B. Sc. HARDWARE SYSTEMS AND NETWORKING

Syllabus

AFFILIATED COLLEGES

Program Code: 26V

2025 – 2026 onwards

BHARATHIAR UNIVERSITY

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

Coimbatore - 641 046, Tamil Nadu, India

Program Educational Objectives (PEOs)	
The **B.Sc. 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 **2025-2026** and onwards*)

Scheme of Examination

Part	Title of the Course	Hours/ Week	Examination				Credits
			Duration in Hours	Maximum Marks			
				CIA	CEE	Total	
	Semester I						
I	Language - I	6	3	25	75	100	4
II	English - I	4	3	25	75	100	4
III	Core 1: Programming Concepts in C	5	3	25	75	100	4
III	Core 2: Computer Architecture	5	3	25	75	100	4
III	Core Lab 1: Programming Lab – C	4	3	20	30	50	2
III	Allied 1: Mathematical Structures for Computer Science	4	3	25	75	100	4
IV	Environmental Studies*	2	3	-	50	50	2
	Total	**30**		**145**	**455**	**600**	**24**
	Semester II						
I	Language – II	6	3	25	75	100	4
II	English – II	4	3	25	25	50	2
III	Core 3: C++ Programming	6	3	25	75	100	4
III	Core Lab 2: Programming Lab – C++	5	3	20	30	50	2
III	Core Lab 3: Office Automation and Internet	3	3	20	30	50	2
III	Allied 2: Discrete Mathematics	4	3	25	75	100	4
IV	Value Education – Human Rights*	2	3	-	50	50	2
IV	Naan Mudhalvan Skill Course ***			25	25	50	2
	Total	**30**		**165**	**385**	**550**	**22**
	Semester III						
I	Language – III	6	3	25	75	100	4
II	English – III	4	3	25	75	100	4
III	Core 4: Data Structures	4	3	25	75	100	4
III	Core 5: Fundamentals of Microprocessor	5	3	25	75	100	4
III	Core Lab 4: PC Assembling Lab	3	3	20	30	50	2
III	Allied 3: Embedded Systems	4	3	25	75	100	4
III	Skill Based Subject 1 : Software Project Management	3	3	25	25	50	2
IV	Tamil @/ Advanced Tamil (OR) Non-major elective-1 (Yoga for Human Excellence)*/ Women's Rights*	1	3	-	50	50	1
IV	Naan Mudhalvan Course ***			25	25	50	2
IV	Health and Wellness**		-	100	-	100	1
	Total	**30**		**295**	**505**	**800**	**28**

	Semester IV						
I	Language – IV	6	3	25	75	100	4
II	English – IV	4	3	25	75	100	4
III	Core 6: Operating System	4	3	25	75	100	4
III	Core 7: Computer Storage Devices	4	3	25	75	100	4
III	Core Lab 5: Fundamentals of Microprocessor Lab	3	3	20	30	50	2
III	Allied 4: Internet of Things (IoT)	4	3	25	75	100	4
III	Skill Based Subject 2 (lab) : Software Project Management Lab	3	3	20	30	50	2
IV	Tamil @/ Advanced Tamil (OR) Non-major elective-II(General Awareness) #	2	3	-	50	50	2
IV	Naan Mudhalvan Skill Course ***		3	25	25	50	2
	Total	**30**		**190**	**510**	**700**	**28**
	Semester V						
III	Core 8: Network Security and Cryptography	6	3	25	75	100	4
III	Core 9: Software Testing	6	3	25	75	100	4
III	Core Lab 6: Computer Hardware Maintenance	6	3	20	30	50	2
III	Elective-I : Computer Networks/ Organization Behaviour / CASE Tools Concepts and Applications	6	3	25	75	100	3
III	Skill Based Subject 3: Server Administration	3	3	25	25	50	2
III	Core Lab - VII : Capstone Project Work Lab *****	3	3	20	30	50	2
IV	Naan Mudhalvan Course ***		3	25	25	50	2
	Total	**30**		**165**	**335**	**500**	**19**
	Semester VI						
III	Core 10: Web Technology	6	3	25	75	100	4
III	Core 11: Mastering LAN and Troubleshooting	6	3	25	75	100	4
III	Core Lab 7: Web Technology Lab	3	3	20	30	50	2
III	Core 12: Project Work Lab	6	-	25	75	100	3
III	Elective-II : Graphics and Multimedia// Business Intelligence / Machine Learning	6	3	25	75	100	3
III	Skill based Subject 4 (lab) : Server Administration Lab	3	3	20	30	50	2
V	Extension Activities**	-	-	50	-	50	2
	Naan Mudhalvan Courses***		3	25	25	50	2
	Total	**30**		**215**	**385**	**600**	**22**
	Grand Total	**180**		**1175**	**2575**	**3750**	**143**

Guidelines for Evaluation :

Govt. - (Non-Autonomous Colleges), $ Aided – (Non-Autonomous Colleges), @ Self-Financing (Non –Autonomous).

Evaluation of the candidates shall be made through internal and external marks.

Paper Type	Total Marks	Internal		External		Overall Passing Minimum for Total Marks (Internal+ External)
		Maximum Marks	Passing Minimum for Internal	Maximum Marks	Passing Minimum for External	
Core and Allied Theory Paper	100	25	10	75	30	40
Skilled Based Subject Theory Paper	50	25	10	25	10	20
Foundation Course Theory Paper	50	-	-	50	20	20
Health and Wellness	100	100	40	-	-	40
Core Practical Paper and Skill Based Subject Lab Paper	50	20	8	30	12	20
Capstone Project Work Lab	50	20	8	30	12	20
Project Work Lab	100	25	10	75	30	40

INTERNAL MARKS BREAK UP

Core Paper, Allied Subject and Skilled Based Subject (Theory)

Components	CIA I	CIA II	Model	Attendance	Assignment & Seminar	Total
Marks	5	5	10	2	3	25

Practical Paper & Skill Based Subject Lab

Components	Observation	Record	Model Practical	Total
Program 1 and Program 2	5	5	10	20

Project

Components	Topic Selection	First and Second Review	Mock Viva Presentation	Report	Total
Capstone Project Work Lab	5	5	5	5	20
Project Work Lab	5	10	5	5	25

Internal Examination Question Paper Pattern

Core Paper, Allied Subject and Skilled Based Subject (Theory) **Duration: 2 Hours**

