B. Sc. HARDWARE SYSTEMS AND NETWORKING

Syllabus

AFFILIATED COLLEGES

Program Code: 26V

2021 – 2022 (Batch)

BHARATHIAR UNIVERSITY

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

Coimbatore - 641 046, Tamil Nadu, India

Program Educational Objectives (PEOs)	
The **B.Sc. Hardware Systems and Networking** program describe accomplishments that graduates are expected to attain within five to seven years after graduation	
PEO1	To enhance the broad knowledge in core area related to computer software and hardware technologies
PEO2	To develop and acquire in-depth knowledge in understanding thoroughly the principles of hardware design in the latest technology
PEO3	To facilitate the graduates to describe and analyze current and relevant advances in computer hardware and software
PEO4	To enrich the learners to develop communication, professional skills and to inculcate team spirit
PEO5	To stimulate the graduates to build awareness on social responsibility , ethical practices and human values in-built in the discipline

Program Specific Outcomes (PSOs)	
After the successful completion of **B.Sc. Hardware Systems and Networking** program, the students are expected to	
PSO1	To impart education with clear knowledge of the fundamentals and applied aspects of Computer Hardware Systems.
PSO2	Graduates will be able to apply fundamentals of Next-generation systems, Networking devices, in various domains.
PSO3	Ability to engage in life-long learning and adopt fast changing technology to prepare for professional developments
PSO4	Ability to communicate effectively with excellent interpersonal skills and demonstrate the practice of professional ethics for societal benefit
PSO5	Learn latest development and technologies in Hardware and Networking system

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

BHARATHIAR UNIVERSITY::COIMBATORE 641 046
B. Sc. Hardware Systems and Networking (CBCS PATTERN)
(*For the students admitted from the academic year 2021-2022 and onwards*)
Scheme of Examination

Part	Title of the Course	Hours/ Week	Duration in Hours	CIA	CEE	Total	Credits
	Semester I						
I	Language - I	6	3	50	50	100	4
II	English - I	6	3	50	50	100	4
III	Core 1: Computing Fundamentals and C Programming	4	3	50	50	100	4
III	Core 2: Computer Architecture	4	3	50	50	100	4
III	Core Lab 1: Programming Lab – C	3	3	50	50	100	4
III	Allied 1: Mathematical Structures for Computer Science	5	3	50	50	100	4
IV	Environmental Studies*	2	3	-	50	50	2
	Total	**30**		**300**	**350**	**650**	**26**
	Semester II						
I	Language – II	6	3	50	50	100	4
II	English – II	6	3	50	50	100	4
III	Core 3: C++ Programming	5	3	50	50	100	4
III	Core Lab 2: Programming Lab – C++	4	3	50	50	100	4
III	Core Lab 3: Internet Basics	2	3	25	25	50	2
III	Allied 2: Discrete Mathematics	5	3	50	50	100	4
IV	Value Education – Human Rights*	2	3	-	50	50	2
	Total	**30**		**275**	**325**	**600**	**24**
	Semester III						
III	Core 4: Data Structures	6	3	50	50	100	4
III	Core 5: Fundamentals of Microprocessor	6	3	50	50	100	4
III	Core Lab 4: PC Assembling Lab	5	3	50	50	100	4
III	Allied 3: Computer Based Optimization Techniques	6	3	50	50	100	4
III	Skill based Subject 1 : Software Engineering	5	3	30	45	75	3
IV	Tamil @/ Advanced Tamil (OR) Non-major elective-1 (Yoga for Human Excellence)* / Women's Rights*	2	3	-	50	50	2
	Total	**30**		**230**	**295**	**525**	**21**
	Semester IV						
III	Core 6: System Software and Operating System	6	3	50	50	100	4
III	Core 7: Computer Storage Devices	6	3	50	50	100	4
III	Core Lab 5: Fundamentals of microprocessor Lab	3	3	25	25	50	2
	NaanMuthalvan Courses Office Fundamentals - Lab http://kb.naanmudhalvan.in/Bharathiar University_(BU)***	3	3	25	25	50	2
III	Allied 4: Embedded Systems	6	3	50	50	100	4

III	Skill based subject 2 (lab) : Software project Management Lab	4	3	30	45	75	3
IV	Tamil @/ Advanced Tamil (OR) Non-major elective-II(General Awareness) #	2	3	-	50	50	2
	Total	**30**		**230**	**295**	**525**	**21**
	Semester V						
III	Core 8: Network Security &Cryptography	6	3	50	50	100	4
III	Core 9: Software Testing	6	3	50	50	100	4
III	Core Lab 6: Computer Hardware Maintenance	6	3	50	50	100	4
III	Elective-I Computer Networks	6	3	50	50	100	4
III	Skill based Subject 3: Server Administration	6	3	30	45	75	3
	Total	**30**		**230**	**245**	**475**	**19**
	Semester VI						
III	Core 10: Web Technology	5	3	50	50	100	4
III	Core 11: Mastering LAN & Troubleshooting	5	3	50	50	100	4
III	Core Lab 7: Web Technology Lab	5	3	50	50	100	4
III	Elective-II : Graphics & Multimedia	5	3	50	50	100	4
III	Industrial Project	4	-	60	90	150	6
	***Naan Muthalvan Courses – Emerging Technology for Employability – II-Skill based Course - Cyber Security @ http://kb.naanmudhalvan.in/images/7/71/Cybersecurity.pdf (or) Machine Learning # http://kb.naanmudhalvan.in/images/1/19/PBL_Google.pdf (or) Android APP Development $ http://kb.naanmudhalvan.in/images/0/08/Android_App_Dev.pdf	2	-	25	25	50	2
III	Skill based Subject 4 (lab) : Server Administration Lab	4	3	30	45	75	3
V	Extension Activities**	-	-	50	-	50	2
	Total	**30**		**380**	**345**	**725**	**29**
	Grand Total			**1645**	**1855**	**3500**	**140**

Note:

*	No Continuous Internal Assessment (CIA), University Examinations Only.
**	No University Examinations, Continuous Internal Assessment (CIA) Only.
***	NaanMudhalvan – Skill courses- external 25 marks will be assessed by Industry and internal will be offered by respective course teacher.
# Govt – Non-Autonomous Colleges, **$** Aided – Non-Autonomous Colleges, **@** Self - Financing (Non – Autonomous)	

First

Semester

Course code		Computing Fundamentals and C Programming	L	T	P	C
Core/Elective/Supportive		**Core Paper: 1**	**4**	**0**	**0**	**4**
Pre-requisite		Students should have basic Computer Knowledge	**Syllabus Version**		2020-21 Onwards	

Course Objectives:

The main objectives of this course are to:
1. To impart knowledge about Computer fundamentals
2. To understand the concepts and techniques in C Programming
3. To equip and indulge themselves in problem solving using C

Expected Course Outcomes:

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

1	Learn about the Computer fundamentals and the Problem solving	**K2**
2	Understand the basic concepts of C programming	**K2**
3	Describe the reason why different decision making and loop constructs are available for iteration in C	**K3**
4	Demonstrate the concept of User defined functions , Recursions , Scope and Lifetime of Variables, Structures and Unions	**K4**
5	Develop C programs using pointers Arrays and file management	**K3**

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

Unit:1	Fundamentals of Computers & Problem Solving in C	12 hours

Fundamentals of Computers : Introduction – History of Computers-Generations of Computers-Classification of Computers-Basic Anatomy of a Computer System-Input Devices-Processor-Output Devices-Memory Management – Types of Software- Overview of Operating System-Programming Languages-Translator Programs-Problem Solving Techniques - Overview of C.

Unit:2	Overview of C	15 hours

Overview of C - Introduction - Character set - C tokens - keyword & Identifiers - Constants - Variables - Data types - Declaration of variables - Assigning values to variables - Defining Symbolic Constants - Arithmetic, Relational, Logical, Assignment, Conditional, Bitwise, Special, Increment and Decrement operators - Arithmetic Expressions - Evaluation of expression - precedence of arithmetic operators - Type conversion in expression – operator precedence & associativity - Mathematical functions - Reading & Writing a character - Formatted input and output.

Unit:3	Decision Making , Looping and Arrays	15 hours

Decision Making and Branching: Introduction – if, if….else, nesting of if …else statements- else if ladder – The switch statement, The ?: Operator – The goto Statement. Decision Making and Looping: Introduction- The while statement- the do statement – the for statement-jumps in loops. Arrays – Character Arrays and Strings

Unit:4	User-Defined Functions, Structures and Unions	15 hours

User-Defined Functions: Introduction – Need and Elements of User-Defined Functions-Definition-Return Values and their types - Function Calls – Declarations – Category of Functions- Nesting of Functions - Recursion – Passing Arrays and Strings to Functions - The

Scope, Visibility and Lifetime of Variables- Multi file Programs. Structures and Unions

Unit:5	**Pointers & File Management**	**15 hours**
Pointers: Introduction-Understanding pointers -Accessing the address of a variable Declaration and Initialization of pointer Variable – Accessing a variable through its pointer Chain of pointers- Pointer Expressions – Pointer Increments and Scale factor- Pointers and Arrays- Pointers and Strings – Array of pointers – Pointers as Function Arguments Functions returning pointers – Pointers to Functions – Pointers and Structures. File Management in C.		

Unit:6	**Contemporary Issues**	**3 hours**
Problem Solving through C Programming - Edureka		

	Total Lecture hours	**75 hours**

Text Book(s)

1	E Balagurusamy: Computing Fundamentals & C Programming – Tata McGraw-Hill, Second Reprint 2008

Reference Books

1	Ashok N Kamthane: Programming with ANSI and Turbo C, Pearson, 2002.
2	Henry Mullish & Hubert L.Cooper: The Sprit of C, Jaico, 1996.

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1	Introduction to Programming in C – NPTEL
2	Problem solving through Programming in C – SWAYAM
3	C for Everyone : Programming Fundamentals – Coursera

Course Designed By:

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

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

Course code		ComputerArchitecture	L	T	P	C
Core/Elective/Supportive		**Core Paper : 2**	**4**	**0**	**-**	**4**
Pre-requisite		**Student should have basic computer knowledge**	**Syllabus Version**		2020-21 Onwards	

Course Objectives:

On successful completion of this subject the students should have Knowledge on
1. To familiarize with different number systems and digital arithmetic & logic circuits
2. To understand the concepts of Combinational Logic and Sequential Circuits
3. To impart the knowledge of buses, I/O devices, flip flops, Memory and bus structure.
4. To understand the concepts of memory hierarchy and memory organization
5. To understand the various types of microprocessor architecture

Expected Course Outcomes:

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

1	Learn the basic structure of number system methods like binary, octal and Hexadecimal and understand the arithmetic and logical operations are performed bycomputers.	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		**Micro Computer System and its types**		**12 hours**

Microcomputer System: Introduction-Hardware and Software-Memory-ALU-Control Unit-Input and Output Techniques-Advanced System Concepts-Micro Computer Types-Multitasking and Multiprogramming.

Unit:2		**Peripheral Devices**		**14 hours**

Peripheral Devices: Keyboard and Mouse-CRT-Printer-Printer Types-Magnetic Storage Devices-Hard disk drive-DVD-CDROM-Scanner-Modem-Speakers.

Unit:3		**Micro programmed Control and addressing Modes**		**12 hours**

Micro programmed Control: Control Memory-Addressing Sequence-Design of Control Unit. CPU: General Register Organization-Stack Organization-Instruction Format-Addressing Modes-RISC-Program Control.

Unit:4		**PC Hardware Overview**		**10 hours**

PC Hardware Overview: BIOS-Power Connector-Inside the System Box-SMPS-Motherboard-PC Expansion Boards-Front Panel Indicator-Serial Interface-Floppy Disk Controller-Hard Disk Controller-Post Sequence.

Unit:5		**MICROPROCESSOR AND ITS TYPES**		**6 hours**

Microprocessor: Types-Processor Modes-Features-Manufacturing-Sockets-Heat and Cooling Problems-Math Coprocessors-Processor Bugs-Processor Upgrades.

