



Srishyla Educational Trust (R), Bheemasamudra
GM INSTITUTE OF TECHNOLOGY, DAVANGERE



DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

(Accredited by NBA , New Delhi (Valid upto 30.06.2022))

Academic Year: 2020-2021

(ODD Sem)

Presentation of Allotted Subject

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Academic Year : 2020-21

SUB CODE	SUBJECT NAME	SHORT	NAME OF THE FACULTY
18MAT31	ENGINEERING MATHEMATICS - III	MAT-III	DR.SRIKANTH
18CS32	DATA STRUCTURES AND APPLICATIONS	DS	SANDEEPA G S
18CS33	ANALOG AND DIGITAL ELECTRONICS	ADE	ARUNA KUMAR B T
18CS34	COMPUTER ORGANIZATION	CO	KOTRESHI S N
18CS35	SOFTWARE ENGINEERING	SE	SUSHMA S G
18CS36	DISCRETE MATHEMATICAL STRUCTURES	DMS	NIRANJAN MURTHY C
18CSL37	ANALOG AND DIGITAL ELECTRONICS LABORATORY	ADEL	ARUNA KUMAR B T
18CSL38	DATA STRUCTURES LABORATORY	DSL	SANDEEPA G S
18KL39	KANNADA	KAN	DEEPA

SUB CODE	SUBJECT NAME	SHORT	NAME OF THE FACULTY
18CS51	MANAGEMENT AND ENTERPRENUERSHIP FOR IT	M&E	ARUNA KUMAR B T
18CS52	COMPUTER NETWORKS	CN	KOTRESHI S N
18CS53	DATABASE MANAGEMENT SYSTEM	DBMS	DR.MOUESHACHARI S
18CS54	ATOMATA THEOREY AND COMUTABILITY	ATC	SANTOSHKUMAR M
18CS5	APPLICATION DEVT USING PYTHON	APT	MARUTHI S T
18CS55	UNIX PROGRAMMING	UP	SUSHMA S G
18CSL57	COMPUTER NETWORKS LABORATORY	CNL	KOTRESHI S N
18CSL58	DBMS LAB & MINI PROJECT	DBMSL	DR.MOUNESHACHARI S
CIV59	ENVIRONMENTAL STUDIES	ES	

SUB CODE	SUBJECT NAME	SHORT	NAME OF THE FACULTY
17CS71	WEB TECH. & IT'S APPLICATIONS	WT	NIRANJAN M C
17CS72	ADVANCED COMPUTER ARCHITECTURE	ACA	RUDRESH N C
17CS73	MACHENE LEARNING	ML	SANTOSHKUMAR M
17CS743	INFORMATION & NETWORK SECURITY	INS	SHIVANNA K
17CS754	STORAGE AREA NETWORK	SAN	SANDDEPA G S
17CSL76	MACHENE LEARNING LAB	MLL	SANTOSHKUMAR M
17CSL77	WEB TECH. LAB WITH MINI PROJECT	WTL	NIRANJAN M C

**Subject: Data Structures And
Applications
Subject Code: 18CS32**

**SANDEEPA G S
Asst Professor, Dept of CSE
GMIT**

Syllabus

- Syllabus
- Objectives
- Fundamental background
- New topics which student can learn
- Activities
- E-resources/links/material availability/ experiments
- Mini project
- Question bank
- Module outcomes
- Consolidated outcomes, CO-PO mapping with Justification
- Components/ materials/ software required for lab

Module-1: Introduction

- **Introduction:** Data Structures, Classifications (Primitive & Non Primitive), Data structure Operations, Review of Arrays, Structures, Self-Referential Structures, and Unions. Pointers and Dynamic Memory Allocation Functions. Representation of Linear Arrays in Memory, Dynamically allocated arrays,
- **Array Operations:** Traversing, inserting, deleting, searching, and sorting. Multidimensional Arrays, Polynomials and Sparse Matrices.
- **Strings:** Basic Terminology, Storing, Operations and Pattern Matching algorithms. Programming Examples
- **Module Outcome:** CO1, CO4

Learning Outcomes:

At the end of the module student should be able to:

1. **Explain** fundamentals of data structures and their applications essential for programming/problem solving
2. **Demonstrate** the working of arrays and develop programs illustrating the array operations.
3. **Demonstrate** the working of Strings and develop programs illustrating the string operations.

Module-2: Stacks and Queues

- **Stacks:** Definition, Stack Operations, Array Representation of Stacks, Stacks using Dynamic Arrays, Stack Applications: Polish notation, Infix to postfix conversion, evaluation of postfix expression,
- **Recursion** - Factorial, GCD, Fibonacci Sequence, Tower of Hanoi, Ackerman's function.
- **Queues:** Definition, Array Representation, Queue Operations, Circular Queues, Circular queues using Dynamic arrays, Dequeues, Priority Queues, A Mazing Problem. Multiple Stacks and Queues. Programming Examples.
- **Module Outcome:** CO2, CO3, CO4

Learning Outcomes:

At the end of the module student should be able to:

1. **Demonstrate** the working of stacks and **apply** stack operations to solve real world problems.
2. **Develop** programs using recursion.
3. **Demonstrate** the working of different types of queues and **develop** programs based on queues.
4. **Assess** appropriate data structure during program development/Problem Solving

Module-3: Linked Lists

- **Linked Lists:** Definition, Representation of linked lists in Memory, Memory allocation; Garbage Collection. Linked list operations: Traversing, Searching, Insertion, and Deletion. Doubly Linked lists, Circular linked lists, and header linked lists. Linked Stacks and Queues. Applications of Linked lists – Polynomials, Sparse matrix representation. Programming Examples
- **Module Outcome: CO2, CO3, CO4**

Learning Outcomes:

At the end of the module student should be able to:

1. **Explain** the basic representation and operations of linked list.
2. **Demonstrate** the working of different types of linked lists (Single, Double, Circular)
3. **Develop** applications which use linked lists as data structure.
4. **Assess** appropriate data structure during program development/Problem Solving

Module-4: Trees

- **Trees:** Terminology, Binary Trees, Properties of Binary trees, Array and linked Representation of Binary Trees, Binary Tree Traversals - Inorder, postorder, preorder; Additional Binary tree operations. Threaded binary trees, Binary Search Trees – Definition, Insertion, Deletion, Traversal, Searching, Application of Trees-Evaluation of Expression, Programming Examples
- **Module Outcome:** CO2, CO3, CO4

Learning Outcomes:

At the end of the module student should be able to:

1. **Explain** the basic representation and operations of trees.
2. **Demonstrate** the working of different types of trees.
3. **Develop** applications which use trees as data structure.

Module-5: Graphs

- **Graphs:** Definitions, Terminologies, Matrix and Adjacency List Representation Of Graphs, Elementary Graph operations, Traversal methods: Breadth First Search and Depth First Search.
- **Sorting and Searching:** Insertion Sort, Radix sort, Address Calculation Sort.
- **Hashing:** Hash Table organizations, Hashing Functions, Static and Dynamic Hashing.
- **Files and Their Organization:** Data Hierarchy, File Attributes, Text Files and Binary Files, Basic File Operations, File Organizations and Indexing
- **Module Outcome:** CO2, CO3, CO4

Learning Outcomes:

At the end of the module student should be able to:

1. Explain the basic representations and operations of graphs.
2. Demonstrate the working of different types of graphs.
3. Illustrate the working of different traversal methods.
4. Develop applications which use trees as data structure.
5. Analyze and Evaluate the sorting & searching algorithms
6. Demonstrate the working of different type of hashing techniques.
7. Explain the properties of files and their organization.

Text books and References

Text Books:

1. Fundamentals of Data Structures in C - Ellis Horowitz and Sartaj Sahni, 2nd edition, Universities Press, 2014
2. Data Structures - Seymour Lipschutz, Schaum's Outlines, Revised 1st edition, McGraw Hill, 2014

Reference Books:

1. Data Structures: A Pseudo-code approach with C –Gilberg & Forouzan, 2nd edition, Cengage Learning, 2014.
2. Data Structures using C, , Reema Thareja, 3rd edition Oxford press, 2012.
3. An Introduction to Data Structures with Applications- Jean-Paul Tremblay & Paul G. Sorenson, 2nd Edition, McGraw Hill, 2013.
4. Data Structures using C - A M Tenenbaum, PHI, 1989.
5. Data Structures and Program Design in C - Robert Kruse, 2nd edition, PHI, 1996.

Course objectives:

This course will enable students to

- Explain fundamentals of data structures and their applications essential for programming/problem solving
- Analyze Linear Data Structures: Stack, Queues, Lists
- Analyze Non-Linear Data Structures: Trees, Graphs
- Analyze and Evaluate the sorting & searching algorithms
- Assess appropriate data structure during program development/Problem Solving

Course Outcomes

After studying this course, students will be able to:

- CO1: Acquire knowledge of
 - Various types of data structures, operations and algorithms.
 - Sorting and searching operations.
 - File structures.
- CO2: Analyse the performance of
 - Stack, Queue, Lists, Trees, Graphs, Searching and Sorting techniques.
- CO3: Implement all the applications of Data structures in a high-level language.
- CO4: Design and apply appropriate data structures for solving computing problems.

CO-PO Mapping

SUBJECT NAME: DATA STRUCTURES AND APPLICATIONS

SUBJECT CODE:
18CS32

Course Outcomes	Program Outcomes												Program Specific Outcomes			
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3	
202																
202.1	3	3	3	3	2	1	0	0	1	1	2	3	2	3	3	
202.2	3	3	3	3	2	1	0	0	1	1	2	3	2	3	3	
202.3	3	3	3	3	2	1	0	0	1	1	2	3	1	2	1	
202.4	3	3	3	3	2	1	0	0	1	1	2	3	3	3	3	
Total	3	3	3	3	3	1	0	0	1	1	2	3	3	3	3	

1: LOW

2: MODERATE

3: HIGH

Fundamental Background

Prerequisites:

- Basic Mathematics
- C – language
- Problem solving skills

How to study?

- A good algorithm usually comes together with a set of good data structures that allow the algorithm to manipulate the data efficiently.
- A good programmer should have a thorough understanding of data structures.
- Understanding the representation of different data structures is important.
- Data structures can be understood only when you implement them using a programming language.
- How to become expert- Using data structures to develop programs which solve real world problems.

Activities

Solving Tower of Hanoi puzzle using props

- Team size: 1
- Learning: Recursion, problem solving technique, Algorithms
- A special prize will be given to the student who solves the puzzle with minimum time.

Infix, prefix and postfix – Roleplay of solving arithmetic expressions

- Team Size: 4
- Learning: Applications of stack

Activities

Tree application : Chain marketing

- Students will be given the scenario of a chain marketing business. They have to come up with a solution using tree data structures.
- Solution should include addition and deletion of customers.

What is the gist of this subject?

- Use of data structures to solve real world problems efficiently.
- No application can be developed without the use of data structures.
- Identifying appropriate data structures for a particular application.

E-resources/links/material availability/ experiments

- NPTEL Data Structures and Algorithms Course
link : <http://nptel.ac.in/courses/106102064/>
- VTU resources link:
<https://www.vturesource.com/vtu-question-papers/CS/2015/15CS33/Data-Structures-and-Applications>



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Analog and Digital Electronics (18CS33)



Aruna Kumar B T
Asst. Professor, Dept. of CSE

Contents



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- New topics which student can learn
- Activities
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- Question bank
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Module-1

- To study basics of analog and digital systems.
- Photodiodes, Light Emitting Diodes and Opto couplers ,BJT Biasing :Fixed bias ,Collector to base Bias , voltage divider bias.
- Operational Amplifier Application Circuits: Multivibrators using IC-555,
- Peak Detector, Schmitt trigger, Active Filters, Non-Linear Amplifier, Relaxation Oscillator.
- Current-to -Voltage Converter, Voltage-to-Current Converter, Regulated Power Supply Parameters.
- Adjustable voltage regulators, D to A and A to D converters.

Module Outcome: CO1

Learning Outcomes:

At the end of the module student should be able to:

1. Differentiate between analog and digital circuits.
2. Construction & working of Photodiodes, Light Emitting Diodes and Opto couplers ,BJT Biasing :Fixed bias ,Collector to base Bias , voltage divider bias.
3. Explain the working of Peak Detector, Schmitt trigger, Active Filters, Non-Linear Amplifier, Relaxation Oscillator,
4. Block diagram and working of Multivibrators using IC-555
4. Working of LED, Photodiode and Opto couplers.
5. Construction & working of Current-to -Voltage Converter, Voltage-to-Current Converter, Regulated Power

Module-2



- Karnaugh maps: minimum forms of switching functions, two and three variable Karnaugh maps, four variable karnaugh maps,
- Determination of minimum expressions using essential prime implicants,
- Quine-McClusky Method: determination of prime implicants, The prime implicant chart, petricks method.
- simplification of incompletely specified functions, simplification using map-entered variables

Module Outcome : CO2

Learning Outcomes:

At the end of the module student should be able to:



1. *Diference* between combinational and sequential circuits.
2. *Solve* the given expression SOP and POS forms.
3. *Simplify* the given expression using K-Map.
- 4 *Simplify* the given expression using Quine Mc-Clusky Method.
5. *Simplification* of an expression using Petriks method.
6. *Explain* Hazard and Hazard covers.

Module 3



- Combinational circuit design and simulation using gates: Review of Combinational circuit design.
- Design of circuits with limited Gate Fan-in, Gate delays and Timing diagrams, Hazards in combinational Logic, simulation and testing of logic circuits.
- Multiplexers, Decoders and Programmable Logic Devices: Multiplexers, three state buffers, decoders and encoders,
- Programmable Logic devices, Programmable Logic Arrays, Programmable Array Logic.

Module Outcome: CO3

Learning Outcomes:

At the end of the module student should be able to:



1. *Define* Multiplexer, with diagram Explain 1:16 multiplexer.
2. *What* are Decoders. Explain different types of decoders.
3. *Design* of circuits with limited Gate Fan-in, Gate delays and Timing diagrams.
4. *Explanation* of Hazards in combinational Logic, simulation and testing of logic circuits.
5. *Write* a program HDL Implementation of Data Processing Circuits
6. With neat diagram *explain* Programmable Logic Arrays.
7. *Difference* between PLA and PAL.

Module-4



- Introduction to VHDL: VHDL description of combinational circuits.
- VHDL Models for multiplexers, VHDL Modules. Latches and Flip-Flops: Set Reset Latch.
- Gated Latches, Edge-Triggered D Flip Flop 3,SR Flip Flop.
- J K Flip Flop, T Flip Flop.
- Flip Flop with additional inputs, Asynchronous Sequential Circuits.

Module Outcome: CO4

Learning Outcomes:



At the end of the module student should be able to:

- *What* is Flip-flop? Explain JK Master-slave Flip-flop.
- *Explain* VHDL Models for multiplexers, VHDL Modules. Latches and Flip-Flops: Set Reset Latch.
- *Design* Gated Latches, Edge-Triggered D Flip Flop 3,SR Flip Flop.
- *Explain* construction of J K Flip Flop, T Flip Flop.
- *Design & Explain* Flip Flop with additional inputs, Asynchronous Sequential Circuits.

Module-5



- Registers and Counters: Registers and Register Transfers, Parallel Adder with accumulator.
- Shift registers, design of Binary counters, counters for other sequences, counter design using SR and J K Flip Flops.
- Sequential parity checker, state tables and graphs.

Module Outcome: CO5

Learning Outcomes:



At the end of the module student should be able to:

- *Explain* Registers and their working.
- *Explain* Parallel Adder with accumulator.
- *Working* of an Shift registers, design of Binary counters, counters for other sequences,
- *Design* counter using SR and J K Flip Flops.
- *Explain* Sequential parity checker, state tables and graphs.

Text books and References



Text Books:

1. Charles H Roth and Larry L Kinney, Analog and Digital Electronics, Cengage Learning, 2019

Reference Books:

1. Anil K Maini, Varsha Agarwal, Electronic Devices and Circuits, Wiley, 2012.
2. Donald P Leach, Albert Paul Malvino & Goutam Saha, Digital Principles and Applications, 8th Edition, Tata McGraw Hill, 2015.
3. M. Morris Mani, Digital Design, 4th Edition, Pearson Prentice Hall, 2008.
4. David A. Bell, Electronic Devices and Circuits, 5th Edition, Oxford University Press, 2008

Course objectives



This course will enable students to :

- Explain the use of photoelectronics devices, 555 timer IC, Regulator ICs and uA741 opamp IC
- Make use of simplifying techniques in the design of combinational circuits.
- Illustrate combinational and sequential digital circuits
- Demonstrate the use of flipflops and apply for registers
- Design and test counters, Analog-to-Digital and Digital-to-Analog conversion techniques.

