

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Diploma in Computer Science & Engineering

Semester - IV

Scheme of Studies:

S.No	Board of Study	Course Code	Course Titles	Scheme of Studies (Hours/Week)			
				L	P	T	Credit L+T+(P/2)
1	CSE	2000451(022)	Object Oriented Programming using C++	2	0	0	2
2	IT	2000452(033)	Computer Network	3	0	0	3
3	CSE	2000453(022)	Computer Organization & Microprocessor	2	0	1	3
4	CSE	2000454(022)	Database Management System	3	0	0	3
5	Mechanical	2000457(037)	Entrepreneurship Development & Management	2	0	1	3
6	CSE	2000461(022)	Object Oriented Programming using C++ (Lab)	0	4	0	2
7	IT	2000462(033)	Computer Network (Lab)	0	4	0	2
8	CSE	2000463(022)	Computer Organization & Mircoprocessor (Lab)	0	2	0	1
9	CSE	2000464(022)	Database Management System (Lab)	0	2	0	1
10			NCC / SPORTS / LIBRARY / HEALTH / TECHNICAL PRESENTATION ACTIVITIES	AS PER CSVTU MINUTES 12 HOURS ARE ALLOCATED TO MENTIONED ACITIVITES			
Total				12	12	2	20

L - Lecture, T - Tutorial, P - Practical,

Legend:- Lecture (L) --> CI : Classroom Instruction (Includes different instructional strategies i.e. Lecture and others

Practical (P) --> LI : Laboratory Instruction (Includes Practical performances in laboratory workshop, field or other locations using different instructional strategies.

Tutorial (T) --> SL : Self Learning.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Diploma in Computer Science & Engineering

Semester - IV

Scheme of Examination:

S.No	Board of Study	Course Code	Course Titles	Scheme of Examination					
				Theory			Practical		Total Marks
				ESE	CT	TA	ESE	TA	
1	CSE	2000451(022)	Object Oriented Programming using C++	70	30	30	0	0	130
2	IT	2000452(033)	Computer Network	70	30	30	0	0	130
3	CSE	2000453(022)	Computer Organization & Microprocessor	70	30	30	0	0	130
4	CSE	2000454(022)	Database Management System	70	30	30	0	0	130
5	Mechanical	2000457(037)	Entrepreneurship Development & Management	70	20	30	0	0	120
6	CSE	2000461(022)	Object Oriented Programming using C++ (Lab)	0	0	0	30	50	80
7	IT	2000462(033)	Computer Network (Lab)	0	0	0	30	50	80
8	CSE	2000463(022)	Computer Organization & Microprocessor (Lab)	0	0	0	30	50	80
9	CSE	2000464(022)	Database Management System (Lab)	0	0	0	30	50	80
10			Technical Presentation	0	0	0	0	40	40
Total				350	140	150	120	240	1000

ESE : End of Semester Exam, CT: Class Test, TA: Teachers Assessment

Legend :- PRA :Process Assessment, PDA : Product Assessment.

Course Curriculum Detailing (Semester- IV)

- A) **Course Code** : 2000451(022)
 B) **Course Title** : Object Oriented Programming using C++
 C) **Pre- requisite Course Code and Title** : Basics of 'C' Programming,
 D) **Rationale** :
 This course is aimed to develop logical ability in students using a widely used programming language C++.The course is designed in order to develop an object oriented programming insight in students for delivering the best possible solution for a real-time problem. This course will enable diploma engineers to develop object oriented program for various computing purpose

E) **Course Outcomes:** The course content should be taught and implemented with the aim to develop the following outcomes in the students.

CO-1: Create an object oriented program for given real life problem.

CO-2: Create objects and member functions using concepts of class.

CO-3: Use Constructors and Destructors in C++ programming.

CO-4: Apply the concept of inheritance in C++ programming.

CO-5: Demonstrate the use of Polymorphism and Pointers in C++ programming.

F) **Scheme of Studies:**

Board of Study	Course Code	Course Title	Scheme of Studies (Hours/Week)					Total Credits(C) (L+T+P/2)
			L	P	T	Total Study Hours (L+T+P)		
Computer Science & Engineering	2000451 (022)	Object Oriented Programming using C++	2	4	0	6	4	

Legend: Lecture (L) and Tutorial (T) and Practical (P)

G) **Scheme of Assessment:**

Board of Study	Course code	Course title	Scheme of examination						Total Marks
			Theory			Practical		Total Marks	
			ESE	CT	TA	ESE	TA		
Computer Science & Engineering	2000451 (022)	Object Oriented Programming using C++	70	30	30	30	50	210	

Session Outcomes (SOs)	Laboratory	Class room Instruction (CI)	Self Learning (SL)
		Scope resolution, member dereferencing operator, memory management operators, type cast, operator precedence 1.9 Manipulators	

SW-1 Suggested Sessional Work (SW):**a. Assignments:**

- i. Can C++ program be written without main? if yes then develop a program without main.
- ii. How can a C function be called in a C++ program?

b. Mini Project:

- i. Create small groups and develop C++ programs with syntactical, logical errors. Distribute the programs randomly amongst the group, debug them to find the errors and correct them.

c. Other Activities (Specify):

- i. Seminar and chart presentation on "Advantages of OO programming"

CO-2 Create objects and member functions using concepts of class.

(Approx. Hrs: CI+LI+SW+SL = 24)

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self Learning (SL)
SO2.1 Demonstrate the use of functions in oops using C++ SO2.2 Identify the use of recursion in programming SO2.3 Demonstrate the use of classes and object in C++ programs SO2.4 Differentiate amongst various types of classes SO2.5 Illustrate the use of new and delete keywords for dynamically memory allocation and de-allocation SO2.6 Identify the use	LE2.1 Develop a program for factorial calculation using recursion LE2.2 Develop a program to create and edit student records (name, roll no., class and marks) using class and objects. LE2.3 Develop a program to read two M x N matrices and create functions to add, subtract and multiply them using object. LE2.4 Develop a program to count number of object	Unit 2.0 Functions and Classes 2.1 Functions in C++ 2.1.1 Introduction to Functions, function prototyping Call by Reference 2.1.2 Nesting member functions 2.2.3 Recursive Function, function overloading, 2.2 Classes and Objects 2.2.1 Introduction to class, Types of class, Base class, Derived class, Virtual class, Abstract class, Friend class 2.2.2 Specifying Class, defining Data member & member functions 2.3 Object creation, Memory allocation for objects	2.1 Write applications of different access specifiers 2.2 List realtime problems which can be solved using recursion 2.3 Identify use and benefits of in INLINE keyword in function.