Unit:6	Contemporary Issues	2 hours
Expert lectures, online seminars – webinars		
	Total Lecture hours	56 hours

Text Book(s)

1	**Govinda Rajulu B, "PC IBM and Clones** – Hardware, Troubleshooting and Maintenance",Tata McGraw Hill Publishing Company Ltd., New Delhi, 1991(UNIT I & II)
2	**Computer System Architecuture-**M. Morris Mano, Third Edition(UNIT III)
3	**Upgrading and Repairing PC's,** 17th Edition By „Scott Mueller"; Publisher: Que Pub Date: March 24, 2006 ; Print ISBN-10: 0-7897-3404-4(UNIT IV & V)

Reference Books

1	Digital Electronics Circuits and Systems, V.K. Puri, TMH.
2	Computer Architecture, M. Carter, Schaum„s outline series, TMH.

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1	https://nptel.ac.in/courses/106/103/106103068/
2	http://www.nptelvideos.in/2012/12/digital-computer-organization.html
3	http://brittunculi.com/foca/materials/FOCA-Chapters-01-07-review-handout.pdf

Course Designed By:

Mapping with Programme Outcomes

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

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

Course code		Programming Lab – C	L	T	P	C
Core/Elective/Supportive		**Core Lab: 1**	**0**	**0**	**3**	**4**
Pre-requisite		Students should have basic knowledge in C programming and algorithms	**Syllabus Version**		2020-21 Onwards	

Course Objectives:

The main objectives of this course are to:
1. To practice the Basic concepts, Branching and Looping Statements and Strings in C programming
2. To implement and gain knowledge in Arrays, functions, Structures, Pointers and File Handling

Expected Course Outcomes:

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

1	Remember and Understand the logic for a given problem and to generate Prime numbers & Fibonacci Series (**Program-1,2,3**)	**K1, K2**
2	Apply the concepts to print the Magic square, Sorting the data , Strings, Recursive functions and Pointers (**Program-4,5,6,8,10**)	**K2, K3**
3	Remember the logic used in counting the vowels in a sentence (**Program-7**)	**K1**
4	Apply and Analyze the concepts of Structures and File management (**Program-9,11,12**)	**K3&K4**

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

Programs	**36 hours**
1. Write a C program to find the sum, average, standard deviation for a given set of numbers.	
2. Write a C program to generate n prime numbers.	
3. Write a C program to generate Fibonacci series.	
4. Write a C program to print magic square of order n where n > 3 and n is odd.	
5. Write a C program to sort the given set of numbers in ascending order.	
6. Write a C program to check whether the given string is a palindrome or not using pointers.	
7. Write a C program to count the number of Vowels in the given sentence.	
8. Write a C program to find the factorial of a given number using recursive function.	
9. Write a C program to print the students Mark sheet assuming roll no, name, and marks in 5 subjects in a structure. Create an array of structures and print the mark sheet in the university pattern.	
10. Write a function using pointers to add two matrices and to return the resultant matrix to the calling function.	
11. Write a C program which receives two filenames as arguments and check whether the file contents are same or not. If same delete the second file	
12. Write a program which takes a file as command line argument and copy it to another file. At the end of the second file write the total i) no of chars ii) no. of words and iii) no. of lines.	
Total Lecture hours	**36 hours**

Text Book(s)

1	E Balagurusamy: Computing Fundamentals & C Programming – Tata McGraw-Hill, Second Reprint 2008

Reference Books

1	Ashok N Kamthane: Programming with ANSI and Turbo C, Pearson, 2002.
2	Henry Mullish & Hubert L.Cooper: The Sprit of C, Jaico, 1996.

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1	Introduction to Programming in C – NPTEL

2	Problem solving through Programming in C – SWAYAM
3	C for Everyone : Programming Fundamentals – Course
Course Designed By:	

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	L	M	S	S	S	L
CO3	S	S	S	M	L	M	S	S	S	M
CO3	S	S	S	L	L	M	S	S	S	L
CO4	S	S	S	M	L	M	S	S	S	M

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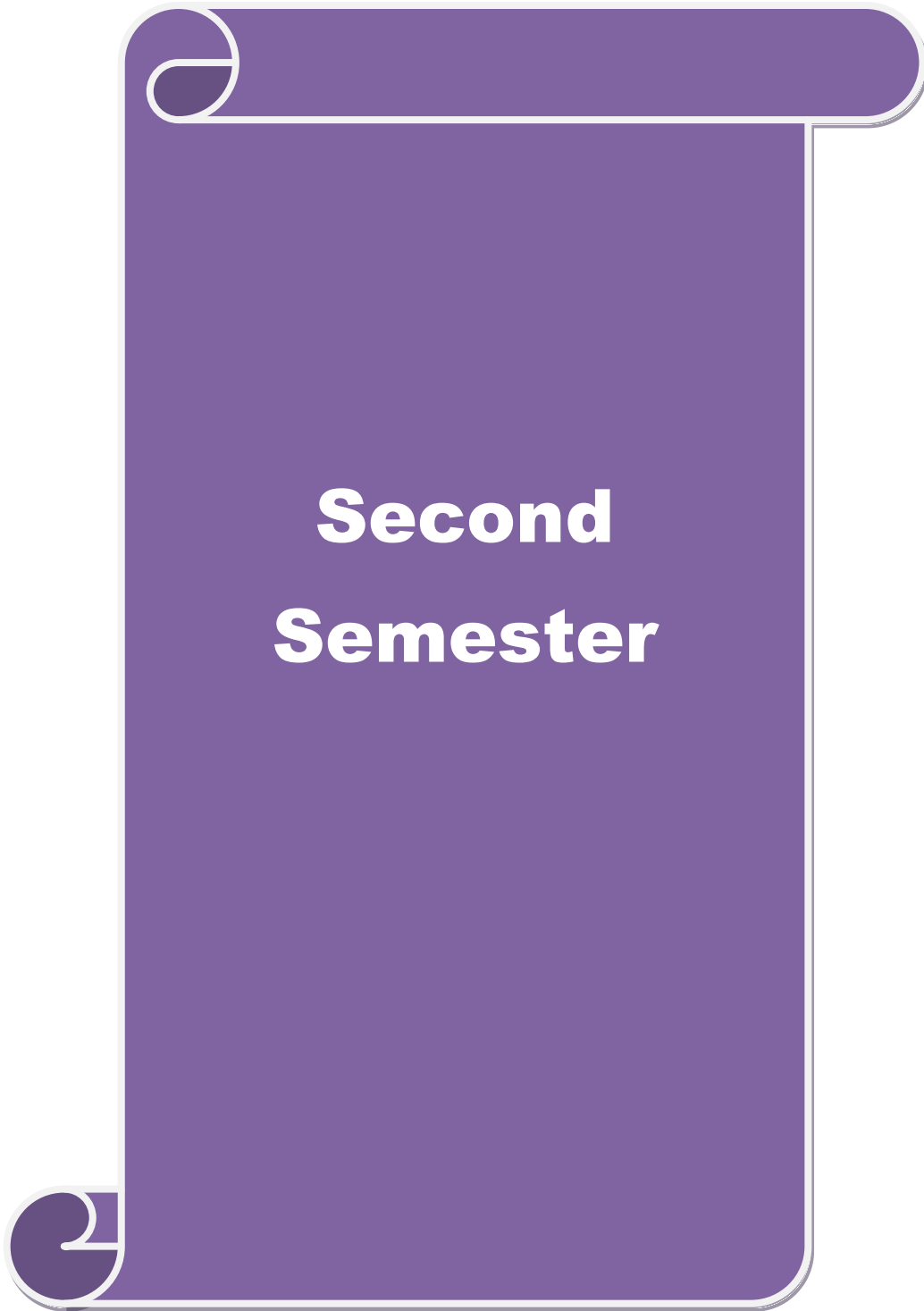
Second
Semester

Course code		C++ PROGRAMMING		L	T	P	C
Core/Elective/Supportive		Core: 3		5	0	0	4
Pre-requisite		Before starting this course one should have a basic understanding of computer programs and computer programming language. If you know the concepts of C programming it will be much easier to understand this course	**Syllabus Version**			2020-21 Onwards	

Course Objectives:

The main objectives of this course are to:

1. Impart knowledge of object oriented programming concepts and implement them in C++
2. Enable to differentiate procedure oriented and object-oriented concepts.
3. Equip with the knowledge of concept of Inheritance so that learner understands the need of inheritance.
4. Explain the importance of data hiding in object oriented programming

Expected Course Outcomes:

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

1	Define the different programming paradigm such as procedure oriented and object oriented programming methodology and conceptualize elements of OO Methodology	K1
2	Illustrate and model real world objects and map it into programming objects for a legacy system.	K2
3	Identify the concepts of inheritance and its types and develop applications using overloading features.	K3
4	Discover the usage of pointers with classes	K4
5	Explain the usage of Files, templates and understand the importance of exception Handling	K5

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

Unit:1		**INTRODUCTION TO C++**		10 hours

Key concepts of Object-Oriented Programming –Advantages – Object Oriented Languages – I/O in C++ - C++ Declarations. Control Structures: - Decision Making and Statements: If.. Else, jump, goto, break, continue, Switch case statements - Loops in C++: for, while, do - functions in C++ - inline functions – Function Overloading..

Unit:2		**CLASSES AND OBJECTS**		10 hours

Declaring Objects – Defining Member Functions – Static Member variables and functions – array of objects –friend functions – Overloading member functions – Bit fields and classes – Constructor and destructor with static members.

Unit:3		**OPERATOR OVERLOADING**		12 hours

Overloading unary, binary operators – Overloading Friend functions – type conversion – Inheritance: Types of Inheritance – Single, Multilevel, Multiple, Hierarchal, Hybrid, Multi path inheritance – Virtual base Classes – Abstract Classes.

Unit:4		**POINTERS**		13 hours

Declaration – Pointer to Class , Object – this pointer – Pointers to derived classes and Base classes – Arrays – Characteristics – array of classes – Memory models – new and delete operators – dynamic object – Binding, Polymorphism and Virtual Functions.

Unit:5	FILES	13 hours
File stream classes – file modes – Sequential Read / Write operations – Binary and ASCII Files – Random Access Operation – Templates – Exception Handling - String – Declaring and Initializing string objects – String Attributes – Miscellaneous functions .		

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

	Total Lecture hours	60 hours

Text Book(s)

1	Ashok N Kamthane, Object-Oriented Programming with Ansi And Turbo C++, Pearson Education, 2003.
2	

Reference Books

1	E. Balagurusamy, Object-Oriented Programming with C++, TMH, 1998.
2	Maria Litvin & Gray Litvin, C++ for you, Vikas publication, 2002.
3	John R Hubbard, Programming with C, 2nd Edition, TMH publication, 2002.

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1	https://www.spoken-tutorial.org
2	https://www.tutorialspoint.com/cplusplus/index.htm
3	https://www.w3schools.com/cpp/

Course Designed By:

Mapping with Programme Outcomes

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

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

Course code		**PROGRAMMING LAB - C++**	**L**	**T**	**P**	**C**
Core/Elective/Supportive		**Core Lab : 2**	**0**	**0**	**4**	**4**
Pre-requisite		Basic understanding of computer programs and computer programming language like C.	**Syllabus Version**		2020-21 Onwards	

Course Objectives:

The main objectives of this course are to:

1. Impart knowledge of object oriented programming concepts and implement them in C++
2. Enable to differentiate procedure oriented and object-oriented concepts.
3. Equip with the knowledge of concept of Inheritance so that learner understands the need of inheritance.
4. Explain the importance of data hiding in object oriented programming

Expected Course Outcomes:

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

1	Define the different programming paradigm such as procedure oriented and object oriented programming methodology and conceptualize elements of OO methodology	K1
2	Illustrate and model real world objects and map it into programming objects for a legacy system.	K2
3	Identify the concepts of inheritance and its types and develop applications using overloading features.	K3
4	Discover the usage of pointers with classes	K4
5	Explain the usage of Files, templates and understand the importance of exception Handling	K5

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

Programs	**36 hours**

1. Write a C++ Program to create a class to implement the data structure STACK. Write a constructor to initialize the TOP of the STACK. Write a member function PUSH() to insert an element and member function POP() to delete an element check for overflow and underflow conditions..

2. Write a C++ Program to create a class ARITHMETIC which consists of a FLOAT and an INTEGER variable. Write member functions ADD (), SUB(), MUL(), DIV() to perform addition, subtraction, multiplication, division respectively. Write a member function to get and display values.

3. Write a C++ Program to read an integer number and find the sum of all the digits until it reduces to a single digit using constructors, destructors and inline member functions.

