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/Cambridge_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-majorelective-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 basicComputer 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-Translat 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,IncrementandDecrementoperators-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 slike binary,octal and hexadecimal and understand the arithmetic and logical operations are performed by computers.	K3
2	Define the functions to simplify the Boolean equations using logic gates.	K1
3	Understand various data transfer techniques in digital computer and control unit operations.	K2
4	Compare the functions of the memory organization	K4
5	Analyze architectures and computational designs concepts related to architecture organization and addressing modes	K4

K1-Remember;**K2** -Understand;**K3** -Apply;**K4** -Analyze;**K5** -Evaluate;**K6** -Create

Unit:1	Number System and Arithmetic circuits	12 hours

Number System and Binary Codes:Decimal,Binary,Octal,Hexadecimal–Binary addition,Multiplication, Division – Floating point representation, Complements, BCD, Excess3, Gray Code.Arithmetic Circuits: Half adder, Full adder, Parallel binary adder, BCD adder, Half subtractor, Full subtractor,Parallel binary subtractor-Digital Logic:The Basic Gates –NOR,NAND,XOR Gates.

Unit:2	Combinational Logic and Sequential Circuits	14 hours

Combinational Logic Circuits: Boolean algebra– Karnaugh map – Canonical form 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	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	**MemoryOrganization**	**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**
Expertlectures,online seminars –webinars		

	TotalLecturehours	**56hours**

TextBook(s)	
1	Digital principles and applications,Albert Paul Malvino,DonaldP Leach,TMH,1996.
2	ComputerSystemArchitecture-M.MorrisMano, PHI.
3	Microprocessors and its Applications-RameshS.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 inasentence **(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.	
.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.	
0.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 OnlineContents[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 programming methodologyandconceptualizeelementsofOOmethodology	K1
2	Illustrateandmodelrealworldobjectsandmapitintoprogrammingobjectsforalegacysystem.	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 stings. 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 AreaandPerimeterofeach 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 RHubbard,Programming with C,2nd Edition,TMH publication, 2002.

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	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, 2nd 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
kb.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,2015,1st 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 2007,9th Edition
3	SeymourLipschutz,Data Structures McGraw Hill Publications,2014,1st 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,5thEdition,TMH.	
2	Herbert Schildt , Java: The Complete Reference, McGraw Hill Education, Oracle Press 10thEdition, 2018	
3	Programmingwith Java– A Primer– E.Balagurusamy, 3rd Edition, TMH.	
Reference Books		
1	The Complete Reference Java 2– Patrick Naughton & Hebert Schildt,3rdEdition,TMH	
2	Programming with Java– JohnR.Hubbard,2ndEdition,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 anda 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 muchas mouse up,mouse down,etc.,the corresponding message to be displayed.
1.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,5th Edition,TMH.	
2	Herbert Schildt , Java: The Complete Reference, McGraw Hill Education, Oracle Press 10th Edition, 2018	
3	Programming with Java– A Primer– E.Balagurusamy, 3rd Edition, TMH.	
Reference Books		
1	The Complete Reference Java2– Patrick Naughton & Hebert Schildt,3rd Edition,TMH	
2	Programming with Java– John R.Hubbard,2nd Edition,TMH.	
Related Online Contents[MOOC,SWAYAM, NPTEL,Websites etc.]		
1	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	Introducation 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, 2nd 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,2ndRevised 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, 1st 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.

.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.

.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 eventargument 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, 1st Edition	
Reference Books		
1	Richard Petersen, Linux: The Complete Reference, Sixth Edition, Tata McGraw-HillPublishingCompany Limited, New Delhi, Edition 2008.	
Related Online Contents[MOOC,SWAYAM,NPTEL,Websitesetc.]		
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	Understandand 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 aparagraphandstoreitasan HTML document,world.html. Each country name must be a hot text. When you click India (for example), it mustopen 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,dairiesandtextile/leather processplants, 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 MarutiEsteem, Registration Number TN 38 A 9650, 1996 Model, Farm, 35 acres Coconut Groves,10 acres Mango Groves.