Blooms Classification	Knowledge Level	Section	Type	No. of Questions to be answered	Marks
Remember, Understand	K1,K2	A	Objective type, questions, fill in the blanks, true or false, expand the following	All questions	4 X 1 = 4
Understand, Apply	K2,K3	B	Paragraph about 3 pages	All question either or pattern unit wise	5 X 2 = 10
Apply, Analyze	K3,K4	C	Essay type about 5 pages	2 out of 5 questions	2 X 8 = 16
				Total	**30**

UNIVERSITY EXTERNAL MARKS BREAK UP

Practical Paper & Skill Based Subject Lab Paper

Components	Max. Marks	Aim & Algorithm	Keying	Output	Record	Total	Passing Minimum External
Program 1	10	4	4	2	10	30	12
Program 2	10	4	4	2			

Project

Components	Report	Presentation	Viva-voce	Total	Passing Minimum External
Capstone Project Work Lab	15	10	5	30	12
Project Work Lab	40	20	15	75	40

University Examination Question Paper Pattern

Core Paper & Allied Paper (Theory) **Duration: 3 Hours**

Blooms Classification	Knowledge Level	Section	Type	No. of Questions to be answered	Marks
Remember, Understand	K1,K2	A	Objective type questions, fill in the blanks, true or false, expand the following	All questions	10 X 1 = 10
Understand, Apply	K2,K3	B	Paragraph about 3 pages	Either or Pattern (Unit Wise)	5 X 5 = 25
Apply, Analyze	K3,K4	C	Essay type about 5 pages	Either or Pattern (Unit Wise)	5 X 8 = 40
				Total	**75**

Skill Based Subject Paper (Theory) **Duration: 3 Hours**

Blooms Classification	Knowledge Level	Section	Type	No. of Questions to be answered	Marks
Remember, Understand	K1,K2	A	Objective type questions	All questions	4 X 1 = 4
Understand, Apply	K2,K3	B	Paragraph about 2 pages	Either or Pattern (Unit Wise)	5 X 2 = 10
Apply, Analyze	K3,K4	C	Essay type about 4 pages	2 out of 5 questions (Unit Wise)	2 X 8 = 16
				Total	**25**

Foundation Course Paper (Theory) **Duration: 3 Hours**

Section	Type	No. of Questions to be answered	Marks
A	Essay type about 5 pages	5 out of 10 questions	5 X 10 = 50
		Total	**50**

Note

*	No Continuous Internal Assessment (CIA), University Examinations Only.
**	No University Examinations, Continuous Internal Assessment (CIA) Only.
***	Naan Mudhalvan – Skill courses- external marks (CEE) will be assessed by industry and internal will be offered by respective course teacher.
****	No University Examinations, Continuous Internal Assessment (CIA) Only will be handled by Department of Physical Education (PD)
*****	Summer Internship / Industrial Training during the Summer Vacation in II Year, IV Semester for 30 hours. The capstone project report to be prepared and it should be submitted during viva-voce. (Refer Project Guidelines)

First Semester

Course code		Programming Concepts in C	L	T	P	C
Core/Elective/Supportive		Core Paper: 1	5	0	0	4
Pre-requisite		Students should have basic Computer Knowledge	Syllabus Version		2025-26 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		Computer Architecture	L	T	P	C
Core/Elective/Supportive		Core Paper : 2	5	0	-	4
Pre-requisite		Student should have basic computer knowledge	Syllabus Version	2025-26 Onwards		

Course Objectives:

On successful completion of this subject the students should have Knowledge on

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

Expected Course Outcomes:

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

1	Learn the basic structure of number system methods like binary, octal and Hexadecimal and understand the arithmetic and logical operations are performed By computers.	K3
2	Define the functions to simplify the Boolean equations using logic gates.	K1
3	Understand various data transfer techniques in digital computer and control unit operations.	K2
4	Compare the functions of the memory organization	K4
5	Analyze architectures and computational designs concepts related to architecture organization and addressing modes	K4

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

Unit:1	Micro Computer System and its types	13 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	15 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	15 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	15 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	15 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	**75 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	4	2
Pre-requisite		Students should have basic knowledge in C programming and algorithms	Syllabus Version		2025-26 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.

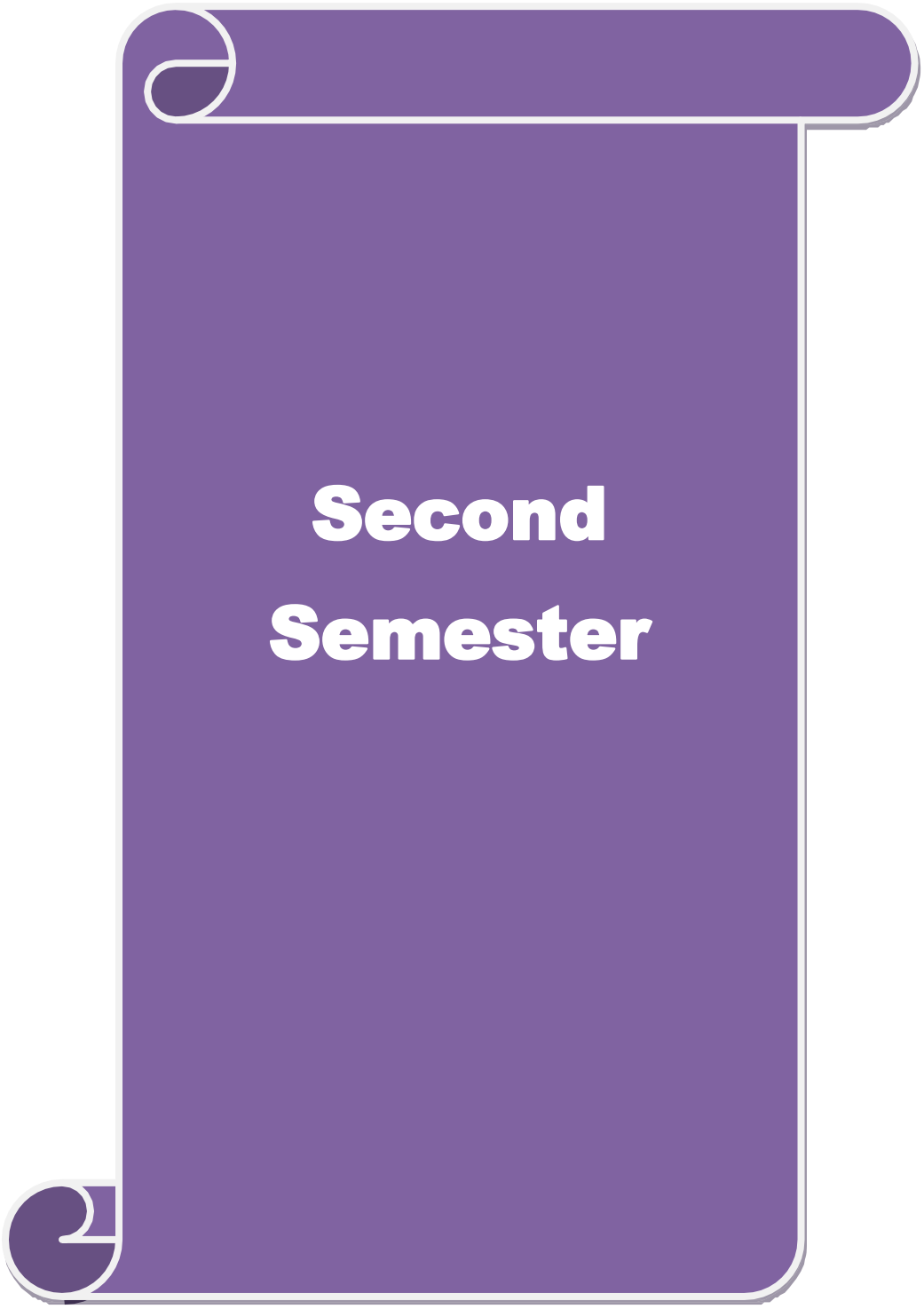
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