4. Write a C++ Program to create a class FLOAT that contains one float data member. Overload all the four Arithmetic operators so that they operate on the object FLOAT

5. Write a C++ Program to create a class STRING. Write a Member Function to initialize, get and display stings. Overload the operators ++ and == to concatenate two Strings and to compare two strings respectively.

6. Write a C++ Program to create class, which consists of EMPLOYEE Detail like E_Number, E_Name, Department, Basic, Salary, Grade. Write a member function to get and display them. Derive a class PAY from the above class and write a member function to calculate DA, HRA and PF depending on the grade.

7. Write a C++ Program to create a class SHAPE which consists of two VIRTUAL FUNCTIONS Calculate_Area() and Calculate_Perimeter() to calculate area and perimeter of various figures. Derive three classes SQUARE, RECTANGLE, TRIANGE from class Shape and Calculate Area and Perimeter of each class separately and display the result.

8. Write a C++ Program to create two classes each class consists of two private variables, a integer and a float variable. Write member functions to get and display them. Write a FRIEND Function common to both classes, which takes the object of above two classes as arguments and the integer and float values of both objects separately and display the result.

9.	Write a C++ Program using Function Overloading to read two Matrices of different Data Types such as integers and floating point numbers. Find out the sum of the above two matrices separately and display the sum of these arrays individually.
10.	Write a C++ Program to check whether the given string is a palindrome or not using Pointers
11.	Write a C++ Program to create a File and to display the contents of that file with line numbers.
12.	Write a C++ Program to merge two files into a single file.

Text Book(s)

1	Ashok N Kamthane, Object-Oriented Programming with Ansi And Turbo C++, Pearson Education, 2003

Reference Books

1	E. Balagurusamy, Object-Oriented Programming with C++, TMH, 1998.
2	Maria Litvin & Gray Litvin, C++ for you, Vikas publication, 2002.
3	John R Hubbard, Programming with C, 2nd Edition, TMH publication, 2002.

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

Course Designed By:

Mapping with Programme Outcomes

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

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

Course code		Internet Basics		L	T	P	C
Core/Elective/Supportive		Core Lab : 3		0	0	2	2
Pre-requisite		Knowledge of WINDOWS Operating Systems		**Syllabus Version**		2020-21 Onwards	

Course Objectives:

The main objectives of this course are to:

1. Introduce the fundamentals of Internet and the Web functions.
2. Impart knowledge and essential skills necessary to use the internet and its various components.
3. Find, evaluate, and use online information resources.
4. Use Google Apps for education effectively.

Expected Course Outcomes:

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

1	Understand the fundamentals of Internet and the Web concepts	K2
2	Explain the usage of internet concepts and analyze its components.	K2
3	Identify and apply the online information resources	K3
4	Inspect and utilize the appropriate Google Apps for education effectively	K3, K4

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

Programs	36 hours

1. Create an email account in Gmail. Using the account created compose a mail to invite other college students for your college fest, enclose the invitation as attachment and send the mail to at least 50 recipients. Use CC and BCC options accordingly

2. Open your inbox in the Gmail account created, check the mail received from your peer from other college inviting you for his college fest, and download the invitation. Reply to the mail with a thank you note for the invite and forward the mail to other friends.

3. Assume that you are studying in final year of your graduation and are eagerly looking for a job. Visit any job portal and upload your resume.

4. Create a meeting using Google calendar and share meeting id to the attendees. Transfer the ownership to the Manager once the meeting id is generated.

5. Create a label and upload bulk contacts using import option in Google Contacts

6. Create your own Google classroom and invite all your friends through email id. Post study material in Google classroom using Google drive. Create a separate folder for every subject and upload all unit wise E-Content Materials.

7. Create and share a folder in Google Drive using „share a link" option and set the permission to access that folder by your friends only.

8. Create one-page story in your mother tongue by using voice recognition facility of Google Docs.

9. Create a registration form for your Department Seminar or Conference using Google Forms.

10. Create a question paper with multiple choice types of questions for a subject of your choice, using Google Forms.

11. Create a Google form with minimum 25 questions to conduct a quiz and generate a certificate after submission.

12. Create a meet using Google Calendar and record the meet using Google Meet.

13. Create a Google slides for a topic and share the same with your friends.

14. Create template for a seminar certificate using Google Slides.

15. Create a sheet to illustrate simple mathematical calculations using Google Sheets.

| 16. Create student"s internal mark statement and share the Google sheets via link. |
| 17. Create different types of charts for a range in CIA mark statement using Google Sheets. |
| 18. Create a mark statement in Google Sheets and download it as PDF, .xls and .csv files |

Text Book(s)

1	Ian Lamont, Google Drive & Docs in 30 Minutes, 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

Third

Semester

Course code		Data Structures	L	T	P	C
Core/Elective/Supportive		Core: 4	6	0	0	4
Pre-requisite		Basic understanding of Data storage, retrieval and algorithms.	**Syllabus Version**		2020-21 Onwards	

Course Objectives:

The main objectives of this course are to:
1. To introduce the fundamental concept of data structures
2. To emphasize the importance of data structures in developing and implementing efficient algorithms.
3. Understand the need for Data Structures when building application
4. Ability to calculate and measure efficiency of code
5. Improve programming logic skills.

Expected Course Outcomes:

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

1	Understand the basic concepts of data structures and algorithms	K1-K2
2	Construct and analyze of stack and queue operations with illustrations	K2-K4
3	Enhance the knowledge of Linked List and dynamic storage management.	K2-K3
4	Demonstrate the concept of trees and its applications	K2-K3
5	Design and implement various sorting and searching algorithms for applications and understand the concept of file organizations	K1-K4

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

Unit:1		INTRODUCTION	15 hours

Introduction of Algorithms, Analysing Algorithms. Arrays: Sparse Matrices - Representation of Arrays. Stacks and Queues. Fundamentals - Evaluation of Expression Infix to Postfix Conversion - Multiple Stacks and Queues

Unit:2		LINKED LIST	12 hours

Linked List: Singly Linked List - Linked Stacks and Queues - Polynomial Addition- More on Linked Lists - Sparse Matrices - Doubly Linked List and Dynamic – Storage Management - Garbage Collection and Compaction.

Unit:3		TREES	15 hours

Basic Terminology - Binary Trees - Binary Tree Representations – Binary Trees-Traversal-More On Binary Trees – Threaded Binary Trees - Binary Tree. Representation of Trees - Counting Binary Trees. Graphs: Terminology and Representations-Traversals, Connected Components and Spanning Trees, Shortest Paths and Transitive Closure

Unit:4		EXTERNAL SORTING	15 hours

Storage Devices -Sorting with Disks: K-Way Merging – Sorting with Tapes Symbol Tables: Static Tree Tables - Dynamic Tree Tables - Hash Tables: Hashing Functions - Overflow Handling.

Unit:5		INTERNAL SORTING	15 hours

Insertion Sort - Quick Sort - 2 Way Merge Sort - Heap Sort – Shell Sort - Sorting on Several Keys. Files: Files, Queries and Sequential organizations – Index Techniques -File Organizations.

Unit:6		Contemporary Issues	3 hours

Expert lectures, online seminars - webinars

		Total Lecture hours	75 hours

	Text Book(s)
1	Ellis Horowitz, Sartaj Shani, Data Structures, Galgotia Publication.
2	Ellis Horowitz, Sartaj Shani, Sanguthevar Rajasekaran, Computer Algorithms, Galgotia Publication.
3	S.Lovelyn Rose, R.Venkatesan, Data Structures, Wiley India Private Limited,2015, 1st Edition
	Reference Books
1	Jean-Paul,Tremblay & Paul G.Sorenson , An Introduction to Data structures with Applications Tata McGraw Hill Company 2008, 2ndEdition.
2	Samanta.D , Classic Data Structure Prentice Hall of India Pvt Ltd 2007, 9th Edition
3	Seymour Lipschutz, Data Structures McGraw Hill Publications, 2014, 1st Edition
	Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1	
2	
3	
	Course Designed By:

Mapping with Programme Outcomes

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

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

Course code		**FUNDAMENTALS OF MICROPROCESSOR**	**L**	**T**	**P**	**C**
Core/Elective/Supportive		**Core: 5**	**6**	**0**	**0**	**4**
Pre-requisite		The objective of the course is to train the students to basic structure of a processor - arithmetic registers, address registers, basic addressing modes	**Syllabus Version**		2020-21 Onwards	

Course Objectives:

The main objectives of this course are to:

1. To expose the students with the basic structure of a processor

2. The concepts of addressing modes

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 microprocessor	K2-K4
3	Apply the concept of data transfer	K3
4	Develop CPU I/O Communication	K3
5	Understand the fundamental concepts of RISC and CISC	K1-K2

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

Unit:1		**MICROPROCESSOR**		**15 hours**

Introduction of Microprocessor , Block Diagram of Micro Computer , Block Diagram of CPU with system Bus -Architecture–Bus Organization– Bus Organization in Microprocessor , Pin Detail , Diagram of Microprocessor , Data & Address deviation , Generate Control Signal in Microprocessor , Detail of Microprocessor Functional diagram and pin out diagram of 8085

Unit:2		**ADDRESSING MODES OF 8085**		**12 hours**

Addressing modes of 8085 – Direct addressing Mode-Indirect Addressing Mode – Data Transfer - Instruction set of 8085 – simple programs

Unit:3		**I/O SCHEMES AND MEMORY ACCESS**		**15 hours**

I/O Schemes – Peripherals and Interfaces .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 – OutputProcessor: CPU-IOP Communication.

Unit:4		**MEMORY ORGANIZATION**		**15 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		**INTRODUCTION TO 8086**		**15 hours**

Introduction to 8086: Pin out diagram -Functional Block diagram of 8086 – Architecture-instruction set-comparison with 8085 & 8086 :Interfacing IC –RISC & CISC

Unit:6	Contemporary Issues	3 hours
Expert lectures, online seminars - webinars		
	Total Lecture hours	75 hours

Text Book(s)

1	Microprocessor Architecture programming & application with 8085 & 8080 – by Ramesh.s.Gaonkar –Wiley eastern.
2	Introduction to microprocessors – Adithya.P.Mathus – TMHPublication.
3	Microprocessor interfaces – Douglas Hall – MC Graw Hill.

Reference Books

1	8086/8088 family Design, programming and interfacing by John Utter Bery - PHI.
2	Microprocessors PC Hardware and interfacing –N.Mathivanan -PHI

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1	www.spoken-tutorial.org
2	www.nptel.ac.in

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		PC ASSEMBLING LAB		L	T	P	C
Core/Elective/Supportive		**Core Lab: 4**		**0**	**0**	**5**	**4**
Pre-requisite	Students should know about the system parts or system components			**Syllabus Version**		2020-21 Onwards	

Course Objectives:

The main objectives of this course are to:

1. The main objective of PC Assembling Lab is to provide the students a strong foundation on PC Assembling concepts and its applications through hands-on training.
2. To practice the Basic concepts, SMPS , Processor and Memory
3. To implement and gain knowledge in Windows OS Installation with FDiSK handling

Expected Course Outcomes:

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

1	Understand the basic concepts of Windows files & Folders	**K1, K2**
2	Demonstrate the CMOS Setup and safely open the system case	**K2**
3	Add / remove floppy and hard drive	**K2, K3**
4	Develop and Demonstrate fdisk	**K2,K3**
5	Construct trouble shooting hardware problems	**K3**

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

Programs	**36 hours**
1. Start Up, Navigate, and Shut Down a Windows System	
2. Use Files and Folders	
3. CMOS Setup	
4. Safely Open the Case to Identify Components	
5. Collect Resource Information – Windows 98,XP,Windows 2000	
6. Replace s Floppy Drive	
7. Replace the Hard Drive	
8. Add a Slave Drive	
9. Install a Windows Mouse	
10. Partition a Hard Drive – FAT32	
11. Partition a Hard Drive – Two Partitions-using FDISK	
12. Partition HDD-NTFS(Win XP)	
13. Disk Management (Hard Disk)	
14. Replace a Power Supply	
15. Remove and Insert Memory	
16. Remove and Replace a Motherboard	
17. Troubleshoot Hardware Problems	
18. Dual boot Windows XP and Windows 2000	

	Total Lecture hours	**36 hours**

Text Book(s)

1	Build Your Own Computer The Complete Step-by-step Manual to Constructing a PC Thats Right for You by Kyle MacRae, Gary Marshall , J H Haynes & Co Ltd
2	
3	

Reference Books

1	Pc Troubleshooting & Repair Guide (English, Paperback, Soper M)

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

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

Course code		SOFTWARE PROJECT MANAGEMENT	L	T	P	C
Core/Elective/Supportive		Skill based Subject : 1	5	0	0	3
Pre-requisite		Basic knowledge on the Software Development Life Cycle.	Syllabus Version		2020-21 Onwards	

Course Objectives:

The main objectives of this course are to:
1. To enhance the basic software engineering methods and practices.
2. To learn the techniques for developing software systems.
3. To understand the object oriented design.
4. To understand software testing approaches

Expected Course Outcomes:

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

1	Understand the basic concepts of software engineering	K1
2	Apply the software engineering models in developing software applications	K2-K3
3	Implement the object oriented design in various projects	K4
4	Knowledge on how to do a software project with in-depth analysis.	K3
5	To inculcate knowledge on Software engineering concepts in turn gives a roadmap to design a new software project.	K1-K4

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

Unit:1		SOFTWARE ENGINEERING		15 hours

Software Engineering: A Layered Technology – Software Process – Software Process Models – The Prototyping. Requirement Engineering– Software prototyping - Elements of analysis model – Data modeling – Functional modeling and information flow.