Course Outcomes

- After studying this course, students will be able to:
- CO1: Design and analyze application of analog circuits using photo devices, timer IC, power supply and regulator IC and op-amp.
 - CO2: Design and analyze application of analog circuits using photo devices, timer IC, power supply and regulator IC and op-amp.
 - CO3: Simplify digital circuits using Karnaugh Map , and Quine-McClusky Methods.
 - CO4: Explain Gates and flip flops and make us in designing different data processing circuits, registers and counters and compare the types.
 - CO5: Develop simple HDL programs

CO-PO Mapping

SUBJECT NAME: ANALOG AND DIGITAL ELECTRONICS

SUBJECT CODE:
18CS32

Course Outcomes	Program Outcomes												Program Specific Outcomes			
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3	
202																
202.1	3	3	3	3	1	1	1	0	0	0	0	3	1	2	3	
202.2	3	3	3	3	1	1	1	0	0	0	0	3	1	3	3	
202.3	3	3	3	3	1	1	1	0	0	0	0	3	1	3	3	
202.4	3	3	3	3	1	1	1	0	0	0	0	3	1	2	1	
Total	3	3	3	3	1	1	1	0	0	0	0	3	3	3	3	

1: LOW

2:
MODERATE

3: HIGH

Fundamental Background



Prerequisites:

- Basic Electronics.
- Digital Logic, Logic gates, Boolean algebra.
- Semiconductors, Transistors, Diodes, Capacitors.
- Flip-Flops, Registers and Counters.

How to study



- Study the basics of electronics.
- Understand the concept of analog and digital systems
- Understand the definition.
- Work out number of small problems from various other books.
- Refer VTU syllabus and question paper.
- Follow the prescribed Textbook and Reference books.

Activities

1. For every module Class room test & MCQ Test will be conducted ,
2. Poster presentation conducted batch wise.

Participants: All students of class

What is the gist of this subject?

- To think logically and design Digital logic circuits and their applications.
- To write HDL code for designing logic circuits.
- Designing of logic circuits for Embedded systems.
- Designing circuits for various automation applications.
- Designing HDL/VHDL, VLSI and Programmable logic controllers(PLC's)

E-resources/links/material availability/ experiments

- <http://www.nptelvideos.in/search?q=analog+and+digital+electronics>
- <https://www.vtresource.com/2011/01/trusted-security.html>

Subject: Computer Organization
Subject Code: 18CS34

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Contents

- Syllabus
- Objectives
- Fundamental background
- New topics which student can learn
- Activities
- E-resources/links/material availability/ experiments
- Mini project
- Question bank
- Module outcomes
- Consolidated outcomes, CO-PO mapping with justification
- Components/ materials/ software required for lab
- Scope

Course Objectives

- Explain the basic sub systems of a computer, their organization, structure and operation.
- Illustrate the concept of programs as sequences of machine instructions.
- Demonstrate different ways of communicating with I/O devices and standard I/O interfaces.
- Describe memory hierarchy and concept of virtual memory.
- Describe arithmetic and logical operations with integer and floating-point operands.
- Illustrate organization of a simple processor, pipelined processor and other computing systems.

Course Outcomes

Students will be able to

- **CO1:** Explain the basic organization of a computer system.
- **CO2:** Demonstrate functioning of different sub systems, such as processor, Input/output, and memory.
- **CO3:** Illustrate hardwired control and micro programmed control. pipelining, embedded and other computing
- **CO4:** Build simple arithmetic and logical units.

Module-1: Basic Structure of Computers

Basic Operational Concepts, Bus Structures, Performance – Processor Clock, **Basic Performance Equation**, Clock Rate, Performance Measurement.

Machine Instructions and Programs: Memory Location and Addresses, Memory Operations, Instructions and Instruction Sequencing, Addressing Modes, Assembly Language,

Basic Input and Output Operations, Stacks and Queues, Subroutines, Additional Instructions, Encoding of Machine Instructions

Module-1: Learning Outcomes

Student will be able to

- Define Terminologies like-computer, clock, clock rate, performance equation, instructions.
- Calculate performance of a computer using Basic performance equation.
- Discuss various addressing modes.
- Describe the basics of instructions for a computer architecture.

Module-2: I/O Organization

Input/Output Organization: Accessing I/O Devices, Interrupts – Interrupt Hardware, Enabling and Disabling Interrupts, Handling Multiple Devices, Controlling Device Requests, Exceptions, **Direct Memory Access**, Buses Interface Circuits, **Standard I/O Interfaces** – PCI Bus, SCSI Bus, USB.

Module-2: Learning Outcomes

Student will be able to

- Define hardware and software interrupts.
- Analyse Interrupt handling mechanisms
- Describe Direct Memory Access(DMA)
- Differentiate between Serial and Parallel Standard I/O interfaces.

Module-3:Memory System

Basic Concepts, Semiconductor **RAM** Memories, **Read Only Memories**, Speed, Size, and Cost, **Cache** Memories – Mapping Functions, Replacement Algorithms, **Performance Considerations**, **Virtual Memories**, **Secondary Storage**.

Module-3: Learning Outcomes

Student will be able to

- Define the heirarchy of memory RAM, ROM, Cache Memories.
- Calculate Memory perofrmance.
- Demonstrate Page replacement algorithms.
- Discuss about the virtual memories

Module-4: Arithmetic

Numbers, Arithmetic Operations and Characters, Addition and Subtraction of Signed Numbers, Design of Fast Adders, Multiplication of Positive Numbers, Signed Operand Multiplication, Fast Multiplication, Integer Division, Floating-point Numbers and Operations.

Module-4: Learning Outcomes

Student will be able to

- Use 2's complement for representation of integers in computers.
- Design adders for computers.
- Perform signed operand multiplication using Booth algorithm.
- Calculate Division of integer numbers at bit level.
- Understand IEEE representation of floating point numbers.

Module-5: Basic Processing Unit

Some Fundamental Concepts, Execution of a Complete Instruction, Multiple Bus Organization, **Hard-wired Control, Micro programmed Control**. Pipelining, Embedded Systems and Large Computer Systems: Basic Concepts of **pipelining**,

Module-5: Learning Outcomes

Student will be able to

- Demonstrate the stepwise execution of an instruction inside a computer.
- Understand hardwired and microprogrammed control in execution of an instruction.
- Analyse role of multi processor and pipelining in execution of an instruction.

Text books and References

Text Books:

1. Carl Hamacher, Zvonko Vranesic, Safwat Zaky: Computer Organization, 5th Edition, Tata McGraw Hill, 2002. (Listed topics only from Chapters 1, 2, 4, 5, 6, 7, 8, 9 and 12)

Reference Books:

1. William Stallings: Computer Organization & Architecture, 9th Edition, Pearson, 2015.

CO-PO Mapping

SUBJECT NAME: COMPUTER ORGANIZATION

SUBJECT CODE:
18CS34

Course Outcomes	Program Outcomes												Program Specific Outcomes			
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3	
302																
302.1	3	3	2	2	1		2		1	1		3		3	2	
302.2	3	3	2	2	1		2		1	1		3		3	2	
302.3	3	3	3	2	1		2		1	1		3		3	2	
302.4	3	3	3	2	1		2		1	1		3		3	2	
Total	3	3	3	2	1		2		1	1		3		3	2	

1: LOW

2: MODERATE

3: HIGH

Fundamental Background

Prerequisites:

- Basics of Computer and its applications
- Definitions of interrupts, instructions, compiler, Memories(RAM,ROM).
- Usage of Input output Devices.
- Binary Mathematics - BCD, 2's compliment, arithmetic and logical operations.

How to study

- Computer Organization is all about architectural basics of a computer. It helps reader to understand the execution of their program inside a computer machine.
- First it introduces with computer components, computer performance measure.
- It also helps in analysing Instruction Architecture (Assembly Language, instructions, addressing modes) and execution of instructions.
- Need of I/O devices and their working (accessing) procedure in computer.
- The role of Memory hierarchy in execution of a program. The memory architectures, performance measure are discussed in this subject.
- It also discusses about the design aspects for arithmetic operations in the computer- adders, multiplication, division for both integers and floating point numbers.
- Finally it helps reader to understand the stepwise execution of different instructions.

Activities

1. Chart preparation for each Modules

- Learning: Summary of each module is depicted in a chart.

2. Quiz competition.

- Learning: It tests students knowledge about the subject.

3. Assignments:

- Learning: some case studies, old question paper questions will help students to better understand subject.

4. Role play:

- Learning: Micro programming control and hardwired control is demonstrated by a role play. So that students will learn the concept by dramatical movements.

What is the gist of this Course?

- Components of Computer and comparing performance of computers
- Instruction set architecture - Instruction types, addressing modes and execution of an instruction.
- I/O devices- interrupts, multiple device interrupts handling, DMA, standard I/O interfaces- serial/parallel.
- Memory heirarchy, organization, performance measure, page replacement.
- Design of Adder circuits, Booth algorithm for multiplication, integer division, IEEE floating point handling.
- Micro program control / hardwired control in execution of an instruction

Scope of Course

- Helps programmer in understanding execution of program in a computer.
- To build a new computer architectures.
- To write assembly program.

E-resources/links/material availability/ experiments

- NPTEL course videos. (
www.onlinecourses.nptel.com)
- **My materials and updates**
- www.nskgmit.blogspot.in
- <https://sites.google.com/gmit.ac.in/18cs34/about-course>

Subject: Computer Organization
Subject Code: 18CS34

Kotreshi S N
 Asst Professor, Dept of CSE
 GMIT, Davangere

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- **CO4:** Build simple arithmetic and logical units.

Module-1: Basic Structure of Computers

Basic Operational Concepts, Bus Structures, Performance – Processor Clock, **Basic Performance Equation**, Clock Rate, Performance Measurement.

Machine Instructions and Programs: Memory Location and Addresses, Memory Operations, Instructions and Instruction Sequencing, Addressing Modes, Assembly Language,

Basic Input and Output Operations, Stacks and Queues, Subroutines, Additional Instructions, Encoding of Machine Instructions

Module-1: Learning Outcomes

Student will be able to

- Define Terminologies like-computer, clock, clock rate, performance equation, instructions.
- Calculate performance of a computer using Basic performance equation.
- Discuss various addressing modes.
- Describe the basics of instructions for a computer architecture.

Module-2: I/O Organization

Input/Output Organization: Accessing **I/O Devices**, Interrupts – **Interrupt Hardware**, Enabling and Disabling Interrupts, Handling Multiple Devices, Controlling Device Requests, Exceptions, **Direct Memory Access**, Buses Interface Circuits, **Standard I/O Interfaces** – PCI Bus, SCSI Bus, USB.

Module-2: Learning Outcomes

Student will be able to

- Define hardware and software interrupts.
- Analyse Interrupt handling mechanisms
- Describe Direct Memory Access(DMA)
- Differentiate between Serial and Parallel Standard I/O interfaces.

Module-3:Memory System

Basic Concepts, Semiconductor **RAM** Memories, **Read Only Memories**, Speed, Size, and Cost, **Cache Memories** – Mapping Functions, Replacement Algorithms, **Performance Considerations**, **Virtual Memories**, **Secondary Storage**.

Module-3: Learning Outcomes

Student will be able to

- Define the heirarchy of memory **RAM**, **ROM**, **Cache Memories**.
- Calculate Memory perofrmance.
- Demonstrate Page replacement algorithms.
- Discuss about the virtual memories

Module-4: Arithmetic

Numbers, Arithmetic Operations and Characters, Addition and Subtraction of Signed Numbers, Design of Fast **Adders**, **Multiplication** of Positive Numbers, Signed Operand Multiplication, Fast Multiplication, Integer **Division**, **Floating-point** Numbers and Operations.

Module-4: Learning Outcomes

Student will be able to

- Use 2's compliment for representation of integers in computers.
- Design adders for computers.
- Perform signed operand multiplication using Booth algorithm.
- Calculate Division of ineger numbers at bit level.
- Understand IEEE representation of floating point numbers.

Module-5: Basic Processing Unit

Some Fundamental Concepts, Execution of a Complete Instruction, Multiple Bus Organization, **Hard-wired Control, Micro programmed Control**. Pipelining, Embedded Systems and Large Computer Systems: Basic Concepts of **pipelining**,

Module-5: Learning Outcomes

Student will be able to

- Demonstrate the stepwise execution of an instruction inside a computer.
- Understand hardwired and microprogrammed control in execution of an instruction.
- Analyse role of multi processor and pipelining in execution of an instruction.

Text books and References

Text Books:

1. Carl Hamacher, Zvonko Vranesic, Safwat Zaky: Computer Organization, 5th Edition, Tata McGraw Hill, 2002. (Listed topics only from Chapters 1, 2, 4, 5, 6, 7, 8, 9 and 12)

Reference Books:

1. William Stallings: Computer Organization & Architecture, 9th Edition, Pearson, 2015.

CO-PO Mapping

SUBJECT NAME: COMPUTER ORGANIZATION

SUBJECT CODE: 18CS44

Course Outcomes	Program Outcomes									Program Specific Outcomes		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PSO-1	PSO-2	PSO-3
302												
302.1	3	3	2	2	1		2		1	1	3	3
302.2	3	3	2	2	1		2		1	1	3	3
302.3	3	3	3	2	1		2		1	1	3	3
302.4	3	3	3	2	1		2		1	1	3	3
Total	3	3	3	2	1		2		1	1	3	3

1: LOW

2: MODERATE

3: HIGH

Fundamental Background

Prerequisites:

- Basics of Computer and its applications
- Definitions of interrupts, instructions, compiler, Memories(RAM,ROM).
- Usage of Input output Devices.
- Binary Mathematics - BCD, 2's compliment, arithmetic and logical operations.

How to study

- Computer Organization is all about architectural basics of a computer. It helps reader to understand the execution of their program inside a computer machine.
- First it introduces with computer components, computer performance measure.
- It also helps in analysing Instruction Architecture (Assembly Language, instructions, addressing modes) and execution of instructions.
- Need of I/O devices and their working (accessing) procedure in computer.
- The role of Memory hierarchy in execution of a program. The memory architectures, performance measure are discussed in this subject.
- It also discusses about the design aspects for arithmetic operations in the computer- adders, multiplication, division for both integers and floating point numbers.
- Finally it helps reader to understand the stepwise execution of different instructions.

Activities

1. **Chart preparation for each Modules**
 - Learning: Summary of each module is depicted in a chart.
2. **Quiz competition.**
 - Learning: It tests students knowledge about the subject.
3. **Assignments:**
 - Learning: some case studies, old question paper questions will help students to better understand subject.
4. **Role play:**
 - Learning: Micro programming control and hardwired control is demonstrated by a role play. So that students will learn the concept by dramatical movements.

What is the gist of this Course?

- Components of Computer and comparing performance of computers
- Instruction set architecture - Instruction types, addressing modes and execution of an instruction.
- I/O devices- interrupts, multiple device interrupts handling, DMA, standard I/O interfaces- serial/parallel.
- Memory hierarchy, organization, performance measure, page replacement.
- Design of Adder circuits, Booth algorithm for multiplication, integer division, IEEE floating point handling.
- Micro program control / hardwired control in execution of an instruction

Scope of Course

- Helps programmer in understanding execution of program in a computer.
- To build a new computer architectures.
- To write assembly program.

E-resources/links/material availability/ experiments

- NPTEL course videos.
(www.onlinecourses.nptel.com)
- **My materials and updates**
- www.nskgmit.blogspot.in
- <https://sites.google.com/gmit.ac.in/18cs34/about-course>

Subject Name:
SOFTWARE ENGINEERING
Subject Code:
18CS35
Faculty Name:
SUSHMA S G

Contents

- Syllabus
- Objectives
- Fundamental background
- New topics which student can learn
- Activities
- E-resources/links/material availability/ experiments
- Mini project
- Question Papers
- Course outcomes
- Consolidated outcomes, CO-PO mapping with justification
- Components/ materials/ software required for lab

Course objectives:

- This course will enable students to · Outline software engineering principles and activities involved in building large software programs.
- Identify ethical and professional issues and explain why they are of concern to software engineers.
- Describe the process of requirements gathering, requirements classification, requirements specification and requirements validation.
- Differentiate system models, use UML diagrams and apply design patterns.

Fundamental Background

- Students Should have knowledge of programming languages.
- Students should be aware of software applications.
- Students should have knowledge of engineering tools necessary for engineering practice.

Activity 1
Poster Presentation
Team size:10

Learning: Software Engineering Models
Participants: Each team will be assigned to a different models, they need make a chart and explain the model.