Session Outcomes	Laboratory Instruction	Class room Instruction (CI)	Self Learning (SL)
of public, private and protected in class	created in a program by using static keyword.	2.4 Array as a class member, Array of objects 2.5 Passing object as an function argument 2.6 Static data member & Member function 2.7 Access specifiers in C++ and theirscope 2.8 C++ streams, C++ stream classes 2.9 Introduction to Class template	

SW-2 Suggested Sessional Work (SW) :**a. Assignments:**

- i. Develop a program to check if a number is an Armstrong number.
- ii. differentiate between class and structure.
- iii. What is the difference between class and object.

b. Mini Project:

- i. Design a presentation on "Flow/Sequence of program execution in recursive functions" with few examples.

c. Other Activities (Specify):

- i. Seminar on "Importance and application of Classes and objects".

CO- 3 Use Constructors and Destructors in C++ programming.

(Approx. Hrs: CI+LI+SW+SL = 12)

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self Learning (SL)
SO3.1 Define Constructor/Destructors SO3.2 Identify the use of constructor for object initialization SO3.3 Identify the use of destructor for memory release of	LE3.1 Develop a program to exhibit the use of each type of constructor/destructor	Unit 3.0 Constructors and Destructors 3.1 Constructors 3.1.1 Concept of Initialization using constructor 3.1.2 Multiple constructors in a class 3.1.3 Types of constructors, Default, Copy, Parameterized,	3.1 use of new and delete keyword

Session Outcomes	Laboratory Instruction (LI)	Class room Instruction (CI)	Self Learning
object		Dynamic, Constructor with default arguments 3.2 Destructor	

SW-3 Suggested Sessional Work (SW) :**a. Assignments:**

- i. Develop a program to list the details of students and use constructor to fill the default/common records of students.

b. Mini Project:

- i. Design a menu-driven program with multiple uses of same operator (+, -, *, /)

c. Other Activities (Specify):

- i. Presentation on "Advantages of using constructors/destructors"

CO- 4 Apply the concept of inheritance in C++ programming.

(Approx. Hrs: CI+LI+SW+SL = 18)

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self Learning (SL)
SO4.1 Define operator overloading and its rules. SO4.2 Use the concept of operator overloading in C++ programs SO4.3 Use inheritance in C++ programs SO4.4 Describe inheritance, its types SO4.5 Identify the use of inheritance in different application SO4.6 Explain Type casting and Type	LE4.1 Develop a program to show single and multilevel inheritance LE4.2 Develop a program to show hierarchical and hybrid inheritance LE4.3 Develop program to show the use of constructors and member functions in derived classes LE4.4 Develop a program to show nesting of classes	4.0 Operator Overloading & Inheritance 4.1 Defining Operator overloading 4.2 Rules for operator overloading 4.3 Overloading Unary operator using member function & friend Function 4.4 Overloading Binary operator using member function & friend Function 4.5 Type Conversions 4.6 Inheritance 4.6.1 Defining Derived classes 4.6.2 Types of inheritance, Single, Multiple,	4.1 Write the use of Abstract classes 4.2 Differentiate between Overloading and Overriding

Session Outcomes	Laboratory Instruction	Class room Instruction	Self Learning (SL)
conversion		Multilevel, Hierarchical, Hybrid 4.6.3 Making private member inheritable 4.6.4 Constructors in derived classes	

Legend: CI: Classroom Instruction (Includes different instructional strategies i.e. Lecture (L) and Tutorial (T) and others) , LI : Laboratory Instruction (Includes Practical performances in Laboratory, Workshop, field or other locations using different instructional strategies) SL: Self Learning

SW-4 Suggested Sessional Work (SW) :

a. Assignments:

- i. Correlate the real-world example for each type of inheritance.
- ii. When do we use the protected visibility specifier to a class member?
- iii. Describe the syntax of multiple inheritance? When do we use such inheritance
- iv. Name the operator that cannot be overloaded.
- v. What is diamond problem. Give an example.

b. Mini Project:

- i. Develop a program to show multilevel inheritance and use constructor for all classes.

c. Other Activities (Specify):

- i. Quiz on OO features – Inheritance, Encapsulation.
- ii. Role play by students to understand the concept of inheritance. Use inheritance to describe family tree

CO- 5 Demonstrate the use of Polymorphism and Pointers in C++ programming.

(Approx. Hrs: CI+LI+SW+SL = 18)

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self Learning (SL)
SO5.1 Explain the concept of Dynamic binding	LE5.1 Debug a program to understand the flow of program execution. Check the values of operands at run time	5.0 Polymorphism and Pointers 5.1 Introduction to Polymorphism, types of polymorphism	5.1 List down the common runtime and compile time errors.
SO5.2 Identify the use of pointers in C++ program		2 Pointers in C++ 5.2.1 pointer to objects	
SO5.3 Describe various methods of communication	LE5.2 Develop a program for	5.2.2 'this' pointer, pointer to derived classes 5.3 Virtual function, pure virtual function, virtual	5.2 When is Friend Function used in a

on between objects	each type of argument passing technique (call by reference, call by value, call by address)	constructor and destructor	program?
SO5.4 Apply the concept of polymorphism in program			
SO5.5 Demonstrate the use of virtual and pure virtual function in class.	LE5.3 Develop a program to overload common operators like +, -, *, / etc.		

SW-5 Suggested Sessional Work (SW) :**a. Assignments:**

- i. List the difference between 'call-by-address' and 'call-by-reference' with suitable examples

b. Mini Project:

- i. Develop a menu-driven program to override functions for various purposes according to user inputs

c. Other Activities (Specify):

- i. MCQs on Polymorphism, Pointers

Note: Performance under Laboratory and Sessional work may appear in more than one COs/SOs.

I) Suggested Specification Table (For ESA of Classroom Instruction)

Unit Number	Unit Title	Total Marks
I	Fundamentals of Object Oriented Programming	14
II	Classes and functions	14
III	Constructors and Destructors	14
IV	Inheritance	14
V	Polymorphism and Pointers	14
Total		70

Note: After completion of all the chapters student will be able to perform the list of following experiments:

J) Suggested Specification Table (For ESA of Laboratory Instruction*)

S.No/ Units	List of Practicals	30 Marks are allocated for performance under ESA
1	Develop a program to show variable initialization, token declaration and use of different operators	
2	i) Develop a program for factorial calculation using recursion ii) Develop a program using call by value argument passing method	
3	Develop a program to initialize objects using copy, parameterized and dynamic constructors	
4	i) Develop a program using base and derived class ii) Develop a program using abstract class iii) Develop a program using single, multiple and hybrid inheritance	
5	i) Develop a program to overload arithmetic operators like +, -, *, / ii) Develop a program to override functions	

Note : The student at the end of the semester examination of 40

Marks; has to undertake any two of the listed practicals.