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	6	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		2025-26 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++	18 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	18 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	18 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	18 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**	**15 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**	**3 hours**
Expert lectures, online seminars – webinars		
	Total Lecture hours	**90 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	5	2
Pre-requisite		Basic understanding of computer programs and computer programming language like C.	Syllabus Version		2025-26 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

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		Office Automation and Internet	L	T	P	C
Core/Elective/Supportive		Core Lab : III	0	0	3	2
Pre-requisite		Basic Knowledge of Office Automation Tools	Syllabus Version		2025-26 Onwards	

Course Objectives:

The main objectives of this course are to:
1. Acquire and apply the computer applications in different aspects.
2. Get an insight knowledge on office automation.
3. Know the database maintenance in every type of applications.
4. Get the knowledge in effective power point presentation.
5. Impart knowledge and essential skills necessary to use the internet.

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	Create and apply various statistical tools available in excel.	**K3,K6**
3	To gain knowledge making effective presentation using power point presentation	**K4**
4	Understand the basic concepts and evaluate the database using excel.	**K5**

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

Programs	**36 hours**

1. Prepare your resume in word and 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.
2. Create a flowchart for any program use proper shapes like ellipse, arrows, rectangle, parallelogram and grouping to group all the parts of the flowchart into one single object.
3. Create a simple mathematical calculations using formulas in excel sheet.
4. Prepare students mark list for your class and calculate Total, Average, Result and Ranking by using arithmetic, logical functions and sorting using excel sheet.
5. Create different types of charts for a range in students mark list using excel sheet.
6. Create a power-point presentation with minimum 10 slides
   The first slide must contain the topic of the presentation and name of the presentation.
   a. At least one table,5 bullets,5 numbers, font size, font face, font color.
   b. Use word art to write the heading for each slides. Insert at least one clip-art, one picture, one audio and one video.
   c. Use custom animation option to animate the text, move left to right one line at a time and Use proper transition for the slides.
   d. Last slide must contain thank you.
7. 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.
8. 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.
9. 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.
10. Create poster for Department Seminar or Conference using any open source tools.

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	4	0	0	4
Pre-requisite		Basic understanding of Data storage, retrieval and algorithms.	Syllabus Version		2025-26 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	12 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	12 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	12 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	11 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	1 hour

Expert lectures, online seminars - webinars

	Total Lecture hours	60 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	5	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		2025-26 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	15 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	14 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**	**1 hour**
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	3	2
Pre-requisite	Students should know about the system parts or system components		Syllabus Version		2025-26 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	
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Course Designed By:	

Mapping with Programme Outcomes										
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	S	L	S	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		EMBEDDED SYSTEMS	L	T	P	C
Core/Elective/Supportive		Allied : 3	4	0	0	4
Pre-requisite		Basic knowledge in devices and programming skills in C and C++	Syllabus Version		2025-26 Onwards	

Course Objectives:

The main objectives of this course are to:

1. To enable the students to learn embedded system concepts and to develop embedded real time applications.
2. To learn the embedded programming in C and C++ to develop applications.
3. To study the embedded programming modeling in single and multiprocessor systems.

Expected Course Outcomes:

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

1	Understand and remember the basic concepts in embedded system and memory organization, DMA.	**K1,K2**
2	Understand the devices, buses for device networks, serial and parallel port device drivers, interrupt servicing mechanism.	**K2,K3**
3	Understand the embedded programming concepts in C and C++, apply to develop embedded application.	**K3**
4	Knowledge on programming in single and multiprocessor system.	**K4**
5	Knowledge in Inter-Process Communication and synchronization of processes, tasks and threads.	**K4**

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

Unit:1	INTRODUCTION TO EMBEDDED SYSTEM	12 hours

Introduction to Embedded System: An Embedded System – Processor in the System – Other Hardware units – Software embedded into a system – Exemplary embedded system – Embedded system on chip and in VLSI circuit. Processor and Memory organization: Structural units in a processor – Processor selection – Memory devices – Memory selection - Allocation of memory – DMA – Interfacing processor, memories and I/O devices

Unit:2	DEVICES AND BUSES FOR DEVICE NETWORKS	12 hours

Devices and buses for device networks: I/O devices – Timer and counting devices – Serial communication – Host system. Device drivers and Interrupts servicing mechanism: Device drivers – Parallel port device drivers – Serial port device drivers – Device drivers for IPTD – Interrupt servicing mechanism – Context and the periods for context-switching, deadline and interrupt latency

Unit:3	PROGRAMMING CONCEPTS AND EMBEDDED PROGRAMMING IN C AND C++	12 hours

Programming concepts and embedded programming in C and C++: Software programming in ALP and C – C program elements – Header and source files and processor directives – Macros and functions – Data types – Data structures – Modifiers – Statements – Loops and pointers – Queues – Stacks – Lists and ordered lists – Embedded programming in C++ - Java – C program compiler and cross compiler – Source code for engineering tools for embedded C / C++ - Optimization of memory needs

