(p) Ltd.ISBN81-265-0254-1. (Chapters: 1,2, 3, 4, 5,6, 7,8, 9,10, 12, 13, 14,15, 16, 17, 18,19, 21, 22, 25, 26, 27, 29, 31, 32, 33, 34, 35, 36, 38, 39, 40, 42, 43, 44, 45, 46, 47, 48, 49, 50).	
Reference Books		
1	Fergal Grimes, Microsoft. NET for programmers, Shroff Publishers & Distributors (P) Ltd. ISBN81-7366-540-0.	
2	ThuanThai&HoangQ. Lam,.NET Framework Essentials,Shroff Publishers & Distributors(P)Ltd. ISBN 81-7366-654-7	
3		
Related Online Contents[MOOC,SWAYAM, NPTEL,Websites etc.]		
1		
2		
3		
Course Designed By:		

Mapping with Programme Outcomes										
Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	M	S	L	M	M	M	M	M	L
CO2	M	S	L	M	M	S	S	M	L	L
CO3	M	M	S	M	S	S	S	L	S	M
CO4	M	M	S	S	S	S	M	S	M	S
CO5	S	L	S	M	M	S	S	M	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			
CourseObjectives:						
The main objectives of this course are to: 1.To enable the students to learn the concepts and techniques in distributed computing and client server computing. 2.To learn the pros and cons of distributed computing, distributed databases. 3.To familiar with design considerations in distributed computing 4.To understand the client server models andR*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, fileserver, 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						
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						
Unit:2		Challenges and Managing Distributed Resources			15 hours	
Distributed systems:Prosand Consof distributed processing–Distributed databases–the challenges of distributed data – loading, factors – managing the distributed resources division of responsibilities.						
Unit:3						
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						
Unit:4		Client Server Network Model		15 hours		
Client server network model:Concept–fileserver –printer server and email 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		
	Tota lLecture hours	75 hours
TextBook(s)		
1	JohnA.Sharp, An introduction to distributed and parallel processing, Black well Scientific Publication (UnitI&III)	
2	UylessD.Black,Data communication and distributed networksII(unit II)	
3	JoelM.Crichllow, Introduction to distributed & parallel computing(Unit IV)	
Reference Books		
1	Stefans Ceri,Ginseppe Pelagatti, Distributed database Principles and systems,McGrawHill	
2		
Related Online Contents[MOOC,SWAYAM,NPTEL,Websites etc.]		
1		
2		
3		
CourseDesignedBy:		

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

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

Course code		Internet of Things(IoT)	L	T	P	C
Core/ Elective/ Supportive		Elective:III	5	0	0	4
Pre-requisite		Students should have the basic understanding of logical circuits and hardware architecture.	Syllabus Version			
Course Objectives:						
The main objectives of this course are to: 1. To learn the concepts of IoT and its protocols. 2. To learn how to analysis the data in IoT. 3. To develop IoT infrastructure for popular applications. 4. To report about the IoT privacy, security and vulnerabilities solution						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	To Understand The Fundamentals of Internet of Things.					K1
2	To know the basics of communication protocols and the designing principles of Web connectivity.					K2
3	To gain the knowledge of Internet connectivity principles					K2-K3
4	Designing And Develop Smart City in IoT					K2-K3
5	Analyzing and evaluate the data received through sensors in IOT.					K4-K5
K1-Remember;K2-Understand; K3-Apply;K4-Analyze;K5 -Evaluate; K6 -Create						
Unit:1						
Unit:1		INTRODUCTION			15 hours	
Introduction - Definition & characteristics of IoT - physical design of IoT - logical design of IoT -IoT enabling Technologies - IoT levels & Deployment templates. Domain specific Iots : Home Automation - cities - Environment - Energy - retail - logistics - Agriculture - Industry i Health and life style.						
Unit:2						
Unit:2		IOT and M2M			12 hours	
IoT and M2M-Deference between Iot and M2M -SDN and NFV for lot- IoT systems management - SNMP -YANG-NETOPEER						
Unit:3						
Unit:3		IOT SPECIFICATION		15 hours		
IoT platforms design Methodology - purpose and specification - process specification - Domain model specification- Information model specification- Service specification- IoT level specification-functional view specification- operational view specification- Device and component Integrators -Application Development.						
Unit:4						
Unit:4		LOGICAL DESIGN USING PYTHON		15 hours		
Logical design using python - Installing python - type conversions - control flow - functions -modules - File handling - classes. IoT physical devices and End points, building blocks of IoTdevice-Raspberry Pi- Linux on RaspberryPi-Raspberry Pi Interfaces.						

