STATE COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING, ODISHA

TEACHING AND EVALUATION SCHEME FOR 3rd Semester Computer Science & Engg. (w.e.f. 2019-20)

| Subject Number	Subject Code	Subject	Periods/week			Evaluation Scheme			
			L	T	P	Internal Assessment/ Sessional	End Sem Exams	Exams (Hours)	Total
		Theory							
	Th.1	Computer System Architecture	04		-	20	80	03	100
	Th.2	Data Structure	04		-	20	80	03	100
	Th.3	Digital Electronics	04		-	20	80	03	100
	Th.4	Object Oriented Methodology	04		-	20	80	03	100
	Th.5	Environmental studies	04		-	20	80	03	100
		Total	20			100	400	-	500
		Practical							
	Pr.1	Data Structure Lab using C	-	-	04	25	50		75
	Pr.2	Digital Electronics Lab	-	-	04	25	50		75
	Pr.3	Object Oriented Programming using JAVA	-	-	04	25	25		50
	Pr.4	Office Automation Lab	-	-	04	25	25		50
		Student Centered Activities(SCA)	-	-	03	-	-		
		Total	-	-	19	*100*	*150*	-	*250*
		Grand Total	**20**	**-**	**19**	**200**	**550**	**-**	**750**

Abbreviations: L-Lecturer, T-Tutorial, P-Practical. Each class is of minimum 55 minutes duration

Minimum Pass Mark in each Theory subject is 35% and in each Practical subject is 50% and in Aggregate is 40%

SCA shall comprise of Extension Lectures/ Personality Development/ Environmental issues /Quiz /Hobbies/ Field visits/ cultural activities/Library studies/Classes on MOOCS/SWAYAM etc., Seminar and SCA shall be conducted in a section.

There shall be 1 Internal Assessment done for each of the Theory Subject. Sessional Marks shall be total of the performance of individual different jobs/ experiments in a subject throughout the semester

CURRICULLUM OF 3RD SEMESTER

For

DIPLOMA IN COMPUTER SCIENCE & ENGINEERING

(Effective FROM 2019-20 Sessions)
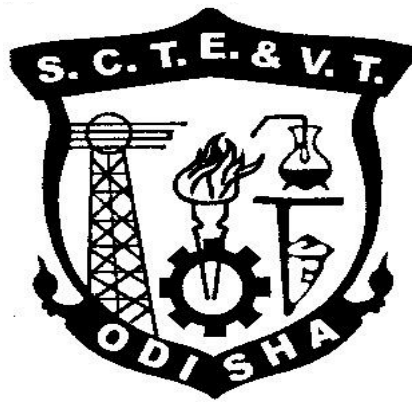
STATE COUNCIL FOR TECHNICAL EDUCATION & VOCATIONAL TRAINING, ODISHA, BHUBANESWAR

Th-1 COMPUTER SYSTEM ARCHITECTURE
Common to (CSE/IT)

Theory	4 Periods per week	Internal Assessment	20 Marks
Total Periods	60 Periods	End Sem Exam	80 Marks
Examination	3hours	Total Marks	100Marks

A.   Topic wise distribution of periods

Sl. No.	Topics	Periods
1	BASIC STRUCTURE OF COMPUTER HARDWARE	06
2	INSTRUCTIONS & INSTRUCTION SEQUENCING	07
3	PROCESSOR SYSTEM	10
4	MEMORY SYSTEM	10
5	INPUT – OUTPUT SYSTEM	10
6	I/O INTERFACE & BUS ARCHITECTURE	10
7	PARALLEL PROCESSING	07
9	**TOTAL**	**60**

B. RATIONAL: Now a days the usage of computer has become very essential in various areas like education, entertainment, business, sports etc. This subject will expose the learner to have an idea about the architecture of different components of a computer system and their operation procedure. Further the learner will have idea how the different components integrate to execute a task to get the result. It also gives an idea how to improve the processing capability.

C. OBJECTIVE: After completion of this course the student will be able to**:**

- Understand the basic structure of a computer with instructions.

- Learn about machine instructions and program execution.

- Learn about the internal functional units of a processor and how they are interconnected.

- Understand how I/O   transfer is performed.

- Learn about basic memory circuit, organization and secondary storage.

- Understand concept of parallel processing.

