(CM301) COMPUTER ORGANIZATION

1. COURSE OBJECTIVES: In this course the students will be able to describe the structure, function and characteristics of computer systems. Learn the basic concepts of CPU and Input/output (I/O) organization. Classify computer memory; learn the functioning of DMA and IOP.

2. PRE-REQUISITES: NIL

3. TEACHING AND EXAMINATION SCHEME

Semester	**III**	**Periods/Week (in hours)**			**Total Hours**	**Examination Scheme**				
Course code & course title						**Theory Marks**		**Practical Marks**		**Total Marks**
CM301 Computer Organization		**L**	**T**	**P**	**H**	**TH**	**TM**	**TW**	**PR/OR**	
		4	-	-	4	75	25	-	-	100

4. COURSE OUTCOMES: On successful completion of the course, the students will be able to:
CM301.CO1: List the functional and organizational units of basic computer system.
CM301.CO2: Explain CPU, Memory and Input/output organization.
CM301.CO3: Classify various functional components of a computer system.
CM301.CO4: Compare various functional components of a computer system.

5. MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
	Basic & Discipline Specific Knowledge	Problem Analysis	Design and Development of Solutions	Engg. Tools, Experimentation& Testing	Engg. Practices for Society, Sustainability & Environment	Project Management	Life -long Learning
CO1	2	1	0	0	0	0	0
CO2	2	1	0	0	0	0	0
CO3	2	1	1	0	1	0	1
CO4	2	1	1	0	1	0	1

Relationship: Low-1 Medium-2 High-3

	PSO1	PSO2
CO1	2	2
CO2	2	2
CO3	1	1
CO4	1	1

6. DETAILED COURSE CONTENTS / MICRO-LESSON PLAN

M=Marks	**Thr= Teaching hours**	**CO = Course Outcomes**		
UNIT		**M**	**Thr**	**CO**
UNIT I	**1 BASIC ORGANIZATION OF COMPUTER** 1.1 Basic organization of Computer (Von Neumann Machine) - Input Unit, Memory unit, Arithmetic and Logic Unit, Output unit, Control Unit 1.2 Features of Von Neumann Model and Von Neumann Bottleneck 1.3 Basic Operational Concepts 1.3.1 Connections between the processor and the main memory 1.3.2 Functions of different registers Program Counter (PC), Instruction Register (IR), Memory Address Register (MAR), Memory Data Register (MDR), General purpose Registers. 1.3.3 Execution of a program (Steps taking place while execution of a program) 1.3.4 Concepts of Interrupt and Interrupt Service Routine (ISR) 1.4 Introduction to Buses-Concept of a bus, Data bus, Address Bus and Control Bus, System bus. 1.4.1 Bus Structures- Single bus structure, multiple bus structure, Traditional bus configuration, High speed bus configuration 1.4.2 Definitions of Bus Design Parameters-Bus Types – Dedicated and Multiplexed, Method of Arbitration – Centralized and Distributed, Bus Timings, Bus width, Data transfer types	15	13	CO1, CO2, CO3, CO4
UNIT II	**2 BASIC CPU ORGANIZATION** 2.1 Internal Structure of CPU 2.1.1 Major Components of CPU – control, Register set, ALU 2.1.2 CPU Operation (flowchart showing major functions of Processor) 2.2 Accumulator Based CPU Organization 2.3 Typical CPU with general purpose register organization. 2.4 Stack Organization- Register Stack, Memory Stack 2.5 Instruction Cycle 2.5.1 Instruction Fetch Cycle 2.5.2 Instruction Decode/Execute Cycle 2.6 Control Unit 2.6.1 Hardwired Control Unit	15	12	CO1, CO2, CO3, CO4

	2.6.2 Micro programmed/Soft-Wired Control Unit 2.7 Characteristics of Complex Instruction Set Computers (CISC) & Reduced Instruction Set Computers (RISC)			
UNIT III	**3 MEMORY ORGANIZATION** 3.1 Introduction to memory and memory parameters 3.2 Classification of memory 3.2.1 Primary/Semiconductor Memory based on: Principal of operation, Physical Characteristics, Mode of access, Terminology used for fabrication 3.2.2 Secondary memory based on Sequential and Random-access methods. 3.3 Memory Hierarchy- two, three and four levels 3.4 Main Memory 3.4.1 RAM- Definition of Static RAM (SRAM), Definition of Dynamic RAM(DRAM), Comparison between SRAM &DRAM, Definition of Synchronous DRAM (SDRAM), Definition of Double-Data-Rate Series (DDRAM), Comparison between DRAMs &SDRAMs 3.4.2 ROM-Overview of PROM, EPROM, EEPROM 3.5 Cache memory 3.5.1 Introduction Cache memory 3.5.2 Cache memory Terminology-Hit rate, Cache Miss, Program locality, Locality of reference, Block fetch 3.5.3 Cache organizations-Look-aside, Look-through 3.5.4 Elements of cache design: Cache size, Mapping Function, Replacement algorithms -Least- Recently –Used (LRU), First-In-First-Out (FIFO), Least-Frequency-Used (LFU), Random	15	13	CO1, CO2, CO3, CO4
UNIT IV	**4 INPUT & OUTPUT ORGANIZATION** 4.1 Input Output (I/O) Systems 4.1.1 Requirements of input output (I/O) systems 4.1.2 Input Output (I/O) interfacing techniques: Memory mapped I/O, I/O mapped I/O 4.2 Types of Data Transfer techniques 4.2.1 Program controlled I/O or polling control 4.2.2 Interrupt program controlled I/O or interrupt driven I/O	15	13	CO1, CO2, CO3, CO4

	4.2.3 Hardware controlled I/O 4.2.4 I/O control by handshake signals 4.3 Interrupt driven I/O 4.3.1 Interrupt Hardware / Hardware interrupt 4.3.2 Enabling and disabling interrupts, Vectored interrupts, Interrupt Nesting, Interrupt priority 4.3.3 Flowchart of Interrupt and response to interrupt 4.4 Comparison between Programmed I/O and Interrupt Driven I/O			
UNIT V	**5 DMA ORGANIZATION AND I/O PROCESSOR** 5.1 Direct memory Access 5.1.1 Introduction to DMA 5.1.2 Drawbacks in Programmed I/O and Interrupt Driven I/O 5.1.3 DMA operation with flowchart of Interaction of CPU and DMA 5.1.4 Comparison of I/O program Controlled Transfer and DMA transfer. 5.1.5 Use of DMA in a Computer system 5.1.6 Bus Arbitration 5.1.7 Types of Bus Arbitration: Centralized and Distributed 5.1.8 Centralized Arbitration: Daisy Chaining, Polling method and Independent Request 5.2 I/O Processor 5.2.1 Features and functions of IOP 5.2.2 Block diagram of IOP	15	13	CO1, CO2, CO3, CO4
	Total	75	64	

7. COURSE DELIVERY:

The Course will be delivered through lectures, class room interactions and exercises.