K) Suggested Instructional/Implementation Strategies:

1. Improved Lecture
2. Tutorial
3. Group Discussion
4. Role Play
5. Demonstration
6. ICT Based Teaching Learning (Video Demonstration, Youtube, Mobile)
7. Brainstorming
8. Others – (Presentation, Charts, project files)

L) Suggested Learning Resources:

(a) Books :

S. No.	Title	Author	Publisher	Edition & Year
01.	Object Oriented Programming with C++	Balagurusamy, E.	McGrawHill, Delhi	6 th edition/2013
02.	Let Us C++	YashwantKanetkar	BPB publication	2 nd edition/2003
03.	Mastering C++	Venugopal	Tata McGrawHill, Delhi,	2011

04	Object Oriented Programming in Turbo C++	Lafore Robert	Galgotia	4 th edition/2017
05	C++ The Complete Reference	Herbert Schildt	Tata McGraw-Hill	5 th edition

b) Open source software and website address:

1. C++ Fundamentals: <http://www.oupinheonline.com>
2. C++ Tutorials: http://www.tutorialspoint.com/cplusplus/cpp_overview.htm
3. NPTEL video tutorial: <http://nptel.iitm.ac.in/syllabus/syllabus.php?subjectId=106101006>

(c) Others:

1. Introduction of Object Oriented Programming:
<http://www.ddegjust.ac.in/studymaterial/mca-3/ms-17.pdf>
2. Mastering C++ by Venugopal PDF:
https://books.google.lk/books?id=MlubBQAAQBAJ&pg=PT5&source=gbs_selected_pages&cad=2#v=onepage&q&f=false

M) List of Major Laboratory Equipment and Tools:

S. No.	Name of Equipment	Broad Specifications	Relevant Experiment Number
1	Personal Computers	4GB RAM core i3 processors	For all the C++ Programs.
2	Projectors	USB port enabled portable projectors	
3	C++ software	C++ IDE	

N) Mapping of POs & PSOs with COs:

Course Outcomes (COs) Titles	Programme Outcomes (POs)										Programme Specific Outcomes (PSOs)	
	Basic knowledge PO-1	Discipline knowledge PO-2	Experiments & Practice PO-3	Engineering Tools PO-4	The Engineer & Society PO-5	Environment & Sustainability PO-6	Ethics PO-7	Individual & Team work PO-8	Communication PO-9	Life Long learning PO-10	PSO-1	PSO-2
CO-1 Create an object oriented program for given real life problem.	3	3	1	1	0	0	1	1	1	3	1	0
CO-2 Create objects and member functions using concepts of class.	3	3	2	2	0	0	1	1	1	3	2	0
CO-3 Use Constructors and Destructors in C++ programming.	2	2	1	1	0	0	1	1	1	2	2	0
CO-4: Apply the concept of inheritance in C++ programming.	3	2	3	2	0	0	1	1	1	3	2	0
CO-5: Demonstrate the use of Polymorphism and Pointers in C++ programming.	3	2	3	2	0	0	1	1	1	3	2	0

Legend - 0: No correlation, 1: Low, 2: Medium, 3: High

O) Course Curriculum Map

POs & PSOs No.	COs No. & Title	SOs No.	Laboratory Instruction (LI)	Classroom Instruction (CI)	Self Learning (SL)
PO1,2,3,4,7,8,9,10 PSO1	CO-1 Create an object oriented program for given problem.	SO1.1 - SO1.4	LE1.1	Unit 1.0: Fundamentals of Object Oriented Programming	As mentioned in relevant page numbers
PO1,2,3,4,7,8,9,10 PSO1	CO-2 Develop a program using classes and function.	SO.2.1- SO.2.6	LE2.1 LE2.2 LE2.3 LE2.4	Unit 2.0: Classes, Objects, Methods	
PO1,2,3,4,7,8,9,10 PSO1	CO-3 Use Constructors and Destructors in C++ program.	SO.3.1- SO3.3	LE3.1	Unit 3.0: Constructors and Destructors	
PO1,2,3,4,7,8,9,10 PSO1	CO-4 Create a program using Inheritance .	SO4.1 - SO4.6	LE4.1 LE4.2 LE4.3 LE4.3	Unit 4.0: Inheritance	
PO1,2,3,4,7,8,9,10 PSO1	CO-5 Develop a program using Polymorphism and Pointers .	SO5.1 - SO5.5	LE5.1 LE5.2 LE5.3	Unit 5.0: Polymorphism and Pointers	

Legend:CI: Classroom Instruction (Includes different instructional strategies i.e. Lecture (L) and Tutorial (T) and others) , LI : Laboratory Instruction (Includes Practical performances in Laboratory, Workshop, field or other locations using different instructional strategies) SL: Self Learning

vii. Course Curriculum Detailing (Semester- IV)

- A) **Course Code** : 2000452(033)
 B) **Course Title** : COMPUTER NETWORK
 C) **Pre- requisite Course Code and Title** :
 D) **Rationale** :

One of the major Components of computer based information systems is computer networks. Through computer networks we can share hardware, Software, Processing, Data and Applications besides getting global connectivity for internet based communication and services.

For Diploma students it is important to understand the function of Computer Networks and obtain requisite knowledge about hardware and software requirements of networks and acquire skills to establish a network using necessary hardware & software tools and configure various services over it. The objectives of this course are to make students learn the technology of establishing, commissioning (making operational) and maintaining computer networks.

- E) **Course Outcomes** :
- CO-1 : Explain basics of Computer Networking.
 CO-2 : Describe Reference models of computer network with its function in each layer.
 CO-3 : Prepare different type of Transmission Mediator data communication.
 CO-4 : Install various communication devices of networking for data communication.
 CO-5 : Establish Subnets, IPv4 and IPv6 in computer networks and different protocol.

F) **Scheme of Studies:**

Board of Study	Course Code	Course Title	Scheme of Studies (Hours/Week)				
			L	P	T	Total Study Hours (L+T+P)	Total Credits(C) (L+T+P/2)
Information Technology	2000452 (033)	Computer Networks	3	4	0	7	5

Legend: Lecture (L) and Tutorial (T) and Practical(P)

G) **Scheme of Assessment:**

Board of Study	Course code	Course Title	Scheme of examination					
			Total Marks					Total Marks
			Theory			Practical		
ESE	CT	TA	ESE	TA				
Information Technology	2000452(033)	Computer Networks	70	30	30	30	50	210

H) **Course-Curriculum Detailing:**

This course curriculum detailing depicts learning outcomes at course level and session level and their attainment by the students through Classroom Instruction (CI), Laboratory Instruction (LI), Sessional Work (SW) and Self Learning (SL). Students are expected to demonstrate the attainment of Session Outcomes (SOs) and finally Course Outcomes (COs) upon the completion of course. Convert unit of the given physical quantity from one unit system to other.

CO-1 Explain Basics of Computer networking

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Interaction (CI)	Self Learning (SL)
SO1.1 List the applications of Computer Networks. SO1.2 Differentiate various line configurations. SO1.3 Design a computer network layout considering particular topology. SO1.4 Categorise computer network based on scope and connection SO1.5 Apply different type of Network Topology.	LE1.1 Establish a network to connect computing systems by using any type of topology. LE1.2 Demonstrate the topology used in computer network.	Unit 1.0 Basics of Computer Networking 1.1 Definition & history of networks, 1.2 Application of Computer Networks, 1.3 Standard Organizations and Protocols, 1.4 Line Configuration 1.4.1 Point to Point connection, 1.4.2 Multipoint connection, 1.5 Network Topology 1.5.1 Bus Topology, 1.5.2 Ring Topology, 1.5.3 Star Topology, 1.5.4 Mesh Topology, 1.5.5 Hybrid Topology, 1.6 Categories of network 1.6.1 Based on Physical scope a) LAN, b) MAN, c) WAN, 1.6.2 Based on Connection a) Connection Oriented, b) Connection Less,	1.1 Identifies different type of topology used in different type of network. 1.2 Differentiate between point to point and multipoint connection.