Activity- 2

Case Study

- **Participants: All students of class**
- **Learning : Functional & Non-Functional Requirements**

E-resources/links/material availability/ experiments

1. <http://agilemanifesto.org/>
2. <http://www.jamesshore.com/Agile-Book/1>
3. <http://onlinecourse.nptel.ac.in>

Question Papers

CBCS Scheme



15CS42

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Fourth Semester B.E. Degree Examination, June/July 2018
Software Engineering

Max. Marks: 80

Time: 3 hrs.

Note: Answer any FIVE full questions, choosing one full question from each module.

Module-1

1. a. What are the essential attributes of good software? Explain the key challenge facing in software engineering. (05 Marks)
- b. Explain four steps in spiral model of requirements elicitation and analysis process. And why the understanding of requirements from stakeholders is difficult task? Explain. (05 Marks)

OR

2. a. What is a software process model? Explain the types of software process models. (05 Marks)
- b. What is requirement specification? Explain various ways of writing system requirements. (05 Marks)
- c. Explain the different checks to be carried during requirement validation process. (05 Marks)

Module-2

3. a. Draw and explain use case modeling and sequence diagram for patient information system. (10 Marks)
- b. With a diagram, explain the phases in the Rational Unified Process (RUP). (05 Marks)

OR

4. a. Draw and explain state diagram of a microwave oven. (07 Marks)
- b. What is design pattern? Explain four essential elements of design pattern. (05 Marks)
- c. Explain the general models of open source licenses. (05 Marks)

Module-3

5. a. What is test driven development? With neat diagram, explain test driven development process. (05 Marks)
- b. With neat diagram, explain six steps of acceptance testing process. (05 Marks)

OR

6. a. With neat diagram, explain the software evolution process. (05 Marks)
- b. Explain three different types of software maintenance. (05 Marks)
- c. Draw a chart showing relative business value and system quality of legacy system management and explain four clusters of systems. (05 Marks)

1. All answers to be written in blue/black ink. 2. All answers to be written in blue/black ink.

- Module-4**
- 7 a. For the set of tasks shown below draw the project scheduling using. (10 Marks)

Task	Duration (Days)	Dependencies
T ₁	10	-
T ₂	15	-
T ₃	15	T ₁ (M1)
T ₄	10	-
T ₅	10	T ₂ , T ₄ (M3)
T ₆	5	T ₁ , T ₂ (M4)
T ₇	20	T ₁ (M1)
T ₈	25	T ₂ (M2)
T ₉	15	T ₅ , T ₇ (M5)
T ₁₀	15	T ₆ , T ₈ (M6)
T ₁₁	10	T ₉ (M7)
T ₁₂	10	T ₁₀ , T ₁₁ (M8)

- b. Explain briefly the algorithmic cost modeling and write the difficulties. (06 Marks)
- OR
- 8 a. Write any four product and process standards. (04 Marks)
- b. Explain briefly the software review process. (06 Marks)
- c. Explain briefly the process of product measurement. (06 Marks)

- Module-5**
- 9 a. State and explain the principles of agile methods. (05 Marks)
- b. Write a note on pair programming. (06 Marks)
- c. List the advantages of SCRUM used in a telecommunication software development environment. (05 Marks)

- OR
- 10 a. Explain the practices involved in the extreme programming. (10 Marks)
- b. How the agile methods are scaled? State the coping of agile methods for large system engineering. (06 Marks)
-

Fourth Semester B.E. Degree Examination, Dec.2017/Jan.2018
Software Engineering

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing one full question from each module.

- Module-1**
- 1 a. What is software? List the fundamental software engineering activities. Mention and explain the key challenges or the general issues facing software engineering. (05 Marks)
- b. List and explain any five software engineering code of ethics. (05 Marks)
- c. Write block diagram for illustrating incremental development model. State at least two benefits and the problems in incremental development. (05 Marks)

- OR
- 2 a. Explain functional, non-functional and domain requirements with at least one example for each. (03 Marks)
- b. Write the structure of the requirements document as suggested by IEEE standards. (10 Marks)
- c. List out all the stakeholders in Mental Health Care Patient Management System (MHIC-PMS). Write a note on interviewing stakeholders for requirements discovery. (03 Marks)

- Module-2**
- 3 Write short notes on:
- a. Context models with context diagram for MHC-PMS. (06 Marks)
- b. Interaction models. (05 Marks)
- c. Behavioral models. (05 Marks)

- OR
- 4 a. Write a neat block diagram and explain the phases of Rational Unified Process (RUP). (06 Marks)
- b. List out all the activities in an object oriented design process. (02 Marks)
- c. What is a sequence model? Write the diagram for sequence model of operations in collecting data from a weather station and explain. (08 Marks)

- Module-3**
- 5 a. State and explain development testing and its three levels - unit testing, component testing and system testing. (04 Marks)
- b. List out all the guidelines for testing. (04 Marks)
- c. Explain test-driven development (TDD), with a block diagram. Explain TDD activities and benefits of TDD. (08 Marks)

- OR
- 6 a. With appropriate block diagram, explain the software evolution process. (06 Marks)
- b. Define "program evolution dynamics". Discuss Lehman laws for program evolution dynamics. (10 Marks)

Module-4

- 7 a. Explain software pricing. List and briefly explain the factors affecting software pricing. (04 Marks)
 b. List and explain various COCOMO cost estimation models. (10 Marks)

OR

- 8 a. List out the questions to be answered by the quality management team to decide whether or not the software is fit for its intended purpose. (06 Marks)
 b. Explain the various inspection checklists for software inspection process. (06 Marks)
 c. What are product metrics? Explain its two classes of metrics. (04 Marks)

Module-5

- 9 a. Draw the block diagram and explain the process of prototype development. What are the benefits of a prototype? Write briefly about throw away prototypes. (10 Marks)
 b. List and explain any six extreme programming practices. (06 Marks)

OR

- 10 a. List all the four key features of testing in XP. (02 Marks)
 b. What is pair programming? List the advantages of pair programming. (04 Marks)
 c. Explain SCRUM. Draw and explain block diagram for the SCRUM process. List all the key characteristics of this process. Mention the advantages of SCRUM. (10 Marks)

**Course Outcomes**

- CO1: Design a software system, component, or process to meet desired needs within realistic constraints.
- CO2: Assess professional and ethical responsibility.
- CO3: Function on multi-disciplinary teams.
- CO4: Use the techniques, skills, and modern engineering tools necessary for engineering practice.
- CO5: Analyze, design, implement, verify, validate, implement, apply, and maintain software systems or parts of software systems.

CO-PO Mapping

Subject Name: **SOFTWARE ENGINEERING**

Subject Code: **18CS35**

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
.1	2	2	2	1	1	2	2	1	1	2	1	2	3	2	3
.2	2	1	2	2	1	2	2	2	2	2	2	2	2	2	2
.3	2	2	2	2	2	2	2	2	1	2	2	2	2	2	2
.4	3	2	2	2	1	2	2	2	2	3	2	2	2	2	2
.5	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2
Total	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
1: LOW					2: MODERATE					3: HIGH					

PO: Program Outcomes, PSO: Program Specific Outcomes

Standard Materials as per University

Text Books

- Ian Sommerville: Software Engineering, 9th Edition, Pearson Education, 2012. (Listed topics only from Chapters 1,2,3,4, 5, 7, 8, 9, 23, and 24).
- The SCRUM Primer, Ver 2.0,
<http://www.goodagile.com/scrumprimer/scrumprimer20.pdf>.

Software engineering

- The economies of ALL developed nations are dependent on software.
- More and more systems are software controlled
- Software engineering is concerned with theories, methods and tools for professional software development.
- Expenditure on software represents a significant fraction of GNP in all developed countries.

Software costs

- Software costs often dominate computer system costs. The costs of software on a PC are often greater than the hardware cost.
- Software costs more to maintain than it does to develop. For systems with a long life, maintenance costs may be several times development costs.
- Software engineering is concerned with cost-effective software development.

Frequently asked questions about software engineering

Question	Answer
What is software?	Computer programs and associated documentation. Software products may be developed for a particular customer or may be developed for a general market.
What are the attributes of good software?	Good software should deliver the required functionality and performance to the user and should be maintainable, dependable and usable.
What is software engineering?	Software engineering is an engineering discipline that is concerned with all aspects of software production.
What are the fundamental software engineering activities?	Software specification, software development, software validation and software evolution.
What is the difference between software engineering and computer science?	Computer science focuses on theory and fundamentals; software engineering is concerned with the practicalities of developing and delivering useful software.
What is the difference between software engineering and system engineering?	System engineering is concerned with all aspects of computer-based systems development including hardware, software and process engineering. Software engineering is part of this more general process.

Frequently asked questions about software engineering

Question	Answer
What are the key challenges facing software engineering?	Coping with increasing diversity, demands for reduced delivery times and developing trustworthy software.
What are the costs of software engineering?	Roughly 60% of software costs are development costs, 40% are testing costs. For custom software, evolution costs often exceed development costs.
What are the best software engineering techniques and methods?	While all software projects have to be professionally managed and developed, different techniques are appropriate for different types of system. For example, games should always be developed using a series of prototypes whereas safety critical control systems require a complete and analyzable specification to be developed. You can't, therefore, say that one method is better than another.
What differences has the web made to software engineering?	The web has led to the availability of software services and the possibility of developing highly distributed service-based systems. Web-based systems development has led to important advances in programming languages and software reuse.

Subject : Discrete Mathematical Structures
Subject Code: 18CS36

Niranjan Murthy C
Asst Professor, Dept of CSE
GMIT

Contents

- **Syllabus**
- **Objectives**
- **Fundamental background**
- **New topics which student can learn**
- **Activities**
- **E-resources/links/material availability/ experiments**
- **Mini project**
- **Question bank**
- **Module outcomes**
- **Consolidated outcomes, CO-PO mapping with justification**
- **Components/ materials/ software required for lab**

Module-1:

- **Fundamentals of Logic:** Basic Connectives and Truth Tables, Logic Equivalence – The Laws of Logic, Logical Implication – Rules of Inference. Fundamentals of Logic contd.
- The Use of Quantifiers, **Quantifiers**, Definitions and the Proofs of Theorems.
- **CO mapping:CO1**
- **Learning outcomes:Define,construct,prove.**

Module-2

- **Properties of the Integers:** Mathematical Induction, The Well Ordering Principle Mathematical Induction, Recursive Definitions. Principles of Counting.
- **Fundamental Principles of Counting:** The Rules of Sum and Product, Permutations, Combinations The Binomial Theorem, Combinations with Repetition.
- **CO mapping:CO1**
- **Learning outcomes:Define,prove.**

Module 3

- **Relations and Functions:** Cartesian Products and Relations, Functions – Plain and One-to-One. Onto Functions. The Pigeon-hole Principle, Function Composition and Inverse Functions.
- **Properties of Relations, Computer Recognition – Zero-One Matrices and Directed Graphs,**
- **Partial Orders – Hasse Diagrams, Equivalence Relations and Partitions.**
- **CO mapping:CO2**
- **Learning outcomes:Define,construct,prove.**

Module-4

- **The Principle of Inclusion and Exclusion:** The Principle of Inclusion and Exclusion, Generalizations of the Principle, Derangements – Nothing is in its Right Place, Rook Polynomials.
- **Recurrence Relations:** First Order Linear Recurrence Relation, The Second Order Linear Homogeneous Recurrence Relation with Constant Coefficients.
- **CO mapping:CO3**
- **Learning outcomes:Define,construct,prove.**

Module-5:

- **Introduction to Graph Theory:** Definitions and Examples, Sub graphs, Complements, and Graph
- **Isomorphism, Vertex Degree, Euler Trails and Circuits , Trees:** Definitions, Properties, and
- **Examples, Routed Trees, Trees and Sorting, Weighted Trees and Prefix Codes.**
- **CO mapping:CO4**
- **Learning outcomes:Define,construct,prove.**

Text books and References

Text Books:

1. Ralph P. Grimaldi: Discrete and Combinatorial Mathematics, ,5th Edition, Pearson Education. 2004.

Reference Books:

1. Basavaraj S Anami and Venakanna S Madalli: Discrete Mathematics – A Concept based approach, Universities Press, 2016
2. Kenneth H. Rosen: Discrete Mathematics and its Applications, 6th Edition, McGraw Hill, 2007.
3. Jayant Ganguly: A Treatise on Discrete Mathematical Structures, Sanguine-Pearson, 2010.
4. D.S. Malik and M.K. Sen: Discrete Mathematical Structures: Theory and Applications, Thomson, 2004.
5. Thomas Koshy: Discrete Mathematics with Applications, Elsevier, 2005, Reprint 2008.

Course Outcomes

This course will enable the students to

CO1: Provide theoretical foundations of computer science to solve mathematical logic.

CO2: Illustrate applications of discrete structures: relations, functions, set theory and counting.

CO3: Describe different mathematical proof techniques,

CO4: Illustrate the use of graph theory in computer science.

CO-PO Mapping

SUBJECT NAME: Discrete Mathematical Structures

SUBJECT CODE:
17CS36

Course Outcomes	Program Outcomes												Program Specific Outcomes			
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3	
206																
206.1	3	1	1	1	1				1	2	1	2	1	1	1	
206.2	3	1	1	2	2				2	2	2	3	1	3	2	
206.3	3	1	1	3	2				2	3	2	3	2	3	2	
206.4	3	1	1	3	2				2	3	2	3	2	3	2	
Total	3	1	1	3	2				2	3	2	3	2	3	2	

1: LOW

2: MODERATE

3: HIGH

Fundamental Background

- prerequisites
 - Basic mathematics equations.
 - Set theory.
 - Mathematical logic.
 - Permutation and combination.

Activities

- Quiz.
- Surprise test.
- Question paper question test.

What is the gist of this subject?

- Mathematical logic.
- Graph theory.
- Rook polynomial.
- Shortest path algorithm.

E-resources/links/material availability/ experiments

- <https://www.vtresource.com/my-papers/CS/2015/3/> for Question paper.

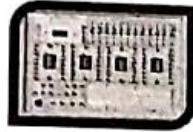


Srishyala Educational Trust (R), Bheemasamudra

GM INSTITUTE OF TECHNOLOGY, DAVANGERE

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Accredited by NBA, New Delhi (Valid upto 30.06.2023)



Analog and Digital Electronics Laboratory (18CSL37)



Aruna Kumar B T

Asst. Professor, Dept. of CSE



Contents



- Syllabus
- Objectives
- Fundamental background
- New topics which student can learn
- Activities
- E-resources/links/material availability/ experiments
- Question bank
- Module outcomes
- Consolidated outcomes, CO-PO mapping with justification
- Components/ materials/ software required for lab

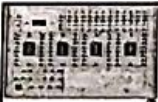


Laboratory Programs: PART-A (Analog Electronic Circuits)



1. Design an astable multivibrator circuit for three cases of duty cycle (50%, 50%) using NE 555 timer IC. Simulate the same for any one duty cycle.
2. Using ua 741 Opamp, design a 1 kHz Relaxation Oscillator with 50% duty cycle. And simulate the same.
3. Using ua 741 opamp, design a window comparator for any given UTP and LTP. And simulate the same.

Outcome: CO1 & CO2



Learning Outcomes:



At the end of the module student should be able to

1. To understand the design concepts of an astable multivibrator circuit for three cases of duty cycle (50%, 50%) using NE 555 timer IC.
2. To designing of an Using ua 741 Opamp, design a 1 kHz Relaxation Oscillator with 50% duty cycle. The output is taken using tracing sheets and comparing results practical & theoretical waveforms. Simulate the same in Multisim software tool.
3. Using ua 741 opamp, design a window comparator for any given UTP and LTP. And simulate the same. The output is taken using tracing sheets and comparing results practical & theoretical waveforms. Simulate the same in Multisim software tool.

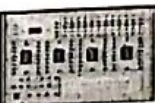


PART- B (Digital Electronic Circuits)




4. Design and implement Half adder, Full Adder, Half Subtractor, Full Subtractor using basic gates. And implement the same in HDL.
5. Given a 4-variable logic expression, simplify it using appropriate technique and realize the simplified logic expression using 8:1 multiplexer IC. And implement the same in HDL.

Outcome:CO3



Learning Outcomes:



At the end of the module student should be able to

4. Understand the concepts of digital circuit Design and implement Half adder, Full Adder, Half Subtractor, Full Subtractor using basic gates. And same implementing using XILINX software tool by writing HDL programs, the output observed by analyzing discrete waveforms.
5. Given a 4-variable logic expression, simplify it using VEM table, appropriate technique and realize the simplified logic expression using 8:1 multiplexer IC. And implement the same in HDL. And same implementing using XILINX software tool by writing HDL programs, the output observed by analyzing discrete waveforms.