Unit:5	IOT AND CLOUD COMPUTING	15hours
IoT physicals ervers & cloud computing- WAMP- Xively cloud for IoT-pythonWeb application frame work- Amazon web services for IoT.		
Unit:6	Contemporary Issues	3 hours
Expertlectures,online seminars –webinars		
	TotalLecturehours	75 hours
TextBook(s)		
1	Internet of Things - A hands on Approach Authors: Arshdeep Bahga, Vijay MadisetiPublisher:Universities press.	
Reference Books		
1	Internet of Things - Srinivasa K.G., Siddesh G.M. Hanumantha Raju R. Publisher: CengageLearning India pvt. Ltd (2018)	
Related Online Contents[MOOC,SWAYAM,NPTEL,Websitesetc.]		
1		
2		
3		
Course Designed By:		

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

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

Course code		WebServices	L	T	P	C
Core/Elective/Supportive		Elective:III	5	0	0	4
Pre-requisite		Fundamentals of markup language, basic knowledge on distributed services.	SyllabusVersion			
Course Objectives:						
The main objectives of this course are :						
1. To familiar with distributed services, XML and web services, XML, SOAP, WSDL, UDDI specification.						
2. To learn about orchestration and refinement, transactions, security issues ,the common attacks.						
3. To study th QOS metrics ,mobile and wireless service, building real world web service applications.						
4. To learn about the deployment of Web services and applications on to application servers.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1		Understand about the distributed computing, web services ,technologies and applications, XML document (WSDL) and the concepts of XML, protocol(SOAP), locating the remote web services				K1
2		Understand the concepts of UDDI and its specifications, Understand the concepts of system interface and its work flow,the common attacks.				K2
3		Examining the concepts of architecture of system to meet the user requirements and analyse the concepts of mobile and wireless services, Design and develop the real - world enterprise applications using web services.				K3
4		Analysing the steps necessary to build and deploy the web services.				K4
5		Applying the applications created based on the web services on different webservers.				K4 - K6
K1-Remember; K2-Understand; K3-Apply;K4-Analyze;K5 -Evaluate; K6 -Create						
Unit: 1	Introduction to Webservices					10 hours
UNITI: Introduction to Web Services–Industry standards,Technologies and Concepts underlying Web Services –their support to Web Services, Applications that consume Web Services.						
Unit: 2	XML					10 hours

XML– its choice for web services– network protocols to back end databases technologies – SOAP,WSDL–exchange of information between applications in distributed environment–locating remote web services–its access and usage.UDDI specification– an Introduction		
Unit: 3	Workflow,security attacks andQoS Metrics	10 hours
A brief outline of web services – conversation – static and interactive aspects of system interface and its implementation,workflow–orchestration and refinement, transactions, security issues–the common attacks –security attacks facilitated with in web services quality of services–		
Architecting of systems to meet users requirement with respect to latency, performance, reliability,QOS metrics, Mobile and wireless services – energy consumption, network bandwidth utilization, portalsand services management..		
Unit:4	Building real world enterprise applications	12 hours
Building real world enterprise applications using web services– sample source codes to develop web services– steps necessary to build and deploy web services and client applications to meet customers requirement– Easier development, customization, maintenance, trans actional requirements, seamless porting to multiple devices and platforms.		
Unit:5	DeploymentofWebservices	12 hours
Deployment of Web services and applications on to Tomcat application server and axis SOAP server (both are free wares) –Web services platform as a set of enabling technologies for XML based distributed computing.		
Unit:6	ContemporaryIssues	3 hours
	TotalLecturehours	55 hours
TextBook(s)		
1	Sandeep Chatterjee, James Webber, Developing Enterprise Web Services: An Architects Guide ,Prentice Hall, Nov 2003.	
2	Keith Ballinger, NET Web services: Architecture and Implementation with .Net, Pearson Education, First Education Feb 2003.	
3	Sandeep Chatterjee, James Webber, Developing Enterprise Web Services: An Architects Guide, Prentice Hall, Nov 2003.	
Reference Books		
1	Ramesh Nagappan, Developing JavaWeb Services: Architecting and developing secure Web Services Using Java, John Wiley and Sons, 2003.	
2	EricAMarks and MarkJ Werrell, Executive Guide to Web Services, John Wiley and Sons, 2003	