SW-1 Suggested Sessional Work (SW):

- a. Assignments:
 1. Illustrate advantages and disadvantages of different types of network topology.
 2. Identify application of physical scope of computer network.
 3. Describe merits and demerits of all the categories of networks.
- b. Mini Project:
 1. Design a small network layout based on LAN in your computer lab.
- c. Other Activities (Specify):
 1. Identify different type of computer network in real life.
 2. Difference between internet and intranet.

CO-2 Describe Reference models of computer network with its function in each layer.

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Interaction (CI)	Self Learning (SL)
SO2.1 List out OSI and TCP/IP Layers. SO2.2 Explain functions of each layer and differentiate them. SO2.3 Compare OSI and TCP/IP Model. SO2.4 Demonstrate different protocol Header format of Physical and Data Link layer protocol.	LE2.1 Prepare a layout demonstrating data transfer aspects as per OSI model between computing devices.	Unit 2.0 Reference Model for network communication 2.1 OSI model and its main function, feature of each layer 2.1.1 Physical Layer, 2.1.2 Data Link Layer, 2.1.3 Network Layer, 2.1.4 Transport Layer, 2.1.5 Session Layer, 2.1.6 Presentation Layer, 2.1.7 Application Layer, 2.2 TCP/IP model and its main function, feature and protocol of each layer 2.2.1 Physical Layer, 2.2.2 Network Layer, 2.2.3 Transport Layer, 2.2.4 Application Layer, 2.3 Compare OSI and TCP/IP model	2.1 Differentiate between feature of data link layer function and transport layer function. 2.2 Classify of OSI and TCP/IP layer function.

SW-2 Suggested Sessional Work (SW):

- a. Assignments:
 1. List out different protocol of TCP/IP Model.
 2. Explain any one protocol of each TCP/IP Model.
 3. Identify the cross layer functioning and their affected layers.
- b. Mini Project:
 1. Explain with all protocol format structure of reference model.

CO- 3: Prepare Different types of Transmission Media for data Communication.

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Interaction (CI)	Self Learning (SL)
SO3.1 List out guided and unguided transmission media. SO3.2 Select appropriate transmission media for a given network. SO3.3 Use different type of media in data communication	LE3.1 Prepare and Test Straight UTP Cable for data transfer. LE3.2 Prepare and Test Cross UTP Cable for data transfer. LE3.3 Prepare and test network connectivity using optical fiber. LE3.4 Perform different types of mode of communications	UNIT 3.0 Transmission Media and Mode 3.1 Basic Concept 3.1.1 Communication Channels Characteristics, 3.1.2 Band Width, 3.1.3 Attenuation, 3.1.4 Bit rate and Baud rate, 3.2 Types of Transmission Media 3.2.1 Guided Media: a) Twisted Pair, b) Coaxial Cable, c) Optical Fiber, 3.2.2 Un Guided Media : a) Electromagnetic spectrum, b) Radio Transmission, c) Microwave Transmission, d) Infrared Transmission, e) Satellite Communication, 3.3 Mode of Communication 3.3.1 Simplex, 3.3.2 Half duplex, 3.3.3 Full Duplex,	3.1 Differentiate different type of signal. 3.2 Find out bandwidth of Guided Media and Un guided media signals.

SW-3 Suggested Sessional Work (SW):

- a. Assignments:
 1. List out different type of Mode of communication system in real life.
 2. Differentiate guided media and unguided media.
 3. Describe the various selection parameters of transmission media.
- b. Mini Project:
 1. Perform different type of communication mode operation.
- c. Other Activities (Specify):
 1. Identify different type of communication system in digital communication.

CO- 4: Install various communication devices of networking for data communication.

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Interaction (CI)	Self Learning (SL)
SO4.1 Use of various Network devices. SO4.2 Differentiate Layer 2 and Layer 3 network device. SO4.3 Select different connection devices of each layer. SO4.4 Describe the applications of network devices in different layers.	LE4.1 Install, configure and Test Repeaters for networking LE4.2 Install, configure and Test Routers for networking LE4.3 Install, configure and Test Gateway for networking LE4.4 Install and configure a small computer network as per given layout.	Unit 4.0 Networking devices 4.1 Network communication devices 4.1.1 Repeater, 4.1.2 Hub, 4.1.3 Switch, 4.1.4 Bridge, 4.1.5 Router, 4.1.6 Access Point, 4.1.7 Gateway, 4.1.8 RS 232, 4.1.9 RJ 45 & RJ11, 4.1.10 NIC, 4.1.11 Bluetooth, 4.1.12 Wi-fi IEEE 802.11 (b,g,n)	4.1 Difference between Layer 2 and Layer 3 Switches. 4.2 Describe Network Management software

SW-4 Suggested Sessional Work (SW):

- a. Assignments:
 1. Identify different network devices of each layer.
 2. Explain each layer network devices in brief.
- b. Mini Project:
 1. Develop a network using different communication device.

CO- 5 : Establish Subnets, IPv4 and IPv6 in computer networks and different protocol.

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Interaction (CI)	Self Learning (SL)
SO5.1 Explain IPv4 and IPv6 protocol. SO5.2 Select appropriate class for given network size. SO5.3 Create and configure subnet for a LAN. SO5.4 Explain DNS, Email and FTP, HTTP. SO5.5 Explain ARP & RARP, ICMP, SMTP protocol.	LE5.1 Install and configure a network adapter of a computer system. LE5.2 Install and configure a Network Operating System.	UNIT: 5.0 Network Protocol and Applications 5.1 IP Protocol – IP v4, IP v6. 5.2 Addressing Schemes 5.3 Subnet & masking 5.4 DNS 5.5 Email 5.6 FTP 5.7 HTTP 5.8 TCP & UDP 5.9 NETBIOS Protocol 5.10 ARP & RARP 5.11 ICMP 5.12 SMTP	5.1 List out different other protocol of each layer.

SW-5 Suggested Sessional Work (SW):

- a. Assignments:
 1. Determine IP address, subnet number, no of host, mask for a given subnet.
 2. How to trouble shoot IP addressing.
 3. Classify different class of IP address.
- b. Mini Project:
 1. Set, Configure and Test internet.

Legend: CI: Classroom Instruction (Includes different instructional strategies i.e. Lecture (L) and Tutorial (T) and others) , LI : Laboratory Instruction (Includes Practical performances in Laboratory, Workshop, field or other locations using different instructional strategies) SL: Self Learning

Note: Performance under Laboratory and Sessional work may appear in more than one COs/SOs.