D.   COURSE CONTENTS:

1. Basic structure of computer hardware
   1.1 Basic Structure of computer hardware
   1.2 Functional Units
   1.3 Computer components
   1.4 Performance measures
   1.5 Memory addressing & Operations

2. Instructions & instruction Sequencing
   2.1 Fundamentals to instructions
   2.2 Operands
   2.3 Op Codes
   2.4 Instruction formats
   2.5 Addressing Modes

3. Processor System
3.1   Register Files
3.2   Complete instruction execution
   - Fetch

- Decode
- Execution

3.3 Hardware control
3.4 Micro program control

4. Memory System
4.1 Memory characteristics
4.2 Memory hierarchy
4.3 RAM and ROM organization
4.4 Interleaved Memory
4.5 Cache memory
4.6 Virtual memory

5. Input – Output System
5.1 Input - Output Interface
5.2 Modes of Data transfer
5.3 Programmed I/O Transfer
5.4 Interrupt driven I/O
5.5 DMA
5.6 I/O Processor

6. I/O Interface & Bus architecture
6.1 Bus and System Bus
6.2 Types of System Bus
- Data
- Address
- Control
7.1 Bus
6.3   Bus Structure
6.4   Basic Parameters of Bus design
6.5   SCSI
6.6   USB

7. Parallel Processing
7.1   Parallel Processing
7.2   Linear Pipeline
7.3   Multiprocessor
7.4 Flynn's Classification

Coverage of Syllabus upto Internal Exams (I.A.)
Chapter 1,2,3,4

Book Recommended:-

Sl.No	Name of Authors	Title of the Book	Name of the Publisher
1	Moris Mano	Computer System Architecture	PHI
2	Er. Rajeev Chopra	Computer Architecture and Organisation	S.Chand
3	Parthasarthy, Senthil Kumar	Fundamentals of Computer Architecture	TMH

Th-2 DATA STRUCTURE
Common to (CSE/IT)

Theory	4 Periods per week	Internal Assessment	20 Marks
Total Periods	60	End Sem Exam	80 Marks
Examination	3hours	Total Marks	100Marks

A.   **Topic wise distribution of periods**

Sl. No.	Topics	Periods
1	INTRODUCTION	04
2	STRING PROCESSING	03
3	ARRAYS	07
4	STACKS & QUEUES	08
5	LINKED LIST	08
6	TREE	08
7	GRAPHS	06
8	SORTING SEARCHING & MERGING	08
9	FILE ORGANIZATION	08
	TOTAL	**60**

B. RATIONAL: The study of **Data structure** is an essential part of computer science. Data structure is a logical & mathematical model of storing & organizing data in a particular way in a computer. In system programming application programming the methods & techniques of data structures are widely used. The study of data structure helps the students in developing logic & structured programs.

C.OBJECTIVE: After completion of this **course** the student will be able to**:**
- Understand the concepts of linear data structures, their operations and applications
- Understand the operation in abstract data type like Stack and Queue.
- Understand the concept of pointers and their operations in linked list.
- Know the concepts of non-linear data structures, their operations and applications in tree and graph.
- Understand the various sorting and searching techniques.
- Understand file storage and access techniques.

D. DETAIL CONTENT:

1.0 INTRODUCTION:

1.1   Explain Data, Information, data types

1.2   Define data structure & Explain different operations

1.3   Explain Abstract data types

1.4   Discuss Algorithm & its complexity

1.5   Explain Time, space tradeoff

2.0 STRING PROCESSING

2.1 Explain Basic Terminology, Storing Strings

2.2 State Character Data Type,

2.3 Discuss String Operations

3.0 ARRAYS

3.1 Give Introduction about array,

3.2 Discuss Linear arrays, representation of linear array In memory

3.3 Explain traversing linear arrays, inserting & deleting elements

3.4 Discuss multidimensional arrays, representation of two dimensional arrays in memory (row
major order & column major order), and pointers