3	AnneThomasManes, WebServices :A Managers Guide,Addison Wesley, 2003.
Related Online Contents[MOOC,SWAYAM, NPTEL, Websitesetc.]	
1	
Course Designed By:	

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

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



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

Factors governing Performance Testing – Methodology of Performance Testing – tools for Performance Testing – Process for Performance Testing – Challenges. Regression Testing: What is Regression Testing? – Types of Regression Testing – When to do Regression Testing – How to do Regression Testing – Best Practices in Regression Testing.		
Unit:5	PLANNING, MANAGEMENT, EXECUTION AND REPORTING	12 hours
Test Planning, Management, Execution and Reporting: Test Planning – Test Management – Test Process – Test Reporting – Best Practices. Test Metrics and Measurements: Project Metrics – Progress Metrics – Productivity Metrics – Release Metrics.		
Unit:6	Contemporary Issues	3 hours
Expert lectures, online seminars-webinars		
	Total Lecture hours	75 hours
Text Book(s)		
1	Software Testing Principles and Practices, Srinivasan Desikan & Gopalswamy Ramesh, 2006, Pearson Education. (UNIT-I: 2.1-2.5, 3.1-3.4 UNIT-II: 4.1-4.4, 5.1-5.5 UNIT-III: 6.1-6.7 (UNIT-IV: 7.1-7.6, 8.1-8.5 UNIT-V: 15.1-15.6, 17.4-17.7)	
2	Limaye M.G., “Software Testing Principles, Techniques and Tools”, Second Reprint, TMH Publishers, 2010.	
3	Aditya P. Mathur, “Foundations of Software Testing”, 2nd Edition, Pearson Education, 2013.	
Reference Books		
1	Effective Methods of Software Testing, William E. Perry, 3rd ed, Wiley India.	
2	Software Testing, Renu Rajani, Pradeep Oak, 2007, TMH.	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1		
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

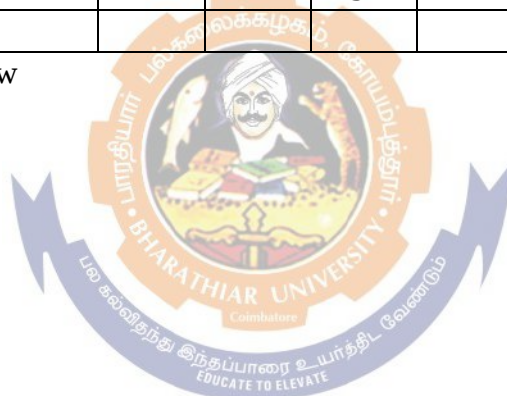
*S-Strong; M-Medium; L-Low

Course code		Lab –CASE TOOLS LAB	L	T	P	C
Core/Elective/Supportive		Skill Based Subject 4(Lab): 2	0	0	3	2
Pre-requisite		Students must have the basic understanding verification and validations in software engineering.	SyllabusVersion			
CourseObjectives:						
The main objectives of this course are to: 1. To enable the students to get better understanding and knowledge in the field of CASE tools. 2. To gain practical knowledge on developing cas etools 3. To develop UML diagrams for the real time problems						
ExpectedCourseOutcomes:						
On the successful completion of the course,student will be able to:						
1	PreparetheCASE tools for the given specification.				K1, K2	
2	Understand and develop theUMLdiagram for real time applications.				K2-K3	
3	Design the real time test cases				K3	
4	Analyze the development of CASE tools				K4-K5	
5	Design the CASEtools and generateVB code				K6	
K1-Remember; K2-Understand; K3-Apply;K4-Analyze;K5 -Evaluate; K6 –Create						
Programs						
					36 hours	
1.To design an ATM transfer system using UMLdiagram and to generate VB code.						
2.To design a student mark analysis using UML diagram and to generate VB code.						
3.To design a platform assignment system using UML diagram and to generateVB code.						
4.To design a railway reservation system usingUMLdiagram andtogenerateVBcode.						
5.To design an expert system for medicine field using UMLdiagram and to generateVB code.						
6.To design as tockmaintenancesystemusing UMLdiagram and to generateVB code.						
7.To design a quizzing system using UML diagram and to generate VB code.						
.To design a remote computer monitoring system using UML diagram and to generate VB code.						
9.To design an online ticket reservation system using UML diagram and to generateVB code.						
10.To design anE-mail client server systemusingUML diagram and to generate VB code.						
		Total Lecture hours	36 hours			