6.WriteaHTML document to print your class TimeTable.

7.DevelopaCompleteWebPageusingFramesandFramesetswhichgivestheInformation

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.Developcompletesetofwebpages to describe you skills in various are as using HTML.	
10.Developa website to publish yourfamily andthedetails ofeachmemberusingHTML.	
11.DevelopaHTMLdocument todisplayaRegistrationForm for aninter-collegiatefunction.	
12.DevelopaHTMLdocument todesignAlumniRegistration formofyourcollege.	
TotalLecturehours	**36hours**
TextBook(s)	
1 InternetandWebDesign,ITLEducation,MacmillanIndiaLtd.	
2 HTMLandXMLanIntroduction,NIIT,PrenticeHallof IndiaPvt.Ltd	
ReferenceBooks	
1 WorldWideWebDesignwithHTML,C.Xavier,2007,TMH.	
RelatedOnlineContents[MOOC,SWAYAM,NPTEL,Websitesetc.]	
1	
2	
3	
CourseDesignedBy:	

MappingwithProgrammeOutcomes										
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

Coursecode	**OfficeFundamentals**	**L**	**T**	**P**	**C**
Core/Elective/Supportive	**NaanMudhalvanSkillBasedCourse**	**0**	**0**	**3**	**2**

http://kb.naanmudhalvan.in/Bharathiar_University_(BU)

Referthe Contentofthe 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. ItalsogivesintroductiontoSQLlanguageto 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

Oracle9*i*: 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– *i*SQL *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,2nd edition,PHI.
2	E-Book:DianaLorentz,“Oracle®DatabaseSQLReference”,ORACLE,Dec,2005.
3	E-Book:BillPribyl,StevenFeuerstein,“Oracle PL/SQLProgramming”,O’ReillyMedia, Inc.,6th Edition, February 2014.
ReferenceBooks	
1	DatabaseManagementSystems,Majumdar&Bhattacharya,2007,TMH.
2	DatabaseManagementSystems, GeraldV. Post,3rd 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	Knowledgeinprogramminglanguageandoopsconcept.	SyllabusVersion			

CourseObjectives:

Themain objectives ofthis courseareto:

1. The main aim of the course is to cover visual basic programming skills required for modernsoftwaredevelopment.
2. Tostudytheadvantages ofControlsavailablewithvisualbasic.
3. Togainabasicunderstandingofdatabaseaccessandmanagementusingdatacontrols.
4. Tofacilitatethelearner tocarryoutprojectworks usingthetoolsavailable inVBandMSAccess.

ExpectedCourseOutcomes:

Onthesuccessful completionofthecourse,student willbe ableto:

1	Demonstratefundamentalskillsinutilizingthetoolsofavisualenvironmentsuch ascommand,menusandtoolbars.	**K1**
2	ImplementSDIandMDIapplicationsusingforms,dialogsandothertypesofGUI components.	**K2**
3	Understandthe connectivitybetweenVBwithMS-ACCESSdatabase.	**K3**
4	Implementthemethodsandtechniquestodevelopprojects.	**K4**
5	Attainagoodpractical skillofmanaging ODBCandData AccessObjects	**K2-K4**

K1–Remember;**K2** –Understand;**K3** –Apply;**K4**– Analyze;**K5**– Evaluate; **K6**–Create

Unit:1	INTRODUCTION TO VB	15hours

GettingStartedwithVB6,ProgrammingEnvironment,workingwith 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	MENUSINVB	15hours

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 Cand 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 OLEAutomation objects, OLE Drag and Drop, File and File System Control: File System Controls,AccessingFiles.

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, 8th 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,1stEdition,
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		Studentsshouldhavethetheoreticalknowledgeinvisual basicand oops concept.	SyllabusVersion			

CourseObjectives:

The main objectives of this course are to:

1. TodevelopapplicationsusingGraphicalUser 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	Underst and the concepts of VisualBasic.	**K1**
2	Learn the advantages of Control sinV 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/SQLand 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.Constructiono f an Arithmetic Calculator (Simple).	
2.Writing simple programs using loops and decision- making statements. a. GenerateFibonacciseries. b.Findthesum ofNnumbers.	
3.Write a program to create a menu and MDIForms.	
4.Write a program to display files in a directory using Drive List Box, Di rList 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 acceptanumberasinputand convert it in to 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 per form 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/SQLblock.	