3.5 Explain sparse matrices.

4.0 STACKS & QUEUES

4.1 Give fundamental idea about Stacks and queues

4.2 Explain array representation of Stack

4.3 Explain arithmetic expression ,polish notation & Conversion

4.4 Discuss application of stack, recursion

4.5 Discuss queues, circular queue, priority queues.

5.0 LINKED LIST

5.1 Give Introduction about linked list

5.2 Explain representation of linked list in memory

5.3 Discuss traversing a linked list, searching,

5.4 Discuss garbage collection.

5.5 Explain Insertion into a linked list, Deletion from a linked list, header linked list

6.0 TREE

6.1 Explain Basic terminology of Tree

6.2 Discuss Binary tree, its representation and traversal, binary search tree,   searching,

6.3 Explain insertion & deletion in a binary search trees

7.0 GRAPHS

7.1 Explain graph terminology & its representation,

7.2 Explain Adjacency Matrix, Path Matrix

8.0 SORTING SEARCHING & MERGING

8.1   Discuss Algorithms for Bubble sort, Quick sort,

8.2   Merging

8.3   Linear searching, Binary searching.

9.0   FILE ORGANIZATION

9.1   Discuss Different types of files organization and their access method,

9.2   Introduction to Hashing, Hash function, collision resolution, open addressing.

Coverage of Syllabus upto Internal Exams (I.A.)
Chapter 1,2,3,4

Book Recommended:-

SI No.	Name of Authors	Title of Book	Name of Publisher:
1	S. Lipschutz	Data Structure	Schaum Series
2	A.N.Kamthane	Introduction to Data Structure in C	Pearson Education
3	Reema Thereja	Data Structure using C	Oxford University Press

Th.3 - DIGITAL ELECTRONICS

(Common to ETC, AE&I, CSE, IT, EIC, Mechatronics)

Theory	: 4 Periods per week	I.A.	: 20 Marks
Total Periods	: 60 Periods	Term End Exam	: 80 Marks
Examination	: 3 Hours	TOTAL MARKS	: 100 Marks

Chapter wise Distribution of periods with Total periods

Sl. No.	Topics	Periods
1.	Basics of Digital Electronics	12
2.	Combinational logic circuits	12
3.	Sequential logic circuits	12
4.	Registers, Memories & PLD	08
5.	A/D and D/A Converters	07
6.	Logic Families	09
	TOTAL	60

Rationale:

Today term digital has become a part of our everyday life. The tremendous power and usefulness of digital electronics can be seen from the wide variety of industrial and consumer products, such as automated industrial machinery, computers, microprocessors, pocket calculators, digital watches, microcontrollers, Digital life support machines, real time systems and clocks, TV games, etc. which are based on the principles of digital electronics. The areas of applications of digital electronics have been increasing every day. In fact, digital systems have invaded all walks of life. This subject will very much helpful for student to understand clearly about the developmental concept of digital devices

Objective:

After completion of this course the student will be able to:

1. Explain Binary, Octal, Hexadecimal number systems and compare with decimal system.
2. Perform binary addition, subtraction, Multiplication and Division.
3. Write 1's complement and 2's complement numbers for a given binary number & Perform subtraction
4. Compare weighted and Un-weighted codes and its applications
5. State Boolean expressions for the given statement of the problem
6. State De-Morgan's theorems &Apply De Morgan's theorems and other postulates to simple Boolean expressions.
7. Use Karnaugh Map to simplify Boolean Expression (upto3 variables only).
8. Implement of Logic Gates, i.e. AND, OR, NOT operators with truth table.
9. Working of combinational logic circuits, function of the Half-adder, full-adder.
10. Explain 2'scomplimentparalleladder/subtractor circuit.
11. Working of Serial & parallel adder with block diagram/circuit diagram
12. Explain the Operation of 4x1 Multiplexer & 1x4 De-Multiplexer, Decoders, Encoder, comparator.
13. Understanding the working of Sequential Logic circuits
14. Construct SR, JK, D, T, Master Slave Flip Flop.
15. Counters and different types and operations
16. Explain the working of Registers and memories & PLD

17. Explain various types of memories, Differentiate between ROM and RAM
18. Working of A/D and D/A converters & Necessity of A/D and D/A converters.
19. Explain Various logic families and Characteristics of Digital ICs

Detailed Contents:

Unit-1: Basics of Digital Electronics

1.1 Number System-Binary, Octal, Decimal, Hexadecimal - Conversion from one system to another number system.

1.2 Arithmetic Operation-Addition, Subtraction, Multiplication, Division, 1's & 2's complement of Binary numbers& Subtraction using complements method

1.3 Digital Code & its application & distinguish between weighted & non-weight Code, Binary codes, excess-3 and Gray codes.

1.4 Logic gates: AND,OR,NOT,NAND,NOR, Exclusive-OR, Exclusive-NOR--Symbol, Function, expression, truth table & timing diagram

1.5 Universal Gates& its Realisation

1.6 Boolean algebra, Boolean expressions, Demorgan's Theorems.

1.7 Represent Logic Expression: SOP & POS forms

1.8 Karnaugh map (3 & 4 Variables)&Minimization of logical expressions ,don't care conditions

Unit-2: Combinational Logic Circuits

2.1 Half adder, Full adder, Half Subtractor, Full Subtractor, Serial and Parallel Binary 4 bit adder.

2.2 Multiplexer (4:1), De- multiplexer (1:4), Decoder, Encoder, Digital comparator (3 Bit)

2.3 Seven segment Decoder

   (Definition, relevance, gate level of circuit Logic circuit, truth table, Applications of above)

Unit-3: Sequential logic Circuits

3.1 Principle of flip-flops operation, its Types,
3.2 SR Flip Flop using NAND,NOR Latch (un clocked)
3.3 Clocked SR,D,JK,T,JK Master Slave flip-flops-Symbol, logic Circuit, truth table and applications
3.4 Concept of Racing and how it can be avoided.