Continued..

6. Realize a J-K Master / Slave Flip-Flop using NAND gates and verify its truth table. And implement the same in HDL.
7. Design and implement code converter I) Binary to Gray (II) Gray to Binary Code using basic gates.

Outcome:CO4



Learning Outcomes:

At the end of the module student should be able to

6. Understand the Realize a J-K Master / Slave Flip-Flop using NAND gates and verify its truth table. And same implementing using XILINX software tool by writing HDL programs, the output observed by analyzing discrete waveforms.
7. Design and implement code converter I) Binary to Gray (II) Gray to Binary Code using basic gates.

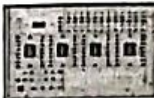


Continued..



8. Design and implement a mod-n ($n < 8$) synchronous counter using J-K Flip-Flop ICs and demonstrate its working.
9. Design and implement an asynchronous counter using decade counter IC to count up from 0 to n ($n \leq 9$) and demonstrate on 7-segment display (using IC-7447)

Outcome:CO5




Learning Outcomes:




At the end of the module student should be able to

8. Understand the Design and implement a mod-n ($n < 8$) synchronous counter using J-K Flip-Flop ICs and demonstrate its working.
9. Understand the Design and implement an asynchronous counter using decade counter IC to count up from 0 to n ($n \leq 9$) and demonstrate on 7-segment display (using IC-7447)



Text books and References




Text Books:


1. Charles H Roth and Larry L Kinney, Analog and Digital Electronics, Cengage Learning, 2019

Reference Books:

1. Anil K Maini, Varsha Agarwal, Electronic Devices and Circuits, Wiley, 2012.
2. Donald P Leach, Albert Paul Malvino & Goutam Saha, Digital Principles and Applications, 8th Edition, Tata McGraw Hill, 2015.
3. M. Morris Mani, Digital Design, 4th Edition, Pearson Prentice Hall, 2008.
4. David A. Bell, Electronic Devices and Circuits, 5th Edition, Oxford University Press, 2008



Course objectives



This laboratory course will enable students to :

- Get practical experience in design, assembly and evaluation/testing of Analog components and circuits including Operational Amplifier, Timer, etc.
- Combinational logic circuits.
- Flip - Flops and their operations
- Counters and registers using flip-flops.
- Synchronous and Asynchronous sequential circuits.
- A/D and D/A converters.

Course Outcomes

After studying this course, students will be able to:

- CO1: Use appropriate design equations / methods to design the given circuit.
- CO2: Examine and verify the design of both analog and digital circuits using simulators.
- CO3: Make use of electronic components, ICs, instruments and tools for design and testing of circuits for the given the appropriate inputs.
- CO4: Compile a laboratory journal which includes; aim, tool/instruments/software/components used, design equations used and designs, schematics, program listing, procedure followed, relevant theory, results as graphs and tables, interpreting and concluding the findings.
- CO5: Develop simple HDL programs.

CO-PO Mapping

SUBJECT NAME: ANALOG AND DIGITAL ELECTRONICS LAB

SUBJECT CODE:
18CSL37

Course Outcomes	Program Outcomes												Program Specific Outcomes		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
207															
207.1	3	3	3	3	1	1	1	1	3	1	2	3	2	3	2
207.2	2	3	3	3	1	1	1	1	3	1	3	3	2	3	3
207.3	3	3	3	3	1	1	1	1	2	2	2	3	2	2	3
207.4	3	3	3	3	1	1	1	1	2	2	2	3	2	3	3
207.5	3	2	3	2	1	2	2	1	3	3	2	3	2	3	3
Total	3	3	3	3	1	1	1	1	3	3	2	3	3	3	3

1: LOW

2
MODERATE

3: HIGH



Fundamental Background



Prerequisites:


- Basic Electronics.
- Digital Logic, Logic gates, Boolean algebra.
- Semiconductors, Transistors, Diodes, Capacitors.
- Flip-Flops, Registers and Counters.




How to study



- Study the basics of electronics. Recall the Basic gates i.e., AND, OR, NOT, NAND, NOR .etc.,.
- Understand the concept of analog and digital systems
Understand the pin diagram of IC's.
- Work out k-map & solve the given expressions and same will implement using logic gates with IC's.
- To write the HDL code for software part refer & Follow the prescribed Textbook and Reference books.



What is the gist of this subject?



- To think logically and design Digital logic circuits and their applications.
- To write HDL code for designing logic circuits.
- Designing of logic circuits for Embedded systems.
- Designing circuits for IOT & various automation applications.
- Designing HDL/VHDL, VLSI and Programmable logic controllers(PLC's).

E-resources/links/material availability/ experiments

- <http://www.nptelvideos.in/search?q=analog+and+digital+electronics>
- <https://www.vturesource.com/2011/01/trusted-security.html>



Srishyla Educational Trust (R), Bheemasamudra

GM INSTITUTE OF TECHNOLOGY, DAVANGERE



DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

(Accredited by NBA , New Delhi (Valid upto 30.06.2022))

Academic Year: 2020-2021

(ODD Sem)

Presentation of Allotted Subject



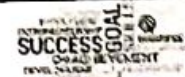
Srishya Educational Trust (R), Bheemasamudra
GM INSTITUTE OF TECHNOLOGY, DAVANGERE
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
Accredited by NBA, New Delhi (Valid upto 30.06.2023)



MANAGEMENT AND ENTREPRENEURSHIP FOR IT INDUSTRY (18CS51)



Aruna Kumar B T
Asst. Professor, Dept. of CSE



Contents

- Syllabus
- Objectives
- Fundamental background
- New topics which student can learn
- Activities
- E-resources/links/material availability/ experiments
- Question bank
- Module outcomes
- Consolidated outcomes, CO-PO mapping with justification
- Components/ materials/ software required for lab



Module-1

- Introduction - Meaning, nature and characteristics of management, scope and Functional areas of management,
- Goals of management, levels of management, brief overview of evolution of management theories,.
- Planning- Nature, importance, types of plans, steps in planning, Organizing- nature and purpose, types of Organization, Staffing- meaning, process of recruitment and selection.

Module Outcome: CO1



Learning Outcomes:

At the end of the module student should be able to:

- ❖ Understand the definition, Introduction - Meaning, nature and characteristics of management, scope and Functional areas of management.
- ❖ Gain the knowledge Goals of management, levels of management, brief overview of evolution of management theories.
- ❖ Planning- Nature, importance, types of plans, steps in planning, Organizing- nature and purpose, types of Organization, Staffing- meaning, process of recruitment and selection.





Module-2

- Directing and controlling- meaning and nature of directing, leadership styles, motivation Theories.
- Communication- Meaning and importance, Coordination- meaning and importance, Controlling- meaning, steps in controlling, methods of establishing control.

Module Outcome : CO2



Learning Outcomes:

At the end of the module student should be able to:

- ❖ Understand the Directing and controlling- meaning and nature of directing, leadership styles, motivation Theories.
- ❖ Gain the knowledge Communication- Meaning and importance, Coordination- meaning and importance, Controlling- meaning, steps in controlling, methods of establishing control.



Module 3

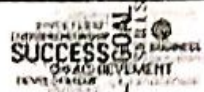


- Entrepreneur – meaning of entrepreneur, characteristics of entrepreneurs, classification and types of entrepreneurs.
- Various stages in entrepreneurial process, role of entrepreneurs in economic development.
- Entrepreneurship in India and barriers to entrepreneurship. Identification of business opportunities, market feasibility study.
- Technical feasibility study, financial feasibility study and social feasibility study.

Module Outcome: CO3



Learning Outcomes:



At the end of the module student should be able to:

- ❖ Understand the concept of Entrepreneur – meaning of entrepreneur, characteristics of entrepreneurs, classification and types of entrepreneurs.
- ❖ Skills required Various stages in entrepreneurial process, role of entrepreneurs in economic development.
- ❖ To study the Entrepreneurship in India and barriers to entrepreneurship. Identification of business opportunities, market feasibility study.
- ❖ Technical feasibility study, financial feasibility study and social feasibility study.



Module-4

- Preparation of project and ERP - meaning of project, project identification, project selection, project report, need and significance of project report, contents, formulation, guidelines by planning commission for project report.
- Enterprise Resource Planning: Meaning and Importance- ERP and Functional areas of Management – Marketing / Sales- Supply Chain Management – Finance and Accounting – Human Resources – Types of reports and methods of report generation.

Module Outcome: CO4



Learning Outcomes:

At the end of the module student should be able to:

- ❖ Understand the meaning of project, project identification, project selection, project report, need and significance of project report, contents, formulation, guidelines by planning commission for project report.
- ❖ Meaning and Importance- ERP and Functional areas of Management – Marketing / Sales- Supply Chain Management – Finance and Accounting – Human Resources – Types of reports and methods of report generation.



Module-5

- **Micro and Small Enterprises:** Definition of micro and small enterprises, characteristics and advantages of micro and small enterprises, steps in establishing micro and small enterprises, Government of India industrial policy 2007 on micro and small enterprises, case study (Microsoft), Case study (Captain G R Gopinath), case study (N R Narayana Murthy & Infosys).
- **Institutional support:** MSME-DI, NSIC, SIDBI, KIADB, KSSIDC, TECSOK, KSFC, DIC and District level single window agency, Introduction to IPR.

Module Outcome: CO5



Learning Outcomes:

At the end of the module student should be able to:

- ❖ Understand the Definition of micro and small enterprises, characteristics and advantages of micro and small enterprises, steps in establishing micro and small enterprises, Government of India industrial policy 2007 on micro and small enterprises, case study (Microsoft), Case study (Captain G R Gopinath), case study (N R Narayana Murthy & Infosys),
- ❖ Gain the knowledge of MSME-DI, NSIC, SIDBI, KIADB, KSSIDC, TECSOK, KSFC, DIC and District level single window agency, Introduction to IPR.



Text books and References



Text Books:

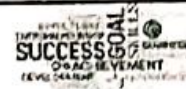
1. Principles of Management -P. C. Tripathi, P. N. Reddy; Tata McGraw Hill, 4th / 6th Edition, 2010.
2. Dynamics of Entrepreneurial Development & Management -Vasant Desai Himalaya Publishing House.
3. Entrepreneurship Development -Small Business Enterprises -Poornima M Charantimath Pearson Education – 2006.
4. Management and Entrepreneurship - Kanishka Bedi- Oxford University Press-2017

Reference Books:

1. Management Fundamentals -Concepts, Application, Skill Development Robert Lusier – Thomson.
2. Entrepreneurship Development -S S Khanka -S Chand & Co.
3. Management -Stephen Robbins -Pearson Education /PHI -17th Edition, 2003.



Course objectives



This course will enable students to :

- Explain the principles of management, organization and entrepreneur.
- Discuss on planning, staffing, ERP and their importance .
- Infer the importance of intellectual property rights and relate the institutional support.



Course Outcomes

After studying this course, students will be able to:

C301.1: Define management, organization, entrepreneur, planning, staffing, ERP and outline their importance in entrepreneurship.

C302.2: Utilize the resources available effectively through ERP.

C303.3: Make use of IPRs and institutional support in entrepreneurship.



CO-PO Mapping

SUBJECT NAME: MANAGEMENT & ENTERPREURSHIP FOR IT
INDUSTRY

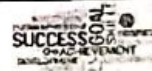
SUBJECT CODE:
18CS51

Course Outcomes	Program Outcomes												Program Specific Outcomes			
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3	
301																
301.1	2	1	2	1	1	1	3	1	3	2	0	3	2	1	2	
302.2	2	2	2	2	1	1	2	3	3	2	0	2	2	1	1	
303.3	1	2	2	2	1	1	2	3	3	2	0	2	2	1	1	
Total	2	2	2	2	1	1	2	3	3	2	0	2	2	1	2	

1: LOW

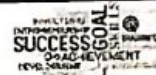
2:
MODERATE

3: HIGH



Fundamental Background

- Constitution Of India.
- Professional Ethics & Human Rights.



How to study

- To start a business, you have to prepare yourself financially and emotionally. Your passion for your product or service and tolerance for risk are the major points which will help you to run a successful business.
- Entrepreneurship is a procedure of designing, beginning & running a new business. For example – like a startup company offering a product or service.
- Refer VTU syllabus and question paper.
- Follow the prescribed Textbook and Reference books.



Activities

1. For every module Class room test & MCQ Test will be conducted.
2. Poster presentation conducted batch wise.

Participants: All students of class



What is the gist of this subject?

- **Management** comprises planning, organizing, staffing, leading or directing, and controlling an organization to accomplish the goal.
- **Strategic influence** in business is the ability to convince other people in your department to implement your ideas. It is also the ability to convince other departments in your company to adopt the suggestions of your department, or to **influence** other companies to take actions favorable to your company.

E-resources/links/material availability/ experiments

- Seminar on Micro and Small Enterprises.
<https://www.youtube.com/watch?v=4gBpli-gXhc>
- Study on entrepreneurship.
<https://www.youtube.com/watch?v=p7vhcob-Ykl&list=PLHRLZtgrF2jnPlrIU1k8y8LdLhmm4eaeO>
- <https://www.managementstudyguide.com/entrepreneurship-articles.htm>
- <https://www.scribd.com/document/305671935/Business-Management-Study-Guide>.

Magazines/Journals Used and Recommended to Students

1. International Entrepreneurship and Management Journal
<https://link.springer.com/journal/11365>
2. International Journal of Entrepreneurship and Innovation
Management
www.inderscience.com/ijeim
3. International Entrepreneurship and Management Journal
(IntEnterprenManag J)
www.inderscience.com/jhome.php?jcode=IJMED

Subject: Computer Networks

Subject Code: 18CS52

Kotreshi S N

Asst Professor, Dept of CSE

GMIT, Davangere

Contents

- Syllabus
- Objectives
- Fundamental background
- New topics which student can learn
- Activities
- E-resources/links/material availability/ experiments
- Mini project
- Question bank
- Module outcomes
- Consolidated outcomes, CO-PO mapping with justification
- Components/ materials/ software required for lab
- Scope

Course Objectives

- Demonstration of application layer protocols
- Discuss transport layer services and understand UDP and TCP protocols
- Explain routers, IP and Routing Algorithms in network layer
- Disseminate the Wireless and Mobile Networks covering IEEE 802.11 Standard
- Illustrate concepts of Multimedia Networking, Security and Network Management

Course Outcomes

Students will be able to

- **CO-1:** Explain principles of application layer protocols
- **CO-2:** Recognize transport layer services and infer UDP and TCP protocols
- **CO-3:** Classify routers, IP and Routing Algorithms in network layer
- **CO-4:** Understand the requirements of network security and demonstrate about some security algorithms.
- **CO-5:** Describe Multimedia Networking and Network Management

Module-1: Application Layer

Principles of Network Applications: Network Application Architectures, Processes Communicating, Transport Services Available to Applications, Transport Services Provided by the Internet, Application-Layer Protocols. **The Web and HTTP:** Overview of HTTP, Non-persistent and Persistent Connections, HTTP Message Format, User-Server Interaction: Cookies, Web Caching, The Conditional GET, File Transfer: FTP Commands & Replies, **Electronic Mail in the Internet:** SMTP, Comparison with HTTP, Mail Message Format, Mail Access Protocols, **DNS;** The Internet's Directory Service: Services Provided by DNS, Overview of How DNS Works, DNS Records and Messages, **Peer-to-Peer Applications:** P2P File Distribution, Distributed Hash Tables, **Socket Programming:** creating Network Applications: Socket Programming with UDP, Socket Programming with TCP.

Module-1: Learning Outcomes

Student will be able to

- Identify Network applications in real life
- Understand Application Layer architecture for building Applications
- Differentiate between Client-Server and P2P architectures
- Describe Application Layer Protocols like - HTTP, FTP, DNS, SMTP.
- Demonstrate the Socket programming

Module-2: Transport Layer

Introduction and Transport-Layer Services: Relationship Between Transport and Network Layers, Overview of the Transport Layer in the Internet, **Multiplexing and Demultiplexing;** Connectionless Transport: **UDP,** UDP Segment Structure, UDP Checksum, Principles of **Reliable Data Transfer:** Building a Reliable Data Transfer Protocol, Pipelined Reliable Data Transfer Protocols, Go-Back-N, Selective repeat, **Connection-Oriented Transport TCP:** The TCP Connection, TCP Segment Structure, Round-Trip Time Estimation and Timeout, Reliable Data Transfer, Flow Control, TCP Connection Management, **Principles of Congestion Control:** The Causes and the Costs of Congestion, Approaches to Congestion Control, Network-assisted congestion-control example, ATM ABR Congestion control, TCP Congestion Control: Fairness.