Unit:4	**PROGRAM MODELING CONCEPTS IN SINGLE AND MULTI PROCESSOR SYSTEMS**	**12 hours**
Program modeling concepts in single and multi processor systems: Modeling process for software analysis before software implementation – Programming models for event controlled or response time constrained real time programs – Modeling of multiprocessor systems. Software engineering practices: Software algorithm complexity – Software development process life cycle and its models – Software analysis – Software design – Implementation – Testing, Validation and debugging – Software maintenance		
Unit:5	**INTER-PROCESS COMMUNICATION AND SYNCHRONIZATION OF PROCESSES, TASKS AND THREADS**	**12 hours**
Inter-process communication and synchronization of processes, tasks and threads: Multiple processor – Problem of sharing data by multiple tasks and routines – Inter process communication. Real time operating systems: Operating system services – I/O subsystem – Network operating systems – Real time and embedded operating systems – Interrupt routine in RTOS environment – RTOS task scheduling – Performance metric in scheduling.		
	Total Lecture hours	**60 hours**

Text Book(s)

1	Raj Kamal, ― Embedded Systems – Architecture, Programming and Design, TMH, 2007

Reference Books

1	James K. Peckol, Embedded Systems, John Wiley & Sons, 2019

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	L	L	M	S	S
CO2	S	S	S	M	S	M	L	L	S	M
CO3	S	S	S	L	M	L	L	M	S	S
CO4	S	M	S	M	M	M	L	L	S	S
CO5	S	M	S	L	S	L	L	M	S	M

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

Course code		SOFTWARE PROJECT MANAGEMENT	L	T	P	C
Core/Elective/Supportive		Skill based Subject : 1	3	0	0	3
Pre-requisite		Basic knowledge on the Software Development Life Cycle.	Syllabus Version		2025-26 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	9 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	9 hours

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

Unit:3	SOFTWARE TESTING	9 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 CONFIGURATION MANAGEMENT	9 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	8 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	1 hour

Expert lectures, online seminars - webinars

	Total Lecture hours	45 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.
Reference Books	
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		**Operating Systems**	**L**	**T**	**P**	**C**
Core/Elective/Supportive		**Core Paper: VI**	**4**	**0**	**0**	**4**
Pre-requisite		Students Should have the basic knowledge in computer.	**Syllabus Version**		**2025-26 Onwards**	

Course Objectives:

The main objectives of this course are to:

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

Expected Course Outcomes:

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

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

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

Unit:1	**OPERATING SYSTEM**	**12 hours**

Introduction - Mainframe systems – Desktop Systems – Multiprocessor Systems – Distributed Systems – Clustered Systems – Real Time Systems – Handheld Systems - Hardware Protection - System Components – Operating System Services – System Calls – System Programs

Unit:2	**PROCESS AND THREADS**	**12 hours**

Process Concept – Process Scheduling – Operations on Processes – Cooperating Processes – Inter-process Communication. Threads – Overview – Threading issues - CPU Scheduling – Basic Concepts – Scheduling Criteria – Scheduling Algorithms – Multiple-Processor Scheduling – Real Time Scheduling

Unit:3	**SYNCHRONIZATION AND DEADLOCK**	**12 hours**

The Critical-Section Problem – Synchronization Hardware – Semaphores – Classic problems of Synchronization – Deadlock Characterization – Methods for handling Deadlocks -Deadlock Prevention – Deadlock avoidance – Deadlock detection – Recovery from Deadlocks

Unit:4	**VIRTUAL MEMORY AND STORAGE MANAGEMENT**	**12 hours**

Storage Management – Swapping – Contiguous Memory allocation – Paging – Segmentation – Segmentation with Paging. Virtual Memory – Demand Paging – Process creation – Page Replacement –Allocation of frames – Thrashing

Unit:5	**FILE MANAGEMENT**	**11 hours**
File Concept – Access Methods – Directory Structure - File System Structure – Allocation Methods – Free-space Management - Disk Structure – Disk Scheduling – Disk Management – Case Study: The Linux System, Windows.		
Unit:6	**CONTEMPORARY ISSUES**	**1 hour**
Expert lectures, online seminars - webinars		
	Total Lecture hours	**60 hours**

Text Book(s)

1	Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Concepts", 10th Edition, John Wiley & Sons (ASIA) Pvt. Ltd, April 2018
2	Harvey M. Deitel, "Operating Systems", Second Edition, Pearson Education Pvt. Ltd, 2002.

Reference Books

1	William Stallings, "Operating System", Prentice Hall of India, 4th Edition, 2003.
2	Pramod Chandra P. Bhatt "An Introduction to Operating Systems, Concepts and Practice", PHI, 2003.
3	Ramez Elmasri, A.G.Carrick and David Levine, "Operating Systems-A Spiral approach",2010

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

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Course Designed By:

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	M	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	4	0	0	4
Pre-requisite		Before starting the course students should have the basic knowledge about computer storage devices	Syllabus Version		2025-26 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	12 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	12 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	12 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	11 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/DVD Drive Support- Troubleshooting Optical Drives

Unit:6	Contemporary Issues	1 hour

Expert lectures, online seminars - webinars

	Total Lecture hours	60 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

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

1	http://spoken-tutorial.org/

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	3	2
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		2025-26 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.]

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2	http://spoken-tutorial.org/
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Mapping with Programme Outcomes										
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	S	M	S	M	S	M	M	M
CO3	S	S	S	M	S	M	S	S	M	M
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

Course code		Internet of Things (IoT)	L	T	P	C
Core/Elective/Supportive		Allied: 4	4	0	0	4
Pre-requisite		Students should have the basic understanding of logical circuits and hardware architecture.	Syllabus Version		2025-26 Onwards	

Course Objectives:

The main objectives of this course are to:

1. To learn the concepts of IoT and its protocols.
2. To learn how to analysis the data in IoT.
3. To develop IoT infrastructure for popular applications.
4. To report about the IoT privacy, security and vulnerabilities solution

Expected Course Outcomes:

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

1	To understand the fundamentals of Internet of Things.	**K1**
2	To know the basics of communication protocols and the designing principles of Web connectivity.	**K2**
3	To gain the knowledge of Internet connectivity principles	**K2-K3**
4	Designing and develop smart city in IoT	**K2-K3**
5	Analyzing and evaluate the data received through sensors in IOT.	**K4-K5**

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

Unit:1	INTRODUCTION	12 hours

Introduction - Definition & characteristics of IoT - physical design of IoT - logical design of IoT - IoT enabling Technologies - IoT levels & Deployment templates.