Unit-4: Registers, Memories & PLD

4.1 Shift Registers-Serial in Serial -out, Serial- in Parallel-out, Parallel in serial out and Parallel in parallel out
4.2 Universal shift registers-Applications.
4.3 Types of Counter & applications
4.4 Binary counter, Asynchronous ripple counter (UP & DOWN), Decade counter. Synchronous counter, Ring Counter.
4.5 Concept of memories-RAM, ROM, static RAM, dynamic RAM,PS RAM
4.6 Basic concept of PLD & applications

Unit-5: A/D and D/A Converters

5.1 Necessity of A/D and D/A converters.
5.2 D/A conversion using weighted resistors methods.
5.3 D/A conversion using R-2R ladder (Weighted resistors) network.
5.4 A/D conversion using counter method.
5.5 A/D conversion using Successive approximate method

Unit-6: LOGIC FAMILIES

6.1 Various logic families &categories according to the IC fabrication process
6.2 Characteristics of Digital ICs- Propagation Delay, fan-out, fan-in, Power Dissipation ,Noise Margin ,Power Supply requirement &Speed with Reference to logic families.
6.3 Features, circuit operation &various applications of TTL(NAND), CMOS (NAND & NOR)

Coverage of Syllabus upto Internal Exams (I.A.)

Chapter 1,2,3

Books Recommended

SI No.	Name of Authors	Title of Book	Name of Publisher:
1	RP JAIN	Modern Digital Electronics	TMH
2	Ananda Kumar	Fundamental of Digital Electronics	PHI Publication
3	P.RAJA	Digital Electronics	SCITECH Publication
4	S.Salivahanan ,S.Arivazhagan	Digital Circuits Design	VIKAS Pub House
5	M. Morris Mano	Digital Logic and Computer Design	MGH
6	Dr. R. S. Sedha	Digital Electronics	S. chand

Th-4 OBJECT ORIENTED METHODOLOGY
Common to (CSE/IT)

Theory	4 Periods per week	Internal Assessment	20 Marks
Total Periods	60	End Sem Exam	80 Marks
Examination	3hours	Total Marks	100Marks

A. Topic wise distribution of periods

Sl. No.	Topics	Periods
1	PRINCIPLES OF OBJECT ORIENTED PROGRAMMING	05
2	INTRODUCTION TO JAVA	10
3	OBJECTS AND CLASSES	08
4	USING JAVA OBJECTS	06
5	INHERITANCE	08
6	POLYMORPHISM	08
7	JAVA FILES AND I/O	06
8	PACKAGES: PUTTING CLASSES TOGETHER	05
9	EXCEPTION HANDLING	04
	TOTAL	**60**

RATIONALE: **Object-oriented programming** is an approach to handle the increasing complexities of the programs, program organization and development by incorporating the structured programming features with several new concepts. It helps to formulate the problems in a better way giving high reliability, adaptability and extensibility to the applications. Java is a simple, reliable, portable and powerful object-oriented programming language, which enables a programmer to write programs to produce the solution to live problems. By undergoing this course, the students will be able to understand the principles of object oriented programming, with programs in Java and use them to make implemented.

OBJECTIVE: After completion of this **course** the student will be able to**:**
- Understand the concepts of OOPs, their advantages and applications
- Comprehend the features of Java
- Know to create classes, objects, methods
- Know the concepts and advantages of overloading methods and type conversions
- Appreciate the concepts of inheritance and the various types of inheritance.
- Understand the use of Interfaces and system packages
- Use the various operations of files to perform file operations
- Understand the concept of managing errors and exceptions

1 **OBJECT ORIENTED PROGRAMMING (OOPS) CONCEPTS**   05
    1.1 Programming Languages
    1.2 Object Oriented Programming
    1.3 OOPS concepts and terminology
    1.4 Benefit of OOPS
    1.5 Application of OOPS

2 **INTRODUCTION TO JAVA**   10
    2.1 What is Java ?
    2.2 Execution Model of Java

7.10 Static Import

8 **JAVA FILES AND I/O**   05
     8.1 What is a stream ?
     8.2 Reading and writing to files(only txt files
     8.3 Input and Output Stream
     8.4 Manipulating Input data
     8.5 Opening and Closing Streams
     8.6 Predefined streams
     8.7 File handling Classes and Methods