8. SPECIFICATION TABLE FOR THEORY/ MACRO-LESSON PLAN

Unit No	Unit	Number of lectures	Marks
I	**1. BASIC STRUCTURE/ORGANIZATION OF COMPUTER** 1.1 Basic organization of Computer (Von Neumann Machine) 1.2 Features of Von Neumann Model and Von Neumann Bottleneck 1.3 Basic Operational Concepts 1.4 Introduction to Buses-Concept of a bus, Data bus, Address Bus and Control Bus, System bus.	13	15
II	**2. BASIC CPU ORGANIZATION** 2.1 Internal Structure of CPU 2.2 Accumulator Based CPU Organization	12	15

	2.3 Typical CPU with general purpose register organization. 2.4 Stack Organization- Register Stack, Memory Stack 2.5 Instruction Cycle 2.6 Control Unit 2.7 Characteristics of Complex Instruction Set Computers (CISC) & Reduced Instruction Set Computers (RISC)		
III	**3. MEMORY ORGANIZATION** 3.1 Introduction to memory and memory parameters 3.2 Classification of memory 3.3 Memory Hierarchy- two, three and four levels 3.4 Main Memory 3.5 Cache memory	13	15
IV	**4. INPUT & OUTPUT ORGANIZATION** 4.1 Input Output (I/O) Systems 4.2 Types of Data Transfer techniques 4.3 Interrupt driven I/O 4.4 Comparison between Programmed I/O and Interrupt Driven I/O	13	15
V	**5. DMA ORGANIZATION** 5.1 Direct memory Access 5.2 I/O Processor	13	15
	Total	64	75

9. SPECIFICATION TABLE FOR TERM WORK & PRACTICALS HOURS

There are no practical in this course and hence it is not applicable.

10. LEARNING RESOURCES

Text Books

S. No.	Author	Title of Books	Publishers
1	A.P. Godse and D.A. Godse	Computer Organisation and Architecture/ Computer Architecture and Organisation	Technical Publication
2	William Stallings	Computer Organisation and Architecture	Prentice Hall

Reference Books for further study

S. No.	Author	Title of Books	Publishers
1	Morris Mano	Computer System and Architecture	Pearson publication

Internet and Web Resources

S. No.	Description
1	https://nptel.ac.in/courses/106106092/
2	http://www.ddegjust.ac.in/studymaterial/msc-cs/ms-07.pdf

Videos and Multimedia Tutorials

S. No.	Description
1	https://youtube.com/watch?v=MIWTxHbPBA0

(CM302) OPERATING SYSTEM

1. COURSE OBJECTIVES: In this course the students will learn the basic concepts of operating system, its functions, types and structure. They will understand about process and how the operating system manages the processes and memory of a computer. They will familiarize with deadlocks and various deadlock strategies. They will also study security management in operating system.

2. PRE-REQUISITES: Knowledge of Computer Hardware.

3. TEACHING AND EXAMINATION SCHEME

Semester	**III**	**Periods/Week (in hours)**			**Total Hours**	**Examination Scheme**				
Course code & course title						**Theory Marks**		**Practical Marks**		**Total Marks**
CM302		**L**	**T**	**P**	**H**	**TH**	**TM**	**TW**	**PR/OR**	
Operating System		3	-	2	5	75	25	25	-	125

4. COURSE OUTCOMES: Student will be able to:

CM302.CO1: Explain the basic concepts of operating systems.
CM302.CO2: Use various concepts of an Operating System.
CM302.CO3: Classify various concepts of an Operating System.
CM302.CO4: Compare various concepts of an Operating System.

5. MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
	Basic & Discipline Specific Knowledge	Problem Analysis	Design and Development of Solutions	Engg. Tools, Experimentation& Testing	Engg. Practices for Society, Sustainability & Environment	Project Management	Life -long Learning
CO1	2	1	1	0	0	0	1
CO2	2	1	1	0	0	0	1
CO3	2	1	2	1	0	0	1
CO4	2	1	2	1	0	0	1

Relationship: Low-1 Medium-2 High-3

	PSO1	PSO2
CO1	2	2
CO2	2	2
CO3	2	2
CO4	2	2

6. DETAILED COURSE CONTENTS / MICRO-LESSON PLAN

M=Marks	**Thr= Teaching hours**	**CO = Course Outcomes**			
UNIT			**M**	**Thr**	**CO**
UNIT I	**1. INTRODUCTION** 1.1 Definition of Operating System 1.2 Functions of Operating System 1.3 Types of Operating System and their features 1.3.1 Batch Processing 1.3.2 Multiprogramming 1.3.3 Real time System 1.3.4 Time Sharing 1.3.5 Distributed 1.3.6 Multimedia 1.4 Definitions: Assembler, Compiler, interpreter, linker, loader and editor 1.5 OS Structure 1.5.1 Layered 1.5.2 Monolithic 1.5.3 Micro Kernel		15	8	CO1, CO2, CO3, CO4
UNIT II	**2. PROCESS MANAGEMENT** 2.1 Definition of Process 2.2 Concept of Context Switching 2.3 Process States 2.4 Process Transition Diagram 2.5 Process Control Block 2.6 Process Scheduling 2.6.1 Scheduling Objectives 2.6.2 Scheduling Philosophies 2.6.3 Scheduling Levels 2.6.4 Scheduling Algorithms: First Come First Serve (FCFS), Round Robin (RR), Priority Based, Priority Class		15	10	CO1, CO2, CO3, CO4
UNIT III	**3. DEADLOCKS AND INFORMATION MANAGEMENT** 3.1 Deadlocks 3.1.1 Concept 3.1.2 Graphical Representation Deadlock 3.1.3 Deadlock Pre-requisite 3.1.4 Concepts of deadlock Strategies: Deadlock Ignorance, Deadlock Detection, Deadlock Recovery, Deadlock Prevention, Deadlock Avoidance 3.2. Information management 3.2.1 Simple File System: File Attributes 3.2.2 File Access Methods: Sequential File Access, Direct/Random/Relative Access, Indexed Sequential Access 3.2.3 Directory Structure: Hierarchical Directory Systems, Access Paths, Directory		15	9	CO1, CO2, CO3, CO4