Unit:2	IOT and M2M	12 hours

Domain specific Iots : Home Automation - cities - Environment - Energy - retail - logistics - Agriculture - Industry Health and life style. IoT and M2M - Difference between IoT and M2M - SDN and NFV for lot.

Unit:3	IOT SPECIFICATION	12 hours

IoT systems management - SNMP - YANG – NETOPEER. IoT Platforms Design Methodology - purpose and specification - process specification - Domain model specification - Information model specification - Service specification - IoT level specification - functional view specification - operational view specification - Device and component Integrators - Application Development.

Unit:4	LOGICAL DESIGN USING PYTHON	12 hours

Logical design using python - Installing python - type conversions - control flow - functions - modules - File handling - classes. IoT physical devices and End points, building blocks of IoT device - Raspberry Pi - Linux on Raspberry Pi - Raspberry Pi interfaces.

Unit:5	IOT AND CLOUD COMPUTING	10 hours

Python Web application frame work - Amazon web services for IoT- Case Studies illustrating IoT Design. Home Automation-Environment-Agriculture-IoT Primer.

Unit:6	**Contemporary Issues**	**2 hours**
Expert lectures, online seminars – webinars		
	Total Lecture hours	**60 hours**

Text Book(s)	
1	Internet of Things - A hands on Approach Authors: Arshdeep Bahga, Vijay Madisetti Publisher: Universities press.
Reference Books	
1	Internet of Things - Srinivasa K.G., Siddesh G.M. Hanumantha Raju R. Publisher: Cengage Learning India pvt. Ltd (2018)
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
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Course Designed By:	

Mapping with Programme Outcomes

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

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

Course code		SOFTWARE PROJECT MANAGEMENT - LAB	L	T	P	C
Core/Elective/Supportive		Skill Based Subject 2 (Lab) : 1	0	0	3	2
Pre-requisite		Basic knowledge in SDLC and managing of software projects	Syllabus Version		2025-26 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.]

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Course Designed By:

Mapping with Programme Outcomes										
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	S	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		2025-26 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	18 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	18 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	18 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	18 hours

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

Unit:5	INTRUDERS	15 hours

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

Unit:6	Contemporary Issues	3 hours

Expert lectures, online seminars - webinars

	Total Lecture hours	90 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	
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Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	http://www.digimat.in/nptel/courses/video/106105175/L01.html
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Course Designed By:	

Mapping with Programme Outcomes										
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	S	M	S	M	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		2025-26 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	18 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	18 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	18 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	18 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	15 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	90 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.]	
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Course Designed By:	

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

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

Course code		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		2025-26 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	18 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	18 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	18 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	18 hours

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

Unit:5	**APPLICATION LAYER**	**18 hours**
APPLICATION LAYER: DNS – E-mail. NETWORK SECURITY: Cryptography –Symmetric Key Algorithms – Public Key Algorithms – Digital Signatures		
	Total Lecture hours	**90 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.]

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Course Designed By:

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	M	S	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		Organizational Behaviour	L	T	P	C
Core/Elective/Supportive		Elective : I	6	0	0	4
Pre-requisite		Basic knowledge in human behavior skills	Syllabus Version		2025-26 Onwards	

Course Objectives:

The main objectives of this course are to:

1. To help the students to develop cognizance of the importance of human behaviour.
2. To enable students to describe how people behave under different conditions and understand why people behave as they do.
3. To provide the students to analyses specific strategic human resources demands for future action.
4. To enable students to synthesize related information and evaluate options for the most logical and optimal solution such that they would be able to predict and control human behaviour and improve results.

Expected Course Outcomes:

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

1	Demonstrate the applicability of the concept of organizational behavior to understand the behavior of people in the organization.	**K1**
2	Develop Managerial skills for Individual Behaviors.	**K2**
3	Analyze the complexities associated with management of the group behavior in the organization. Analyze how to manage the Stress during a job.	**K3**
4	Develop an Organizational Behaviour model for any type of Organization.	**K3**
5	Analyze the Common biases and eradication in Decision Making Process.	**K4**

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

Unit:1	INTRODUCTION	18 hours

Introduction to Organizational Behavior –Related Disciplines – Theoretical Framework – Organizational Approaches – Modern Organizational Scenario: Impact of Globalization

Unit:2	INDIVIDUAL BEHAVIOR	18 hours

Individual Behavior – Perception – Process – Changes - Personality and Attitudes – Job Satisfaction

Unit:3	MOTIVATION	18 hours

Motivation: Needs, Content and Process: Motivation: Content Theories -ghh– Process Theories – Contemporary Theories – Motivation Applied – Job Design and Goal setting. Leadership – Background – Process- Styles – Activities – Skills

Unit:4	GROUP	18 hours

Group Dynamics – The nature of Informal Organizations – Formal Groups – Interactive conflict: Interpersonal conflict – Inter-group behavior and conflict – Negotiation Skills: Going beyond conflict management – Traditional Negotiation Approaches - Contemporary negotiation skills.

Unit:5	COMMUNICATION	15 hours

Communication – Role and background – Interpersonal communication – Informal

communication- The Decision Making process – Participative Decision making techniques – Organization design – culture – Organization change and development		
Unit:6	**Contemporary Issues**	**3 hours**
Expert lectures, online seminars - webinars		
	Total Lecture hours	**90 hours**

Text Book(s)	
1	Fred Luthans, Organizational Behavior, 9th Edition, McGraw Hill Irwin, 2002.
2	John W. Newstorm and Keith Davis, Organizational Behavior, 10th Edition.

Reference Books	
1	Robbins, S. P., & Judge, T. (2013). Organizational behavior (15th ed.). Boston: Pearson.
2	Newstrom J. W., & Davis, K. (2011). Human behavior at work (12th ed.). Tata McGraw Hill

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

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

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

Course code		CASE Tools Concepts and Applications	L	T	P	C
Core/Elective/Supportive		Elective-I	6	0	0	4
Pre-requisite		Basic knowledge in software project, testing in SDLC	Syllabus Version		2025-26 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	18 hours

Data Modeling: Business Growth-Organizational Model-Case Study of student MIS-What is the purpose of such Models-Understanding the business-Types of models-model development approach-the case for structural development-advantages of using a case tool. System analysis and design-what is DFD-General Rules for Drawing DFD-Difference Between Logical data flow diagram and Physical data flow diagram-Software verses Information Engineering-How case tools store information.