	10.WriteaPL/SQL program to implement the concept of Triggers
	11.WriteaPL/SQL program to implement the concept"Procedures".
	12.WriteaVBprogramtomanipulatethestudentmarklistwithoracledatabaseconnectivityprogram.
	TotalLecturehours — **36 hours**
TextBook(s)	
1	Visual Basic 6.0 Programming, Content Development Group, TMH, 8th reprint, 2007. **(Unit ItoUnit IV)**
2	ProgrammingwithVisualBasic6.0,MohammedAzam,VikasPublishingHouse,FourthReprint,2006. **(Unit V)**
3	E-Book:BillPribyl,StevenFeuerstein,"OraclePL/SQLProgramming",O'ReillyMedia,Inc.,6th Edition, February 2014.
ReferenceBooks	
1	GrayCornell(2003),"VisualBasic6fromgroundup"TMH,New Delhi,1st Edition,
2	Deitel and Deitel, T.R.Nieto (1998), "Visual Basic 6 – How to Program", Pearson Education.FirstEdition.
RelatedOnlineContents[MOOC,SWAYAM,NPTEL,Websitesetc.]	
1	
2	
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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	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 Compliers: Compliers and Translator – Need of Translator – The structure of aComplier –Lexical Analysis– Syntax analysis– Intermediate code generation–optimization –code generation – Complier – 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–peepholes optimization.		
Unit:6	**ContemporaryIssues**	**3 hours**
Expertlectures,online seminars–webinars		
	Total Lecture hours	**75 hours**
Text Book (s)		
1	Principles of Complier 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		
3		
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.	
2		
3		
RelatedOnlineContents[MOOC,SWAYAM,NPTEL, Websitesetc.]		
1		
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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	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", 2nd edition, Updated for Python 3, Shroff/O'Reilly Publishers, 2016	
2	Guido van Rossum and Fred L. Drake Jr, ―An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011	
3	WesleyJChun,―CorePythonApplicationsProgramming‖,PrenticeHall,2012.	
RelatedOnlineContents[MOOC,SWAYAM,NPTEL,Websites etc.]		
1		

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 oft his 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 beable 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 inturn 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 suchModels- Understanding the business- Types of models -model development approach-the case for structural development-advantages of using a case tool. System analysis and design -what is DFD -General Rules for Drawing DFD- Difference Between Logical data flow diagram and Physical data flow diagram-Software verses Information Engineering-How case tools store information.

Unit:2	SOFTWAREDESIGN	12 hours

Approach used to solve the problem statement: How to deal with a problem statement-Data flow diagram for Payroll System-Presentation Diagram for Payroll System-sehematics of the model-Forms-Screens-Menu Screens-Data entry Screens-Report Output Format-Utilities. Installation of Ubridge and Synthesis: How to use the tools in Ubridge Synthesis for case -Installation of Ubridge Synthesis-Computer Aided Software Engineering -Getting Ubridge to work-Setup-Assign-Housekeep-The Ubridge page.