Unit:2		SOFTWARE DESIGN		12 hours

Software design and Software engineering – The Design process – Design principles – Design concepts – Effective modular design –Software Architecture

Unit:3		SOFTWARE TESTING		15 hours

Software testing fundamentals – Test Case Design - White box testing – Basis path testing – Control structure testing – Black box testing. Unit testing – Validation testing – System testing.

Unit:4		SOFTWARE CONFIGURATIONMANAGEMENT		15 hours

Software Configuration Management: Definitions and terminology – processes and activities. Software Quality assurance: Definitions – Quality control and Quality assurance – Organization of Structures. Risk Management: Risk Identification – quantification - Monitoring - Mitigation. Software requirements gathering: Steps to be followed – Outputs and Quality Records - Skill sets required – Challenges

Unit:5		ESTIMATION		15 hours

Estimation: What is Estimation? – When and Why? – Three phases of Estimation – Estimation methodology – Formal models of Size Estimation. Design and Development phases: Reusability - Technology choices – Standards – Portability -User interface issues – Testability - The Effect of Internet on Project Management.

Unit:6		Contemporary Issues		3 hours

Expert lectures, online seminars - webinars

		Total Lecture hours		**75 hours**

Text Book(s)	
1	Roger S. Pressman: Software Engineering, Tata McGraw Hill, V Edition.
2	Gopalaswamy Ramesh, Managing Global Software Projects, Tata McGraw Hill, New Delhi, 2002.
3	Programming with Java – A Primer - E. Balagurusamy, 3rd Edition, TMH.
Reference Books	
1	The Complete Reference Java 2 – Patrick Naughton & Hebert Schildt, 3rd Edition, TMH
2	Programming with Java – John R. Hubbard, 2nd Edition, TMH.
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	
2	
3	
Course Designed By:	

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

Fourth Semester

Course code		System Software and Operating Systems	L	T	P	C
Core/Elective/Supportive		Core : 6	6	0	0	4
Pre-requisite		Students Should have the basic knowledge in computer.	Syllabus Version		2020-21 Onwards	

Course Objectives:

The main objectives of this course are to:
1. To understand the processing of programs on a computer system to design and implementationof language processor.
2. To enhance the ability of program generation through expansion and gain knowledge aboutCode optimization using software tools.
3. Students will gain knowledge of basic operating system concepts.
4. To have an in-depth understanding of process concepts, deadlock and memory management.
5. To provide an exposure to scheduling algorithms, devices and information management.

Expected Course Outcomes:

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

1	Know the program generation and program execution activities in detail	K1
2	Understand the concepts of Macro Expansions and Gain the knowledge of Editing processes	K2-K3
3	Remember the basic concepts of operating system	K1
4	Understand the concepts like interrupts, deadlock , memory management and file management	K2
5	Analyze the need for scheduling algorithms and implement different algorithms used for representation, scheduling, and allocation in DOS and UNIX operating system.	K1-K4

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

Unit:1		INTRODUCTION TO SYSTEM SOFTWARE		12 hours

Introduction–System Software and machine architecture. Loader and Linkers: Basic Loader Functions - Machine dependent loader features –Machine independent loader features - Loader design options

Unit:2		MACHINE AND COMPILER		15 hours

Machine dependent compiler features - Intermediate form of the program - Machine dependent code optimization - Machine independent compiler features - Compiler design options - Division into passes – Interpreters – p-code compilers - Compiler-compilers.

Unit:3		OPERATING SYSTEM		15 hours

What is an Operating System? – Process Concepts: Definition of Process - Process States - Process States Transition – Interrupt Processing – Interrupt Classes - Storage Management: Real Storage: Real Storage Management Strategies – Contiguous versus Non-contiguous storage allocation – Single User Contiguous Storage allocation- Fixed partition multiprogramming – Variable partition multiprogramming.

Unit:4		VIRTUAL STORAGE		15 hours

Virtual Storage: Virtual Storage Management Strategies – Page Replacement Strategies – Working Sets – Demand Paging – Page Size. Processor Management: Job and Processor Scheduling: Preemptive Vs Non-preemptive scheduling – Priorities – Deadline scheduling.

Unit:5		DEVICE AND INFORMATION MANAGEMENT		15 hours

Device and Information Management Disk Performance Optimization: Operation of moving head disk storage – Need for disk scheduling – Seek Optimization – File and Database Systems: File

	System – Functions – Organization – Allocating and freeing space – File descriptor – Access control matrix.	
Unit:6	**Contemporary Issues**	**3 hours**
Expert lectures, online seminars - webinars		
	Total Lecture hours	**75 hours**

Text Book(s)

1	Leland L.Beck, System Software: An Introduction to Systems Programming, Pearson, Third Edition.
2	H.M. Deitel, Operating Systems, 2nd Edition, Perason, 2003.

Reference Books

1	Achy8ut S. Godbole, Operating Systems, TMH, 2002.
2	John J. Donovan, Systems Programming, TMH, 1991.
3	D.M. Dhamdhere, Systems Programming and Operating Systems, 2nd Revised Edition, TMH.

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1	
2	
3	

Course Designed By:

Mapping with Programme Outcomes

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

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

Course code		Computer Storage Devices	L	T	P	C
Core/Elective/Supportive		Core : 7	6	0	0	4
Pre-requisite		Before starting the course students should have the basic knowledge about computer storage devices	**Syllabus Version**		2020-21 Onwards	

Course Objectives:

The main objectives of this course are to:

1. Students should have the basic knowledge about computer storage devices
2. Understand the Role of Removable-Media Drives
3. Concepts of Optical Technology

Expected Course Outcomes:

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

1	Describe the various storage devices of computer system	K1
2	Develop the utilities of magnetic storage	K2-K3
3	Develop and perform Hard Drive Advancements and disk formatting	K2
4	Apply Data Encoding on the Disc	K3
5	Build or recover Troubleshooting Optical Drives	K3-K6

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

Unit:1		Magnetic Storage	12 hours

Magnetic Storage- History of Magnetic Storage- How Magnetic Fields Are Used to Store Data- Read/Write Head Designs- Ferrite- Metal-In-Gap- Thin Film- Magneto- Resistive Heads- Giant Magneto-Resistive Heads- Head Sliders- Data Encoding Schemes- RLL Encoding- Encoding Scheme Comparisons- Partial-Response, Maximum-Likelihood Decoders- Capacity Measurements- Areal Density- Increasing Areal Density with Pixie Dust- Perpendicular Magnetic Recording

Unit:2		Definition of a Hard Disk	15 hours

Definition of a Hard Disk- Hard Drive Advancements- Form Factors- 5 1/4" Drive- 1" Drives- Hard Disk Drive Operation- The Ultimate Hard Disk Drive Analogy- Tracks and Sectors- Disk Formatting- Partitioning- High-Level Formatting- Basic Hard Disk Drive Components- Hard Disk Platters (Disks- Recording Media- Oxide Media- AFC Media- Read/Write Heads- Read/Write Head Designs- Stepper Motor Actuators- Voice Coil Actuators- Linear Actuators- Servo Mechanisms- Wedge Servo- Embedded Servo- Automatic Head Parking- Air Filters- Hard Disk Temperature Acclimation- The Faceplate or Bezel- Hard Disk Features- CapacityBIOS Limitations-Operating System Limitations- Performance-Transfer Rate- Average Seek Time-Average Access Time- Cache Programs and Caching Controllers-Interleave Selection- Reliability-SMART- Cost.

Unit:3		The Role of Removable-Media Drives	15 hours

The Role of Removable-Media Drives-The Importance of Data Backups-Data Transfer Between Systems- Floppy-based Driver Installation for Removable-Media Devices- Comparing Disk, Tape, and Flash Memory Technologies-Magnetic Disk Media- Magnetic Tape Media-Flash Memory Media-Interfaces for Removable- Media Drives- Floppy Disk Drives, Past and Present-Alternatives to Floppy Drives-Floppy Drive Interfaces- Drive Components-Power and Data Connectors-The Floppy Disk Controller Cable-How the Operating System Uses a Floppy Disk-Analyzing 3 1/2" Floppy Disk Media Construction- Floppy Disk Media Types and Specifications-Floppy Drive Installation Procedures

Unit:4		High-Capacity Magnetic Storage Devices	15 hours

High-Capacity Magnetic Storage Devices-Iomega Zip-Iomega REV-Iomega REV Drives- Magneto- Optical Drives-Comparing MO to "Pure" Magnetic Media-Flash Memory Devices- Types of Flash Memory Devices-Comparing Flash Memory Devices-Moving Data in Flash Memory Devices to Your Computer-Key

Factors in Selecting a Removable-Media Drive- Microdrive Technology-Tape Drives-Hard-Tape Backup Technologies-Choosing a Tape Backup Drive-Tape Standards and Compatibility-Tape Drive Backup Software-Backup and Restoration Troubleshooting-Motherboard BIOS- ROM Hardware-ROM Chip Types-PROM- EPROM-EEPROM/Flash ROM-ROM BIOS Manufacturers-Flash BIOS -CMOS Setup Specifications

Unit:5	Optical Technology	15 hours

Optical Technology-CD-Based Optical Technology-Data Encoding on the Disc-DVD- Data Encoding on the Disc-Blu-ray Disc-HD-DVD-Optical Disc Formats-CD-ROMXA- Multisession Recording Overview-Photo CD Disc Types-CD-ROM File Systems- DVD Formats and Standards-CD/DVD Read-Only Drives and Specifications-Direct Memory Access and Ultra-DMA-Interface-Loading Mechanism-Internal Versus External Drives- Writable CDs-Recording Software-CD Copy Protection-CD/DVD Drive and Software Installation and Support-Booting from a Floppy Disk with CD/DVDDrive Support- Troubleshooting Optical Drives

Unit:6	Contemporary Issues	3 hours

Expert lectures, online seminars - webinars

	Total Lecture hours	75 hours

Text Book(s)

1	**Upgrading and Repairing PC's,** 17th Edition By „Scott Mueller" ;Publisher:Que ;Pub Date: March 24, 2006 ; Print ISBN-10: 0-7897-3404-4
2	**Govinda Rajulu B, "PC IBM and Clones** – Hardware, Troubleshooting andMaintenance", Tata McGraw Hill Publishing Company Ltd., New Delhi, 1991
3	**Hardware bible By :** Winn L Rosch, Techmedia publications
4	**Trouble shooting, maintaining and repairing PCs By** :Stephon J Bigelow TataMcGraw Hill Publication
5	**Modern All about printers By:** Manohar Lotia, Pradeep Nair, Bijal Lotia BPBpublications.
6	**The complete PC upgrade and maintenance guide By:**Mark Minasi, BPB Publications

Reference Books

1	
2	

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1	http://spoken-tutorial.org/
2	
3	

Course Designed By:

Mapping with Programme Outcomes										
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	M	M	M	S	M	M	M	M	L
CO2	S	S	S	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 – Fundamentals Of Microprocessor	L	T	P	C
Core/Elective/Supportive		Core Lab : 5	0	0	6	4
Pre-requisite		The objective of the course is to train the students to basic structure of a processor - arithmetic registers, address registers, basic addressing modes	Syllabus Version		2020-21 Onwards	

Course Objectives:

The main objectives of this course are to:
  1. To expose the students with the basic structure of a processor
  2. The concepts of addressing modes

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	K1, K2
2	programs that demonstrate professionally acceptable coding	K2-K3
3	Demonstrate the concept of microprocessor	K3
4	Apply the concept of data transfer	K4-K5
5	Develop CPU I/O Communication Understand the fundamental concepts of RISC and CISC	K6

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

Programs	36 hours
1. Addition – 8 bit, 16 bit	
2. Subtraction – 8 bit, 16 bit	
3. Multiplication.	
4. Array addition (multibyte)	
5. Logical operators – AND, OR NOT.	
6. Decimal to ASCII and ASCII to Decimal	
7. Decimal to Hexa and Hexa to Decimal	
8. Ascending Order.	
9. Descending Order	
10. Up/down Counter.	
11. Block data transfer	
12. Rotating display – Flashing display	
13. Interfacing with LED's	
14. Square wave Generators	
15. Interfacing with ADC	
16. Interfacing with DAC	
Total Lecture hours	**36 hours**

Text Book(s)

1	Microprocessor Architecture programming & application with 8085 & 8080 – by Ramesh.s.Gaonkar –Wiley eastern.
2	Introduction to microprocessors – Adithya.P.Mathus – TMH Publication.