Unit:2	SOFTWARE DESIGN	18 hours

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

Unit:3	SOFTWARE TESTING	18 hours

Introduction to Ubridge: Introduction – Main flow of the system prototyping your Report-Introducing the Novice Model of the Operation. Introducing Synthesis – Synthesis basic – Synthesis – Menu Drawing the screen-Requirement Definition-Diagram-Data Dictionary-Document-Synthesis Main Administration – Synthesis reference – importing and exporting screen.

Unit:4	SOFTWARE CONFIGURATION MANAGEMENT	18 hours

Diagram definition tool: Introduction-Starting DDT-Drawing your own Icon – Defining the

connection rules-Rebuilding your icon. Object oriented methodologies: Rambaugh et.al._s object modeling techniques-The Booch methodology –The Jacobson et.al. Methodologies-Pattern-Frame works-The Unified Approach.		
Unit:5	**ESTIMATION**	**15 hours**
Introduction to UML-UML Diagram-Class Diagram-Use Case Diagram-Interaction Diagram-Sequence Diagram-Collaboration Diagram-State Chart Diagram-Activity Diagram-Component Diagram-Deployment Diagram.		
Unit:6	**Contemporary Issues**	**3 hours**
Expert lectures, online seminars – webinars		
	Total Lecture hours	**90 hours**

Text Book(s)

1	Case Tools Concepts and Applications, Ivan N Bayross, BPB Publications
2	Object Oriented System Development using the Unified Modeling Language, McGraw Hill International edition.
3	

Reference Books

1	Software Engineering: A Practitioner‘s Approach, Roger S Pressman, McGraw Hill International Edition.
2	

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

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Course Designed By:

Mapping with Programme Outcomes

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

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

Course code		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		2025-26 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.]		
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Course Designed By:		

Mapping with Programme Outcomes

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

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

Course code		SERVER ADMINISTRATION	L	T	P	C
Core/Elective/Supportive		Skill based Subject : 2	3	0	0	2
Pre-requisite		Students should have the practical knowledge about Basic knowledge in server administration	Syllabus Version		2025-26 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	9 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	9 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	9 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	9 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**	**6 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	**45 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

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

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Course Designed By:

Mapping with Programme Outcomes

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

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

Course Code		Core Lab - VII : Capstone Project Work	L	T	P	C
Core/Elective/Supportive			0	0	3	2
Pre - requisite		• Students should have a good understanding of software engineering • Student should possess strong analytical skills • Strong coding skills in any one programming	Syllabus version		2025-26 Onwards	

Course Objectives

- To understand and select the task based on their core skills.
- To get the knowledge about analytical skill for solving the selected task.
- To get confidence for implementing the task and solving the real time problems.

Expected Course Outcomes

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

1	Illustrate a real world problem and identify the list of project requirements	**K3**
2	Judge the features of the project including forms, databases and reports	**K5**
2	Design code to meet the input requirements and to achieve the required output	**K6**
3	Compose a project report incorporating the features of the project	**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.

Selection of Tools

No restrictions shall be placed on the students in the choice of platform/tools/languages to be utilized for their project work, though open source is strongly recommended, wherever possible. No value shall be placed on the use of tools in the evaluation of the project.

Viva Voce

1. Viva-Voce will be conducted at the end of the semester by both Internal (Respective Guides) and External Examiners, after duly verifying the project report in the college, for a total of 50 marks.
2. Internal Mark Split up (20 marks) : Title Selection – 5 marks, Problem Identification – 5 marks Review I and Review II -10 marks
3. External Mark Split up (30 marks) : Project report 15 marks, Viva PPT Presentation 5 marks and 10 Marks for Viva Voce.

Capstone Project Work Format

PROJECT WORK

TITLE OF THE DISSERTATION

Bonafide Work Done by

STUDENT NAME REG.
NO.

Project report submitted in partial fulfillment of the requirements for the award of <Name of the Degree>

of Bharathiar University, Coimbatore-46.

College Logo

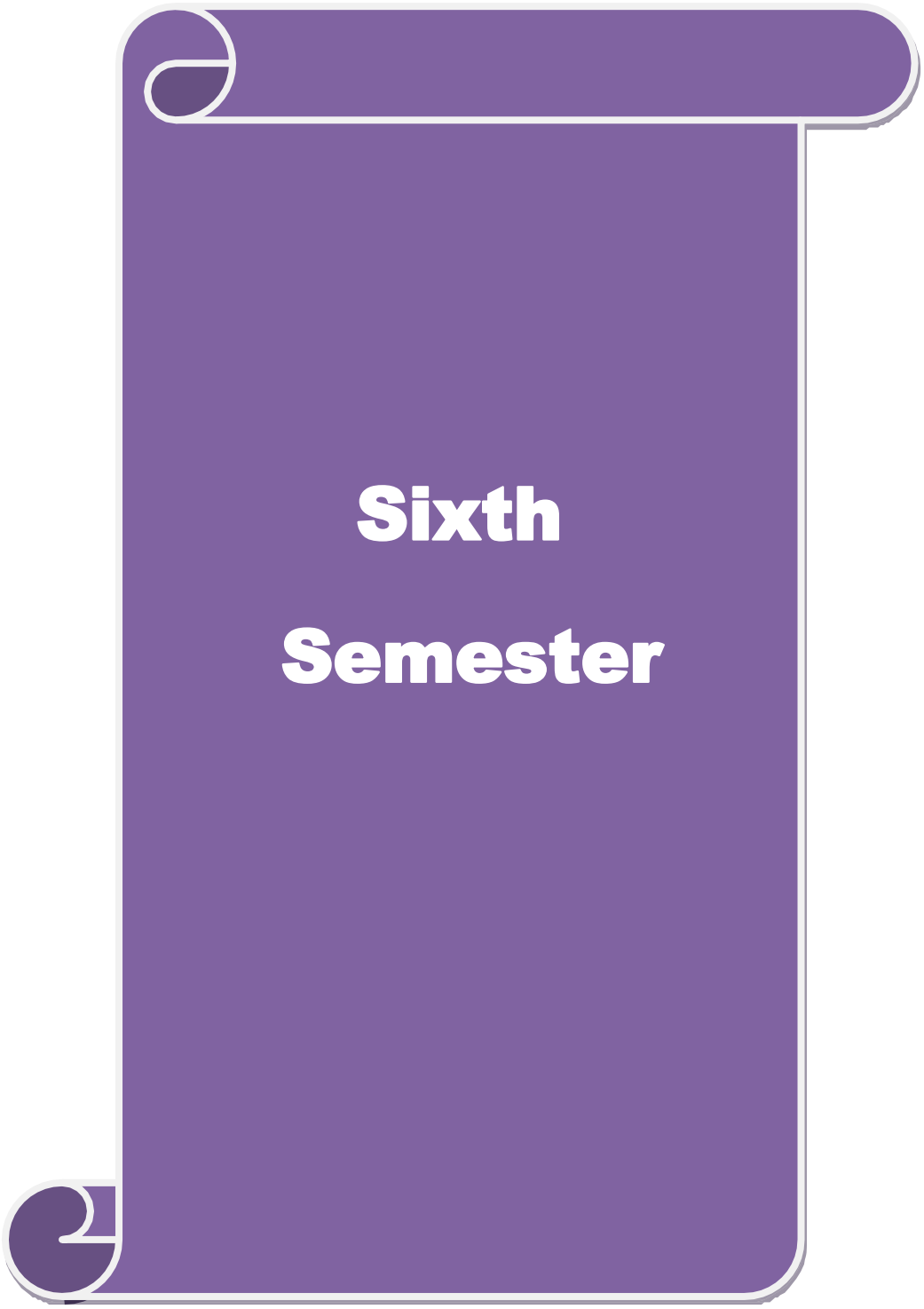
Signature of the Guide Signature of the HOD