9 **EXCEPTION HANDLING**   06
     9.1 Exceptions Overview
     9.2 Exception Keywords
     9.3 Catching Exceptions
     9.4 Using Finally Statement
     9.5 Exception Methods
     9.6 Declaring Exceptions
     9.7 Defining and throwing exceptions
     9.8 Errors and Runtime Exceptions

Coverage of Syllabus upto Internal Exams (I.A.)
Chapter 1,2,3,4

Books Recommended:-

Sl.No	Name of Authors	Title of the Book	Name of Publisher:
01	E. Balagurusami	Programming With Java A Primer	The McGraw-Hill Companies
02	Patric Naughton Herbert Schildt	Java^{TM} 2: The Complete Reference	Tata McGraw-Hill Publishing Company Limited
03	Rashmi Kanta Das	Core Java For Beginners	Vikas Publishing
04	Herbert Schildt	Java: A Beginner's Guide	McGraw-Hill Education
05	Cay S. Horstmann	Core Java Volume I - Fundamentals	Prentice Hall

Th5. ENVIRONMENTAL STUDIES

(Common to all Branches)

Name of the Course: Diploma in Electrical Engineering			
Course code:		Semester	3rd
Total Period:	60	Examination :	3 hrs
Theory periods:	4P / week	Internal Assessment:	20
Maximum marks:	100	End Semester Examination ::	80

A. RATIONALE:

Due to various aspects of human developments including the demand of different kinds of technological innovations, most people have been forgetting that, the Environment in which they are living is to be maintained under various living standards for the preservation of better health. The degradation of environment due to industrial growth is very much alarming due to environmental pollution beyond permissible limits in respect of air, water industrial waste, noise etc. Therefore, the subject of Environmental Studies to be learnt by every student in order to take care of the environmental aspect in each and every activity in the best possible manner.

B. OBJECTIVE:

After completion of study of environmental studies, the student will be able to:

1. Gather adequate knowledge of different pollutants, their sources and shall be aware of solid waste management systems and hazardous waste and their effects.
2. Develop awareness towards preservation of environment.

C. Topic wise distribution of periods:

Sl. No.	Topics	Period
1	The Multidisciplinary nature of environmental studies	04
2	Natural Resources	10
3	Systems	08
4	Biodiversity and it's Conservation	08
5	Environmental Pollution	12
6	Social issues and the Environment	10
7	Human population and the environment	08
	Total:	**60**

D. COURSE CONTENTS
1.   The Multidisciplinary nature of environmental studies:

    1.1 Definition, scope and importance.

    1.2 Need for public awareness.

2.   Natural Resources:

Renewable and non-renewable resources:

a) Natural resources and associated problems.
2.1.1. Forest resources: Use and over-exploitation, deforestation, case studies, Timber extraction mining, dams and their effects on forests and tribal people.
2.1.2. Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dam's benefits and problems.
2.1.3. Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources.
2.1.4. Food Resources: World food problems, changes caused by agriculture and over grazing, effects of modern agriculture, fertilizers- pesticides problems, water logging, salinity, .
2.1.5. Energy Resources: Growing energy need, renewable and non-renewable energy sources, use of alternate energy sources, case studies.
2.1.6. Land Resources: Land as a resource, land degradation, man induces landslides, soil erosion, and desertification.
b) Role of individual in conservation of natural resources.
c) Equitable use of resources for sustainable life styles.

3. **Systems:**
3.1. Concept of an eco-system.
3.2. Structure and function of an eco-system.
3.3. Producers, consumers, decomposers.
3.4. Energy flow in the eco systems.
3.5. Ecological succession.
3.6. Food chains, food webs and ecological pyramids.
3.7. Introduction, types, characteristic features, structure and function of the following eco system:
3.8. Forest ecosystem:
3.9. Aquatic eco systems (ponds, streams, lakes, rivers, oceans, estuaries).

4. **Biodiversity and it's Conservation:**
4.1. Introduction-Definition: genetics, species and ecosystem diversity.
4.2. Biogeographically classification of India.
4.3. Value of biodiversity: consumptive use, productive use, social ethical, aesthetic and optin values.
4.4. Biodiversity at global, national and local level.
4.5. Threats to biodiversity:Habitats loss, poaching of wild life, man wildlife conflicts.

5. **Environmental Pollution:**

5.1. Definition Causes, effects and control measures of:

a) Air pollution.
b) Water pollution.
c) Soil pollution
d) Marine pollution
e) Noise pollution.
f) Thermal pollution
g) Nuclear hazards.