Text Book(s)	
1	
Reference Books	
1	
Related Online Contents [MOOC, SWAYAM ,NPTEL, Websites etc.]	
1	
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

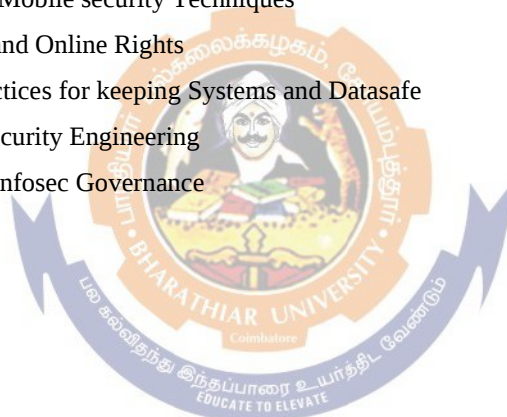
*S-Strong;M-Medium;L-Low



CourseCode		Cyber Security	L	T	P	C
Core/elective/Supportive		Naan Mudhalvan Skill based Course	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 Cyber security eco-system
4. **Course 4:** CoreThreat 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 Datasafe
14. **Course 14:** Cloud Security Engineering
15. **Course 15:**Industry Infosec Governance



Course1-Information Security Fundamentals : Broad Overview of Information Security will cover the following topics:

- 1.1Information Security,1.2Computer Security,1.3 CIA Triad / Principles, 1.4 Non-repudiation, 1.5 Risk Management
- 1.6 Cryptography Basics,1.7Authentication, 1.8Authorization,1.9 AccessControl,1.10 Security Policies
- 1.11 Security Auditing,1.12 Security Laws and Regulations,1.13Defense,1.14 Security Monitoring, 1.15 ISO27000 framework
- 1.16 Information Security use case demonstration as per industry verticals, 1.17 Policy, Process, Procedures, Standards, Guidelines, Baselines

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

- Case structure – Objectives,Target audience, Executive summary, Background, Your evaluation, Proposed solution, Conclusion
- **CaseStudy#1:**List Foundations of Health Care 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, 2.8Zero trust, 2.9 IOT, 2.10 Layers of cybersecurity, 2.11 Hacking, 2.12Incident management,2.13Security operations

CaseStudy / Demo/ RolePlay /Discussion/ Quiz will cover the following topics:

- **CaseStudy #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, Ports canning, 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, Open source governance, Software composition analysis, Log and audit trail, OWASP Top 10 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 protect any user account in applications
 - 2FA, MFA, Password Management
- Demo
- Scenario based role play (Cyber security 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 Cyberkillchain,. 4.8MITRE ATT@ACK

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

- **CaseStudy#8:How many Level sof User expertise are involved to for man ThreatIntelteam**
- **CaseStudy#9:What are the roles included in Threat Intelligence at Industry level**
- Demo
- Scenario based roleplay (Cyber security 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, Burp suite, 5.6 Basic defense 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 roleplay (Cyber security 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, Burp suite, 6.6 Basic defence measures- Antivirus, Intrusion Detection / Prevention systems,
- 1. Penetration test approach, tools, 6.8 Pen test reporting, 6.9 Pen test rules, 6.10 Gray box, White box, Blackbox ,6.11 Sniffing, 6.12 DOS, 6.12 Social engineering, 6.13 Session Hijacking, SQL Injection

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

- CaseStudy#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 roleplay (Cybersecurity Strategy Development, Incident Response Plan)
- Group discussion
- Quiz



Course7 -Core Cyber Exploitations: Broad Overview of cyber exploitation will cover the following topics:

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

- **CaseStudy#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 roleplay (Cyber security strategy development, Incident Response Plan)
- Group discussion
- Quiz



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

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

- **CaseStudy#16:Explain Ransomw are behaviour and impact with in 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. Considere commerce services**
- Demo
- Scenario based roleplay(Cyber security strategy development, Incident response plan)
- Group discussion
- Quiz

following topics:

- 9.1SOC security operations center concept,9.2Logging, Attack Methodology And Monitoring,
- 1. Incident detection and Reporting,9.4SIEM,9.5 Threat intelligence feed, 9.624x7 monitoring

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

- **CaseStudy#19: What is Security posture for any healthcare industry**
- **CaseStudy#20: What is SO Cinfood chain industry**
- Demo
- Scenario based roleplay (Cyber security 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 IncidentRACI,10.3 Forensic Package,critical incident package,10.4 Malware incidents,10.5 Email security and phishing incidents,10.6Threat Reporting,10.7Third Party Incidents,10.8 Feedback Process,10.9TTX

CaseStudy/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 andAutomotiveindustries**
- Demo
- Scenario based roleplay(Cyber security strategy development, Incident response plan)
- Group discussion
- Quiz

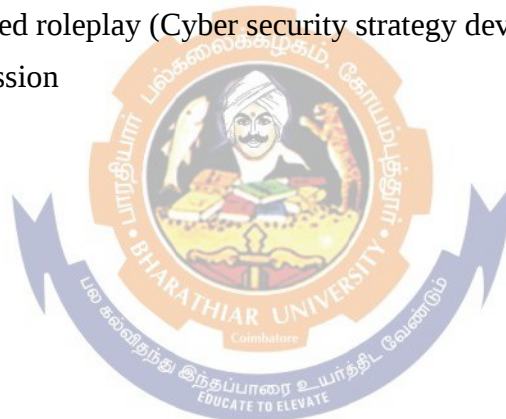


Course11–Web and Mobile security Techniques: Broad Overview of web and mobile security techniques will cover the following topics:

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

**CaseStudy/Demo /Role
Play/Discussion/Quizwillcoverthefollowingtopics:**

- Cyber breach case study(Equifax,Uber,Target, Stuxnet, SWIFT)
- **Case Study#23:What'stheTopstandardfollowedinWebApplications**
- **Case Study#24:What the Top standard followed in Mobile Applications**
- **Case Study#25:List secure framework susedin Mobile App Development**
- Demo
- Scenario based roleplay (Cyber security strategy development,Incident response plan)
- Group discussion
- Quiz



Course12–Privacy And online rights :BroadOverviewof privacy techniques will cover the following topics:

- 12.1 Privacy Concept,12.2Privacy Regulations,12.3GDPR,12.4Online 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**
- **CaseStudy#27:Whats the impactify our company related data available online?**
- Demo
- Scenario Based Roleplay(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 Wallcover 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, ISO27001, GDPR, 13.7 Risk Management Framework and Security Standards
- NIST SP800-30: Evaluating security risks
- ISO27000- Information Security Management Standards (ISMS)
- DO-178C- Software Considerations in Airborne Systems and Equipment Certification
- ISO/IEC27034– Application Security Guidelines
- SS584: Singapore Standard for MultiTier Cloud Security

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

- **CaseStudy#28: How can you assure your data is safe in Public network and corporate network**
- **Case Study#29: List 3 simple methods to keep your system safe from malware**
- Demo
- Scenario Based Roleplay (Cybersecurity Strategy Development, Incident Response Plan)
- Group Discussion
- Quiz



Course14–Cloud security engineering:

Broad Overview Of Cloud Security Will cover the following topics:

- 14.1Cloud Security Fundamentals,14.2 Cloud Providers,14.3 Tools For Cloud Security,14.4 Cloud Recovery, 14.5Cloud Monitoring,14.6Cloud Compliance,certification,audit and compliance,Pentest
-

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

- **CaseStudy#30:How the Cloud services or application scan targeted to hackers**
- **Case Study#31:What are the Different methods to store datasafe**
- Demo
- Scenario Based Roleplay(Cyber security 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

CaseStudy/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 Roleplay (Cybersecurity Strategy Development,Incident Response Plan)
- Group Discussion
- Quiz