	Operations 3.2.4 File Protection: Access Control			
UNIT IV	**4. MEMORY MANAGEMENT** 4.1 Functions 4.1.1 Issues in memory management scheme: Relocation and address translation, Protection and sharing, Evaluation 4.2 Contiguous Real Memory Management Techniques 4.2.1 Single Contiguous Memory Management 4.2.2 Fixed Partitioned Memory Management 4.2.3 Variable Partitioned Memory Management 4.2.4 Fragmentation –Internal and External 4.3 Non-Contiguous Real Memory Management 4.3.1 Paging: Introduction, Relocation and address Translation, General Methodology, Implementation of PMT (Software Method) 4.3.2 Segmentation: Introduction, Relocation and address Translation 4.4 Concept of Virtual Memory 4.4.1 Introduction 4.4.2 Definitions: Locality of Reference, Page Fault, Working set, Page Replacement Policy (FIFO, NRU, and LRU), Dirty Page/Dirty Bit, Demand Paging.	15	11	CO1, CO2, CO3, CO4
UNIT V	**5. SECURITY MANAGEMENT** 5.1 Security Management 5.1.1 Introduction 5.1.2 Security Threats 5.1.3 Attacks on Security 5.1.4 Computer Worm: Mode of Operation, Safeguard against worm\ 5.1.5 Computer virus: Types of viruses, Infection Methods, Mode of Operation, Virus Detection, Removal and Prevention 5.1.6 Security Design Principles 5.1.7 Authentication: Password, Artifact, Biometrics	15	10	CO1, CO2, CO3, CO4
	Total	75	48	

7. COURSE DELIVERY:

The Course will be delivered through lectures, class room interactions, exercises and case studies

8. SPECIFICATION TABLE FOR THEORY/ MACRO-LESSON PLAN

Unit No	Unit	Number of lectures	Marks
I	**1. INTRODUCTION** 1.1 Definition of Operating System 1.2 Functions of Operating System 1.3 Types of Operating System and their features 1.4 Definitions: Assembler, Compiler, interpreter, linker, loader and editor 1.5 OS Structure	8	15
II	**2. PROCESS MANAGEMENT** 2.1 Definition of Process 2.2 Concept of Context Switching 2.3 Process States 2.4 Process Transition Diagram 2.5 Process Control Block 2.6 Process Scheduling	10	15
III	**3. DEADLOCKS AND INFORMATION MANAGEMENT** 3.1 Deadlocks 3.2 Information management	9	15
IV	**4. MEMORY MANAGEMENT** 4.1 Functions 4.2 Contiguous Real Memory Management Techniques 4.3 Non-Contiguous Real Memory Management 4.4 Concept of Virtual Memory	11	15
V	**5. SECURITY MANAGEMENT** 5.1 Security Management	10	15
	Total	48	75

9. SPECIFICATION TABLE FOR TERM WORK & PRACTICALS HOURS

No	Practical
1	Study of Disk Operating System (Internal and External commands)
2	Installation of Windows Operating System
3	Study of Windows Operating System: (Architecture and functionality)
4	Installation of Linux Operating System
5	Study of Linux Operating System: (Architecture and functionality)
6	Study of Linux Commands
7	Study of Linux shell programming

8	Study of process scheduling algorithms.
9	Study of Antivirus: Types of Antiviruses, installation and usage.
10	Case Study on Android and IOS7

10. LEARNING RESOURCES

Text Books

S. No.	Author	Title of Books	Publishers
1	Achyut S. Godbole	Operating System	Tata Mc-Graw Hill
2	Silberschatz Galvin John Wiley and Sons	Operating System Concepts	John Wiley & Sons
3	William Stallings	Operating System	Pearson
4	Sumitabha Das	Unix Concept and Programming	Tata Mc-GrawHill

Reference Books for further study

S. No.	Author	Title of Books	Publishers
1	Andrew Tanenbaum	Modern Operating systems	PHI
2	Kumar Saurabh	UNIX Programming	Wiley India

Internet and Web Resources

S. No.	Description
1	https://nptel.ac.in/courses/106108101/
2	https://nptel.ac.in/downloads/106108101/

Videos and Multimedia Tutorials

S. No.	Description
1	https://www.youtube.com/watch?v=MaA0vFKt-ew

(CM303) COMPUTER PROGRAMMING

1. COURSE OBJECTIVES: In this course the students will study the syntax of C programming language. Develop, execute, test and debug programs using C programming language.

2. PRE-REQUISITES: Knowledge of computer programming terminology.

3. TEACHING AND EXAMINATION SCHEME

Semester	**III**	**Periods/Week (in hours)**			**Total Hours**	**Examination Scheme**				
Course code & course title						**Theory Marks**		**Practical Marks**		**Total Marks**
CM303 Computer Programming		**L**	**T**	**P**	**H**	**TH**	**TM**	**TW**	**PR/OR**	
		3	1	2	6	75	25	25	25	150

4.COURSE OUTCOMES: Student will be able to:

CM303.CO1: Explain the elements of C programming language.
CM303.CO2: Write C programs using modular programming concepts.
CM303.CO3: Compare various C language constructs.
CM303.CO4: Develop simple applications using C.

5.MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
	Basic & Discipline Specific Knowledge	Problem Analysis	Design and Development of Solutions	Engg. Tools, Experimentation& Testing	Engg. Practices for Society, Sustainability & Environment	Project Management	Life -long Learning
CO1	2	2	1	0	0	0	1
CO2	2	3	3	1	0	1	1
CO3	2	2	1	0	0	0	1
CO4	2	3	3	1	1	2	1

Relationship: Low-1 Medium-2 High-3

	PSO1	PSO2
CO1	2	2
CO2	3	3
CO3	2	2
CO4	3	3

6. DETAILED COURSE CONTENTS / MICRO-LESSON PLAN

M=Marks	**Thr= Teaching hours**	**CO = Course Outcomes**		
UNIT		**M**	**Thr**	**CO**
UNIT I	**1. INTRODUCTION TO C** 1.1 Basic Elements of C 1.1.1 History of C 1.1.2 Characteristics of C 1.1.3 Simple C programs 1.1.4 Structure of a C Program 1.1.5 The character set of C 1.1.6 C Tokens: Identifiers, Keywords, Constants, Basic data types and sizes, Variables, Variable declarations 1.2 Operators and Expressions 1.2.1 Arithmetic operators 1.2.2 Relational Operators 1.2.3 Logical operators 1.2.4 Assignment operators 1.2.5 Unary operators 1.2.6 Conditional expressions 1.2.7 Bitwise operators 1.2.8 Operator precedence and associativity 1.3 Standard Input and Output in C 1.3.1 I/O Functions 1.3.2 Formatted output – The printf function 1.3.3 Unformatted output – putchar and puts function 1.3.4 Formatted input – The scanf function 1.3.5 Unformatted input – getchar and gets functions	15	9	CO1, CO2, CO3, CO4
UNIT II	**2. CONDITIONAL PROGRAM EXECUTION, PROGRAM LOOPS AND ITERATIONS** 2.1 Branching: The if-else statement 2.2 Nested if statement 2.3 Dangling else problem 2.4 The if-else-if ladder 2.5 The switch statement 2.6 The goto statements and labels 2.7 Loops 2.7.1 The while statement 2.7.2 The do while statement 2.7.3 The for statement	15	10	CO1, CO2, CO3, CO4