Reference Books

1	8086/8088 family Design, programming and interfacing by John Utter Bery - PHI.
2	Microprocessors PC Hardware and interfacing –N.Mathivanan -PHI

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1	
2	http://spoken-tutorial.org/
3	

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
Mapping with Programme Outcomes										
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

Course code		SOFTWARE PROJECT MANAGEMENT - LAB	L	T	P	C
Core/Elective/Supportive		**Skill Based Subject 2 (Lab) : 1**	**0**	**0**	**4**	**3**
Pre-requisite		Basic knowledge in SDLC and managing of software projects	**Syllabus Version**		2020-21 Onwards	

Course Objectives:

The main objectives of this course are to:
1. To gain knowledge about how to develop project plan
2. To create requirement analysis and specification for software applications.
3. Student is given an introduction of various phases of software development life cycle models.
4. To analyze the steps are to be implemented using SDLC to develop applications.

Expected Course Outcomes:

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

1	Prepare a Project Plan with requirement analysis and specification.	K1,K2
2	Understand and develop cost estimation model for real time applications.	K2-K3
3	Implement the concepts of checkpoints in design phase	K3
4	Analyze the Development phase of the database and text area of the applications	K4-K5
5	Create SDLC for real time applications.	K6

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

Programs	**36 hours**
1. Preparation of Project Management Plan.	
2. Using any of the CASE tools, Practice requirement analysis and specification for different firms.	
3. Case study of cost estimation models.	
4. Practice object oriented design principles for implementation.	
5. Practice function oriented design	
6. Practice creating software documentation for the Analysis phase of software development life cycle for a real time application.	
7. Practice creating software documentation for the Development phase of software development life cycle for a real time application	
8. Practice creating software documentation for the Implementation phase of software development life cycle for a real time application.	
9. Practice creating software documentation for the Testing phase of software development life cycle for a real time application	
10. Simulate a tool for path testing principles.	
11. Simulate a tool for testing based on control structures	
12. Simulate a tool that reflects black box testing concepts	

Total Lecture hours	**36 hours**

Text Book(s)

1	Roger S. Pressman: Software Engineering, Tata McGraw Hill, V Edition

Reference Books

1	Gopalaswamy Ramesh, Managing Global Software Projects, Tata McGraw Hill, New Delhi, 2002.

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1	
2	
3	

Course Designed By:

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	M	S	M	M	M
CO3	S	S	M	S	S	M	S	S	M	M
CO3	S	M	S	M	S	M	S	S	M	M
CO4	S	S	M	M	S	S	M	M	M	M

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

Fifth

Semester

Course code		NETWORK SECURITY AND CRYPTOGRAPHY	L	T	P	C
Core/Elective/Supportive		Core : 8	6	0	0	4
Pre-requisite		Basic knowledge about the network security	**Syllabus Version**		2020-21 Onwards	

Course code		NETWORK SECURITY AND CRYPTOGRAPHY	L	T	P	C
Core/Elective/Supportive		**Core : 8**	**6**	**0**	**0**	**4**
Pre-requisite		Basic knowledge about the network security	**Syllabus Version**	2020-21 Onwards		

Course Objectives:

The main objectives of this course are to:
1. To enable the students to learn attacks on computers and how to handle the security issues.
2. To study about the digital certificate and public key infrastructure protocols.
3. To gain knowledge in firewalls in network securities

Expected Course Outcomes:

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

1	Understand the basics of attacks on computers and computer security and cryptography encryption and decryption	**K2**
2	Understand cryptography algorithm types and modes: asymmetric and symmetric key algorithms	**K2-K3**
3	Understand the concept of digital certificate and public key infrastructure and internet security protocols.	**K3**
4	Understand the user authentication and keberos, cryptography in java, .NET and operating system.	**K4**
5	Knowledge in firewalls in network security, VPN and case studies in cryptography and security.	**K3-K4**

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

Unit:1		SERVICE MECHANISM AND ATTACKS		15 hours

Service mechanism and attacks – The OSI security architecture – A model for network security – symmetric Cipher model – Substitution techniques – transposition techniques– simplified des – block chipper principles – the strength of des – block chipper design principles and modes of operation.

Unit:2		CRYPTOGRAPHY		15 hours

Triple des-blow fish – RCS Advanced Symmetric Block Ciphers –RC4 stream Cipher confidentially using symmetric encryption – introduction to number theory – public – key cryptography and RSA.

Unit:3		KEY MANAGEMENT		15 hours

Key management – Diffle Hellman key exchange – message authentication and hash function – hash algorithm – digital signature and authentication protocols – digital signature standard.

Unit:4		AUTHENTICATION APPLICATION		15 hours

Authentication application – pretty good privacy – S/MIME – ip security – web security considerations –secure socket layer transport layer security –secure electronic transaction.

Unit:5		INTRUDERS		12 hours

Intruders –intrusion detection – password management –viruses and related threats –virus countermeasures – fire wall design principles – trusted systems

Unit:6		Contemporary Issues		3 hours

Expert lectures, online seminars - webinars

		Total Lecture hours		**75 hours**

Text Book(s)

1	William Stallings, "Cryptography and Network Security Principles and Practices". Fourth edition, phi Education Asia.

2	Atul kahate "Cryptography and Network Security" second edition. TMH.
3	Behrouz A.forouzan" Cryptography and Network Security " TMH.
Reference Books	
1	
2	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	http://www.digimat.in/nptel/courses/video/106105175/L01.html
2	
3	
Course Designed By:	

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

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

Course code		SOFTWARE TESTING	L	T	P	C
Core/Elective/Supportive		**Core : 9**	**6**	**0**	**0**	**4**
Pre-requisite		Basic knowledge in software project and SDLC	**Syllabus Version**		2020-21 Onwards	

Course Objectives:

The main objectives of this course are to:
1. To study fundamental concepts in software testing
2. To discuss various software testing issues and solutions in software unit test, integration and system testing.
3. To expose the advanced software testing topics, such as object-oriented software testing methods.
4. List a range of different software testing techniques and strategies and be able to apply specific automated unit testing method to the projects.

Expected Course Outcomes:

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

1	Explain the basic concepts and the processes that lead to software testing	**K2**
2	Design test cases from the given requirements using Black box testing techniques	**K3**
3	Identify the test cases from Source code by means of white box testing techniques	**K3**
4	Know about user acceptance testing and generate test cases for it	**K4**
5	Examine the test adequacy criteria to complete the testing process	**K4**

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

Unit:1	SOFTWARE DEVELOPMENT LIFE CYCLE MODELS	15 hours

Software Development Life Cycle models: Phases of Software project – Quality, Quality Assurance, Quality control – Testing, Verification and Validation – Process Model to represent Different Phases - Life Cycle models. White-Box Testing: Static Testing – Structural Testing – Challenges in White-Box Testing.

Unit:2	BLACK-BOX TESTING	15 hours

Black-Box Testing: What is Black-Box Testing? - Why Black-Box Testing? – When to do BlackBox Testing? – How to do Black-Box Testing? – Challenges in White Box Testing - Integration Testing: Integration Testing as Type of Testing – Integration Testing as a Phase f Testing – Scenario Testing – Defect Bash.

Unit:3	SYSTEM AND ACCEPTANCE TESTING	15 hours

System and Acceptance Testing: system Testing Overview – Why System testing is done? – Functional versus Non-functional Testing - Functional testing - Non-functional Testing – Acceptance Testing – Summary of Testing Phases.

Unit:4	PERFORMANCE TESTING	15 hours

Factors governing Performance Testing – Methodology of Performance Testing – tools for Performance Testing – Process for Performance Testing – Challenges. Regression Testing: What is Regression Testing? – Types of Regression Testing – When to do Regression Testing – How to do Regression Testing – Best Practices in Regression Testing.

Unit:5	TEST PLANNING, MANAGEMENT, EXECUTION AND REPORTING	12 hours

Test Planning, Management, Execution and Reporting: Test Planning – Test Management – Test Process – Test Reporting –Best Practices. Test Metrics and Measurements: Project Metrics – Progress Metrics – Productivity Metrics – Release Metrics

Unit:6	Contemporary Issues	3 hours

Expert lectures, online seminars - webinars

	Total Lecture hours	**75 hours**

	Text Book(s)
1	Software Testing Principles and Practices, Srinivasan Desikan & Gopalswamy Ramesh, 2006, Pearson Education. (UNIT-I: 2.1-2.5, 3.1-3.4 UNIT-II: 4.1-4.4, 5.1-5.5 UNIT III: 6 .1-6.7 (UNIT IV: 7.1-7.6, 8.1-8.5 UNIT-V: 15.1-15.6, 17.4-17.7)
2	Limaye M.G., "Software Testing Principles, Techniques and Tools", Second Reprint, TMH Publishers, 2010.
3	Aditya P.Mathur, "Foundations of Software Testing", 2nd Edition, Pearson Education, 2013
	Reference Books
1	Effective Methods of Software Testing, William E. Perry, 3rd ed, Wiley India.
2	Software Testing, Renu Rajani, Pradeep Oak, 2007, TMH.
3	
	Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1	
2	
3	
	Course Designed By:

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	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		COMPUTER NETWORKS		L	T	P	C
Core/Elective/Supportive		**Elective : I**		**6**	**0**	**0**	**4**
Pre-requisite		Students should have the knowledge on computer connectivity and connectivity peripherals.		**Syllabus Version**		2020-21 Onwards	

Course Objectives:

The main objectives of this course are to:

1. To identify various components in a data communication system and understand state-of -the-art in network protocols, architectures and applications.
2. To enable students through the concepts of computer networks, different models and their involvement in each stage of network communication.
3. To educate the concepts of terminology and concepts of the OSI reference model and the TCP/IP reference model and protocols such as TCP, UDP and IP.
4. To be familiar with the concepts of protocols, network interfaces, and design/performance issues in local area networks and wide area networks.
5. Introduce the student to a network routing for IP networks and how a collision occurs and how to solve it and how a frame is created and character count of each frame.

Expected Course Outcomes:

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

1	Remember the organization of computer networks, factors influencing computer network development and the reasons for having variety of different types of networks.	**K1**
2	Understand Internet structure and can see how standard problems are solved and the use of cryptography and network security	**K2**
3	Apply knowledge of different techniques of error detection and correction to detect and solve error bit during data transmission.	**K3**
4	Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies	**K4**
5	Knowledge about different computer networks, reference models and the functions of each layer in the models.	**K2-K4**

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

Unit:1	BASICS OF NETWORKS AND OSI MODEL	15 hours

Network Hardware: LAN – WAN – MAN – Wireless – Home Networks. Network Software: Protocol Hierarchies – Design Issues for the Layers – Connection-oriented and connectionless services – Service Primitives – The Relationship of services to Protocols. Reference Models: OSI Reference Model – TCP/IP reference Model – Comparison of OSI and TCP/IP -Critique of OSI and protocols – Critique of the TCP/IP Reference model.