I) Suggested Specification Table (For ESA of Classroom Instruction CI+SW+SL):

Unit Number	Unit Title	Total Marks
I	Basics of Computer Network	14
II	Reference Model for network communication	12
III	Transmission Media and Mode	14
IV	Networking devices	16
V	Network Protocol and Applications	14
Total		70

J) Suggested Specification Table (For ESA of Laboratory Instruction*):

Note: The student at the end of semester examination of **30Marks**; has to undertake any **ONE** of the listed practical's.

Laboratory Instruction Number	Short Laboratory Experiment Title	
LE1.1	Establish a network to connect computing systems by using any type of topology.	30 Marks are allocated for performance under ESA
LE1.2	Demonstrate the topology used with the computer network.	
LE2.1	Prepare a layout demonstrating data transfer aspects as per OSI model between computing devices.	
LE3.1	Prepare and Test Straight UTP Cable for data transfer	
LE3.2	Prepare and Test Cross UTP Cable for data transfer.	
LE3.3	Prepare and test network connectivity using optical fiber.	
LE3.4	Perform different types of mode of communications	
LE4.1	Install, configure and Testing of Repeaters for networking.	
LE4.2	Install, configure and Testing of Routers for networking.	
LE4.3	Install, configure and Testing of Gateway for networking.	
LE4.4	Install and configure a small computer network as per given layout.	
LE 5.1	Install and configure a network adapter of a computer system.	
LE 5.2	Install and configure a Network Operating System.	
GRAND TOTAL		

K) Suggested Instructional/Implementation Strategies:

1. Improved Lecture
2. Tutorial
3. Case Method
4. Group Discussion
5. Industrial visits
6. Industrial Training
7. Field Trips
8. Portfolio Based Learning
9. Role Play

10. Demonstration
11. ICT Based Teaching Learning (Video Demonstration, CBT, Blog, Face book, Mobile)
12. Brainstorming
13. Others

L) Suggested Learning Resources:

(a) Books :

S. No.	Title	Author	Publisher	Edition & Year
1.	Computer Networks	Andrew S Tanenbaum	Prentice Hall	-
2.	Data communication and Networking	Behrouz, Forouzan,	Mcgraw Hill	2007 or latest
3.	Networking Essential – Training Guide	Joe Casad & Dan Newland,	(MCSE, MCT) Tech Media New Delhi	1997 or latest
4.	Networking Essential – Study Guide	James Chellis	Techmedia Publication New Delhi	2000 or latest

(b) Open source software and website address

1. https://www.tutorialspoint.com/data_communication_computer_network/data_communication_computer_network_tutorial.pdf
2. <https://doc.lagout.org/network/Data%20Communications%20and%20Networking%20By%20Behrouz%20A.Forouzan.pdf>
3. <http://www.studytonight.com/computer-network/tcp-ip-reference-model>
4. <http://www.studytonight.com/computer-network/network-topology-types>
5. http://www.tcpiptide.com/free/t_connectionorientedandconnectionlessprotocols.htm

(c) Others

1. Learning Packages.
2. Lab Manuals.
3. Manufacturers' Manual
4. Users' Guide

M) List of Major Laboratory Equipment and Tools:

S. No.	Name of Equipment	Broad Specifications	Relevant Experiment Number
1	Multi Level Cable Tester, different length and type (Twisted Pair, Co-axial, Optical fiber) of LAN cable, RJ11 and RJ45 Connectors, I/O Box, Clipping Device	Use for BNC indicator, 10 BASE T, Token Ring with specification of AT & T 258A, EIA/TIA 568	LE 3.1, LE 3.2
2	Radio, Walkie-Talkie and Land Line with connection	As per the availability.	LE 3.3
3	Repeater, switches, gateways and routers.	As Per Latest Specification devices	LE4.1, LE 4.2, LE 4.3
4	Server Clients and Networking OS	As Per Latest Specification	LE5.1, LE5.2

N) Mapping of POs & PSOs with COs:

Course Outcomes (COs) Titles	Programme Outcomes (POs)										Programme Specific Outcomes (PSOs)	
	Basic knowledge PO-1	Discipline knowledge PO-2	Experiments & Practice PO-3	Engineering Tools PO-4	The Engineer & Society PO-5	Environment & Sustainability PO-6	Ethics PO-7	Individual & Team work PO-8	Communication PO-9	Life Long learning PO-10	PSO-1	PSO-2
CO-1 Explain Basics Computer networking.	3	3	2	1	3	1	1	2	2	3	2	2
CO-2 Describe Reference models in networks with function of each layer.	3	3	2	1	2	1	2	2	3	3	2	2
CO-3 Prepare different type of Transmission Media for data communication.	2	2	3	3	3	1	2	2	3	3	2	2
CO-4 Install various communication devices of networking for data communication.	3	3	3	2	2	1	1	2	3	3	2	2
CO-5 Establish Subnets, IPv4 and IPv6 in computer networks and different protocol.	2	3	1	1	2	1	1	2	3	3	2	2

Legend: 0 -No Co-relation, 1 – Low, 2 Medium, 3 - High

O) Course Curriculum Map:

POs & PSOs No.	COs No.& Title	SOs No.	Laboratory Instruction (LI)	Classroom Instruction (CI)	Self Learning (SL)
PO1- PO4, PO7-PO10 PSO1-PSO2	CO-1 Explain Basics Computer networking.	SO1.1 - SO1.5	LE1.1 LE1.2	Unit 1.0 Basics of Computer Network	1.1 – 1.2
PO1- PO4, PO7-PO10 PSO1-PSO2	CO-2 Describe Reference models in networks with function of each layer.	SO2.1 - SO2.4	LE. 2.1	Unit2.0 Reference Model for network communication	2.1 -2.2
PO1- PO4, PO7-PO10 PSO1-PSO2	CO-3 Prepare different type of Transmission Media for data communication.	SO3.1 - SO3.3	LE3.1 LE3.2 LE3.3 LE3.4	Unit 3.0 Transmission Media and Mode	3.1 – 3.2
PO1- PO4, PO7-PO10 PSO1-PSO2	CO-4 Install various communication devices of networking for data communication.	SO4.1 - SO4.4	LE4.1 LE4.2 LE4.3 LE4.4	Unit 4.0 Networking devices	4.1 – 4.2
PO1- PO4, PO7-PO10 PSO1-PSO2	CO-5 Establish Subnets, IPv4 and IPv6 in computer networks and different protocol.	SO5.1 - SO5.5	LE5.1 LE5.2	Unit 5.0 Network Protocol and Applications	5.1

Legend:CI: Classroom Instruction (Includes different instructional strategies i.e. Lecture (L) and Tutorial (T) and others), LI: Laboratory Instruction (Includes Practical performances in Laboratory, Workshop, field or other locations using different instructional strategies) SL: Self Learning

vii. Course Curriculum Detailing (Semester- IV)

- A) **Course Code** : 2000453(022)
- B) **Course Title** : Computer Organization & Microprocessor
- C) **Pre- requisite Course Code and Title** : CFA, Digital Electronics
- D) **Rationale** :
Microprocessor is the course used to provide an understanding of microprocessor hardware and software. Students completing this course will work with microprocessor based equipment and be capable of distinguishing hardware from software faults. The superior students will also be capable of participating in product development efforts, including support and development of assembly language code. The purpose of this Course is to cover the underlying concepts and techniques used in Micro Processor and Interfacing.
- E) **Course Outcomes:** The course content should be taught and implemented with the following with the aim to develop following outcome in the students.