Module-2: Learning Outcomes

Student will be able to

- Relate Transport layer and Network Layer
- Define TCP/IP and UDP.
- Demonstrate Multiplexing and Demultiplexing in UDP.
- Demonstrate the working of TCP
- Apply congestion control algorithms to flow control

Module-3: Network Layer

What's Inside a **Router**?: Input Processing, Switching, Output Processing, Where Does **Queuing** Occur?
Routing control plane, IPv6, A Brief foray into IP Security, **Routing Algorithms**: The Link-State (LS) Routing Algorithm, The Distance-Vector (DV) Routing Algorithm, Hierarchical Routing, **Routing in the Internet**, Intra-AS Routing in the Internet: RIP, Intra-AS Routing in the Internet: OSPF, Inter/AS Routing: BGP, **Broadcast Routing Algorithms and Multicast**.

Module-3: Learning Outcomes

Student will be able to

- Define router and routing algorithms
- Analyse Router - input processing, switching and output processing.
- Apply routing algorithms for routing packets in the network.
- Differentiate between Routing in Internet and Intranet
- Differentiate between Broadcast and Multicast

Module-4: Network Security

Network Security: Overview of Network Security: Elements of Network Security, Classification of Network Attacks, Security Methods, Symmetric-Key Cryptography: Data Encryption Standard (DES), Advanced Encryption Standard (AES), Public-Key Cryptography: RSA Algorithm, Diffie-Hellman Key-Exchange Protocol, Authentication: Hash Function, Secure Hash Algorithm (SHA), Digital Signatures, Firewalls and Packet Filtering, Packet Filtering, Proxy Server.

Module-4: Learning Outcomes

Student will be able to

- Discuss about Network security basics
- understand Symmetric key algorithms like DES and AES
- Describe RSA algorithm and key sharing using Diffie-Hellman using Public key encryption
- Differentiate between encryption and digital signature.
- Understand Firewalls.

Module-5: Multimedia Networking

Properties of video, properties of **Audio**, Types of multimedia Network Applications, **Streaming stored video**: UDP Streaming, HTTP Streaming, Adaptive streaming and DASH, content distribution Networks, case studies: : **Netflix, You Tube** and **Kankan**.

Network Support for Multimedia: Dimensioning Best-Effort Networks, Providing Multiple Classes of Service, Diffserv, Per-Connection Quality-of- Service (QoS) Guarantees: Resource Reservation and Call Admission

Module-5: Learning Outcomes

Student will be able to

- Define and identify Multimedia networks
- Categorize the streaming methods into - UDP, HTTP, Adaptive, DASH streaming.
- Analyse the support of network for multimedia data transfer.
- Describe Multimedia Networking and Network Management

Text books and References

Text Books:

1. James F Kurose and Keith W Ross, **Computer Networking, A Top-Down Approach, Sixth edition**, Pearson, 2017
2. Nader F Mir, **Computer and Communication Networks**, 2nd Edition, Pearson, 2014.

Reference Books:

1. Behrouz A Forouzan, **Data and Communications and Networking**, Fifth Edition, McGraw Hill, Indian Edition
2. Larry L Peterson and Bruce S Davie, **Computer Networks**, fifth edition, ELSEVIER
3. Andrew S Tanenbaum, **Computer Networks**, fifth edition, Pearson
4. Mayank Dave, **Computer Networks**, Second edition, Cengage Learning

CO-PO Mapping

SUBJECT NAME: COMPUTER NETWORKS

SUBJECT CODE:
18CS52

Course Outcomes	Program Outcomes												Program Specific Outcomes		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
302															
302.1	3	3	3	3	1	1	1			1		3	2	2	2
302.2	3	3	3	3	1	1	1			1		3	3	3	3
302.3	3	3	3	3	1	1	1			1		3	3	3	3
302.4	3	3	3	3	1	1	1			1		3	3	3	3
302.5	3	3	3	2	1	1	1			1		3	3	3	3
Total	3	3	3	3	1	1	1			1		2	3	3	3
										1		3	3	3	3

1: LOW

2:
MODERATE

3: HIGH

An presentation on

DATABASE MANAGEMENT SYSTEM

Subject Code: 18CS53

NBA code: 303

Dr. Mouneshachari S

Associate Professor

Course Outcomes

Students will be able to

- CO1: Identify, analyse and define database objects and design data models**
- CO2: Use Structured Query Language for database manipulation**
- CO3: Design and build simple and efficient database systems**
- CO4: Develop web applications to interact with database**

Course Outcomes Mapping

Course Outcomes	Program Outcomes												Program Specific Outcomes			
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3	
303																
C303.1	3	3	3	3	2	2	3	0	0	0	1	1	2	3	3	
C303.2	3	2	3	3	2	1	3	0	0	0	1	2	2	3	3	
C303.3	3	3	3	3	3	1	3	0	0	0	3	3	3	3	3	
C303.4	3	3	3	3	3	2	3	0	0	0	3	3	3	3	3	
Highest	3	3	3	3	3	2	3	0	0	0	3	3	3	3	3	

1 – Low, 2 – Medium, 3 – High

Syllabus – Module 1

Introduction to Databases: Introduction, Characteristics of database approach, Advantages of using the DBMS approach, History of database applications. **Overview of Database Languages and Architectures:** Data Models, Schemas, and Instances, Three schema architecture and data independence, database languages, and interfaces, The Database System environment. **Conceptual Data Modelling using Entities and Relationships:** Entity types, Entity sets, attributes, roles, and structural constraints, Weak entity types, ER diagrams, examples, Specialization and Generalization.

10 Contact Hours

CO1

This module introduces the Database concepts and data models based on the real world conceptualization.

Activity planned, Poster presentation on Design of Case studies using ER diagram

Syllabus – Module 2

Relational Model: Relational Model Concepts, Relational Model Constraints and relational database schemas, Update operations, transactions, and dealing with constraint violations.
Relational Algebra: Unary and Binary relational operations, additional relational operations (aggregate, grouping, etc.) Examples of Queries in relational algebra. **Mapping Conceptual Design into a Logical Design:** Relational Database Design using ER-to-Relational mapping.
SQL: SQL data definition and data types, specifying constraints in SQL, retrieval queries in SQL, INSERT, DELETE, and UPDATE statements in SQL, Additional features of SQL.

CO1, CO2

10 Contact Hours

This module introduces RDBMS and its related concepts. Also it introduces the fundamentals of SQL language

Syllabus – Module 3

SQL : Advances Queries: More complex SQL retrieval queries, Specifying constraints as assertions and action triggers, Views in SQL, Schema change statements in SQL. **Database Application Development:** Accessing databases from applications, An introduction to JDBC, JDBC classes and interfaces, SQLJ, Stored procedures, Case study: The internet Bookshop. **Internet Applications:** The three-Tier application architecture, The presentation layer, The Middle Tier

CO2

10 Contact Hours

This module emphasize more on the advanced syntaxes from SQL and issues present in the development of Database applications

Activity planned: Workshop on web application development using PHP and MySQL

Syllabus – Module 4

Normalization: Database Design Theory – Introduction to Normalization using Functional and Multivalued Dependencies; Informal design guidelines for relation schema, Functional Dependencies, Normal Forms based on Primary Keys, Second and Third Normal Forms, Boyce-Codd Normal Form, Multivalued Dependency and Fourth Normal Form, Join Dependencies and Fifth Normal Form. **Normalization Algorithms:** Inference Rules, Equivalence, and Minimal Cover, Properties of Relational Decompositions, Algorithms for Relational Database Schema Design, Nulls, Dangling tuples, and alternate Relational

10 Contact Hours

CO3

This module highlights the concepts involved in making the database efficient

Activity planned: Mini Project development

Syllabus – Module 5

Transaction Processing: Introduction to Transaction Processing, Transaction and System concepts, Desirable properties of Transactions, Characterizing schedules based on recoverability, Characterizing schedules based on Serializability, Transaction support in SQL. **Concurrency Control in Databases:** Two-phase locking techniques for Concurrency control, Concurrency control based on Timestamp ordering, Multiversion Concurrency control techniques, Validation Concurrency control techniques, Granularity of Data items and Multiple Granularity Locking. **Introduction to Database Recovery Protocols:** Recovery Concepts, NO-UNDO/REDO recovery based on Deferred update, Recovery techniques based on immediate update, Shadow paging, Database backup and recovery from catastrophic failures

CO4

10 Contact Hours

This module focus on the issues in concurrent access of the database from one single repository

Resource Material & Text books

Textbooks:

1. Fundamentals of Database Systems, Ramez Elmasri and Shamkant B. Navathe, 7th Edition, 2017, Pearson.
2. Database management systems, Ramakrishnan, and Gehrke, 3rd Edition, 2014, McGraw Hill

Reference Books:

1. Silberschatz Korth and Sudharshan, Database System Concepts, 6th Edition, Mc-GrawHill, 2013.
2. Coronel, Morris, and Rob, Database Principles Fundamentals of Design, Implementation and Management, Cengage Learning 2012.

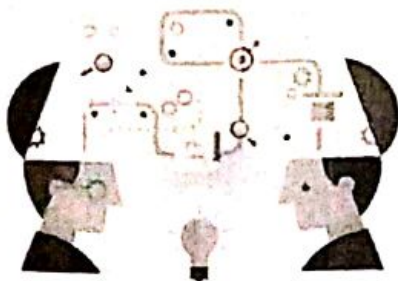
NPTEL Link

<https://youtu.be/SkT7jhPAQOE>

<https://www.youtube.com/watch?v=EUzsy3W4IOg>

<https://www.youtube.com/watch?v=rbwXdTsCk2c>

Activities



1. Poster presentation on "Design of Case studies using ER diagram and Schema Diagram"
2. Workshop on web application development using PHP and MySQL
3. Mini Project development

Beyond the syllabus

10 Contact Hours

1. Application development using PHP and MySQL
2. Web application development using Content Management Systems (Joomla or Wordpress)

Subject:
Application Development Using Python
Subject Code: 18CS55

Mr. Maruthi S T
Asst Professor, Dept of CSE
GMIT

CONTENTS

SL NO	PARTICULARS	SLIDE NO
1	<u>Syllabus & Learning Outcomes</u>	3-20
2	<u>Textbook & References</u>	21
3	<u>Course Objectives</u>	22
4	<u>Course Outcomes</u>	23
5	<u>CO-PO Mapping</u>	24
6	<u>Fundamental Background</u>	25
7	<u>How to study</u>	26
8	<u>Activities Planned</u>	27-29
9	<u>Glst of Cloud Computing</u>	30
10	<u>E Resources/Online Learning Center</u>	31

MODULE-1

- **CHAPTER 1: PYTHON BASICS**

Entering Expressions into the Interactive Shell, The Integer, Floating-Point, and String Data Types, String Concatenation and Replication, Storing Values in Variables, Your First Program, Dissecting Your Program

- **CHAPTER 2: FLOW CONTROL**

Boolean Values, Comparison Operators, Boolean Operators, Mixing Boolean and Comparison Operators, Elements of Flow Control, Program Execution, Flow Control Statements, Importing Modules, Ending a Program Early with `sys.exit()`

- **CHAPTER 3: FUNCTIONS**

Def Statements with Parameters, Return Values and return Statements, The None Value, Keyword Arguments and `print()`, Local and Global Scope, The `global` Statement, Exception Handling, A Short Program: Guess the Number

Textbook 1: Chapters 1 – 3 RBT: L1, L2

Contents

MODULE-2

- **CHAPTER 4: LISTS**

The List Data Type, Working with Lists, Augmented Assignment Operators, Methods, Example Program: Magic 8 Ball with a List, List-like Types: Strings and Tuples, References

- **CHAPTER 5: DICTIONARIES AND STRUCTURING DATA**

The Dictionary Data Type, Pretty Printing, Using Data Structures to Model Real-World Things

- **CHAPTER 6: MANIPULATING STRINGS**

Working with Strings, Useful String Methods, Project: Password Locker, Project: Adding Bullets to Wiki Mark-up

Textbook 1: Chapters 4 – 6 RBT: L1, L2, L3

Contents

MODULE-3

- **CHAPTER 7: PATTERN MATCHING WITH REGULAR EXPRESSIONS**
Finding Patterns of Text Without Regular Expressions, Finding Patterns of Text with Regular Expressions, More Pattern Matching with Regular Expressions, Greedy and Nongreedy Matching, The findall() Method, Character Classes, Making Your Own Character Classes, The Caret and Dollar Sign Characters, The Wildcard Character, Review of Regex Symbols, Case-Insensitive Matching, Substituting Strings with the sub() Method, Managing Complex Regexes, Combining re.IGNORECASE, re.DOTALL, and re.VERBOSE, Project: Phone Number and Email Address Extractor,
- **CHAPTER 8: READING AND WRITING FILES**
Files and File Paths, The os.path Module, The File Reading/Writing Process, Saving Variables with the shelve Module, Saving Variables with the pprint.pformat() Function, Project: Generating Random Quiz Files, Project: Multiclipboard.

[Contents](#)

MODULE-3

- **CHAPTER 9: ORGANIZING FILES**
The shutil Module, Walking a Directory Tree, Compressing Files with the zip file Module, Project: Renaming Files with American-Style Dates to European-Style Dates, Project: Backing Up a Folder into a ZIP File
- **CHAPTER 10: DEBUGGING**
Raising Exceptions, Getting the Traceback as a String, Assertions, Logging, IDLE's Debugger.

Textbook 1: Chapters 7 – 10 RBT: L1, L2, L3

[Contents](#)

MODULE-4

- **CHAPTER 15: CLASSES AND OBJECTS**

Programmer-defined types, Attributes, Rectangles, Instances as return values, Objects are mutable, Copying.

- **CHAPTER 16: CLASSES AND FUNCTIONS**

Time, Pure functions, Modifiers, Prototyping versus planning

Contents

MODULE-4

- **CHAPTER 17: CLASSES AND METHODS**

Object-oriented features, Printing objects, Another example, A more complicated example, The `init` method, The `__str__` method, Operator overloading, Type-based dispatch, Polymorphism, Interface and implementation,

- **CHAPTER 18: INHERITANCE**

Card objects, Class attributes, Comparing cards, Decks, Printing the deck, Add, remove, shuffle and sort, Inheritance, Class diagrams, Data encapsulation

Textbook 2: Chapters 15 – 18

RBT: L1, L2, L3

Contents

MODULE-5

- **CHAPTER 11: WEB SCRAPING**

Project: MAPIT.PY with the web browser Module, Downloading Files from the Web with the requests Module, Saving Downloaded Files to the Hard Drive, HTML, Parsing HTML with the BeautifulSoup Module, Project: "I'm Feeling Lucky" Google Search, Project: Downloading All XKCD Comics, Controlling the Browser with the selenium Module,

- **CHAPTER 12: WORKING WITH EXCEL SPREADSHEETS**

Excel Documents, Installing the openpyxl Module, Reading Excel Documents, Project: Reading Data from a Spreadsheet, Writing Excel Documents, Project: Updating a Spreadsheet, Setting the Font Style of Cells, Font Objects, Formulas, Adjusting Rows and Columns, Charts,

Contents

MODULE-5

- **CHAPTER 13: WORKING WITH PDF AND WORD DOCUMENTS**

PDF Documents, Project: Combining Select Pages from Many PDFs, Word Documents,

- **CHAPTER 14: WORKING WITH CSV FILES AND JSON DATA**

The csv Module, Project: Removing the Header from CSV Files, JSON and APIs, The json Module, Project: Fetching Current Weather Data

Textbook 1: Chapters 11 – 14 RBT: L1, L2, L3

Contents

TEXT BOOKS

1. Al Sweigart, "Automate the Boring Stuff with Python", 1st Edition, No Starch Press, 2015. (Available under CC-BY-NC-SA license at <https://automatetheboringstuff.com/>) (Chapters 1 to 18)
2. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", 2nd Edition, Green Tea Press, 2015. (Available under CC-BY-NC license at <http://greenteapress.com/thinkpython2/thinkpython2.pdf>) (Chapters 13, 15, 16, 17, 18) (Download pdf/html files from the above links)

Contents

REFERENCE BOOKS

- 1. Gowrishankar S, Veena A, "Introduction to Python Programming", 1st Edition, CRC Press/Taylor & Francis, 2018. ISBN-13: 978-0815394372
- 2. Jake VanderPlas, "Python Data Science Handbook: Essential Tools for Working with Data", 1st Edition, O'Reilly Media, 2016. ISBN-13: 978-1491912058
- 3. Charles Dierbach, "Introduction to Computer Science Using Python", 1st Edition, Wiley India Pvt Ltd, 2015. ISBN-13: 978-8126556014
- 4. Wesley J Chun, "Core Python Applications Programming", 3rd Edition, Pearson Education India, 2015. ISBN-13: 978-9332555365

Contents

Course Objectives

This course will enable students to:

- Learn the syntax and semantics of Python programming language.
- Illustrate the process of structuring the data using lists, tuples and dictionaries.
- Demonstrate the use of built-in functions to navigate the file system.
- Implement the Object Oriented Programming concepts in Python.
- Appraise the need for working with various documents like Excel, PDF, Word and Others.