Unit:2	PHYSICAL LAYER	15 hours

PHYSICAL LAYER - Guided Transmission Media: Magnetic Media – Twisted Pair – Coaxial Cable – Fiber Optics. Wireless Transmission: Electromagnetic Spectrum – Radio Transmission – Microwave Transmission – Infrared and Millimeter Waves – Light Waves. Communication Satellites: Geostationary, Medium-Earth Orbit, Low Earth-orbit Satellites – Satellites versus Fiber.

Unit:3	DATA-LINK LAYER	15 hours

DATA-LINK LAYER: Error Detection and correction – Elementary Data-link Protocols – Sliding Window Protocols. MEDIUM-ACCESS CONTROL SUB LAYER: Multiple Access Protocols – Ethernet – Wireless LANs - Broadband Wireless – Bluetooth.

Unit:4	NETWORK LAYER	15 hours

NETWORK LAYER: Routing algorithms – Congestion Control Algorithms. TRANSPORT LAYER: Elements of Transport Protocols – Internet Transport Protocols: TCP

Unit:5	APPLICATION LAYER	12 hours
APPLICATION LAYER: DNS – E-mail. NETWORK SECURITY: Cryptography –Symmetric Key Algorithms – Public Key Algorithms – Digital Signatures		
	Total Lecture hours	**75 hours**

Text Book(s)

1	**1. COMPUTER NETWORKS** – Andrew S. Tanenbaum, 4th edition, PHI. *(UNIT-I:1.2-1.4 UNIT-II:2.2-2.4 UNIT-III:4.2-4.6 UNIT-IV:5.2,5.3,6.2,6.5UNIT- V:7.1,7.2,8.1-8.4)*

Reference Books

1	**DATA COMMUNICATION AND NETWORKS –** Achyut Godbole, 2007, TMH.
2	**COMPUTER NETWORKS Protocols, Standards, and Interfaces** – Uyless Black, 2nd ed, PHI.

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1	
2	
3	

Course Designed By:

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

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

Course code		**COMPUTER HARDWARE MAINTENANCE**	**L**	**T**	**P**	**C**
Core/Elective/Supportive		**Core Lab : 6**	**0**	**0**	**6**	**4**
Pre-requisite		Students should have the practical knowledge about computer hardware components.	**Syllabus Version**		2020-21 Onwards	

Course Objectives:

The main objectives of this course are to:
1. To understand windows installation procedure.
2. To customize windows desktop
3. To Install a printer & Creating Network Printer
4. To create system restore and backup option.

Expected Course Outcomes:

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

1	Understand the concepts of HDD, FDD	**K1**
2	Learn the advantages of CD,DVD, USB	**K2**
3	Design and develop install, Sharing options, Configure a Peer-to-Peer Network	**K3**
4	Apply the knowledge of system data backup methods.	**K4**
5	Learn basics of DOS commands and remote desktop	**K6**

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

Programs	**36 hours**
1. Install an Operating System – Windows XP	
2. Install an Operation System – Windows 98	
3. Install an Operation System – Windows 2000	
4. Repairing OS	
5. Configuration Antivirus & Firewalls	
6. Enabling Disk quota	
7. Customize the Windows Desktop	
8. Image and Replace a Windows 98 Hard Drive	
9. Install and Launch Windows Applications	
10. Install a CD-and DVD	
11. Install a CD-ROM Drive – Windows	
12. Install a Sound Card – Windows	
13. Install a printer & Creating Network Printer	
14. System restoration	
15. Fixing SMPS & its Complaints	
16. Use scan disk and defrag -Windows	
17. Create an ERD and Startup Disk – Windows 2000	
18. Configure and Connect Dial-Up Networking	
19. Expansion Bus Cables	
20. Adding MODEM & Internet	
21. Configure a Peer-to-Peer Network	

22. Driver Signing
23. Troubleshoot Software
24. Scanner installation
25. Remote Desktop

		Total Lecture hours	**36 hours**

Text Book(s)

1	Pc Troubleshooting & Repair Guide (English, Paperback, Soper M)
2	Build Your Own Computer The Complete Step-by-step Manual to Constructing a PC Thats Right for You by Kyle MacRae, Gary Marshall , J H Haynes & Co Ltd
3	

Reference Books

1	Modern Computer Hardware Course Paperback – 1 December 2006 by Manahar Lotia (Author)

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	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		SERVER ADMINISTRATION	L	T	P	C
Core/Elective/Supportive		Skill based Subject : 2	6	0	0	3
Pre-requisite		Students should have the practical knowledge about Basic knowledge in server administration	Syllabus Version		2020-21 Onwards	

Course Objectives:

The main objectives of this course are to:
1. To understand server editions and New Active Directory Features
2. To enable students to learn the basics of Set Up Server Roles Manually
3. To familiar with Registry Security
4. To learn about the IIS.
5. To enable the students to learn how to hardware bootup.

Expected Course Outcomes:

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

1	Understand the basics of Client /Server architecture	K1
2	Understand the procedures of windows server installtion	K2
3	Understand and remember the components in Server Editions	K2
4	Understand the Client Remote Connection Software	K3
5	Knowledge on Starting a Remote Desktop Session and Leaving a Remote Desktop Session	K2-K4

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

Unit:1	INTRODUCING WINDOWS SERVER 2003	15 hours

Introducing Windows Server 2003 -Windows Server 2003 Editions- Standard Edition- Enterprise Edition- Datacenter Edition -Web Edition- Brand New in Windows Server 2003- New Remote Administration Tools -New Active Directory Features -Availability and Reliability Improvements-Resultant Set of Policies

Unit:2	INSTALLATION	15 hours

Installation. Hardware Requirements. Hardware Compatibility List. Symmetric Multiprocessing Hardware. Clustering Hardware. Plug and Play Support -ACPI Issues - Developing a Deployment Plan -Document the Hardware Document the Network- Document the Software Document the Legacy Components- Prepare for Problems -Complete the Pre- installation Tasks .-Understanding Installation Models -Winnt.exe vs. Winnt32.exe –Installing from CD-Booting to the Windows Server 2003 CD . . Running Setup.exe from CD -Installing from an MS-DOS Boot Disk .-Using Network Share points Using Logon Scripts and BatchFiles . Automated Installations-Choosing an Automated Installation Type-Unattended Installation-SYSPREP

Unit:3	SYSTEM BASICS FOR SERVERS	15 hours

 System Basics for Servers . Manage Your Server . Configure Your Server Wizards Removing Server Roles Configure Your Server Log . Set Up Server Roles Manually . Remote Desktop - Enable Remote Desktop on the Server -Client Remote Connection Software . Starting a Remote Desktop Session- Running a Remote Desktop Session -Leaving a Remote Desktop Session- Managing the Connections from the Server -Joining the Console Session-Using a Snap-in for Remote Desktop . - Changes in IIS -Use Web Edition for IIS . Installing IIS -Set Compatibility Options Manually

Unit:4	THE WINDOWS SERVER 2003 REGISTRY	15 hours

The Windows Server 2003 Registry. Overview of the Registry . Registry structure . Hives and Hive Files. Registry Data Items. HKEY_CLASSES_ROOT . HKEY_CURRENT_USER . Regedit.exe.

Prevent Regedit from Displaying the Last Accessed Key . Accessing Remote Registries. Searching the Registry- Creating Favorites - Tweak and Troubleshoot with the Registry . Exporting Keys - Adding Items to the Registry - Registry Security -Auditing the Registry . Reg.exe . General Guidelines for Reg.exe .

Unit:5	BOOTING HARDWARE BOOTUP	12 hours

UNIT V: Web Services: Introduction- Infrastructure- SOAP-Building web services- Deploying and publishing web services- Finding and consuming web services

Unit:6	Contemporary Issues	3 hours

Expert lectures, online seminars – webinars

	Total Lecture hours	75 hours

Text Book(s)

1	Windows® Server 2003:The Complete Reference: By Kathy Ivens with Rich Benack, Christian Branson, John Green, David Heinz, Tim Kelly, John Linkous, Christopher McKettrick, Patrick J. Santry, Mitch Tulloch; Publications McGraw- Hill/Osborne

Reference Books

1	
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	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

Sixth

Semester

Course code		**WEB TECHNOLOGY**	**L**	**T**	**P**	**C**
Core/Elective/Supportive		**Core : 10**	**5**	**0**	**0**	**4**
Pre-requisite		Basic knowledge in web server, browser and web application	**Syllabus Version**		2020-21 Onwards	

Course Objectives:

The main objectives of this course are to:
1. On completion of this course, a student will be familiar with client server architecture and able to develop a web application using java technologies.
2. Students will gain the skills and project-based experience needed for entry into web application and development careers
3. Understand best technologies for solving web client/server problems
4. Use Java script for dynamic effects and to validate form input entry
5. Analyze to Use appropriate client-side or Server-side applications

Expected Course Outcomes:

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

1	Understand and analyse the TCP/IP basics.	K1
2	Understand Domain server name, FTP, TFTP, basics of WWW, web browser architecture.	K2
3	Knowledge of Microsoft and java technologies, dynamic web pages, DHTML, ASP and JSP.	K2-K3
4	Understanding active web pages, Java Applet, Java bean, CORBA, RMI and EDI architecture	K2-K3
5	Knowledge on XML, XML parser, WAP	K4-K6

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

Unit:1		**TCP/IP**	**15 hours**

TCP/IP: TCP/IP Basics – Why IP address – Logical Address - TCP/IP Example- The concept of IP address – Basics of TCP – Features of TCP – Relationship between TCP and IP – Ports and Sockets – Active Open and Passive Open - TCP Connections – What makes TCP reliable? – TCP Packet format - Persistent TCP connections – UDP – Differences between TCP and UDP

Unit:2		**DNS**	**12 hours**

DNS – E-mail – FTP – TFTP – History of WWW – Basics of WWW and Browsing - Local information on the internet – HTML – Web Browser Architecture – Web Pages and Multimedia – Remote Login (TELNET).

Unit:3		**INTRODUCTION TO WEB TECHNOLOGY**	**15 hours**

Introduction to Web Technology: Web pages – Tiers – Concept of a Tier – Comparison of Microsoft and Java Technologies – Web Pages – Static Web Pages – Plug-ins – Frames – Forms. Dynamic Web Pages: Need – Magic of Dynamic Web Pages – Overview of Dynamic Web Page Technologies – Overview of DHTML – Common Gateway Interface – ASP – ASP Technology – ASP Example – Modern Trends in ASP – Java and JVM – Java Servlets – Java Server Pages.

Unit:4		**ACTIVE WEB PAGES**	**15 hours**

Active Web Pages: Active Web Pages in better solution – Java Applets – Why are Active Web Pages Powerful? – Lifecycle of Java Applets – ActiveX Controls – Java Beans. Middleware and Component-Based E-Commerce Architectures: CORBA – Java Remote Method Invocation – DCOM. EDI: Overview – Origins of EDI – Understanding of EDI – Data Exchange Standards – EDI Architecture – Significance of EDI – Financial EDI – EDI and internet.

Unit:5		**XML**	**15 hours**

XML: SGML – Basics of XML – XML Parsers – Need for a standard. WAP: Limitations of Mobile devices – Emergence of WAP – WAP Architecture – WAP Stack – Concerns about WAP and its future – Alternatives to

WAP.	

Unit:6	**Contemporary Issues**	**3 hours**
Expert lectures, online seminars - webinars		

		Total Lecture hours	**75 hours**

Text Book(s)

1	Web Technologies: TCP/IP to Internet Applications Architectures – Achyut S Godbole & Atul Kahate, 2007, TMH. (UNIT-I: 3.1-3.5,4.1-4.12 UNIT-II: 5.1-5.4,6.1-6.7 UNIT III:8.1-8.1,9.1- 9.13 UNIT IV: 10.1-10.7,15.1-15.3,16.1-16.8 UNIT-V: 17.1-17.4,18.1-18.6)

Reference Books

1	Internet and Web Technologies, Rajkamal, TMH.
2	TCP/IP Protocol Suite, Behrouz A. Forouzan, 3rd edition, TMH.

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1	
2	
3	

Course Designed By:

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

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

Course code		MASTERING LAN & TROUBLE SHOOTING	L	T	P	C
Core/Elective/Supportive		Elective : II	5	0	0	4
Pre-requisite		Understand the Basics of Computer networks	Syllabus Version		2020-21 Onwards	

Course Objectives:

The main objectives of this course are to:
1. To enable the students to learn computer networks on computers and how to handle the n e t w o r k securityissues.
2. To study about the types of network.
3. To gain knowledge in firewalls in network securities.