Submitted for the Viva-Voce Examination held on _____

Internal Examiner External Examiner

Month – Year

CONTENTS


Sixth
Semester

Course code		WEB TECHNOLOGY	L	T	P	C
Core/Elective/Supportive		Core : 10	6	0	0	4
Pre-requisite		Basic knowledge in web server, browser and web application	Syllabus Version		2025-26 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	18 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	18 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	18 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	18 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	**90 hours**

Text Book(s)	
1	Web Technologies: TCP/IP to Internet Applications Architectures – Achyut S Godbole & Atul Kahate, 2007, TMH. (UNIT-I: 3.1-3.5,4.1-4.12 UNIT-II: 5.1-5.4,6.1-6.7 UNIT III:8.1-8.1,9.1- 9.13 UNIT IV: 10.1-10.7,15.1-15.3,16.1-16.8 UNIT-V: 17.1-17.4,18.1-18.6)
Reference Books	
1	Internet and Web Technologies, Rajkamal, TMH.
2	TCP/IP Protocol Suite, Behrouz A. Forouzan, 3rd edition, TMH.
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
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Course Designed By:	

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	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		CORE : 11	6	0	0	4
Pre-requisite		Understand the Basics of Computer networks	Syllabus Version		2025-26 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 network 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	18 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	18 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	15 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	18 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	18 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	**90 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.]

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Course Designed By:

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	M	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 LAB	L	T	P	C
Core/Elective/Supportive		Core Lab : 7	0	0	3	2
Pre-requisite		Basic knowledge in web server, browser and web application	Syllabus Version		2025-26 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	
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3	
Course Designed By:	

Mapping with Programme Outcomes										
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	M	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	6	0	0	3
Pre-requisite		Basic knowledge in 2D, 3D and multimedia file formats	Syllabus Version		2025-26 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	18 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	18 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	18 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	18 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	15 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	**90 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	
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3	
Course Designed By:	

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	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		BUSINESS INTELLIGENCE	L	T	P	C
Core/Elective/Supportive		Elective - II	6	0	0	3
Pre-requisite		Basic knowledge in data, data base and information	Syllabus Version		2025-26 Onwards	

Course Objectives:

The main objectives of this course are to:

3. To enable the students to learn business intelligence concepts, data warehouses, data mining techniques for CRM.
4. To learn about text mining and web mining and its applications.

Expected Course Outcomes:

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

1	Understand the basics of business intelligence, business decisions, data warehouses and its architecture, KDD process.	**K2**
2	Understand the applications of data mining in business, data mining techniques for CRM, text mining and web mining.	**K2,K3**
3	Knowledge in business intelligence, application in various domains and best practices.	**K3**
4	Understand the knowledge management, its architecture, approaches and tools.	**K3**
5	Knowledge in Web analytics and business intelligence, eCRM and case studies in web analytics.	**K4**

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

Unit:1	INTRODUCTION TO BUSINESS INTELLIGENCE	18 hours

Introduction to business intelligence and business decisions – Data warehouses and its role in Business Intelligence – Creating a corporate data warehouse – Data Warehousing architecture – OLAP vs. OLTP - ETL process – Tools for Data Warehousing – Data Mining – KDD Process

Unit:2	APPLICATIONS	18 hours

Applications of Data Mining in Business – Data Mining Techniques for CRM – Text Mining in BI - Web Mining – Mining e-commerce data – Enterprise Information Management - Executive Information Systems

Unit:3	BUSINESS INTELLIGENCE	18 hours

Business Intelligence – Function, Process, Services & Tools - Application in different domains – Operational BI - Customizing BI – Managing BI projects vs. Traditional IS projects – Managing BI projects – Best Practices in BI Strategy

Unit:4	KNOWLEDGE MANAGEMENT	18 hours

Knowledge Management – Definition – Data Vs. Information Vs. Knowledge –
The ten key principle of KM – Knowledge Management Architecture – Knowledge Management Vs. Knowledge Processing – KM approaches – KM Tools – KM Infrastructure – KM models - KM Strategies

Unit:5	ANALYTICS	15 hours

Web Analytics and Business Intelligence – eCRM - Case Study: Web Trends – Boeing – EverBank – China Eastern

Unit:6	**Contemporary Issues**	**3 hours**
Expert lectures, online seminars - webinars		
	Total Lecture hours	**90 hours**

Text Book(s)

1	Business Intelligence in the Digital Economy - Opportunities, Limitations and Risks, M.Raisinghani, Idea Group Publications, 2004
2	Introduction to Data Mining and its Applications, Sumathy, Sivanandam, Springer Verlag, 2006