Unit:3	SOFTWARE TESTING	15 hours

Introduction to Ubridge: Introduction–Main flow of the system prototyping your Report - Introducing the Novice Model of the Operation . Introducing Synthesis–Synthesis basic– Synthesis–Menu Drawing thescreen - Requirement Definition- Diagram-Data Dictionary- Document- Synthesis MainAdministration–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: Rambaughet.al._s object modeling techniques - The Booch methodology –The Jacobson et.al. Methodologies-Pattern - Frameworks-TheUnified 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		
	TotalLecturehours	**75 hours**
Text Book(s)		
1	Case Tools Concepts and Applications ,IvanN 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, RogerSPressman, McGraw Hill International Edition.	
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	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,commonlyusedandtechniquesofcomputergraphicsandalgorithmsforLine-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, 2nd edition, PHI. (UNIT-I: 3.1-3.6,4.1-4.5&UNIT-II: 5.1-5.4,6.1-6.5)
2	Principles of Multimedia, Ranjan Parekh, 2007, TMH. (UNIT III: 4.1-4.7,5.1-5.16 UNIT-IV:7.1-7.3,7.8-7.14,7.18-7.20,7.22,7.24,7.26-28 UNIT-V: 9.5-9.10,9.13,9.15,10.10-10.13)
ReferenceBooks	
1	Computer Graphics, Amarendr aNSinha,ArunD Udai,TMH.
2	Multimedia: Making it Work, TayVaughan, 7th 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		Studentsshouldhavethestrongknowledgeinanyoneofthepro gramming languagesinthiscourse.	SyllabusVersion			

CourseObjectives:

The main objectives of this course are to:

1. Tounderstandand 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 there altime problems.
4. Express technical and behavioral ideas and thought in oral settings.
5. Prepare and conductoral presentations

Expected Course Outcomes:

On the successful completion of the course,student will be able to:

1	Formulate areal 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 originals requirements of the problem.	**K5**
3	Work as a responsible member and possibly a leader of ateamin 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,comparethem 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 forVivaVoce.

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 theViva-VoceExaminationheldon ___

Internal Examiner External Examiner

Month–Year

CONTENTS

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 DDAAlgorithm.	
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.AnimatePlaneflying 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.	

	TotalLecturehours	**36 hours**

TextBook(s)	
1	Computer Graphics,DonaldHearn,M.PaulineBaker, 2nd edition,PHI.
2	Principle sof Multimedia,RanjanParekh,2007,TMH.
ReferenceBooks	
1	Computer Graphics, AmarendraNSinha,ArunD Udai,TMH.
2	Multimedia:Making itWork, TayVaughan, 7th edition, TMH.
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	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-artin 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. Toeducatetheconceptsof terminology and concept sof theOSIreference model and the TCP/IPreferencemodelandprotocols such as TCP,UDP and IP.
4. To be familiar with the concept sofprotocols, network interfaces, and design /performance issues in local area works and wide area net works.
5. Introducethestudenttoanetworkroutingfor IP networks and how acollisionoccursandhowto solve it and how aframe is created and character count of each frame.

Expected Course Outcomes:

On the successful completion of the course, student will beable to:

1	Remember the organization of computer networks, factors influencing computer network development and there reasons for having variety of different type sof 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	BASICSOFNETWORKS ANDOSIMODEL	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 – CoaxialCable – Fiber Optics. Wireless Transmission: Electromagnetic Spectrum – Radio Transmission-MicrowaveTransmission–InfraredandMillimeterWaves–LightWaves.CommunicationSatellites:Geostationary,Medium-EarthOrbit,LowEarth-orbitSatellites–SatellitesversusFiber.

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,4th edition,PHI.*(UNIT-I:1.2-1.4 UNIT-II:2.2-2.4 UNIT-III:4.2-4.6 UNIT-IV:5.2,5.3,6.2,6.5 UNIT-V:7.1,7.2,8.1-8.4)*	
Reference Books		
1	Data Communication and Networks, AchyutGodbole,2007,TMH.	
2	Computer Networks: Protocols,Standards,and Interfaces, UylessBlack,2nded,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 consof 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	**Introduction to Distributed Systems**	**15 hours**

Distributed Systems:Fully Distributed Processing systems–Networks and Interconnection Structures–designing a distributed processing g system.

Unit:2	**Challenges and Managing Distributed Resources**	**15 hours**

Distributed systems:Prosand Consof distributed processing–Distributed databases–the challenges of distributed data – loading, factors – managing the distributed resources division of responsibilities.

Unit:3	**Design Considerations**	**15 hours**

Design considerations: Communication Line loading – line loading calculations- partitioning and allocation - data flow systems – dimensional analysis- network database design considerations-ration analysis-database decision trees-synchronization of network databases

Unit:4	**Client Server Network Model**	**15 hours**

Client server network model:Concept–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 networks‖(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		Studentsshouldhavethebasicunderstandingoflogicalcircuitsand hardware architecture.	SyllabusVersion			

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

ExpectedCourseOutcomes:

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	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	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	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	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 MadisettiPublisher: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.]