Expected Course Outcomes:

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

1	Understand the basics of computer networks.	K2
2	Understand PC hardware-interconnections between Boxes	K2-K3
3	Understand the concept of MOTHERBOARD CIRCUITS and Mother board functions	K3
4	Understand the CRT controller principle	K4
5	Knowledge in installation and maintenance	K3-K4

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

Unit:1	PC- HARDWARE OVERVIEW	15 hours

PC- Hardware overview Introduction to computer organization-Memory-PC family-PC hardware-interconnections between Boxes-Inside the boxes:-motherboard, daughter boards, floppy disk drive, HDD, speaker, mode switch, front panel indicators & Control-mother board logic-memory space-I/O port address-wait state-interrupts -I/O data transfer-DMA channels-POST sequence.

Unit:2	PERIPHERAL DEVICES	15 hours

PERIPHERAL DEVICES Floppy drive controller-Overview-Disk format-FDC system interface-FDD interface Hard Disk controller-overview-Disk Drives and interface- controller post description Hard disk card-Hard disk format. Display Adapter:-CRT display- CRT controller principle -CRT controller 6845 Printer controller:-Centronics interface- programming sequence -Hardware overview-printer-sub assemblers.

Unit:3	MOTHERBOARD CIRCUITS	12 hours

MOTHERBOARD CIRCUITS Mother board functions-functional units and inter communications:-Reset logic -CPU nucleus logic-DMA logic-Wait state logic-NM logic-speaker logic-keyboard interface-SMPS.

Unit:4	INSTALLATION AND MAINTENANCE	15 hours

INSTALLATION AND MAINTENANCE Introduction-pre installation planning - installation practice-routine checks-special configuration memory up gradation - HD upgradation - DOS command(Internal and external).Preventive maintenance-system usage.

Unit:5	TROUBLE SHOOTING	15 hours

Network Security Firewalls and Virtual Private Networks (VPN) : Introduction – Brief introduction to TCP/IP – Fire walls – IP security – Virtual Private networks (VPN) – Intrusion. Case Studies on Cryptography and Security : Introduction – Cryptographic Solutions a Case Study – SSO – Secure inter

branch payment Transactions – DOS Attacks – IP Spoofing Attacks – Cross Site Scripting Vulnerability (CSSV) – Contract signing – secret Splitting - virtual elections – secure multiparty calculations – creating a VPN – Cookies and Privacy.

Unit:6	**Contemporary Issues**	**3 hours**

Expert lectures, online seminars – webinars

	Total Lecture hours	**75 hours**

Text Book(s)

1	B.Govindarajulu, "IBM PC and Clones", Tata McGraw Hill Co.1995.
2	Robert C Brenner, "IBM PC Troubleshooting and Repair Guide", BPB publications.
3	Winn & Rosch, "Hardware Bible", TechMedia.
4	Meyers, Introduction to PC Hardware and Troubleshooting, Tata McGraw Hill edition.

Reference Books

1	Zacker, Upgrading & Troubleshooting Networks – The Complete Reference, Tata McGraw Hill edition.

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1	
2	
3	

Course Designed By:

Mapping with Programme Outcomes

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

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

Course code		**WEB TECHNOLOGY**	**L**	**T**	**P**	**C**
Core/Elective/Supportive		**Core Lab : 7**	**0**	**0**	**6**	**4**
Pre-requisite		Basic knowledge in web server, browser and web application	**Syllabus Version**		2020-21 Onwards	

Course Objectives:

The main objectives of this course are to:
1. On completion of this course, a student will be familiar with client server architecture and able to develop a web application using java technologies.
2. Students will gain the skills and project-based experience needed for entry into web application and development careers
3. Understand best technologies for solving web client/server problems
4. Use Java script for dynamic effects and to validate form input entry
5. Analyze to Use appropriate client-side or Server-side applications.

Expected Course Outcomes:

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

1	Understand and analyze the TCP/IP basics.	**K1**
2	Understand Domain server name, FTP, TFTP, basics of WWW, web browser architecture.	**K2**
3	Knowledge of Microsoft and java technologies, dynamic web pages, DHTML, ASP and JSP.	**K2-K3**
4	Understanding active web pages, Java Applet, Java bean, CORBA, RMI and EDI architecture	**K2-K3**
5	Knowledge on XML, XML parser, WAP	**K4-K6**

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

Programs	**36 hours**
1. Design a personal web page using HTML.	
2. Design a data entry form in HTML.	
3. Write a Program in ASP to get data using a form, validate the data and returns thesame data for correction if any using the same form.	
4. Write a program in ASP to display the Session properties.	
5. Write a program in ASP that makes use of Ad Rotator component.	
6. Write a program in ASP that makes use of Browser Capabilities component.	
7. Write a program in ASP that makes use of Content Rotator component.	
8. Write a program in ASP that makes use of page counter component.	
9. Write a program in ASP to get the data of students using forms and stores them indatabase.	
10. Write a program in ASP to perform record navigation using a form.	
Total Lecture hours	**36 hours**

Text Book(s)

1	Web Technologies: TCP/IP to Internet Applications Architectures – Achyut S Godbole & Atul Kahate, 2007, TMH. (UNIT-I: 3.1-3.5,4.1-4.12 UNIT-II: 5.1-5.4,6.1-6.7 UNIT III:8.1-8.1,9.1- 9.13 UNIT IV: 10.1-10.7,15.1-15.3,16.1-16.8 UNIT-V: 17.1-17.4,18.1-18.6)

Reference Books	
1	Internet and Web Technologies, Rajkamal, TMH.
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	
2	
3	
Course Designed By:	

Mapping with Programme Outcomes

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

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

Course code		**GRAPHICS AND MULTIMEDIA**	**L**	**T**	**P**	**C**
Core/Elective/Supportive		**Elective : II**	**5**	**0**	**0**	**4**
Pre-requisite		Basic knowledge in 2D, 3D and multimedia file formats	**Syllabus Version**		2020-21 Onwards	

Course Objectives:

The main objectives of this course are to:

1. Design and apply two dimensional graphics and transformations.
2. Design and apply three dimensional graphics and transformations.
3. Apply Illumination, color models and clipping techniques to graphics.
4. Understood Different types of Multimedia File Format.

Expected Course Outcomes:

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

1	Explain applications, principles, commonly used and techniques of computer graphics and algorithms for Line-Drawing, Circle- Generating and Ellipse Generating	**K2**
2	Students will get the concepts of 2D and 3D, Viewing, Curves and surfaces, Hidden Line/surface elimination techniques	**K3**
3	Studies concepts of Multimedia Systems, Text, Audio and Video tools	**K3**
4	Compressing audio and video using MPEG-1 and MPEG-2	**K4**
5	Creates Animation with special effects using algorithms	**K6**

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

Unit:1		**OUTPUT PRIMITIVES**	**15 hours**

Output Primitives: Points and Lines – Line-Drawing algorithms – Loading frame Buffer – Line function – Circle-Generating algorithms – Ellipse-generating algorithms. Attributes of Output Primitives: Line Attributes – Curve attributes – Color and Grayscale Levels – Area-fill attributes – Character Attributes.

Unit:2		**2D GEOMETRIC TRANSFORMATIONS**	**15 hours**

2D Geometric Transformations: Basic Transformations – Matrix Representations – Composite Transformations – Other Transformations. 2D Viewing: The Viewing Pipeline – Viewing Coordinate Reference Frame – Window-to-Viewport Co-ordinate Transformation - 2D Viewing Functions – Clipping Operations.

Unit:3		**TEXT**	**15 hours**

Text: Types of Text – Unicode Standard – Font – Insertion of Text – Text compression – File formats. Image: Image Types – Seeing Color – Color Models – Basic Steps for Image Processing – Scanner – Digital Camera – Interface Standards – Specification of Digital Images – CMS – Device Independent Color Models – Image Processing software – File Formats – Image Output on Monitor and Printer

Unit:4		**AUDIO**	**15 hours**

Audio: Introduction – Acoustics – Nature of Sound Waves – Fundamental Characteristics of Sound – Microphone – Amplifier – Loudspeaker – Audio Mixer – Digital Audio – Synthesizers – MIDI – Basics of Staff Notation – Sound Card – Audio Transmission – Audio File formats and CODECs – Audio Recording Systems – Audio and Multimedia – Voice Recognition and Response - Audio Processing Software

Unit:5		**VIDEO AND ANIMATION**	**12 hours**

Video: Analog Video Camera – Transmission of Video Signals – Video Signal Formats – Television Broadcasting Standards – PC Video – Video File Formats and CODECs – Video Editing – Video Editing Software. Animation: Types of Animation – Computer Assisted Animation – Creating Movement – Principles of Animation – Some Techniques of Animation – Animation on the Web – Special Effects – Rendering

	Algorithms. Compression: MPEG-1 Audio – MPEG-1 Video - MPEG-2Audio – MPEG-2 Video.		
Unit:6	**Contemporary Issues**		**3 hours**
Expert lectures, online seminars – webinars			
		Total Lecture hours	**75 hours**

Text Book(s)

1	Computer Graphics, Donald Hearn, M.Pauline Baker, 2nd edition, PHI. (UNIT-I: 3.1-3.6,4.1- 4.5 & UNIT-II: 5.1-5.4,6.1-6.5)
2	Principles of Multimedia, Ranjan Parekh, 2007, TMH. (UNIT III: 4.1-4.7,5.1-5.16 UNIT-IV: 7.1-7.3,7.8-7.14,7.18-7.20,7.22,7.24,7.26-28 UNIT-V: 9.5-9.10,9.13,9.15,10.10-10.13)

Reference Books

1	Computer Graphics, Amarendra N Sinha, Arun D Udai, TMH.
2	Multimedia: Making it Work, Tay Vaughan, 7th edition, TMH.

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1	
2	
3	

Course Designed By:

Mapping with Programme Outcomes

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

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

Course code		**PROJECT WORK LAB**	**L**	**T**	**P**	**C**
Core/Elective/Supportive		**Elective : II**	**0**	**0**	**4**	**6**
Pre-requisite		Students should have the strong knowledge in any one of the Practical knowledge in this course.	**Syllabus Version**		2020-21 Onwards	

Course Objectives:

The main objectives of this course are to:
     1. To understand and select the task based on their core skills.
     2. To get the knowledge about analytical skill for solving the selected task.
     3. To get confidence for implementing the task and solving the real time problems.
     4. Express technical and behavioral ideas and thought in oral settings.
      5. Prepare and conduct oral presentations

Expected Course Outcomes:	
On the successful completion of the course, student will be able to:	
Formulate a real world problem and develop its requirements develop a design solution for a set of requirements.	**K3**
Test and validate the conformance of the developed prototype against the original requirements of the problem	**K5**
Work as a responsible member and possibly a leader of a team in developing software solutions.	**K3**
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	**K4**
Generate alternative solutions, compare them and select the optimum one.	**K6**

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

	AIM OF THE PROJECT WORK	
1. The aim of the project work is to acquire practical knowledge on the implementation of the programming concepts studied. 2. Each student should carry out individually one project work and it may be a work using the software packages that they have learned or the implementation of concepts from the papers studied or implementation of any innovative idea focusing on application oriented concepts. 3. The project work should be compulsorily done in the college only under the supervision of the department staff concerned. **Viva Voce** 1. Viva-Voce will be conducted at the end of the year by both Internal (Respective Guides) and External Examiners, after duly verifying the Annexure Report available in the College, for a total of 150 marks at the last day of the practical session. 2. Out of 150 marks, 60 marks for CIA and 90 for CEE (60 evaluation of project report + 30 Viva Voce).		

Project Report Format

PROJECT WORK

TITLE OF THE DISSERTATION

Bonafide Work Done by

STUDENT NAME

REG. NO.