[Contents](#)

Course Outcomes

The students should be able to:

- Demonstrate proficiency in handling of loops and creation of functions.
- Identify the methods to create and manipulate lists, tuples and dictionaries.
- Discover the commonly used operations involving regular expressions and file system.
- Interpret the concepts of Object-Oriented Programming as used in Python.
- Determine the need for scraping websites and working with CSV, JSON and other file formats.

[Contents](#)

CO-PO Mapping

SUBJECT NAME: APPLICATION DEVELOPMENT USING PYTHON

SUBJECT CODE: 18CS44

CO	PROGRAM OUTCOMES												PO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO1	PO2	PO3
PO1	2	2	2	2	2	2	1	1	2	2	2	2	2	2	2
PO2	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2
PO3	2	2	2	2	2	2	1	1	2	2	2	2	2	2	2
PO4	2	2	2	2	2	2	1	1	2	2	2	2	2	2	2
PO5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

1: LOW

2: MODERATE

3: HIGH

Contents

Fundamental Background

Prerequisites:

- Students should be fairly comfortable programming in Python, preferably with some experience developing web applications and working with databases.
- Know some basics about developing the backend of a sample app & front end design using HTML or JavaScript.

Contents

How to study

- Subject is more into technical aspects and full of programming concepts.
- There are number of programming examples which helps you to learn coding python.
- Key to learn this subject – Understand the concepts and find a real time application of the concept for better understanding.

Note:

If you plan to enter IT Industry – you must understand these concepts thoroughly.

Contents

Activity 1

Module-1

Name: Debate

- Team Size: 5
- Learning: Characteristics, Benefits, Pros & Cons of Python Programming.
- Audience: All students of V semester class

Contents

Activity 2

Module-2

Name: Quiz (Objective Type Questions)

- Team size: Individual
- Learning: Chapter 4,5 & 6
- Participants: All students of class

Contents

Activity 3

Module-5

Name: Technical Seminar

Team Size: 2

Learning: Communication skills, Team work,
Presentation skills

Participants: All students of V semester class

Contents

E-resources/Online Learning Center

- NPTEL

[https://www.youtube.com/playlist?list=PLJ5C_6qd](https://www.youtube.com/playlist?list=PLJ5C_6qdAvBEuTZLWTUkPL7gfDngyAoNT)

[AvBEuTZLWTUkPL7gfDngyAoNT](https://www.youtube.com/playlist?list=PLJ5C_6qdAvBEuTZLWTUkPL7gfDngyAoNT)

- YOUTUBE LINK-

[https://www.youtube.com/playlist?list=PLGoJzB27](https://www.youtube.com/playlist?list=PLGoJzB271_7r-iLYuEHEPJ5pSIYxXjJEn)

[1_7r-iLYuEHEPJ5pSIYxXjJEn](https://www.youtube.com/playlist?list=PLGoJzB271_7r-iLYuEHEPJ5pSIYxXjJEn)

Contents

Subject Name:

UNIX PROGRAMMING

Subject Code:

18CS56

Faculty Name:

SUSHMA S G

Contents

- Syllabus
- Activities
- E-resources/links/material availability/
experiments
- Question Papers
- Course outcomes
- Consolidated outcomes, CO-PO mapping with
justification

Syllabus

Module	Contact Hours
<p>Module 1</p> <p>Introduction: Unix Components/Architecture, Features of Unix The UNIX Environment and UNIX Structure, Posix and Single Unix specification General features of Unix commands/ command structure Command arguments and options, Basic Unix commands such as echo, printf, ls, who, date, passwd, cat, Combining commands, Meaning of Internal and external commands The type command, knowing the type of a command and locating it. The root login Becoming the super user su command</p> <p>Unix files: Naming files Basic file types/categories, Organization of files, Hidden files, Standard directories, Parent child relationship, The home directory and the HOME variable, Reaching required files, the PATH variable, manipulating the PATH, Relative and absolute pathnames, Directory commands - pwd, cd, mkdir, rmdir commands, The dot (.) and double dots (..) notations to represent present and parent directories and their usage in relative path names, File related commands - cat, mv, rm, cp, wc and od commands.</p>	08
<p>RBT: LL, L2</p> <p>Module 2</p> <p>File attributes and permissions: The ls command with options, Changing file permissions: the relative and absolute permissions changing methods, Recursively changing file permissions, Directory permissions, Removing the special meanings of wild cards, The shells interpretive cycle: Wild cards, Connecting commands: Pipe, Basic and Extended Three standard files and redirection, Connecting commands: Typical examples involving different regular regular expressions, The grep, egrep, Typical examples involving different regular expressions.</p> <p>Shell programming: Ordinary and environment variables, The profile, Read and readonly commands, Command line arguments, exit and exit status of a command, Logical operators for conditional execution, The test command and its shortcut, The if, while, for and case control statements, The set and shift commands and handling positional parameters, The here (=>) document and trap command Simple shell program examples.</p>	08
<p>RBT: LL, L2</p> <p>Module 3</p> <p>UNIX File APIs: General File APIs, File and Record Locking, Directory File APIs, Device File APIs, FIFO File APIs, Symbolic Link File APIs.</p> <p>UNIX Processes and Process Control: The Environment of a UNIX Process: Introduction, main function, Process Termination, Command Line Arguments, Environment List, Memory Layout of a C Program, Shared</p>	08

<p>Libraries: Memory Allocation, Environment Variables, setjmp and longjmp Functions, getrlimit, setrlimit Functions, UNIX Kernel Support for Processes.</p> <p>Process Control: Introduction, Process Identifiers, fork, vfork, exit, wait, waitpid, wait3, wait4 Functions, Race Conditions, exec Functions</p>	
RBT: LL, L2, L3	
Module 4	
<p>Changing User IDs and Group IDs, Interpreter Files, system Function, Process Accounting, User Identification, Process Times, IO Redirection</p> <p>Overview of IPC Methods: Pipes, popen, pclose Functions, Coprocesses, FIFOs, System V IPC, Message Queues, Semaphores.</p> <p>Shared Memory, Client-Server Properties, Stream Pipes, Passing File Descriptors, An Open Server-Version 1, Client-Server Connection Functions.</p>	08
RBT: LL, L2, L3	
Module 5	
<p>Signals and Daemon Processes: Signals: The UNIX Kernel Support for Signals, signal, Signal Mask, sigaction, The SIGCHLD Signal and the waitpid Function, The sigsetjmp and siglongjmp Functions, Kill, Alarm, Interval Timers, POSIX.1b Timers, Daemon Processes: Introduction, Daemon Characteristics, Coding Rules, Error Logging, Client-Server Model</p>	08
RBT: LL, L2, L3	
Course Outcome: The student will be able to:	

Activity

Program Write Up

Learning: Learns to write shell scripts on different problems.

Participants : All Students

E-resources/links/material availability/ experiments

1. <https://www.azdocuments.in/2020/09/unix-programming18cs56.html>
2. <https://www.vtupulse.com/cbcs-cse-notes/18cs56-unix-programming-notes/>

Question Papers

Model Question Paper I with effect from 2019-20 (CBCS Scheme)
5th Semester B.E. Degree Examination
CANAL DESIGN

Time: 3 hours
 Marks: 100
 Answer any FOUR full questions, choosing at least THREE questions from each Module I & II.

Module I		
Q.1	(a)	10
	(b)	10
Q.2	(a)	5
	(b)	5
	(c)	5
Q.3	(a)	5
	(b)	5
	(c)	5
Q.4	(a)	10
	(b)	5
	(c)	5
Q.5	(a)	10
	(b)	10

Q.6	(a)	10
	(b)	10
Q.7	(a)	10
	(b)	10
	(c)	10
Q.8	(a)	10
	(b)	10
	(c)	10
Q.9	(a)	10
	(b)	10
	(c)	10
Q.10	(a)	10
	(b)	10
	(c)	10

Course Outcomes

- The student will be able to :
- Explain Unix Architecture, File system and use of Basic Commands
- Illustrate Shell Programming and to write Shell Scripts
- Categorize, compare and make use of Unix System Calls
- Build an application/service over a Unix system.

CO-PO Mapping

Subject Name: **Cryptography, Network security and cyber law**

Subject Code: **17CS61**

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO1	1	1	2	1	1	1	1	1	2	1	-	1	1	1	1
CO2	2	2	2	1	2	2	2	2	2	1	1	2	1	1	1
CO3	1	2	1	1	1	2	2	2	2	1	1	2	1	1	1
CO4	2	2	2	2	2	2	2	2	2	2	1	2	1	1	1
Total	2	2	2	1	2	2	2	2	2	1	1	2	1	1	1
1: LOW				2: MODERATE				3: HIGH							

PO: Program Outcomes, PSO: Program Specific Outcomes

Standard Materials as per University

1. Sumitabha Das., Unix Concepts and Applications., 4th Edition., Tata McGraw Hill (Chapter 1,2,3,4,5,6,8,13,14)
2. W. Richard Stevens: Advanced Programming in the UNIX Environment, 2nd Edition, Pearson Education, 2005 (Chapter 3,7,8,10,13,15)
3. Unix System Programming Using C++ - Terrence Chan, PHI, 1999. (Chapter 7,8,9,10)

An presentation on

DBMS LABORATORY

Subject Code: 18CSL58

NBA CODE: C308

Dr. Mouneshachari S

Associate Professor

Syllabus

PART-A: SQL Programming

- Design, develop, and implement the specified queries for the following problems using Oracle, MySQL, MS SQL Server, or any other DBMS under LINUX/Windows environment.
- Create Schema and insert at least 5 records for each table. Add appropriate database constraints.

PART-B: Mini Project

- Use Java, C#, PHP, Python, or any other similar front-end tool. All applications must be demonstrated on desktop/laptop as a stand-alone or web based application (Mobile apps on Android/iOS are not permitted.)

Installation procedure of the required software must be demonstrated, carried out in groups and documented in the journal.

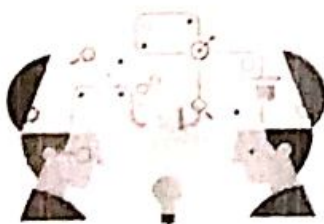
36 Contact Hours

Course Outcomes Mapping

Course Outcome	Program Outcomes												Program Specific Outcomes		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	3	3	3	3	2	1	1	0	1	1	1	2	3	3	3
CO-2	3	3	3	3	2	1	1	0	1	1	1	2	3	3	3
CO-3	3	3	3	3	3	3	3	0	3	3	3	2	3	3	3
Highcut	3	3	3	3	3	3	3	0	3	3	3	2	3	3	3

1 - Low, 2 - Medium, 3 - High

Activities



1. Poster presentation on "Design of Case studies using ER diagram and Schema Diagram"
2. Workshop on web application development using PHP and MySQL
3. Mini Project development
4. Mini project exhibition

Beyond the syllabus

10 Contact Hours

1. Application development using PHP and MySQL
2. Web application development using Content Management Systems (Joomla or Wordpress)

WEB TECHNOLOGY AND ITS APPLICATIONS



Module 1

10 Hours

Introduction to HTML, What is HTML and Where did it come from?, HTML Syntax, Semantic Markup, Structure of HTML Documents, Quick Tour of HTML Elements, HTML5 Semantic Structure Elements

Introduction to CSS What is CSS CSS Syntax, Location of Styles, Selectors, The Cascade: How Styles Interact, The Box Model, CSS Text Styling

Mapping CO: CO1

Learning outcomes from module 1

10 Hours

1. Knowledge about origin and importance of HTML
2. Understanding the Syntax of HTML
3. Writing and execution of HTML programs
4. Understanding the need of CSS
5. Embedding CSS in HTML
6. Writing and execution of CSS with HTML

Mapping CO: CO1

Module 2

10 Hours

HTML Tables and Forms, Introducing Tables, Styling Tables, Introducing Forms, Form Control Elements, Table and Form Accessibility, Microformats

Advanced CSS Layout, Normal Flow, Positioning Elements, Floating Elements, Constructing Multicolumn Layouts, Approaches to CSS Layout, Responsive Design, CSS Frameworks

Mapping CO: CO2

Learning outcomes from module 2

10 Hours

1. Understanding the Tables and Forms of HTML
2. Creating HTML layouts using Tables and Forms
3. Understanding the advanced CSS
4. Creating of CSSfiles and using them with HTML

Mapping CO: CO2

Module 3

10 Hours

JavaScript Client-Side Scripting, What is JavaScript and What can it do?, JavaScript Design Principles, Where does JavaScript Go?, Syntax, JavaScript Objects, The Document Object Model (DOM), JavaScript Events, Forms,

Introduction to Server-Side Development with PHP, What is Server-Side Development, A Web Server's Responsibilities, Quick Tour of PHP, Program Control, Functions

Mapping CO: CO3

Learning outcomes from module 3

10 Hours

1. Understanding Client side scripting language
2. Embed simple JavaScript functions in HTML
3. Creating interactive web pages
4. Understanding Server Side scripting language and PHP syntaxes
5. Creating simple php pages

Mapping CO: CO3

Module 4

10 Hours

PHP Arrays and Superglobals, Arrays, \$_GET and \$_POST Superglobal Arrays, \$_SERVER Array, \$_FILES Array, Reading/Writing Files,

PHP Classes and Objects, Object-Oriented Overview, Classes and Objects in PHP, Object Oriented Design, Error Handling and Validation, What are Errors and Exceptions?, PHP Error Reporting, PHP Error and Exception Handling

Mapping CO: CO4

Learning outcomes from module 4

10 Hours

1. Understanding PHP arrays, Files
2. Creating simple data handling PHP pages
3. Understanding Cookies using PHP
4. Embedding error handling using PHP

Mapping CO: CO4

Module 5

10 Hours

Managing State, The Problem of State in Web-Applications.
Passing Information via Query Strings, Passing Information via the URL Path,
Cookies, Sessionization, Session State, HTML5 Web Storage, Caching,
Advanced JavaScript and JQuery, JavaScript Resource-Casas, JQuery
Foundations,
AJAX, Asynchronous File Transmission,
Animation, Backbone MVC-Frameworks, XML, Processing and Web Services,
XML Processing, JSON Overview of Web-Services

Mapping CO: CO6

Learning outcomes from module 5

10 Hours

1. Understanding states
2. Creating web pages with passing values
3. Understanding AJAX
4. Understanding the need of animations, XML, JSON in web design

Mapping CO: CO6

Course Outcomes:

- CO1: Adapt HTML and CSS syntax and semantics to build web pages.
- CO2: Construct and visually format tables and forms using HTML and CSS
- CO3: Develop Client-Side Scripts using JavaScript and Server-Side Scripts using PHP to generate and display the contents dynamically
- CO4: Appraise the principles of object oriented development using PHP
- CO6: Inspect JavaScript frameworks like JQuery and Backbone which facilitates developer to focus on core features

CO-PO Mapping

SUBJECT CODE: 15CS71

SUBJECT NAME: WEB TECHNOLOGY AND ITS APPLICATIONS

Course Outcomes	Program Outcomes										Program Specific Outcomes					
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3	
401	3	1	3	1	3	2	0	0	1	2	1	3	3	3	3	3
401.1	3	1	3	1	3	2	0	0	1	2	1	3	3	3	3	3
401.2	3	1	3	1	3	2	0	0	1	2	1	3	3	3	3	3
401.3	3	1	3	1	3	2	0	0	1	2	1	3	3	3	3	3
401.4	3	2	3	1	3	2	0	0	2	2	2	3	3	3	3	3
401.5	3	2	3	3	3	2	0	0	2	2	2	3	3	3	3	3
Total	3	2	3	3	3	2	0	0	2	2	2	3	3	3	3	3

1: LOW

2: MODERATE

3: HIGH

E-resources/links/material availability/experiments

Websites

<https://www.w3schools.com/html/default.asp>

<https://www.w3schools.com/js/default.asp>

<https://www.w3schools.com/css/default.asp>

<https://www.w3schools.com/php/default.asp>

Subject Name:

ADVANCED COMPUTER ARCHITECTURES

Subject Code:

17CS72

Faculty Name:

Mr. Rudresh N C

Contents

- Syllabus
- Objectives
- Fundamental background
- New topics which student can learn
- Activities
- E-resources/links/material availability/ experiments
- Mini project
- Question bank
- Module outcomes
- Consolidated outcomes, CO-PO mapping with justification
- Components/ materials/ software required for lab

Course Outcomes-Defined

After studying this course, students will be able to

C402.1: Able to describe various architecture like 80386 to P-IV

C402.2: Able to solve simple calculation of power, cost and performance on computer design

C402.3: Able to demonstrate pipeline, pipeline hazards, ILP and implementation of pipeline

C402.4: Able to describe various memory hierarchy and its architectures

C402.5: Analyze advanced optimization of cache performance, protection of virtual memory and virtual machine

Standard Materials as per University

Text Books

Kai Hwang and Naresh Jotwani, Advanced Computer Architecture (SIE): Parallelism, Scalability, Programmability, McGraw Hill Education 3/e. 2015

Reference Books:

John L. Hennessy and David A. Patterson, Computer Architecture: A quantitative approach, 5th edition, Morgan Kaufmann Elseveir, 2013

Course objectives:

This course will enable students to

- Describe computer architecture.
- Measure the performance of architectures in terms of right parameters.
- Summarize parallel architecture and the software used for them.