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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		WebServices	L	T	P	C
Core/Elective/Supportive		Elective:III	5	0	0	4
Pre-requisite		Fundamentals of mark-up 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 specifi 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

FactorsgoverningPerformanceTesting–MethodologyofPerformanceTesting–toolsforPerformance Testing – Process for Performance Testing – Challenges. Regression Testing: What isRegression Testing? – Types of Regression Testing – When to do Regression Testing – How to doRegressionTesting – Best Practices inRegressionTesting.		
Unit:5	**PLANNING, MANAGEMENT, EXECUTION AND REPORTING**	**12 hours**
Test Planning, Management, Execution and Reporting: Test Planning – Test Management – TestProcess – Test Reporting –Best Practices. Test Metrics and Measurements: Project Metrics–ProgressMetrics – Productivity Metrics– Release Metrics.		
Unit:6	**ContemporaryIssues**	**3 hours**
Expertlectures,online seminars-webinars		
	TotalLecturehours	**75 hours**
TextBook(s)		
1	SoftwareTestingPrinciplesandPractices,SrinivasanDesikan&GopalswamyRamesh,2006,PearsonEducation.*(UNIT-I:2.1-2.5,3.1-3.4UNIT-II:4.1-4.4,5.1-5. 5UNITIII:6.1-6.7 (UNITIV:7.1-7.6,8.1-8.5 UNIT-V:15.1-15.6,17.4-17.7)*	
2	LimayeM.G.,"SoftwareTestingPrinciples,TechniquesandTools",SecondReprint,TMHPublishers, 2010.	
3	AdityaP.Mathur,"FoundationsofSoftwareTesting",2ndEdition,PearsonEducation,2013.	
ReferenceBooks		
1	EffectiveMethodsofSoftwareTesting,WilliamE.Perry,3rded,WileyIndia.	
2	SoftwareTesting,RenuRajani,PradeepOak,2007,TMH.	
RelatedOnlineContents[MOOC,SWAYAM,NPTEL,Websitesetc.]		
1		
CourseDesignedBy:		

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	PrepretheCASE 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 CIATriad / 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 frame work
- 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, Yourevaluation, Proposed solution, Conclusion
- **CaseStudy#1:**ListFoundationsofHealthCareIndustries
  - 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–ArchitectureandStandards,Wireless security,NetworkVulnerabilities,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,Dictionaryattack,Email spoofing
- 3.3 Software security – Secure Design, Secure Coding, Static Security, Dynamic Security, Open source governance,Softwarecompositionanalysis,Log and audit trail,OWASPTop10Threats
- **SQL Injection, Cross Site Scripting (XSS), Cross Site RequestForgery(CSRF)**
  - 3.4 Cryptography Basics–Security by Obscurity,CryptographicKeys,Asymmetric,Symmetric,Hashing, Public Key Infrastructure (PKI), Challenges in cryptography
  - 3.5 Application of Cryptography – Virtual Private Network (VPN), Secure Socket Layer (SSL), DigitalSignature
  - 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 ZeroTrust,3.9XDR,3.10AI,3.11MUD,3.12 Context a ware

CaseStudy/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
- **CaseStudy#6:** List methods to Secure Data in transit and Dataatrest
  - Encryption,Hashing,
- **CaseStudy#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, 5.4Tools, 5.5 Attack Toolset–Metasploit, Nessus, nmap, Burp suite, 5.6Basic defense measures-Antivirus,IntrusionDetection/Prevention systems

CaseStudy/Demo/RolePlay/Discussion/Quizwillcoverthefollowingtopics:

- **CaseStudy #10:What are few examples of anVulnerability asperIndustry oriented applications**
- **CaseStudy#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:

- 6.1what 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 ,6.11Sniffing, 6.12DOS, 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,13.7Risk Management Framework and Security Standards
  - NISTSP800-30: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 yours 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
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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