Reference Books

1	Knowledge Management and Business Innovation, Yogesh Malhotra, Idea Group, 2001

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

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Course Designed By:

Mapping with Programme Outcomes

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

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

Course Code	Machine Learning	L	T	P	C
Core/elective/Supportive	Elective - II	6	0	0	3
Pre - requisite	None	Syllabus version			2025-26 Onwards

Course Objectives

- To explain about the basics of machine learning

Expected Course Outcomes

1	Understanding of the fundamental issues and challenges of machine learning: data, model selection, model complexity, etc.	K2
2	Understanding of the strengths and weaknesses of many popular machine learning approaches.	K2
3	Explain about the concepts of computational learning theory and dimensionality Reduction	K2
4	Appreciate the underlying mathematical relationships within and across Machine Learning algorithms and the paradigms of supervised and un-supervised learning.	K3

K1 – Remember K2 – Understand K3 – apply K4- Analyze K5 – evaluate K6- Create

UNITI	Introduction to Learning	18 hours

Algorithmic models of learning, Learning classifiers, functions, relations, grammars, probabilistic models, value functions, behaviors and programs for experience. Bayesian, maximum some posterior, and minimum description length frameworks.

UNIT II	Learning Models	18 hours

Parameter Estimation, sufficient statistics, decision trees, neural networks, support vector machines, Bayesian networks, bag of words classifiers, N-gram models; Markov and Hidden Markov models, probabilistic relational models, association rules, nearest neighbor classifiers, locally weighted regression, ensemble classifiers.

UNIT III	Computational Learning	18 hours

Computational Learning theory, mistake bound analysis, sample complexity analysis, VC dimension, Occam learning, accuracy and confidence boosting, Dimensionality reduction: Principal component Analysis, feature selection and visualization.

UNIT IV	Unsupervised Learning	18 hours

Unsupervised Learning: Clustering, mixture models, k-means clustering, hierarchical clustering, distributional clustering, Reinforcement learning; Learning from heterogeneous, distributed, data and knowledge.

UNIT V	Learning Applications	18 hours

Selected applications in data mining, automated knowledge acquisition, pattern recognition, program synthesis, text and language processing, internet-based information systems, human computer interaction, semantic web, and bioinformatics and computational biology.

	Total Lecture Hours	90 hours

Text Book(s)

1. Bishop, C. (2006). Pattern Recognition and Machine Learning. Berlin: Springer-Verlag.

Reference Book(s)	
1	Russel, S. And Norving, P. (2003). Artificial Intelligence: A Modern Approach. 2nd Edition, New York: Prentice-Hall.
2	Baldi, P., Frasconi, P., Smyth, P. (2002). Bioinformatics: A Machine Learning Approach. Cambridge, MA: MIT Press.
3	Baldi, P., Frasconi, P., Smyth, P. (2003). Modeling the Internet and the Web – Probabilistic Methods and Algorithms. New York: Wiley.
4	Bishop, C.M. Neural Networks for pattern recognition. New York: Oxford University press (1995).
5	Hastie, T., Tibshirani, R., and Friedman, J. (2001). The elements of Statistical Learning – Data mining, Inference, and Prediction, Berlin: Springer- Verlag.
6	Cohen, P.R. (1995) Empirical Methods in Artificial Intelligence. Cambridge, MA: MIT Press.
7	Cowell, R.G., Dawid, A.P., Lauritzen, S.L., and Spiegelhalter. D.J. (1999). Graphical Models and Expert Syatems. Berlin: Springer.
Related Online Contents (MOOC, SWAYAM,NPTEL, Websites etc)	
1	**https://onlinecourses.swayam2.ac.in/aic20_sp06/preview**
2	**https://onlinecourses.swayam2.ac.in/arp19_ap79/preview**
Course Designed by :	

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

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

Course code		Project Work Lab	L	T	P	C
Core/Elective/Supportive		Core Lab: 12	0	0	6	3
Pre-requisite		Students should have the strong knowledge in any one of the programming languages in this course.	Syllabus Version		2025-26 Onwards	

Course Objectives:

The main objectives of this course are to:

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

Expected Course Outcomes:

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

1	Formulate a real world problem and develop its requirements develop a design solution for a set of requirements.	**K3**
2	Test and validate the conformance of the developed prototype against the original requirements of the problem.	**K5**
3	Work as a responsible member and possibly a leader of a team in developing software solutions.	**K3**
4	Express technical ideas, strategies and methodologies in written form. Self-learn new tools, algorithms and techniques that contribute to the software solution of the project.	**K1-K4**
5	Generate alternative solutions, compare them and select the optimum one.	**K6**

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

AIM OF THE PROJECT WORK

1. The aim of the project work is to acquire practical knowledge on the implementation of the programming concepts studied.
2. Each student should carry out individually one project work and it may be a work using the software packages that they have learned or the implementation of concepts from the papers studied or implementation of any innovative idea focusing on application oriented concepts.
3. The project work should be compulsorily done in the college only under the supervision of the department staff concerned.
4. The project work with 2 new modules to be designed, implemented and it should be completed.

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 100 marks at the last day of the practical session.
2. Out of 100 marks, 60 marks for project report, 20 marks for presentation and 20 marks for Viva Voce.

Project Report Format

PROJECT WORK

TITLE OF THE PROJECT

Bonafide Work Done

by STUDENT NAME

REG. NO.

Project Report submitted in partial fulfillment of the requirements for the award of

<Name of the Degree>

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

College Logo

Sign**ature of the Guide** **Signature of the HOD**

Submitted for the Viva-Voce Examination held on _____

Internal Examiner **External Examiner**

Month – Year

CONTENTS

3.4 Output Design

3.4.1 Sample Output

3.4.2 Screens and Reports

3.5 Data Base Design

3.5.1 Table Design

3.6 Source Code

3.6.1 Sample Code

Chapter IV System Testing and Implementation

4.1 System Testing

4.2 System Implementation

Chapter V Conclusion

5.1 Conclusion

5.2 Scope for the Future

Bibliography

Course Designed By:

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

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

Course code		SERVER ADMINISTRATION LAB	L	T	P	C
Core/Elective/Supportive		Skill based Subject Lab : 4	0	0	3	2
Pre-requisite		Students should have strong knowledge in Server administration	Syllabus Version		2025-26 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 tomigrate.
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 basedsetup, 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