	2.7.4 Nested for statement 2.8 The break statement 2.9 The continue statement			
UNIT III	**3. ARRAYS AND STRINGS** 3.1 Arrays 3.1.1 Array notation and representation 3.1.2 Array declaration and defining 3.1.3 Storing elements in array 3.1.4 Manipulating array elements 3.1.5 Two-dimensional and multi-dimensional arrays 3.2 Strings and String handling functions 3.2.1 String length 3.2.2 Using strcpy to copy strings 3.2.3 Concatenating strings using strcat 3.2.4 String compare	15	10	CO1, CO2, CO3, CO4
UNIT IV	**4. STRUCTURES, POINTERS AND FILE MANAGEMENT** 4.1 Structures 4.1.1 Introduction 4.1.2 Defining a structure 4.1.3 Initializing of a structure 4.1.4 Accessing and processing a structure 4.1.5 Array of Structures 4.2 Pointers 4.2.1 Pointer concept 4.2.2 Pointer declaration 4.2.3 Initializing pointer variable 4.2.4 Accessing variable through pointer 4.3 File Management 4.3.1 Introduction to file management 4.3.2 Defining and opening a file 4.3.3 Closing a file, input/output operations On files	15	10	CO1, CO2, CO3, CO4
UNIT V	**5 MODULAR PROGRAMMING** 5.1 Introduction 5.2 User-defined functions in C 5.3 Function – Basics 5.4 General form of a function 5.4.1 Declaring function/function prototype 5.4.2 Accessing a function 5.5 Scope rules 5.6 Function arguments	15	09	CO1, CO2, CO3, CO4

	5.6.1 Call by value 5.6.2 Call by reference 5.7 Return statements 5.7.1 Returning from a function 5.7.2 Return values 5.7.3 Functions of type void 5.8 Recursive functions 5.9 Standard Library functions			
	Total	75	48	

7. COURSE DELIVERY:

The Course will be delivered through lectures, class room interactions, exercises and case studies

8. SPECIFICATION TABLE FOR THEORY/ MACRO-LESSON PLAN

Unit No	Unit	Number of lectures	Marks
I	**1 INTRODUCTION TO C** 1.1 Basic Elements of C 1.2 Operators and Expressions 1.3 Standard Input and Output in C	9	15
II	**2 CONDITIONAL PROGRAM EXECUTION, PROGRAM LOOPS AND ITERATIONS** 2.1 Branching: The if-else statement 2.2 Nested if statement 2.3 Dangling else problem 2.4 The if-else-if ladder 2.5 The switch statement 2.6 The goto statements and labels 2.7 Loops 2.8 The break statement 2.9 The continue statement	10	15
III	**3 ARRAYS AND STRINGS** 3.1 Arrays 3.2 Strings and String handling functions	10	15
IV	**4 STRUCTURES, POINTERS AND FILE MANAGEMENT** 4.1 Structures 4.2 Pointers 4.3 File Management	10	15

V	**5 MODULAR PROGRAMMING** 5.1 Introduction 5.2 User-defined functions in C 5.3 Function – Basics 5.4 General form of a function 5.5 Scope rules 5.6 Function arguments 5.7 Return statements 5.8 Recursive functions 5.9 Standard Library functions	9	15
	Total	48	75

9. SPECIFICATION TABLE FOR TERM WORK & PRACTICALS HOURS

No	Practical
1.	Write a C program to implement Input / Output Functions
2.	Write a C program to implement Operators and Expression
3.	Write a C program to implement Conditional statements
4.	Write a C program to implement Loops
5.	Write a C program to implement Arrays
6.	Write a C program to implement Strings
7.	Write a C program to implement Structures
8.	Write a C program to implement Pointers
9.	Write a C program to implement Functions
10.	Write a C program to implement File Management
No	**Tutorial Exercise**
1	At least 2 problems on each unit given above

10. LEARNING RESOURCES

Text Books

S. No.	Author	Title of Books	Publishers
1	E. Balagurusamy	Programming in ANSI C	Tata McGraw Hill.
2	Yeshavant Kanetkar	Let us C	BPB Publication

Reference Books for further study

S. No.	Author	Title of Books	Publishers
1	J. S. Katre, Deitel, Deitel	C- How to program	Deitel Publication.
2	P Godse, D. A. Godse	Computer Programming using C	Technical Publication

Internet and Web Resources

S. No.	Description
1	Introduction to C Programming Language, http://www.learnconline.com/2010/03/introduction.html
2	Comp.lang.C Frequently Asked Questions, http://www.c-faq.com
3	C Tutorial, http://www.cprogramming.com/tutorial/c-tutorial.html

Videos and Multimedia Tutorials

S. No.	Description
1	https://nptel.ac.in/courses/106105085/4
2	https://nptel.ac.in/courses/106104128/

(CM304) WEB DESIGNING

1. COURSE OBJECTIVES: In this course students will learn the basic concepts of World Wide Web and protocols of Internet Technology. They will also learn HTML, CSS and JavaScript and create webpages and develop website.

2. PRE-REQUISITES: Basic Engineering Practice (Comp.)

3. TEACHING AND EXAMINATION SCHEME

Semester	**III**	**Periods/Week (in hours)**			**Total Hours**	**Examination Scheme**				
Course code & course title						**Theory Marks**		**Practical Marks**		**Total Marks**
CM304 Web Designing		**L**	**T**	**P**	**H**	**TH**	**TM**	**TW**	**PR/OR**	
		3	1	2	6	75	25	25	25	150

4. COURSE OUTCOMES: On successful completion of the course, the students will be able to:
CM304.CO1: Explain basics of World Wide Web.
CM304.CO2: Write HTML, CSS and JavaScript code.
CM304.CO3: Compare various web technologies for web designing.
CM304.CO4: Design simple web applications.

5. MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
	Basic & Discipline Specific Knowledge	Problem Analysis	Design and Development of Solutions	Engg. Tools, Experimentation & Testing	Engg. Practices for Society, Sustainability & Environment	Project Management	Life -long Learning
CO1	2	0	0	0	1	0	1
CO2	2	2	2	2	1	2	0
CO3	2	1	1	1	0	0	1
CO4	2	2	2	2	1	2	1

Relationship: Low-1 Medium-2 High-3

	PSO1	PSO2
CO1	2	2
CO2	3	3
CO3	2	2
CO4	3	3

6. DETAILED COURSE CONTENTS / MICRO-LESSON PLAN

M=Marks	**Thr= Teaching hours**	**CO = Course Outcomes**		
UNIT		**M**	**Thr**	**CO**
UNIT I	**1 INTRODUCTION TO WORLD WIDE WEB** 1.1 Basics of world wide web 1.2 The Internet and its applications 1.3 Secure Connections 1.4 The Web Browser 1.5 Search Engine 1.6 The concept of a tier 1.6.1 One-tier application 1.6.2 Two-tier application 1.6.3 Three-tier application: Presentation tier, business tier, database tier 1.7 Web Pages 1.7.1 Static Web Pages: Introduction, Advantages and Disadvantages 1.7.2 Dynamic Web Pages: Introduction, Advantages and Disadvantages 1.7.3 Active Web Pages: Introduction, Advantages and Disadvantage	15	9	CO1, CO2, CO3, CO4
UNIT II	**2 DNS, FTP, HTTP AND EMAIL** 2.1 Domain Name System 2.1.1 Name Space: Flat Name Space, Hierarchical Name Space 2.1.2 Domain Name Space: Label, Domain Name, Domain 2.1.3 Distribution of Name Space: Hierarchy of Name Servers, Zone, Root server, Primary and Secondary Servers 2.1.4 DNS in the Internet: Generic Domain, Country Domain, Inverse Domain 2.2 File transfer and Access Using FTP and TFTP 2.2.1 Understanding FTP 2.2.2 FTP Process Model 2.2.3 Trivial File Transfer Protocol 2.3 Hypertext Transfer Protocol 2.3.1 Understanding Uniform Resource Locator(URL) 2.3.2 Understanding HTTP commands: GET, HEAD, PUT, POST, DELETE, LINK, UNLINK 2.4 Electronic Mail 2.4.1 Conceptual Components of an E-mail System 2.4.2 Email address format 2.4.3 Email Services Protocols: Simple Mail Transfer Protocol, Post Office Protocol, Internet Message Access Protocol	15	10	CO1, CO2, CO3, CO4

UNIT III	**3 HTML** 3.1 Introduction to HTML 3.1.1 HTML Tags: Container tag, Standalone tag 3.1.2 HTML Page Structure: Head and Body 3.1.3 Document Structure Tags: <HTML>,<HEAD>, <BASE>, <META>, <LINK>, <SCRIPT>, <TITLE>, <BODY> 3.2 Formatting Tags 3.2.1 Text Formatting Tags: <B>, <BASEFONT>, <BIG>, <FONT>, <I>, <STRIKE>, <SMALL>, <SUB>, <SUP>, <U> 3.2.2 Block Formatting Tags: , <DIV>, <HR>, <H1>….<H6>, <P> 3.3 List Tags 3.3.1 List Item - <LI> 3.3.2 Ordered List - <OL> 3.3.3 Unordered List - <UL> 3.3.4 Definition List - <DL> 3.4 Hyperlink - <A> (Attributes -href, Name, Target) 3.5 Image -<IMG> (Attributes -src, Alt, Width, Height, Border) 3.6 Table 3.6.1 The Table tags: <TABLE>, <CAPTION>, <THEAD>, <TFOOT>, <TBODY>, <COLGROUP>, <COL>, <TR>, <TD>, <TH> 3.6.2 Attributes of <TABLE>tag : border, bordercolor, cellpadding, cellspacing, width, height, bgcolor, background, align, hspace, vspace 3.6.3 Attributes of <TR>tag : align, valign, bgcolor, background, bordercolor 3.6.4 Attributes of <TD>tag : align, valign, width, height, colspan, rowspan, bgcolor, background, bordercolor 3.6.5 Spanning multiple rows and columns :colspan,and rowspan 3.7 Frames 3.7.1 Application of frames 3.7.2 The <FRAMESET> tag 3.7.3 Nesting <FRAMESET> tag 3.7.4 Placing content in frames with the <FRAME> tag (Attributes - src, name, scrolling, noresize, frameborder, bordercolor, marginwidth, marginheight) 3.7.5 Targeting named frames 3.7.6 Creating Floating Frames - <IFRAME> tag (Attributes - align, height, width, name, src, frameborder)	15	10	CO1, CO2, CO3, CO4

	3.8 Forms 3.8.1 Creating Forms- The <FORM> tag (Attributes - url, method, name, target, onSubmit,onReset) 3.8.2 Form Elements: The Input Tag (Attributes – type, name, value, size, maxlength, checked, disabled, readonly), Single line text field, text area (multiline input - <textarea>), password, submit button, reset button, radio-buttons, checkboxes, list boxes (<select> and <option>tags) 3.8.3 Grouping Related Fields (<fieldset> and <legend>tags) 3.8.4 Passing form data (method and action attribute of <form>tag) 3.9 Multimedia (<embed>tag) 3.10 HTML 5 3.10.1 New Input Types in HTML5 - color, date, datetime, datetime-local, email, month, number, range, search, tel, time, url, week			
UNIT IV	**4 CSS** 4.1 Basics of CSS 4.1.1 Understanding the Syntax of CSS 4.1.2 Inserting CSS in an HTML Document: Inline style, Internal style sheet, External style sheet 4.2 CSS Selectors - universal selector, type selector, class selector, id selector, attribute selector 4.3 Font properties in CSS (font-family, font-size, font-size-adjust, font-stretch, font- style, font-variant, font-weight) 4.4 Introducing Web Font 4.5 Text formatting properties, border properties 4.6 Aesthetics with CSS 4.6.1 Using the text shadow property 4.6.2 Gradient Properties 4.6.3 Background of a Web Page 4.6.4 Definitions of CSS Transitions, Transformations, Animations	15	10	CO1, CO2, CO3, CO4
UNIT V	**5 JAVASCRIPT** 5.1 Origin of JavaScript, Advantages of java script, Java script syntax. 5.2 Variables, Data Types, Operators, Literals 5.3 JavaScript Control Statements 5.4 Arrays and Functions 5.5 Dialog Boxes 5.6 Introduction to Objects: object definition, properties, methods 5.7 Core JavaScript built-in objects 5.7.1 Date object: getDate(), setDate()	15	9	CO1, CO2, CO3, CO4

	5.7.2 Math object: max(x,y,z,....,n), min(x,y,z,....,n), pow(x,y), round(x), sqrt(x) 5.7.3 String object: charAt(), concat(), indexOf(), lastIndexOf(), slice(), toUpperCase(), toLowerCase() 5.8 Events and Event Handlers 5.8.1 General information about events 5.8.2 Defining event handlers onclick (), onload(), onsubmit(), onreset())			
	Total	75	48	

7. COURSE DELIVERY:

The Course will be delivered through lectures, class room interactions and exercises.