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

<Name of the Degree>

of Bharathiar University, Coimbatore-46**.**

College Logo

Signature of the Guide   Signature of the HOD

Submitted for the Viva-Voce Examination held on _____

Internal Examiner   External Examiner

Month – Year

CONTENTS
Acknowledgement
Contents
Synopsis
1. Introduction
    Organization Profile
    System Specification
    Hardware Configuration
    Software Specification
2. System Study
    Existing System
    Drawbacks

Proposed System
Features
3. System Design and Development

    File Design

    Input Design

    Output Design

    Database Design

    System Development

    Description of Modules (Detailed explanation about the project work)

4. Testing and Implementation

5. Conclusion

Bibliography

Appendices

  A. Data Flow Diagram

  B. Table Structure

  C. Sample Coding

  D. Sample Input

  E. Sample Output

Course Designed By:

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

Course code			**SERVER ADMINISTRATION LAB**	**L**	**T**	**P**	**C**
Core/Elective/Supportive			Skill based Subject Lab : 4	**0**	**0**	**4**	**3**
Pre-requisite			**Students should have strong knowledge in Server administration**	**Syllabus Version**		2020-21 Onwards	

Course Objectives:

The main objectives of this course are to:
1. To understand server configuration.
2. To enable students to learn the basics firewall configuration.
3. To familiar with Sharing options
4. To learn about the user permissions

Expected Course Outcomes:

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

1	Understand the basics of server installation and maintenance.	**K2, K4, K6**
2	Understand the concept of firewall	**K2, K4, K6**
3	Understand and apply sharing permissions.	**K2, K4, K6**
4	Understand resource sharing permissions	**K2, K4, K6**
5	Develop multiuser settings	**K2, K4, K6**

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

Programs	**36 hours**

1. Identify the functions needed for a network environment.

   (subtasks: subtasks: understand reasons for Windows server 2003, understand components of Windows server 2003)

2. Decide whether to migrate to Windows server 2003.

   (subtasks: subtasks : evaluate the size, hardware/software, networking environment, security demand of the organization to decide whether to migrate.

3. Complete an installation checklist

   (subtasks: check system requirements, consider installation choices, prepare for installation, plan migration to Windows server 2003)

4. Install Windows server 2003

   (subtasks: choose setup method, run setup, configure the server)

5. Install WINDOWS XP PROFESSIONAL

   (subtasks: clean install from new version, character based setup, GUI based setup, run upgrade, automate installation, create/use images)

6. Install, configure, test trouble shoot RIS	

7..Plan network

8. Ensure that the network is properly set up (subtasks: set up network interface card, configure protocols, test network, setup DHCP, DNS and WINS, group permissions, user accounts)

9. implement Active Directory (subtasks: install AD, replicate Ad among sites)

10. use communication among the computers (subtasks: LAN) and connect to internet (subtasks: connect PCs with LAN, telephony connections, install/maintain Windows server 2003 router, internet connection, send/receive internet mail)

11. use IIS 6 (subtasks: install IIS 6, customize/maintain IIS 6)

12. install VPN (subtasks: use PPTP, layer two tunneling protocol, setup VPN server/client)

13. use terminal services and Remote Desktop (subtasks: setup terminal service, activate/install client licenses, use remote desktop for administration)

14. plan and use storage and file systems (subtasks: Use disk management, dynamic volume management, distributed file system, distributed file system, backup/restore)

15. set up print services (subtasks: set up network printing, control que, manage fonts, set up fax service)
16. use control panel, task manager, MMC, registry, group policy, local user profiles and update Windows server 2003.

		Total Lecture hours	**36 hours**

Text Book(s)

1	Bill Evjen, Jason Beres, et.al, Visual Basic .Net programming, Wiley Dreamtech India (p) Ltd. ISBN 81-265-0254-1.

Reference Books

1	

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

| 1	Fergal Grimes, Microsoft .NET for programmers, Shroff Publishers & Distributors (P) Ltd. ISBN 81-7366-540-0.
2	Thuan Thai & Hoang Q.Lam, .NET Framework Essentials, Shroff Publishers & Distributors (P) Ltd. ISBN 81-7366-654-7

Course Designed By:	

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

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

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

Cyber Security course contents

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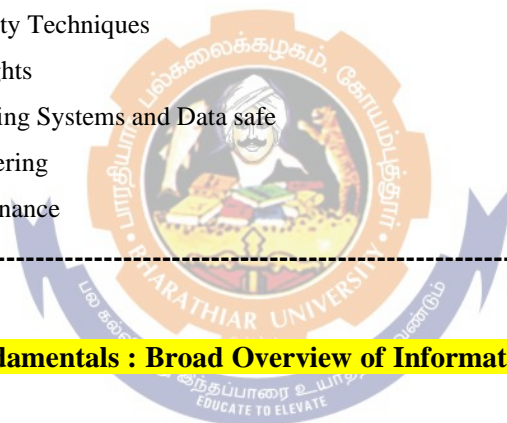
Course 1 - Information Security Fundamentals : Broad Overview of Information Security will coverthe following topics:

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

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

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

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

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

- **Case Study #3: Define cyber security governance structure for CISO in bank**

- # Case Study #4: Define cyber security structure for CISO in Auto manufacturing

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

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

- 3.1 Network security – Architecture and Standards, Wireless security, Network Vulnerabilities, Threats – Password cracking, Spoofing, Packet sniffing, Port scanning, Poisoning
- 3.2 System security - Asset classification, Asset accountability, Configuration management, Privilege access control, Virtualization security, System hardening, End-point security, System upgrades and patches, Backup and recovery, Systems Auditing, Threats – Denial of Service (DOS), DHCP spoofing, Dictionary attack, Email spoofing
- 3.3 Software security – Secure Design, Secure Coding, Static Security, Dynamic Security, Opensource governance, Software composition analysis, Log and audit trail ,OWASP Top10 Threats

- SQL Injection, Cross Site Scripting (XSS), Cross Site Request Forgery (CSRF)

- 3.4 Cryptography Basics – Security by Obscurity, Cryptographic Keys, Asymmetric, Symmetric, Hashing, Public Key Infrastructure (PKI), Challenges in cryptography
- 3.5 Application of Cryptography – Virtual Private Network (VPN), Secure Socket Layer (SSL), Digital Signature
- 3.6 Cloud security – Identity and Access management (IAM), Key management, Governance, Risk and Compliance (GRC), Legal, Data sovereignty, Business continuity, Disaster recovery,Cloud security models
- 3.7 Block chain security, 3.8 Zero Trust, 3.9 XDR, 3.10 AI, 3.11 MUD, 3.12 Context aware

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

- **Case Study #5:** What are the Fundamental Network protections used in Any Industry
  - Firewalls, IDS, IPS, VPN, Antivirus, SIEM
- **Case Study #6:** List methods to Secure Data in transit and Data at rest

- • Encryption, Hashing,
- • **Case Study #7:** How many ways can you protect any user account in applications
  - • 2FA, MFA, Password Management
- • Demo
- • Scenario based role play (Cybersecurity strategy development, Incident response plan)
- • Group discussion
- • Quiz

--   -----------

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

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

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

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

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

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

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

- • **Case Study #10: What are few examples of an Vulnerability as per Industry orientedapplications**
- • **Case Study #11: Explain RACI Matrix in banking environment**
- • Demo
- • Scenario based role play (Cybersecurity strategy development, Incident response plan)
- • Group discussion
- • Quiz

--   -------

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

- 6.1 what is penetration testing, vulnerability, Threats, Risks, Exploitation, 6.2 Computer ports / protocols, 6.3 Port Scanning, 6.4 Tools, 6.5 Attack Toolset – Metasploit, Nessus, nmap, Burpsuite, 6.6 Basic defence measures - Antivirus, Intrusion Detection / Prevention systems,

6.7 Penetration test approach, tools, 6.8 Pen test reporting, 6.9 Pen test rules, 6.10 Gray box, White box, Black box , 6.11 Sniffing, 6.12 DOS, 6.12 Social engineering, 6.13 Session hijacking, SQL Injection

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

- **Case Study #12: How to do network scanning in banking industry**

- # Case Study #13: How to do social engineering (email phishing) in auto manufacturing

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

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

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

7.10 Zero day attack, 7.11 Man in the middle

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

- **Case Study #14: Difference between Vulnerability and Exploitations. How to identifyexploitation in banking industry**

- # Case Study #15: What Network vectors are considered for exploitation.

  # How to implementin healthcare

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

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

- 8.1 Past, present & future trends of cyber threat landscape (Worldwide)

- 8.2 Cybercrime landscape in Asia Pacific

- 8.3 Organizational processes, Security roles and responsibilities, Due care and Due diligence

- 8.4 Cybersecurity threats – Malware, Viruses and Worms, Trojan horses, Botnets, Zero-dayexploits, Phishing, Spear phishing, Whaling, Social engineering, etc.

- 8.5 Risk management concepts, Personnel security policies, Information security training andawareness

- 8.6 Critical infrastructure protection, Privacy by design

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

- **Case Study #16: Explain Ransomware behaviour and impact within the industries.**

- # Case Study #17: What is a Malware and how to setup malware protection in hospital

- **Case Study #18: Will Linux and Mac have any Attacks and Malware. Consider ecommerceservices**

- Demo

- Scenario based role play (Cybersecurity strategy development, Incident response plan)

- Group discussion

- Quiz

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

- 9.1 SOC security operations centre concept, 9.2 Logging, Attack methodology and monitoring,

9.3 Incident detection and Reporting, 9.4 SIEM, 9.5 Threat intelligence feed , 9.6 24x7monitoring

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

- Case Study #19: **What is Security posture for any healthcare industry**

- # Case Study #20: What is SOC in food chain industry

- Demo

- Scenario based role play (Cybersecurity strategy development, Incident response plan)

- Group discussion

- Quiz

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

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

process, 10.9 TTX

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

- **Case Study #21: What is Zero Day? Does it have any impact on any industry applications.Define process framework**

- # Case Study #22: How are Incidents managed for HealthCare , FinTech, SCADA and Automotive industries

- Demo

- Scenario based role play (Cybersecurity strategy development, Incident response plan)

- Group discussion

- Quiz

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

- 11.1 Web environment setup for scan and tools, 11.2 Scan web application, 11.3 Exploitvulnerabilities, 11.4 Deep analysis, 11.5 Reporting

- 11.6 Mobile environment setup for scan and tools, 11.7 Scan mobile application, 11.8 Exploitvulnerabilities, 11.9 Deep analysis, 11.10 Reporting

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

- Cyber breach case study (Equifax, Uber, Target, Stuxnet, SWIFT)

- # Case Study #23: What's the Top standard followed in Web Applications

- **Case Study #24: What the Top standard followed in Mobile Applications**

- # Case Study #25: List secure frameworks used in Mobile App Development

- Demo

- Scenario based role play (Cybersecurity strategy development, Incident response plan)

- Group discussion

- Quiz

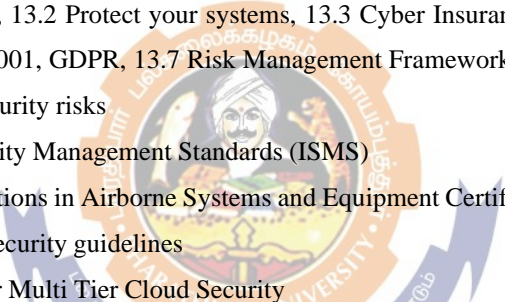==Course 12 – Privacy and online rights: Broad Overview of privacy techniques will cover the followingtopics:==

- 12.1 Privacy concept, 12.2 Privacy regulations, 12.3 GDPR, 12.4 Online privacy challenges

12.5 Online marketing/ sales privacy challenges, 12.6 Privacy protection and penalties

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

the following topics:

- Cyber breach case study (Equifax, Uber, Target, Stuxnet, SWIFT)

• Case Study #26: What data is considered as Privacy issue in online ecommerce

- **Case Study #27: Whats the impact if your company related data is available online?**
- Demo
- Scenario based role play (Cybersecurity strategy development, Incident response plan)
- Group discussion
- Quiz

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

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

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

- **Case Study #28: How can you assure your data is safe in Public network and corporatenetwork**

• Case Study #29: List 3 simple methods to keep your system safe from malware

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

<mark>Course 14 – Cloud security engineering: Broad Overview of cloud security will cover the followingtopics:</mark>

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

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

- **Case Study #30: How the Cloud services or applications can be targeted to hackers**

- ## Case Study #31: What are the Different methods to store data safe

- Demo

- Scenario based role play (Cybersecurity strategy development, Incident response plan)

- Group discussion

- Quiz

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

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

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

- Cyber breach case study (Equifax, Uber, Target, Stuxnet, SWIFT)

- ## Case Study #32: Abbreviated CIA and give one example for Healthcare industry

- **Case Study #33: Are Policies, procedures and standards important to protect CIA for anIndustry**

- Demo

- Scenario based role play (Cybersecurity strategy development, Incident response plan)

- Group discussion

- Quiz