5.2. Solid waste Management: Causes, effects and control measures of urban and industrial wastes.
5.3. Role of an individual in prevention of pollution.
5.4. Disaster management: Floods, earth quake, cyclone and landslides.

6. **Social issues and the Environment:**

6.1. Form unsustainable to sustainable development.
6.2. Urban problems related to energy.
6.3. Water conservation, rain water harvesting, water shed management.
6.4. Resettlement and rehabilitation of people; its problems and concern.
6.5. Environmental ethics: issue and possible solutions.
6.6. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies.
6.7. Air (prevention and control of pollution) Act.
6.8. Water (prevention and control of pollution) Act.
6.9. Public awareness.

7. **Human population and the environment:**

7.1. Population growth and variation among nations.
7.2. Population explosion- family welfare program.
7.3. Environment and human health.
7.4. Human rights.
7.5. Value education
7.6. Role of information technology in environment and human health.

Syllabus coverage up to Internal assessment
Chapters: 1, 2 and 3.

Sl.No	Title of the Book	Name of Authors	Name of Publisher
1.	Textbook of Environmental studies	Erach Bharucha	#UGC
2.	Fundamental concepts in Environmental Studies	D.D. Mishra	S.Chand & Co-Ltd
3.	Text book of Environmental Studies	K.Raghavan Nambiar	SCITECH Publication Pvt. Ltd.
4.	Environmental Engineering	V.M.Domkundwar	Dhanpat Rai & Co

Learning Resources:

PR-1 DATA STRUCTURE LAB USING "C"

Total Periods	60	Maximum Marks	75 Marks
Lab. Periods:	4 Periods /week	Term Work/Sessional	25 Marks
Examination	3hours	End Semester Examination	50Marks

LIST OF PRACTICALS:-

1. Implementation of 1D & 2D Array

2. Implementation of Stack

3. Pointer and it's application.

4. Structure & Union

5. Implementation of insertion & deletion in Stack

6. Implementation of insertion & deletion in Queue

7. Implementation of insertion & deletion in Linked list

8. Implementation of Bubble sort

9. Implementation of Quick sort

10. Implementation of Binary tree traversal

11. Implementation of Linear search

12. Implementation of Binary search

Learning Resources:

SL.NO	Name of Authors:	Title of Book:	Name of Publisher:
1	T.R.Jagadesh	Computer lab referral for diploma students	Unv. S. Press
2	Gilburg,Forouzen	Data Structure A pseudo code approach with C	Cengage Learning
3	Reema Thareja	Data Structure using C	Oxford
4	Susanta Ku.Rout	Tips and Triks on Data Structure	Vikas

Pr3. DIGITAL ELECTRONICS LAB

Total Periods	60	Total Marks	75 Marks
Lab. Periods:	4 Periods /week	Term Works/Sessional	50 Marks
Examination	3hours	Sessional	25 Marks

A. Rationale:

The Digital Electronics Laboratory can play a vital role in wide Varity applications in the field of microprocessor, microcontrollers & household appliances, among others. It is the inter connection among the digital components and modules. Various digital ICs are discussed. This lab includes combinational logic & sequential logic circuits and its implementations.

B. Objective:

After completion of this course the student will be able to:

1. Familiarization of Digital Trainer Kit, logic Pulser Logic Probe & Digital ICs
2. Verify truth tables of Digital gates
3. Implement various gates by using universal properties
4. Implement Half adder, Full adder, Half subtractor and Full subtractor using logic gates.
5. Know about Flip Flop,Counters,Registers
6. Study Multiplexer and Demultiplexer.
7. Study 8-bit D/A and A/D conversion.
8. Study display devices, LED, LCD, 7-segment displays.

C. List of Practicals

1. Familiarization of Digital Trainer Kit, logic Pulser Logic Probe & Digital ICs IE 7400, 7402, 7404,7408, 7432 & 7486.(draw their pin diagram and features)