8. SPECIFICATION TABLE FOR THEORY/ MACRO-LESSON PLAN

Unit No	Unit	Number of lectures	Marks
I	**1 INTRODUCTION TO WORLD WIDE WEB** 1.1 Basics of world wide web 1.2 The internet and its applications 1.3 Secure Connections 1.4 The Web Browser 1.5 Search Engine 1.6 The concept of a tier 1.7 Web Pages	9	15
II	**2 DNS, FTP, HTTP AND EMAIL** 2.1 Domain Name System 2.2 File transfer and Access Using FTP and TFTP 2.3 Hypertext Transfer Protocol 2.4 Electronic Mail	10	15
III	**3 HTML** 3.1 Introduction to HTML 3.2 Formatting Tags 3.3 List Tags 3.4 Hyperlink - <A> (Attributes - href, Name, Target) 3.5 Image - <IMG> (Attributes - src, Alt, Width, Height, Border) 3.6 Table 3.7 Frames 3.8 Forms 3.9 Multimedia (<embed>tag) 3.10 HTML 5	10	15
IV	**4 CSS** 4.1 Basics of CSS 4.2 CSS Selectors 4.3 Font properties in CSS	10	15

	4.4 Introducing Web Font 4.5 Text formatting properties, border properties 4.6 CSS color Modes 4.7 Aesthetics with CSS		
V	**5 JAVASCRIPT** 5.1 Origin of JavaScript, Advantages of java script, Java script syntax. 5.2 Variables, Data Types, Operators, Literals 5.3 JavaScript Control Statements 5.4 Arrays and Functions 5.5 Dialog Boxes 5.6 Introduction to Objects 5.7 Core JavaScript built-in objects 5.8 Events and Event Handlers	9	15
	Total	48	75

9. SPECIFICATION TABLE FOR TERM WORK & PRACTICALS HOURS

S. No	Practical
1	Study of Web Browser and Search Engine
2	Study of Web pages, HTTP and its commands
3	Implement image, hyperlinks and lists tags in HTML
4	Implement table tag in HTML
5	Implement frame and frameset in HTML
6	Design form using HTML
7	Implement inline, internal and external CSS
8	Implement HTML5 tags
9	Implement in-built and event handling JavaScript functions
10	Mini project: Develop Website using HTML, CSS and JavaScript
No	**Tutorial Exercise**
1	At least 2 problems on each unit given above

10. LEARNING RESOURCES

Text Books

S. No.	Author	Title of Books	Publishers
1	Achyut Godbole	Web Technologies	Wesley Publishing Co
2	Behrouz.A.Forouzan	Data Communication and Networking	Mc Graw Hill
3	Kogent Learning Solutions Inc	Web Technologies: HTML, JAVASCRIPT, PHP, JAVA, JSP, ASP.NET, XML and Ajax	Dreamtech Press

Reference Books for further study

S. No.	Author	Title of Books	Publishers
1	Duckett, Jon	Beginning Web Programming with HTML, XHTML, and CSS	Wrox
2	Bhumika S. Zalavadia	Static and Dynamic Webpage Development with HTML, CSS, JavaScript, jQuery, PHP, MySQL and AJAX	Penram International Publishing (India) Pvt.Ltd.

Internet and Web Resources

S. No.	Description
1	https://www.w3schools.com/html/default.asp
2	https://www.tutorialspoint.com/

Videos and Multimedia Tutorials

S. No.	Description
1	https://nptel.ac.in/courses/124107002/18
2	http://www.nptelvideos.in/2012/11/internet-technologies.html

(CM305) COMPUTER LABORATORY-I

1. COURSE OBJECTIVES: In this course the students will learn to design and setup a computer/server room, installation and configuration of computer systems and to diagnose the faults and troubleshoot the computer system.

2. PRE-REQUISITES: NIL

3. TEACHING AND EXAMINATION SCHEME

Semester	III	Periods/Week (in hours)			Total Hours	Examination Scheme				
Course code & course title						Theory Marks		Practical Marks		Total Marks
		L	T	P	H	TH	TM	TW	PR/OR	
CM305 COMPUTER LABORATORY-I		-	1	2	3	-	-	25	50	75

4. COURSE OUTCOMES: Student will be able to:

CM305.CO1: Identify various parts of a computer system.

CM305.CO2: Use various components to assemble a computer system.

CM305.CO3: Devise specification for computer systems.

CM305.CO4: Manage a computer system and its peripherals.

5. MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
	Basic & Discipline Specific Knowledge	Problem Analysis	Design and Development of Solutions	Engg. Tools, Experimentation & Testing	Engg. Practices for Society, Sustainability & Environment	Project Management	Life -long Learning
CO1	2	1	1	0	0	0	1
CO2	2	1	2	2	0	1	1
CO3	2	2	2	2	1	2	1
CO4	2	2	2	2	1	2	1

Relationship: Low-1 Medium-2 High-3

	PSO1	PSO2
CO1	2	1
CO2	3	2
CO3	3	2
CO4	3	2

6. DETAILED COURSE CONTENTS / MICRO-LESSON PLAN

M=Marks	**Thr= Teaching hours**	**CO = Course Outcomes**		
UNIT		**M**	**Thr**	**CO**
UNIT I	**1 PRE-INSTALLATION PLANNING AND INSTALLATION** 1.1 Design of computer room considering factors: Location, Earthing, Computer Room Pollution, Air Room Conditioning, False Flooring and False Ceiling, temperature, humidity, Fire Protection Systems. 1.2 Power Supply: Clean Power Supply, Power Supply Problems, Power Conditioning, Power Supply Characteristics (noise level, Ripple, Efficiency, Rated wattage) 1.2.1 UPS: Types of UPS and working principle 1.2.2 SMPS: working principle, Power Connectors (24-pin ATX, NLX, adapter cables) and color codes	10	6	CO1, CO2, CO3, CO4
UNIT II	**2 PC SYSTEM** 2.1 System Unit 2.1.1 Front Panel Controls 2.1.2 Motherboard: Different Forms of Motherboard, Motherboard and its Components, Rear side Connectors of Motherboard, Motherboard Selection criteria, Form Factors, Expansion Slots: PCI, PCI-E, PCI-Express, PCMCIA 2.2 Display Unit 2.2.1 Types of Displays 2.2.2 Working Principle of Displays 2.3 Input Devices 2.3.1 Keyboard: Types of keyboards, Working Principle 2.3.2 Mouse: Working principle of mice, Different types of mice 2.4 Ports, Cables, Connectors 2.5 USB Connectors and Features	10	8	CO1, CO2, CO3, CO4
UNIT III	**3 UNDERSTANDING MEMORY AND DRIVES** 3.1 Memory: DRAM, SRAM, DIMM DDR1, DDR2, DDR3 3.2 Hard Disk Drive: 3.2.1 Construction: Hard Disk Drive, Sub-	10	6	CO1, CO2, CO3, CO4