CO-1 Identify the structure of 8085 microprocessor and its application.

CO-2 Execute programs on various instructions of 8085.

CO-3 Develop various programs on assembly language programming for 8085.

CO-4 Interface various input and output devices with 8085 microprocessor.

CO-5 Compare merits and demerits of different types of memory.

F) **Scheme of Studies:**

Board of Study	Course Code	Course Title	Scheme of Studies (Hours/Week)				
			L	P	T	Total Study Hours (L+T+P)	Total Credits(C) (L+T+P/2)
Computer Science & Engineering	2000453 (022)	Computer Organization & Microprocessor	2	2	1	5	4

Legend: Lecture (L) and Tutorial (T) and Practical (P)

G) **Scheme of Assessment:**

Board of Study	Course Code	Course Title	Scheme of examination					
			Total Marks					Total Marks
			Theory			Practical		
ESE	CT	TA	ESE	TA				
Computer Science & Engineering	2000453 (022)	Computer Organization & Microprocessor	70	30	30	30	50	210

H) **Course-Curriculum Detailing:**

This course curriculum detailing depicts learning outcomes at course level and session level and their attainment by the students through Classroom Instruction (CI), Laboratory Instruction (LI), Sessional Work (SW) and Self Learning (SL). Students are expected to demonstrate the attainment of Session Outcomes (SOs) and finally Course Outcomes (COs) upon the completion of course.

Convert unit of the given physical quantity from one unit system to other.

CO-1 : Identify the structure of 8085 microprocessor and its application.

(Approx.Hrs:CI+LI+SW+SL=12)

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self Learning (SL)
SO1.1 Explain basic terminologies used in microprocessor. SO1.2 Explain various Functional Units of 8085 microprocessor. SO1.3 Explain basic idea about the data transfer schemes and its applications. SO1.4 Draw pin diagram of 8085 .	LE1.1. Introduction to Microprocessor to Trainer Kit and identify the different peripheral devices on it. LE1.2 Introduction to 8085 simulator IDE and understand the steps to simulate the program using it.	Unit 1.0 8085 Microprocessor 1.1 List of terms used in Microprocessor. 1.1.1 Instruction Set 1.1.2 Clock Speed 1.1.3 Bandwidth 1.1.4 Word Length 1.1.5 Data Types 1.2 Features of Microprocessor 1.3 8085 Architecture and block diagram 1.4 8085 Functional units 1.4.1 Multiplexed address / data Bus 1.4.2 Accumulator 1.4.3 Arithmetic and Logic Unit 1.4.4 General Purpose Registers 1.4.5 Program Counter 1.4.6 Stack Pointer 1.4.7 Flag Register 1.5 8085 Pin Configuration	1.1 Flag Register 1.2 Temporary register

SW-1 Suggested Sessional Work (SW):**a. Assignments**

1. Draw the architecture of 8085 and mention its various functional blocks.
2. Draw the pin configuration and functional pin diagram of microprocessor 8085. Discuss the functionality of control and status signal.

b. Mini Project: NIL**c. Other Activities (Specify):**

1. Demonstrate 8085 microprocessor kit.

CO-2 : Execute programs on various instructions Of 8085.

(Approx. Hrs: CI+LI+SW+SL=20)

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self Learning (SL)
SO2.1. Distinguish between immediate, direct and indirect addressing modes SO2.2. Select an appropriate addressing mode for a given instruction. SO2.3. distinguish the use of different instructions SO2.4. Perform the various operation using 8085 instruction set. SO2.5. Draw timing diagram for various instructions.	LE2.1 Execute various data movement instructions. LE2.2 Execute various arithmetic instructions. LE2.3 Execute various logical instructions. LE2.4 Execute various shift and rotate instructions. LE2.5 Execute various Program control instructions. LE2.6 Execute various Branching instructions. LE2.7 Execute various stack instructions.	Unit 2.0 Addressing Modes & Instruction set of 8085 2.1 Instruction cycle 2.1.1 Opcode fetch cycle 2.1.2 Execution cycle 2.2 Timing Diagram 2.2.1 Opcode fetch 2.2.2 Memory Read 2.2.3 Memory Write 2.2.4 MOV R1, R2 2.2.5 MOV R, Mem 2.2.6 MOV Mem, R 2.3 Addressing modes in 8085 2.3.1 Immediate Addressing Mode 2.3.2 Register Addressing Mode 2.3.3 Direct Addressing Modes 2.3.4 Indirect addressing Mode 2.4 Instruction set of 8085 2.4.1 Data Movement Instructions 2.4.2 Arithmetic instructions 2.4.3 Logical Instructions 2.4.4 Shift & Rotate instructions 2.4.5 Program Control instructions 2.4.6 Branching instructions 2.4.7 Stack instructions	2.1 RST 6.5 2.2 RST 5.5 2.3 Three state bus buffers memory transfer

SW-2 Suggested Sessional Work (SW):**a. Assignments**

- List various instructions microprocessor 8085 has.
- What an instruction consist of? Give one example each of different types of instructions.
- Difference between direct and indirect addressing mode.

b. Mini Project:

- Prepare a chart for 8085 instructions and respective opcode

c. Other Activities (Specify):

- Presentation on Timing diagram of basic instruction of 8085.

CO-3: Develop various programs on assembly language programming for 8085.

(Approx. Hrs: CI+LI+SW+SL-19)

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self Learning (SL)
SO2.1 Define assembly language and its terminology. SO2.2 Implement the specified program using assembly language. SO2.3 Define interrupts SO2.4 Analyze various hardware and software interrupts SO2.5 Differentiate between hardware and software interrupts. SO2.6 Draw and study the block diagram of 8086 microprocessor.	LE3.1. Develop a program using 8085 Microprocessor for Decimal, Hexadecimal addition and subtraction of two Numbers. LE3.2. Develop a program using 8085 Microprocessor for addition and subtraction of two BCD numbers. LE3.3. Develop a program to perform multiplication and division of two 8 bit numbers using 8085. LE3.4. Develop a program to find the largest and smallest number in an array of data using 8085 instruction set. LE3.5. Develop a program to convert given Hexadecimal number into its equivalent ASCII number and vice versa using 8085 instruction set. LE3.6. Develop a program for stack operation.	Unit 3.0 Assembly Language Programming for 8085 3.1 Machine Language, Assembly language, 3.2 Assemblers first pass, 3.3 Assembly language programming 3.3.1 Arithmetic operation of two numbers (both numbers stored in R, Mem & Immediate) 3.3.2 Swapping of two numbers stored in registers & memory 3.3.3 Program for Stack using PUSH, POP 3.4 8085 Interrupt Structure 3.4.1 Hardware Interrupts 3.4.2 Software Interrupts 3.5 Architectural block diagram of 8086	3.1 Input Output Instruction and Interrupts 3.2 Integer division

SW-3 Suggested Sessional Work (SW) :**a. Assignments:**

1. Mention the addressing modes of 8085. What jobs ALU of 8085 perform?
2. Develop a program to arrange an array of data in ascending and descending order.

b. Mini Project:

- 1 . Prepare a chart demonstrating stack operations.

c. Other Activities (Specify):

CO-4: Interface various input and output devices to 8085 microprocessor.