2. Verify truth tables of AND, OR, NOT, NOR, NAND, XOR, XNOR gates & simplifications of Boolean gates

3. Implement various gates by using universal properties of NAND & NOR gates verify and truth table tabulate data.

4. Construct & verify operation of Half adder and Full adder using logic gates.

5. Construct & verify operation of Half subtractor and Full subtractor using logic gates.

6. Design &Implement a 4-bit Binary to Gray code converter.

7. Design & Implement a Single bit/ two bit digital comparator circuit

8. Design Multiplexer (4:1) and De-multiplexer (1:4).

9. Study the operation of flip-flops (i)S-R flip flop (ii) J-K flip flop (iii) D flip flop (iv) T flip flop

10. Realize a 4-bit asynchronous UP/Down counter with a control for up/down counting.

11. Study shift registers.

12. verify the operation 8-bit D /A and A/ D conversion & test its performance

13   Study display devices LED, LCD, 7-segment displays.

14   Mini Project : To collect data like pin configurations, display devices, Operational characteristics, applications and critical factors etc. on all digital ICs studied in theory and compile a project report throughout and submit at the end of the semester. To assemble and tests circuits using above digital ICs with test points e.g. Digital Clock / Frequency Counter / Running Glow Light upto 999/Solar cell & Opto coupler applications.

       (All the above experiments are to be conducted by through study of ICs)

15.   **Digital Works 3.04/** higher version is a graphical design tool that enables you to construct digital logic circuits and to analyse their behaviour through real time simulation. Its intuitive, easy to use interface makes it the ideal choice for learning or teaching digital electronics.

PR-3 OBJECT ORIENTED PROGRAMMING USING JAVA

Total Period:	60	**Examination:**	3 hr
Lab. periods:	4P/Week	**Term Work:**	25
Maximum marks:	50	**End Semester Examination**	50

List of Practicals:-

1. Write a Java program to print 'Hello' on screen and then print your name on a separate line.
2. Write a Java program to print the sum of two numbers.

3. Write a Java program that takes a number as input and prints its multiplication table upto 10.

4. Write a Java program to print the area and perimeter of a rectangle.

5. Write a Java program to swap two variables.

6. Write a Java program to convert a decimal number to binary number.

7. Write a Java program to compare two numbers.

8. Write a Java program and compute the sum of the digits of an integer.

9. Write a Java program to count the letters, spaces, numbers and other characters of an input string.

10. Write a Java program to reverse a string.

11. Write a Java program to accept a number and check the number is even or not. Prints 1 if the number is even or 0 if the number is odd.

12. Write a Java program that accepts two integer values from the user and return the larger values. However if the two values are the same, return 0 and return the smaller value if the two values have the same remainder when divided by 6.

13. Write a Java program to get the larger value between first and last element of an array (length 3) of integers .

14. Design a class to represent a bank account. Include the following members :

Data members:

- Name of the depositor
- Account Number
- Type of account
- Balance amount in the account

Methods:

- To assign initial values
- To deposit an amount
- To withdraw an amount
- To display the name and balance

15. Given are two one-dimensional arrays, A and B which are sorted in ascending order. Write a program to merge them into a single sorted array C that contains every item from arrays A and B, in ascending order.

16. Write a java program implementing multiple inheritance.

17. Write a java program implementing package.

18. Write a java program to read a file line by line and print the line on the output screen.

19. Write a java program to read content from one file and write it into another file.

20. Define an exception called "No Match Exception" that is thrown when a string is not equal to "India". Write a program that uses this exception.

21. Develop a java project for percentage calculator/temperature conversion tool.

Books Recommended:-

Sl.No	Name of Authors	Title of the Book	Name of Publisher:
01	E. Balagurusami	Programming With Java: A Primer	The McGraw-Hill Companies
02	Patric Naughton Herbert Schildt	Java^{TM} 2: The Complete Reference	Tata McGraw-Hill Publishing Company Limited
03	Rashmi Kanta Das	Core Java For Beginners	Vikas Publishing
04	Herbert Schildt	Java: A Beginner's Guide	McGraw-Hill Education
05	Cay S. Horstmann	Core Java Volume I - Fundamentals	Prentice Hall

Pr.4- OFFICE AUTOMATION LAB

Total Period	60	Examination	3hr
Lab. periods	4P/Week	Term Work	25
Maximum Marks	50	End Semester Examination	25