	assemblies, Tracks, Sectors, Clusters, Sector Interleaving , Landing Zone 3.2.2 Working of HDD: Reading and Writing operation 3.2.3 Interfaces, Installation 3.3 Types of Optical Drives, Optical Disk 3.4 Installing and Configuring an Optical Drive			
UNIT IV	**4 OTHER PERIPHERAL DEVICES** 4.1 Printers 4.1.1 Types of Printers: Impact and Non-impact printers 4.1.2 Ink-Jet Printer: Working Principle, Advantages and Disadvantages 4.1.3 Laser Printer: Working Principle, Advantages and Disadvantages 4.1.4 Dot Matrix Printer: Working Principle, Advantages and Disadvantages 4.2 Scanner: Working Principle of Scanners 4.3 Modem: Types of Modem	10	6	CO1, CO2, CO3, CO4
UNIT V	**5 MAINTENANCE AND TROUBLESHOOTING** 5.1 Maintenance- Preventive and remedial maintenance 5.1.1 Preventive maintenance –Problem causes, Problem Source, Effects and actions taken for printers, keyboards 5.1.2 General Precautions 5.1.3 Computer faults-Nature –Solid or Intermittent, hardware and Software fault. Customer provided information and its synthesis. 5.2 Troubleshooting 5.2.1 Classical steps to successful troubleshooting 5.2.2 Understanding how components fail 5.2.3 Disk drives failures and troubleshooting 5.2.4 Safety precautions in trouble shooting. 5.2.5 Equipment used in trouble shooting. 5.2.6 Diagnostic software. 5.2.7 POST	10	6	CO1, CO2, CO3, CO4
	Total	50	32	

7. COURSE DELIVERY

The Course will be delivered through practical and exercises.

8. SPECIFICATION TABLE FOR THEORY/ MACRO-LESSON PLAN

Unit No	Unit	Number of lectures	Marks
I	**1 PRE-INSTALLATION PLANNING AND INSTALLATION** 1.1 Design of computer room considering factors 1.2 Power Supply problems, Characteristics	6	10
II	**2 PC SYSTEM** 2.1 System Unit 2.2 Display Unit 2.3 Input Devices 2.4 Ports, Cables, Connectors 2.5 USB Connectors and Features	8	10
III	**3 UNDERSTANDING MEMORY AND DRIVES** 3.1 Memory: DRAM, SRAM, DIMM DDR1, DDR2, DDR3 3.2 Hard Disk Drive 3.3 Types of Optical Drives, Optical Disk 3.4 Installing and Configuring an Optical Drive	6	10
IV	**4 OTHER PERIPHERAL DEVICES** 4.1 Printers 4.2 Scanner 4.3 Modem: Types of Modem	6	10
V	**5 MAINTENANCE AND TROUBLESHOOTING** 5.1 Maintenance- Preventive and remedial maintenance 5.2 Troubleshooting	6	10
	Total	32	50

9. SPECIFICATION TABLE FOR TERM WORK & PRACTICALS HOURS

No	Practical
1	Case study of a computer lab and a server room.
2	Design a computer room for a given need.
3	Study of various types of UPS.
4	Study of SMPS and identifying various voltage levels.
5	Identifying front and rear panel indicators, switches and connectors/ports of a computer system.
6	Study of motherboard.
7	Study of different types of Computer Memory
8	Installation of HDD and CD ROM Drive.
9	Study of different types of Printers.
10	Study of Maintenance of a computer system.
11	Study of different types of computer faults and troubleshooting mechanism.
12	Assembling of a computer system
No	**Tutorial Exercise**
1	At least 2 problems on each unit given above

10. LEARNING RESOURCES

Text Books

S. No.	Author	Title of Books	Publishers
1	B. Govindrajalu	IBM PC and Clones, Hardware, Troubleshooting and Maintenance	Tata McGraw-Hill
2	D Balasubramanian	Computer Installation and Servicing	McGraw-Hill

Reference Books for further study

S. No.	Author	Title of Books	Publishers
1	Robert Bruce Thompson and Barbara Bruce Thompson	Repairing and Upgrading your PC	O'Reilly
2	K. L. James	Computer Hardware: Installation, Interfacing, Troubleshooting and Maintenance	PHI Learning

Internet and Web Resources

S. No.	Description
1	https://www.tutorialspoint.com/computer_fundamentals/computer_hardware.html
2	Nji.gov.ng/images/Workshop_Papers/2017/IT_Workshop/s3.pdf

Videos and Multimedia Tutorials

S. No.	Description
1	Computer Basics Hardware – https://www.youtube.com/watch?v=ctAVC2JwEwl

(CC309) DIGITAL ELECTRONICS

1. COURSE OBJECTIVES:

The students need to learn basic concepts of digital circuits and system which leads to design of complex digital system such as microprocessors.

The students need to know combinational and sequential circuits using digital logic fundamentals. This is the first course by which students get exposure to digital electronics world.

The students will able to

1. To understand various number representations and conversion between different representation in digital electronic circuits.
2. To introduce the students to various logic gates, SOP, POS and their minimization techniques.
3. To analyze logic processes and implementation of logical operations using combinational logic circuits.
4. To understand, analyze and design sequential circuits

2. TEACHING AND EXAMINATION SCHEME

Semester	III								
Course code & course title		Periods/Week (in hours)			Total Hours	Examination Scheme			
						Theory Marks		Practical Marks		Total Marks
Digital Electronics CC309		L	T	P	C	TH	TM	TW	PR/OR	
		03	-	02	05	75	25	25	25	150

3. COURSE OUTCOMES:

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

CO1: Relate the knowledge of Number Systems in Digital Applications.

CO2: Build different Sequential and Combinational Circuits.

CO3: Simplify logical problems using digital circuits.

CO4: Develop basic digital electronics circuits.

.