(Approx. Hrs: CI+LI +SW+SL-13)

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self Learning (SL)
SO4.1 Explain input output interface . SO4.2 Compare I/O Bus and Interface Modules. SO4.2 Compare I/O vs Memory Bus. SO4.3 Isolated vs Memory Mapped I/O. SO4.4 Explain various techniques for asynchronous data transfer. SO4.5 Describe various DMA Techniques. SO4.6 Identify the features of input output processor.	LE4.1 Program for interfacing ADC/DAC. LE4.2 Program to obtain Interfacing of DMA Controller. LE4.3 Program to obtain Interfacing of Keyboard Controller.	Unit 4.0 Input Output Organization 4.1 Input Output Interface 4.1.1 I/O Bus and Interface Modules 4.1.2 I/O vs. Memory Bus 4.1.3 Isolated vs. Memory Mapped I/O 4.2 Asynchronous Data Transfer 4.2.1 Strobe Control 4.2.2 Handshaking 4.3 Modes of Transfer 4.3.1 Programmed I/O 4.3.2 Interrupt initiated I/O 4.3.3 Software considerations 4.4 Direct Memory Access 4.4.1 DMA Controller 4.4.2 DMA Transfer 4.5 Input Output Processor 4.5.1 CPU-IOP Communication	4.1 Program control instructions - 4.1.1 RISC 4.1.2 CISC width.

SW-4 Suggested Sessional Work (SW) :**a. Assignments:**

1. What is a bus? What are the different buses and what jobs they do in a microprocessor?
2. List out major advantages of DMA.
3. What is the difference between memory-mapped I/O and isolated I/O?

b. Mini Project:

1. Prepare a chart representing DMA operations.

c. Other Activities (Specify):

1. Present a seminar on I/O processor.

CO-5: Compare merits and demerits of different types of memory.

(Approx. Hrs: CI+LI+SL+SW=15)

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self Learning (SL)
SO5.1 Draw and explain memory hierarchy. SO5.2 List and Explain the features of main memory and cache memory and compare them. SO5.3 Compare various address mapping techniques.	LE5.1 Program to obtain Interfacing of RAM Chip to 8085 Based system.	Unit 5.0 Memory Organization 5.1 Memory hierarchy 5.2 Auxiliary Memory 5.2.1 Magnetic Disks 5.2.2 Magnetic Tape 5.3 Cache Memory 5.3.1 Associative Mapping 5.3.2 Direct Mapping 5.3.3 Set Associative Mapping 5.4 Virtual Memory 5.4.1 Address Space and Memory Space 5.4.2 Address Mapping using Pages 5.4.3 Associative Memory Page table 5.5 Memory Management Hardware	5.1 Memory management hardware -Segment and page mapping, memory protection.

SW-5 Suggested Sessional Work (SW) :**a. Assignments:**

1. Compare various cache memory mapping techniques.

b. Mini Project:

1. Draw diagram for secondary storage devices and explain it.

c. Other Activities (Specify):

1. PowerPoint presentation on various types of memory and their hierarchy.

Legend: CI: Classroom Instruction (Includes different instructional strategies i.e. Lecture (L) and Tutorial (T) and others) , LI : Laboratory Instruction (Includes Practical performances in Laboratory, Workshop, field or other locations using different instructional strategies) SL: Self Learning

Note: Performance under Laboratory and Sessional work may appear in more than one COs/SOs.

I) Suggested Specification Table (For ESA of Classroom Instruction CI+SW+SL):

Unit Number	Unit Title	Total Marks
I	8085 Microprocessor	14
II	Addressing Modes & Instruction set of 8085	14
III	Assembly Language Programming for 8085	14
IV	Input Output Organization	14
V	Memory Organization	14
Total		70

Legend: R: Remember, U: Understand, A: Apply and above

J) Suggested Specification Table (For ESA of Laboratory Instruction*):

Laboratory Instruction Number	Short Laboratory Experiment Title	30 Marks are allocated for performance under ESA
1	Introduction to Microprocessor Trainer Kit and identify the different peripheral devices on it	
2	Introduction to 8085 simulator IDE and understand the steps to simulate the program using it.	
3	Execute various data movement instructions .	
4	Execute various arithmetic instructions	
5	Execute various logical instructions	
6	Execute various shift and rotate instructions .	
7	Execute various Program control instructions .	
8	Execute various Branching instructions	
9	Execute various stack instructions	
10	Develop a program using 8085 Microprocessor for Decimal, Hexadecimal addition and subtraction of two Numbers.	
11	Develop a program using 8085 Microprocessor for addition and subtraction of two BCD numbers.	
12	Develop a program to perform multiplication and division of two 8 bit numbers using 8085.	
13	Develop a program to find the largest and smallest	

	number in an array of data using 8085 instruction set.	
14	Develop a program to convert given Hexadecimal number into its equivalent ASCII number and vice versa using 8085 instruction set.	
15	Develop a program for stack operation	
16	Program for interfacing ADC/DAC.	
17	Program to obtain Interfacing of DMA Controller.	
18	Program to obtain Interfacing of Keyboard Controller	
19	Program to obtain Interfacing of RAM Chip to 8085 Based system.	