<u>List of Assignments (MS Word)</u>

1. Create a news-paper document with at least 200 words,
    a. Use margins as, top:1.5, bottom:2, left:2, right:1 inches.
    b. Use heading "Gandhi Jayanti", font size: 16, font color: red, font face: Arial Black.
    c. With first letter "dropped" (use drop cap option) of the first paragraph containing a picture at the right side
    d. Use three columns from the second paragraph onwards till the half of the page.
    e. Then use heading "Computer basics"
    f. Create paragraph using two columns till the end of the page.
2. Create a Mathematical question paper using, at least five equations
    a. With fractions, exponents, summation function
    b. With at least one 'm*n' matrix
    c. Basic mathematical and geometric operators.
    d. Use proper text formatting, page color and page border.
3. Create a flowchart using,
    a. Proper shapes like ellipse, arrows, rectangle, and parallelogram.
    b. Use grouping to group all the parts of the flowchart into one single object.
4. Create a table using table menu with,
    a. At least 5 columns and 10 rows.
    b. Merge the first row into one cell.
    c. Merge the second row into one cell, then split the second row into three cells.
    d. Use proper table border and color.
    e. Insert proper content into the table with proper text formatting.
5. Create a table using two columns,
    a. The left column contains all the short-cut keys and right side column contains the function of the short-cut keys.
    b. Insert a left column using layout option. Name the heading as Serial No.
6. Create two letters with the following conditions in Ms Word and find the difference.
    a. Write a personal letter to your friend using at least 100 words and two paragraphs. The date must be in top-right corner. Use 'justify' text-alignment and 1.5 line spacing for the body of the letter. Letter must contain proper salutation and closing.
    b. Use step by step mail-merge wizard to design a letter. (Mailing → step by step mail merge wizard→letters→start from a template→select template→ letters→select proper template→ create new document→OK)
7. Create a letter, which must be sent to multiple recipients.
    a. Use Mail-Merge to create the recipient list.

b. Use excel sheet to enter the recipient.
c. Start the mail merge using letter and directory format. State the difference.

<h2 style="text-align:center">List of Assignments (MS Excel)</h2>

1. Create a table "Student result" with following conditions.
   a. The heading must contain, Sl. No., Name, Mark1, Mark2, Mark3, Total, average and result with manual entry.
   b. Use formulas for total and average.
   c. Find the name of the students who has secured the highest and lowest marks.
   d. Round the average to the nearest highest integer and lowest integer (use ceiling and floor function respectively).
2. Do as directed
   a. Create a notepad file as per the following fields

   Slno   name th1   th2   th3   th4   th5   total   %   grade

   b. Import this notepad file into excel sheet using 'data→from text' option.
   c. Grade is calculated as,
      i. If %>=90, then grade A
      ii. If %>=80 and <90, then grade B
      iii. If %>=70 and <80, then grade C
      iv. If %>=60 and <70, then grade D
      v. If %<60, then grade F
3. Create a sales table using the following data,

Item	Year1	Year2	Year3	Year4
Item1	1000	1050	1100	1200
Item2	950	1050	1150	1200
Item3	1100	1200	1200	1300

   a. Draw the bar-graph to compare the sales of the three items for four years using insert option.
   b. Draw a line-graph to compare the sales of three items for four years using insert option.
   c. Draw different pie-charts for the given data using insert option.
   d. Use condition, to highlight all the cells having value >=1000 with red color (use conditional formatting).

<h2 style="text-align:center">List of Assignments (MS PowerPoint)</h2>

1. Create a power-point presentation with minimum 5 slides.
   a. The first slide must contain the topic of the presentation and name of the presentation.
   b. Must contain at least one table.
   c. Must contain at least 5 bullets, 5 numbers.
   d. The heading must be, font size:32, font-face: Arial Rounded MT Bold, font-color: blue.
   e. The body must be, font size: 24, font-face: Comic Sans MS, font-color: green.
   f. Last slide must contain 'thank you'.
2. Create a power-point presentation with minimum 10 slides

a. Use word art to write the heading for each slides.
b. Insert at least one clip-art, one picture
c. Insert at least one audio and one video
d. Hide at least two slides
3. Create a power-point presentation with minimum 5 slides
   a. Use custom animation option to animate the text; the text must move left to right one line at a time.
   b. Use proper transition for the slides.

<div align="center">List of Assignments (MS Access)</div>

1. Create a database "Student" with,
   a. At least one table named "mark sheet" with field name "student name, roll number, mark1, mark2, mark3, mark4, total"
   b. The data types are, student name: text, roll number: number, mark1 to mark4: number, total: number. Roll number must be the primary key.
   c. Enter data in the table. The total must be calculated using update query.
   d. Use query for sorting the table according to the descending/ascending order of the total marks.
2. With addition to the table above,
   a. Add an additional field "result" to the "mark sheet" table.
   b. Enter data for at least 10 students
   c. Calculate the result for all the students using update queries, if total>=200, then pass, else fail.
   d. Search the students, whose name starts with "sh".
   e. Show the names and total marks of the students who have passed the examination.

Book Recommended:-

Sl.No	Name of Authors	Title of the Book	Name of Publisher
1	Vikas Gupta	Comdex 14-1in-1 Computer course Kit	Dream Tech
2	Bittu Kumar	Master in Ms-Office	