CO-PO Mapping

Subject Name: **ADVANCED COMPUTER ARCHITECTURES**

Subject Code: **17CS72**

402	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
402.1	2	3	2	1	2	1	1	-	1	1	1	2	2	2	2
402.2	3	3	3	2	2	-	-	-	2	2	-	2	2	2	2
402.3	2	3	3	2	-	-	1	-	2	1	3	1	2	2	2
402.4	2	3	3	2	-	-	1	-	2	1	3	1	2	2	2
402.5	2	3	2	2	2	1	1	-	3	1	1	1	2	2	2
Total	3	3	3	2	2	1	1	-	3	2	3	2	2	2	2
1. LOW					2. MODERATE					3. HIGH					

PO: Program Outcomes, PSO: Program Specific Outcomes

Activity- Module-1

Generate Multiple Choice question

- Learning: Choosing the correct answers.
- Create a question paper of 60 questions with more stress being given on the basic fundamentals of the present module. Few questions must be related to Computer Organization, Data Structures, Operating System. Since course play a basic role in understanding the subject.
- The question can be created based on certain company technical round quires. It will help students do well in Interviews and Oral exams.

Participants: All students of class

Activity- Module-2

Presentation Skills

- Team size: 8-10
- Learning: Communication skills, Team work, Presentation skills
- Topics : Memory Hierarchy, Processor Technology, Vector Processor and Virtual Memory Concept.
- Each team will be given a part of the module and informed to prepare the brief view of the topic in coordination with all the member of the team.
- An individual from the team will be asked to present the content / documentation created on behalf of the team.
- The total time given for the team can be at most 15-20 Minutes.

Participants: All students of class

Activity- Module - 3

Role play on Bus, Memory Organization, Pipeline

Team Size: 7-8

Learning: Working of Memory Organizations and its Models, Different Techniques in Pipelines.

Participants: Teams will be made to present the concept based on working pattern and a member of will explain the process with considering each student of his team as one of the entity of the system.

Participants: All students of class

Activity- Module-5

Open Book Test.

Team Size: 7-8

Learning: Team work, Documentation skills

Concept: Ten to twelve questions are generate out of the entire module. The students are informed to bring any material such a Text Book, Notes, Smart Phone, Library Resources and answer the question.

The trick is to create a Question which covers the entire Module and also the Important points which makes the fundamental importance in the subject.

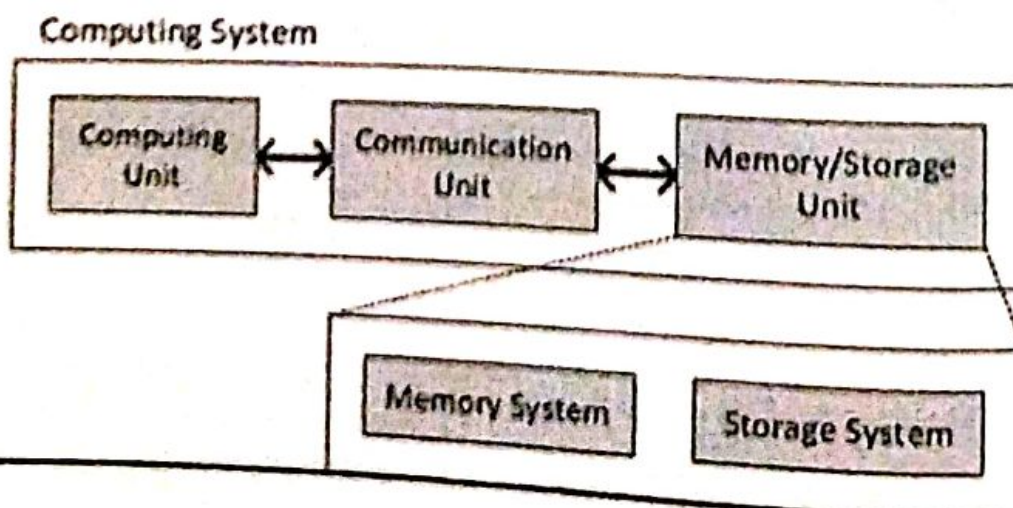
Participants: All students of class

E-resources/links/material availability/ experiments

- <https://www.slideshare.net/.../introduction-to-advanced-computer-architecture>
- <https://www.tutorialspoint.com/Parallel-Computer-Architecture/>
- web.cs.lastate.edu/~prabhu/Tutorial/title.htm
- www.astro.yale.edu/coppl/astro520/compute_architecture/architect1.pdf
- nptel.ac.in/courses/106105033/20
- https://computing.llnl.gov/tutorials/parallel_comp/
- <https://www.youtube.com/watch?v=5qVzeYxbPbl>
- <https://eduboard.com/computer-science/architecture-and-engineering/>
- <https://pdfs.semanticscholar.org/4bd9/9622f8f83e80c8145dda5852b9a3e8ab3d4a.pdf>
- <https://resources.sel.cmu.edu/library/asset-view.cfm?assetid=52435>

What is A Computer?

- Three key components
- Computation
- Communication
- Storage (memory)

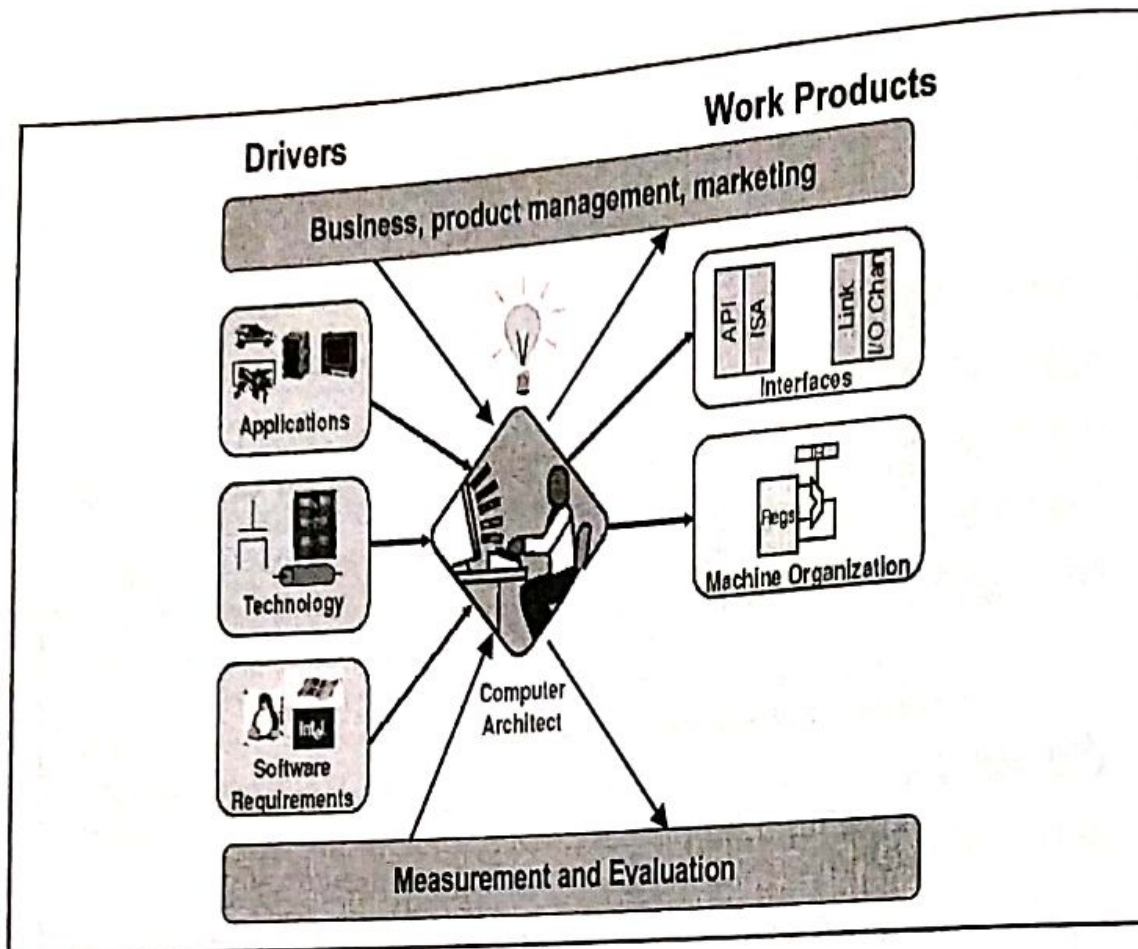


What is Computer Architecture?

- The science and art of designing, selecting, and interconnecting hardware components and designing the hardware/software interface to create a computing system that meets functional, performance, energy consumption, cost, and other specific goals.
- We will soon distinguish between the terms *architecture*, and *microarchitecture*.

Why Study Computer Architecture?

- Enable better systems: make computers faster, cheaper, smaller, more reliable, ...
 - By exploiting advances and changes in underlying technology/circuits
- Enable new applications
 - Life-like 3D visualization 20 years ago?
 - Virtual reality?
 - Personal genomics?
- Enable better solutions to problems
 - Software innovation is built into trends and changes in computer architecture
 - > 50% performance improvement per year has enabled this innovation
- Understand why computers work the way they do



What You Need to Know from prerequisites

Basic machine structure

- Processor, memory, I/O

Assembly language programming

Simple operating system concepts

Logic design

- Logical equations, schematic diagrams, FSMs, Digital design

Computer Architecture's Changing Definition

1950s Computer Architecture

- Computer Arithmetic

1960s

- Operating system support, especially memory management

1970s to mid 1980s Computer Architecture

- Instruction Set Design, especially ISA appropriate for compilers
- Vector processing and shared memory multiprocessors

1990s Computer Architecture

- Design of CPU, memory system, I/O system, Multi-processors, Networks
- Design for VLSI

2000s Computer Architecture:

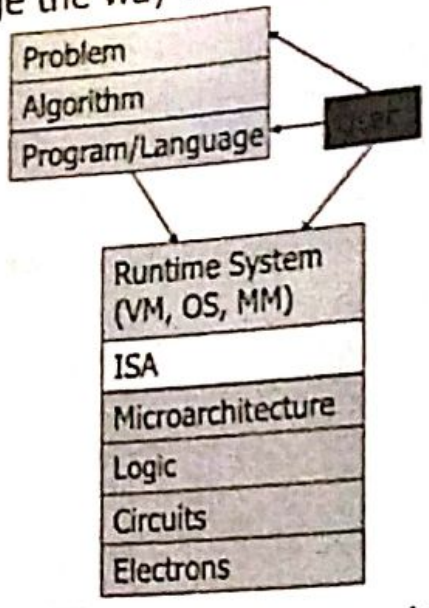
- Special purpose architectures, Functionally reconfigurable, Special considerations for low power/mobile processing, highly parallel structures

Computer Architecture Today (I)

- Today is a very exciting time to study computer architecture
- Industry is in a large paradigm shift (to multi-core and beyond) – many different potential system designs possible
- Many difficult problems *motivating* and *caused by* the shift
 - Power/energy constraints
 - Complexity of design → multi-core?
 - Difficulties in technology scaling → new technologies?
 - Memory wall/gap
 - Reliability wall/issues
 - Programmability wall/problem
- No clear, definitive answers to these problems

Computer Architecture Today (II)

These problems affect all parts of the computing stack – if we do not change the way we design systems



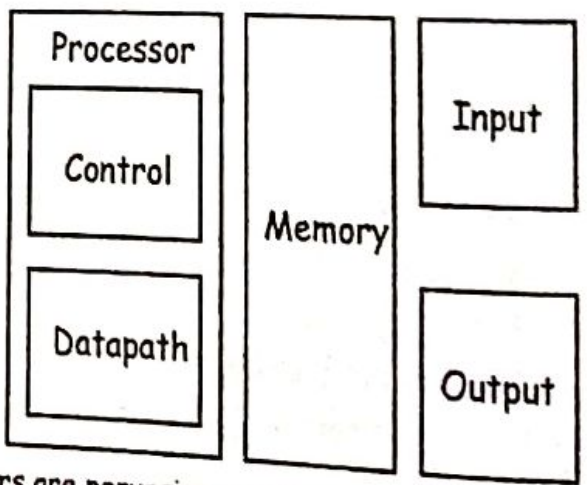
No clear, definitive answers to these problems

This Course Focuses on General Purpose Processors

- A general-purpose computer system
- Uses a programmable processor
 - Can run "any" application
 - Potentially optimized for some class of applications
 - Common names: CPU, DSP, NPU, microcontroller, microprocessor

- Unified main memory
- For both programs & data
 - Von Neumann computer

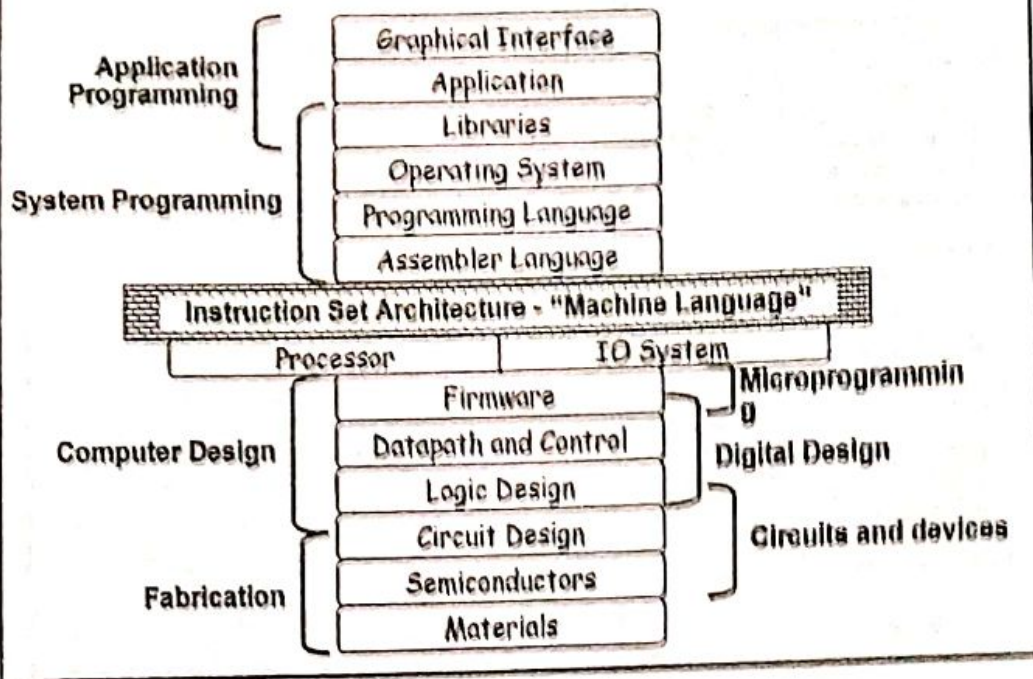
Busse & controllers to connect processor, memory, IO devices



MIT Whirlwind, 1951

Computers are pervasive - servers, standalone PCs, network processors, embedded processors, ...