4. Mapping Course Outcomes with Program Outcomes

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
	Basic & Discipline Specific Knowledge	Problem Analysis	Design and Development of Solutions	Engg. Tools, Experimentation & Testing	Engg. Practices for Society, Sustainability & Environment	Project Management	Life -long Learning
CO1	3	2	3	3	0	0	3
CO2	3	3	3	3	3	3	3
CO3	3	3	3	3	3	0	3
CO4	3	3	3	3	2	2	3

Relationship: Low-1 Medium-2 High-3

	PSO1	PSO2
CO1	3	2
CO2	3	2
CO3	3	2
CO4	3	2

5. DETAILED COURSE CONTENTS / MICRO-LESSON PLAN

M = Marks	**Thr = Teaching hours**	**CO = Course Objectives**	

Unit	**M**	**Thr**	**CO**
1 Number System	**14**	**09**	**CO1**
1.1 **Digital and Analog Signals**. Definition of digital and analog signals, Comparison between Analog and Digital signals			
1.**2 Number System**:- Decimal, Binary, Hexadecimal. Introduction to Decimal, Binary and Hexadecimal Number Systems. Counting in each system. Conversion from one system to other.			
1.3 Codes:- introduction and importance of Codes. BCD code, GRAY code conversion of Gray to Binary, Binary to Gray, BCD to binary and Binary to BCD. Represent Decimal Numbers in BCD and Gray codes. ASCII code and its importance.			
1.4 Binary Addition (upto 4 bits), 1's complement of a Binary number, 2's complement of a Binary number. Binary Subtraction using 2's complement method. Addition of signed decimal numbers.			
2Combinational Circuits	**19**	**12**	**CO1,CO2,CO3**
2.1 Logic Gates:- Symbol, Expression and Truth Tables of Basic gates(AND,OR,NOT) and Combinational gates(NOR,NAND,EXOR,EXNOR).			
2.2 Boolean Algebra:- DeMorgan's Theorems, Laws of Boolean Algebra , Duality Theorem,			
2.3Simplification of Boolean Expressions using Boolean Algebraic laws and by using K-Maps Techniques (upto 4 Variables in SOP Form),			
2.4 Universal Gates:- Implementation of NOT,OR,AND,EXOR gates using NOR and NAND Gates			
2.5Adders:- Half Adder circuit using logic gates , Full Adder circuit using logic gates, block diagram of 4 bit parallel adder. Subtractors:- Half subtractor circuit using logic gates, Full			

Subtractor using logic gates			
2.6Combinational circuits:- Block diagram and Implementation using basic gates:- Multiplexers(4 to 1), Demultiplexer(1 to 4), Encoder (4 to 2), Decoder(2 to 4). BCD to 7 segment Decoder driver (Common Cathode).			
3 Flip Flops	**12**	**08**	**CO1,CO2,**
3.1 Definition of FlipFlop. Applications. Symbol, Truth Tables, Operation and timing diagrams of RS F/F using NAND gates. ,			
3.2 Symbol, Truth Tables, Operation and timing diagrams of clocked RS F/F using NAND Gates, Concept of Asynchronous inputs(Preset and Clear)			
3.3 Symbol, Truth Tables, Operation of Clocked D F/F			
3.4 Symbol, Truth Tables, Operation of Clocked JK F/F, Excitation table of JK flip flop			
3.5 Race around condition in JK F/F. Symbol, Truth Tables, Operation of JK master slave F/F.			
3.6 Symbol, Truth Tables, Operation of T F/F,			
4 Registers And Counters	**19**	**12**	**CO1,CO2,CO4**
4.1 Registers: Definition of Shift Registers, Applications of Registers Symbols and Logic block diagram of SISO,SIPO,PISO and PIPO Registers,			
4.2 Serial IN Serial Out Register (size of the register 4 bits) Logic Diagram and Operation of SISO Register using negative edge triggered D F/F along with the Truth Table and Timing diagrams			
4.3 Serial IN Parallel Out Register (size of the register 4 bits) Logic Diagram and Operation of SIPO Register using negative edge triggered D F/F along with the Truth Table and Timing diagrams.			
4.4 Parallel IN Serial Out Register (size of the register 4 bits) Logic Diagram and Operation of PISO Register using negative edge triggered D F/F along with the Truth Table and Timing diagrams			
4.5 Parallel In Parallel Out Register (size of the register 4 bits) Logic Diagram and Operation of PISO Register using negative edge triggered D F/F along with the Truth Table and Timing diagrams . Concept of Shift right, Shift left, Ring Counter.			
4.6 Counters: Introduction to counters, Modulus of			

counters. Count sequence, No of Flip Flops required for Specified counters			
4.7 Asynchronous Counters:- 4 bit UP counter using JK Flip Flops only and 4 bit DOWN counter using JK Flip Flops only.			
4.8 Synchronous Counters:- 4 bit UP counter using JK Flip Flops only and 4 bit DOWN counter using JK Flip Flops only, Decade (Mod 10) using JK Flip Flops only			
4.9 Design of Synchronous counters(upto 4 bit) using only JK Flip Flops			
5 DAC and ADC and Memories	**11**	**7**	**CO1,CO4**
5.1 Definitions, Types of DAC and ADC(no Description),Applications		1	
5.2 Binary Ladder Network for DAC:- Logic circuit and operation. Simple numerical problems Successive Approximation ADC .:- Logic circuit and operation. Simple numerical problems.		4	
5.3Memories: Introduction, Semiconductor memories and its types –ROM,RAM,PROM, EPROM,EEPROM(only definition and applications)		2	
Total	**75**	**48**	

6. COURSE DELIVERY:

The Course will be delivered through lectures, class room interactions, exercises and case studies

7. SPECIFICATION TABLE FOR THEORY/ MACRO-LESSON PLAN

Unit No	Unit	Number of lectures	Marks
1	**Number System**	09	14
2	**Combinational Circuits**	12	19
3	**Flip FLops**	08	12
4	**Registers And Counters**	12	19
5	**DAC and ADC**	07	11
	Total	48	75

8. SPECIFICATION TABLE FOR TERM WORK & PRACTICALS HOURS

No	Practical (Perform any 8)	Marks
1.	Verification of Logic gates and Demorgan's Theorems	
2.	Universal gates (NAND and NOR)	
3.	Verification of Boolean Expression	
4.	Half Adder and Full Adder using logic gates	
5.	Half Subtractor and Full Subtractor using logic gates	

6.	MUX and D-MUX	
7.	RS F/F, D F/F and JK F/F	
8.	Assemble and Test Binary Counter/Decade counter	
9.	Assemble and test DAC using DAC0808	
10.	Assemble and test ADC using ADC0808	
	Total	25
...		
No	Class room Assignments	
	At least 2 assignments	
No	**Tutorial Exercise**	**Marks**
1	NIL	
...	Total	

9. LEARNING RESOURCES

Text Books

S. No.	Author	Title of Books	Publishers
1	R.P.Jain,	Modern Digital Electronics	Fourth Edition, Tata McGraw-Hill Education.
2	Malvino & Leach,	Digital Principles and Applications	Seventh Edition, McGraw-Hill Education

Reference Books for further study

S. No.	Author	Title of Books	Publishers
1	Thomas L. Floyd,	Digital Fundamentals	10th Edition, Pearson Education Inc, 2011
2	. By A.K. Maini,	Digital Electronics: Principles and Integrated Circuits	Wiley India Publications