Levels of Abstraction



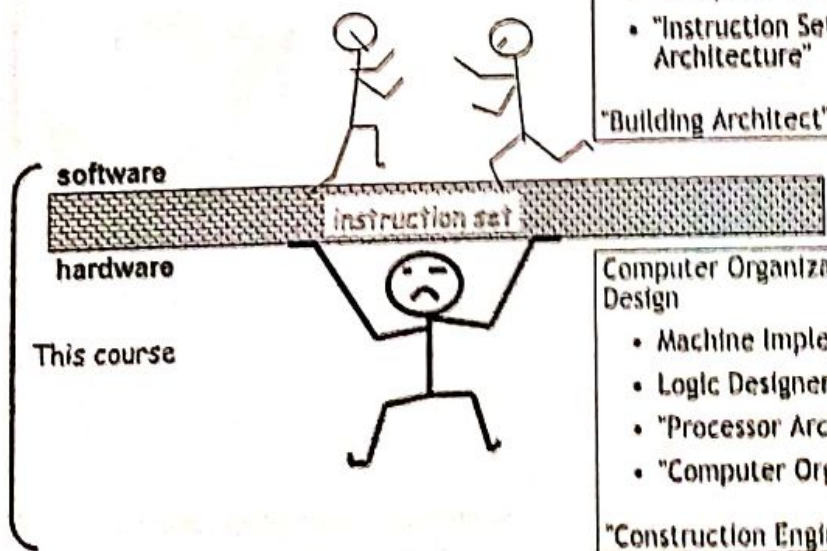
The Instruction Set: A Critical Interface

Computer Architecture =
Instruction Set Architecture +
Machine Organization

Instruction Set Design

- Machine Language
- Compiler View
- "Computer Architecture"
- "Instruction Set Architecture"

"Building Architect"



Computer Organization and Design

- Machine Implementation
- Logic Designer's View
- "Processor Architecture"
- "Computer Organization"

"Construction Engineer"

Instruction Set Architecture

- Data Types
 - Encoding and representation
- Memory Model
- Program Visible Processor State
 - General registers
 - Program counter
 - Processor status
- Instruction Set
 - Instructions and formats
 - Addressing modes
 - Data structures
- System Model
 - States
 - Privilege
 - Interrupts
 - IO
- External Interfaces
 - IO
 - Management

Architecture Reference Manual
Principles of Operation
Programming Guide
...

... the attributes of a [computing] system as seen by the programmer, i.e. the conceptual structure and functional behavior, as distinct from the organization of the data flows and controls the logic design, and the physical implementation.

Applications Drive Design Points

Numerical simulations

- Floating-point performance
- Main memory bandwidth

Transaction processing

- I/Os per second and memory bandwidth
- Integer CPU performance

Media processing

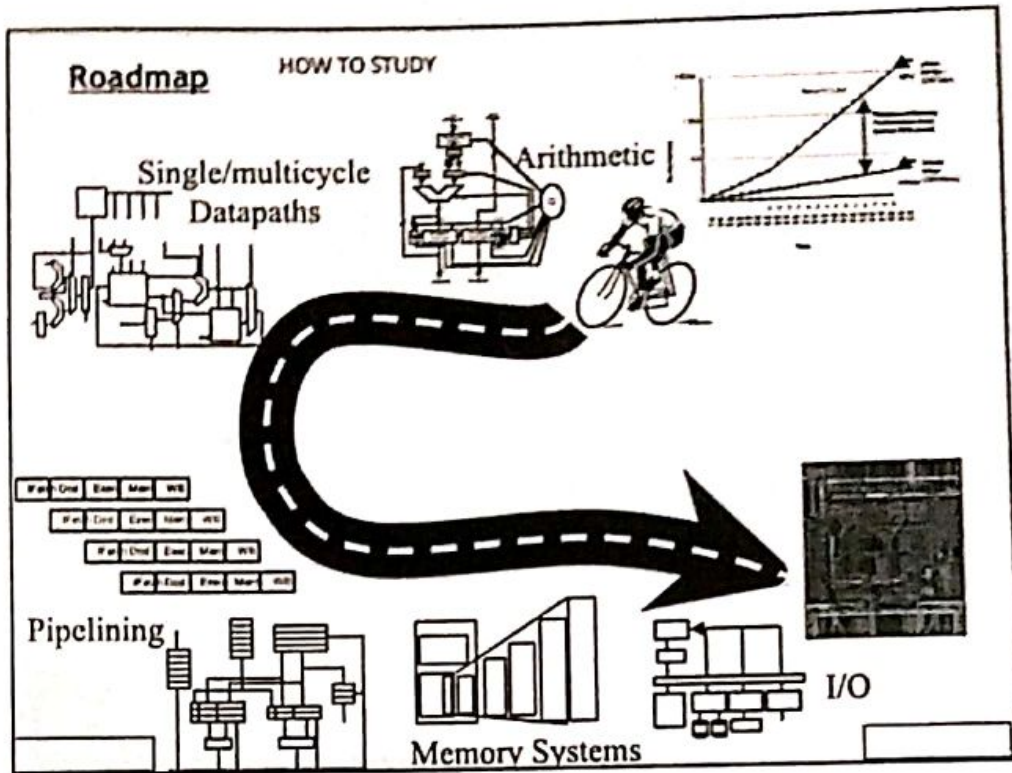
- Repeated low-precision 'pixel' arithmetic
- Multiply-accumulate rates
- Bit manipulation

Embedded control

- I/O timing
- Real-time behavior



Architecture decisions will often exploit application behavior



Subject: Information and Network Security

Subject Code: 17CS743

- ▶ **Mr. Shivanna K**
- ▶ **Asst Professor, Dept of CSE**
- ▶ **GMIT**

Contents

- ▶ Syllabus
- ▶ Objectives
- ▶ Fundamental background
- ▶ New topics which student can learn
- ▶ Activities
- ▶ E-resources/links/material availability/ experiments
- ▶ Mini project
- ▶ Question bank
- ▶ Module outcomes
- ▶ Consolidated outcomes, CO-PO mapping with justification
- ▶ Components/ materials/ software required for lab

Module-1: Introduction

- ▶ How to Speak Crypto.
- ▶ Simple Substitution Cipher.
- ▶ Cryptanalysis of a Simple Substitution.
- ▶ Double Transposition Cipher, One-time Pad.
- ▶ Taxonomy of Cryptography.
- ▶ Taxonomy of Cryptanalysis.

Module Outcome: CO1

Learning Outcomes:

At the end of the module student should be able to:

1. *Define* cryptography and its terminology.
2. *Apply* simple substitution cipher to obtain cipher text.
3. *Define* OTP and its utilization.
4. *Learn* taxonomy of cryptography and cryptanalysis.

Module-2

- ▶ What is a Hash Function?
- ▶ The Birthday Problem
- ▶ Non-cryptographic Hashes
- ▶ Uses of Hash Functions.
- ▶ Secret Sharing.
- ▶ Random Numbers.
- ▶ Texas Hold 'em Poker.
- ▶ Generating Random Bits.

Module Outcome: CO1

Learning Outcomes:

At the end of the module student should be able to:

1. *Define* hash functions and its advantages.
2. *Analysis* of Birthday problem.
3. *Define* secret sharing on secure channels.
4. *Define* random numbers generation and its uses.

Module 3

- ▶ Random number generation
- ▶ Fundamentals of entity authentication
- ▶ Dynamic password schemes
- ▶ Zero-knowledge mechanisms
- ▶ Authentication and key establishment protocols

Module Outcome: CO3

Learning Outcomes:

At the end of the module student should be able to:

1. *Define* entity authentication using digital signature.
2. *Design* dynamic password scheme in a public transaction.
3. *Apply* authentication and key distribution protocol.

Module-4

- ▶ Key management fundamentals
- ▶ Key lengths and lifetimes
- ▶ Key generation, Key establishment
- ▶ Key storage, Key usage
- ▶ Certification of public keys
- ▶ Public-key management models

Module Outcome: CO4

Learning Outcomes:

At the end of the module student should be able to:

1. *Define* key management and key distribution.
2. *Define* length of the key and its lifetime.
3. *Learn* about key storage schemes.
4. *Knowledge* of public key management models.

Module-5:

- ▶ Cryptographic Applications
- ▶ Cryptography on the Internet
- ▶ Cryptography for wireless local area networks
- ▶ Cryptography for mobile telecommunications
- ▶ Cryptography for secure payment card transactions
- ▶ Cryptography for identity cards
- ▶ Cryptography for home users

Module Outcome: CO2, CO4

Learning Outcomes:

At the end of the module student should be able to:

1. *How to Apply* cryptography in real world applications.
2. *Apply* cryptography on internet, wireless LAN.
3. *Apply* cryptography on secure payment card, identity card and home users.

Text books and References

Text Books:

1. Information Security: Principles and Practice, 2nd Edition by Mark Stamp Wiley.
2. Everyday Cryptography: Fundamental Principles and Applications Keith M. Martin
Oxford Scholarship Online: December 2013

Reference Books:

1. Applied Cryptography Protocols, Algorithms, and Source Code in C by Bruce Schneier.

Course objectives:

This course will enable students to :

1. Analyze the cryptographic processes.
2. Summarize the digital security process.
3. Indicate the location of a security process in the given system

Course Outcomes

After studying this course, students will be able to:

1. Analyze the Digital security lapses.
2. Illustrate the need of key management.
3. Illustrate the need of random number generation and passwords.
4. Apply cryptographic techniques on real world applications.

CO-PO Mapping

SUBJECT NAME: Information & Network Security

SUBJECT CODE:17CS743

Course Outcomes	Program Outcomes												Program Specific Outcomes					
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	Total	PSO-1	PSO-2	PSO-3	Total	
CA043.1	3	3	3	3	1			1					3	14	3	2	3	B
CA043.2	3	3	3	1	1	2		1					3	14	3	2	3	B
CA043.3	3	3	3	2	1	1	2	1	1	1	1	1	3	22	3	2	3	B
CA043.4	3	3	3	2	1	1	2	1	1	1	1	1	3	22	3	2	3	B
Total	3	3	3	3	1	2	2	1	1	1	1	1	3		3	2	3	

Fundamental Background

Prerequisites:

- ▶ Basic Mathematics, Functions, Number systems.
- ▶ Problem solving skills.
- ▶ Plain text, cipher text and key.
- ▶ Basics of computer network.

Activities

Design and develop the OTP, substitution cipher and transposition cipher

- ▶ Team size: 8-10
- ▶ Learning: Project development

Participants: All students of class

Design and develop the MAC, MD, MD5

- ▶ Team Size: 8-10
- ▶ Learning: Project development

Participants: All students of class

Activities

Design and develop the key generation using random number.

- Team size: 8-10
 - Learning: Project development
- Participants: All students of class

Design and develop the algorithm for secure data sharing on public user.

- Team Size: 8-10
 - Learning: Project development
- Participants: All students of class

What is the gist of this subject?

- Cryptography
- Cryptanalysis
- Random number generation
- Hash functions
- Key length and life time
- Cryptographic applications

Subject : Storage Area Networks
Subject Code: 17CS754

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Asst Professor,
Dept of CSE, GMIT

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Contents

- > Course Objectives
- > Course Outcomes
- > Module-wise Syllabus
- > Textbooks and references
- > CO PO Mapping
- > Fundamental background
- > How to Study
- > Activities
- > E-resources/links/material availability/ experiments

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Course objectives:

This course will enable students to :

1. Evaluate Storage Architectures.
2. Define backup, recovery, disaster recovery, business continuity, and replication.
3. Examine emerging technologies including IP-SAN.
4. Understand logical and physical components of storage infrastructures.
5. Identify components of managing and monitoring the data centre.
6. Define information security and identify different storage virtualization technologies.

Course Outcomes

After studying this course, students will be able to:

CO1: Identify key challenges in managing information and analyze different storage networking technologies and virtualization

CO2: Explain components and the implementation of NAS

CO3: Describe CAS architecture and types of archives and forms of virtualization

CO4: Illustrate the storage infrastructure and management activities

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Module-1: Storage System

- **Introduction** : Evolution of Storage Architecture, Data Center Infrastructure, Virtualization and Cloud Computing.
- **Key Data Center Environment**: Application, Host (Compute), Connectivity, Storage.
- **Data Protection**: RAID Implementation Methods, RAID Techniques, RAID Levels, RAID Impact on Disk Performance.
- **Intelligent Storage Systems**: Components of Intelligent Storage System, Storage Provisioning.

Module Outcome: CO1

11/08/20

5

Learning Outcomes:

At the end of the module student should be able to:

1. Understand Evolution of Storage Architecture
2. Understand RAID Implementation methods
3. Define Intelligent storage systems.

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6

Module-2: Storage Networking Technologies Fibre Channel Storage Area Networks

- Components of FC SAN, FC connectivity, Fibre Channel Architecture, Zoning, FC protocol stack, addressing and operations.
- **IP SAN and FCoE:** iSCSI, FCIP, FCoE. Network Attached Storage: Components of NAS, NAS I/O Operation, NAS File-Sharing Protocols, File-Level Virtualization.
- File level storage virtualization, Object based storage and unified storage platform.

Module Outcome: CO1, CO2

Learning Outcomes:

At the end of the module student should be able to:

1. Identify the various communication technologies in storage area networks
2. Demonstrate the working of Fibre channel network.
3. Explain components and the implementation of NAS

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Module 3: Backup, Archive & Replication

- **Introduction to Business Continuity:** Information Availability, BC Terminology, BC Planning Lifecycle, Failure Analysis, BC Technology Solutions.
- **Backup and Archive:** Backup Methods, Backup Topologies, Backup Targets, Data Deduplication for Backup, Backup in Virtualized Environments, Data Archive.
- **Local Replication:** Replication Terminology, Uses of Local Replicas, Local Replication Technologies, Local Replication in a Virtualized Environment.
- **Remote Replication:** Remote Replication Technologies, Three-Site Replication, Remote Replication and Migration in a Virtualized Environment.
- **Module Outcome: CO3**

9

Learning Outcomes:

At the end of the module student should be able to:

1. Discuss Backup, Archive and Replication of storage data
2. Describe CAS architecture and types of archives and forms of virtualization

11/08/20

10

Module-4: Cloud Computing Characteristics and benefits

- Business drivers, definition, essential characteristics, and phases of journey to the Cloud.
- Business drivers for Cloud computing, Definition of Cloud computing, Characteristics of Cloud computing.
- Steps involved in transitioning from Classic data center to Cloud computing environment Services and deployment models.
- Cloud infrastructure components, Cloud migration considerations

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Module Outcome: CO3, CO4

11

Learning Outcomes:

At the end of the module student should be able to:

1. Understand the Cloud computing and Virtualization of huge data storage.
2. Describe about various Virtualization appliances
3. Brief on storage management.

11/08/20

12

Module-5: Securing and Managing Storage Infrastructure

- Focus on framework and domains of storage security along with covering security.
- Implementation at storage networking, Security threats, and countermeasures in various domains Security solutions for FC-SAN, IP-SAN and NAS environments.
- Security in virtualized and cloud environments, Monitoring and managing various information infrastructure components in classic and virtual environments, Information lifecycle management (ILM) and storage tiering, Cloud service management activities

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· **Module Outcome: C04**

13

Learning Outcomes:

At the end of the module student should be able to:

1. Illustrate the storage infrastructure and management activities
2. Analyse Securing and managing challenges of Storage infrastructure.

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14

Text books

Text Books:

1. Information Storage and Management, Author :EMC Education Services, Publisher: Wiley ISBN: 9781118094839

2. Storage Virtualization, Author: Clark Tom, Publisher: Addison Wesley Publishing Company ISBN : 9780321262516

11/08/20

15

CO-PO Mapping

SUBJECT NAME: STORAGE AREA NETWORKS

SUBJECT CODE:
17CS754

Course Outcomes	Program Outcomes												Program Specific Outcomes			
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3	
4054																
4054.1	2	2	2								2	2	2	1	1	
4054.2	2	2	2								2	2	2	1	1	
4054.3	2	2	2								2	2	2	1	1	
4054.4	2	2	2								2	2	2	1	1	
Total																

11/08/20 1: LOW

2:
MODERATE

16

3: HIGH

Fundamental Background

Prerequisites:

- Data Communication
- Graph theory
- Computer Networks
- Computer Organization

11/08/20

17

How to study

- This Course comprises of storage of huge data that generated in Internet daily.
- There are many architectures of data storage and management of data that includes RAID, NAS etc.
- There are many communication technologies in transmission of data ex: optical fibre technology.
- Security of data stored in Internet.

11/08/20

18

Activities

- Conducting online quiz
- Surprise Test
- Seminar presentations on Virtualization, Cloud computing and Communication networks.
- Video presentation.

11/08/20

19

What is the gist of this subject?

- Storage Virtualization
- Backup, recovery, disaster recovery, business continuity, and replication of stored data.
- RAID Technology.
- Fibre Channel Architecture.
- Cloud Computing and Virtualization
- Securing and managing storage infrastructure.

11/08/20

20

E-resources/links/material availability/ experiments

- <https://www.youtube.com/watch?v=KXQUpJWTrIA>
- <https://www.youtube.com/watch?v=kl9X6mzEWO4>
- www.nskgmit.blogspot.in

11/08/20

21