Note : Only one experiment has to performed at the end semester examination of 30 Marks as per assessment scheme

K) Suggested Instructional/Implementation Strategies:

1. Improved Lecture
2. Tutorial
3. Case Method
4. Group Discussion
5. Industrial visits
6. Industrial Training
7. Field Trips
8. Portfolio Based Learning
9. Role Play
10. Demonstration
11. ICT Based Teaching Learning (Video Demonstration, CBT, Blog, Face book, Mobile)
12. Brainstorming
13. Others

Suggested Learning Resources:

(a) Books :

S. No.	Title	Author	Publisher	Edition & Year
1	Computer Fundamentals & Architecture Organization	B. Ram	New Age International Limited	3rd
2	Microprocessor Architecture, Programming and applications with 8085	Ramesh Gaonkar	Penram International Limited	5 th
3	Computer System Architecture	M. Morris Mano	Pearson Prentice Hall	3rd

(b) Open source software and website address :

1. Microprocessor tutorial by tutorialspoint-
<https://www.tutorialspoint.com/microprocessor/index.htm>
2. Microprocessor tutorial by NPTEL- <http://nptel.ac.in/downloads/106108100/>

M) List of Major Laboratory Equipment and Tools:

S. No.	Name of Equipment	Broad Specifications	Relevant Experiment Number
1	8085 Microprocessor programming kit, instruction coding sheet	SCIENTECH-8085	1-19
2	Power supply	A.C (230V Mains)	1-19
3	8085 Simulator	8085 Simulator version 2	1-19
4	PC	Processor-p4 and above, RAM 1 GB, Hard Drive-1TB	1-19

N) Mapping of POs & PSOs with COs:

Course Outcomes (COs) Titles	Programme Outcomes (POs)										Programme Specific Outcomes (PSOs)	
	Basic knowledge PO-1	Discipline knowledge PO-2	Experiments & Practice PO-3	Engineering Tools PO-4	The Engineer & Society PO-5	Environment & Sustainability PO-6	Ethics PO-7	Individual & Teamwork PO-8	Communication PO-9	Life Long learning PO-10	PSO-1	PSO-2
CO-1 : Identify the structure of 8085 microprocessor and its application.	2	2	1	1	1	1	1	1	2	2	1	0
CO-2 :Execute programs on various instructions of 8085.	1	2	2	1	2	2	1	2	1	2	1	0
CO-3 : Develop various programs on assembly language programming for 8085	1	2	3	2	2	1	2	3	2	3	2	1
CO-4 : Interface various input and output devices to 8085 microprocessor	2	3	2	2	2	2	2	3	2	3	2	0
CO-5 : Compare merits and demerits of different types of memory	3	3	2	3	3	2	3	3	2	3	2	1

O) Course Curriculum Map:

POs & PSOs No.	COs No.& Title	SOs No.	Laboratory Instruction (LI)	Classroom Instruction (CI)	Self Learning (SL)
PO-1-PO10 PSO1	CO-1: Identify the structure of 8085 microprocessor and its application.	SO1.1-SO 1.4	LE1.1- LE1.2	Unit -1.0 8085 Microprocessor	1.1-1.2
PO-1-PO10 PSO1	CO-2: Execute programs on various instructions of 8085.	SO2.1- SO 2.5	LE2.1- LE2.7	Unit -2.0 Addressing Modes & Instruction set of 8085	2.1-2.3
PO-1-PO10 PSO1- PSO2	CO-3 : Develop various programs on assembly language programming for 8085	SO3.1- SO3.6	LE3.1-LE3.6	Unit -3.0 Assembly Language Programming for 8085	3.1-3.2
PO-1-PO10 PSO1	CO-4 : Interface various input and output devices to 8085 microprocessor	SO4.1- SO4.6	LE4.1 – LE4.3	Unit -4.0 Input Output Organization	4.1-4.1.2
PO-1-PO10 PSO1- PSO2	CO-5: Compare merits and demerits of different types of memory.	SO5.1-SO5.3	LE5.1	Unit -5.0 Memory Organization	5.1

Legend: CI: Classroom Instruction (Includes different instructional strategies i.e. Lecture (L) and Tutorial (T) and others) , LI : Laboratory Instruction (Includes Practical performances in Laboratory, Workshop, field or other locations using different instructional strategies) SL: Self Learning

I. Course Curriculum Detailing (Semester- IV)

- A) **Course Code** : 2000454(022)
 B) **Course Title** : DATABASE MANAGEMENT SYSTEM
 C) **Pre- requisite Course Code and Title** : Fundamentals of Computer System
 D) **Rationale** :

Database Management Systems (DBMS) are vital components of modern information systems. Database applications are pervasive and range in size from small in-memory databases to terra bytes or even larger in various applications domains. This course focuses on the fundamentals of relational database management systems, and the current developments in database theory and their practices.

E) **Course Outcomes**

- :
CO-1 Describe basic concepts of database system.
CO-2 Design a data model and schemas in RDBMS.
CO-3 Use of Structured Query Language (SQL).
CO-4 Use of Group Functions in Structured Query Language (SQL).
CO-5 Apply functional dependencies for designing a robust database.

F) **Scheme of Studies:**

Board of Study	Course Code	Course Title	Scheme of Studies (Hours/Week)				
			L	P	T	Total Study Hours (L+T+P)	Total Credits(C) (L+T+P/2)
Computer Science & Engineering	2000454 (022)	Database Management System	3	2	0	5	4

Legend: Lecture (L) and Tutorial (T) and Practical (P)

G) **Scheme of Assessment:**

Board of Study	Course code	Course Title	Scheme of examination					
			Total Marks					Total Marks
			Theory			Practical		
ESE	CT	TA	ESE	TA				
Computer Science & Engineering	2000454 (022)	Database Management System	70	30	30	30	50	210

Legend: PRA: Process Assessment, PDA : Product Assessment **Note:** Separate passing is must for Progressive and End Semester Assessment.

H) **Course-Curriculum Detailing:**

This course curriculum detailing depicts learning outcomes at course level and session level and their attainment by the students through Classroom Instruction (CI), Laboratory Instruction (LI), Sessional Work (SW) and Self Learning (SL). Students are expected to demonstrate the attainment of Session Outcomes (SOs) and finally Course Outcomes (COs) upon the completion of course. Convert unit of the given physical quantity from one unit system to other.

CO-1: Describe basic concepts of database system.

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Interaction(CI)	Self Learning (SL)
SO1.1 Describe Database management system SO1.2 Identify users of database system SO1.3 Differentiate types of database management systems.	LE1.1 Install different Database systems. Ex: ORACLE,POSTGRESQ L, MYSQL	Unit 1.0 Overview Of Database Management System 1.1 Need of Database system 1.2 Advantages and Disadvantages of DBMS 1.3 Levels of data abstractions 1.3.1 Logical Level 1.3.2 Physical level 1.3.3 view level 1.4 Data independence 1.5 An architecture of DBMS 1.5.1 Data base users 1.5.2 Roles of DBA 1.6 Applications of DBMS	1.1 Configure database management systems

SW-1 Suggested Sessional Work (SW):

- a. Assignments:
 1. Differentiate between file system and database management system
 2. List the features of database management system
- b. Mini Project:
 1. Install and configure ORACLE database.
 2. Install and configure POSTGRESQL
- c. Other Activities (Specify):
 1. A seminar on “database architecture”.

CO-2: Design a data model and schemas in RDBMS

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Interaction(CI)	Self Learning (SL)
SO2.1 Describe different data models SO2.2 Apply ER model to design a data base SO2.3 identify types of attributes of an entity	LE2.1 Draw the ER-Diagram for hospital management system LE2.2 Draw the ER-Diagram for Library management system LE2.3 Draw the ER-Diagram for Human Resource management system	Unit 2.0 Data Models & ER Model 2.1 schema and instance 2.2 Types of data model 2.2.1 Relational data model 2.2.2 Network data model 2.2.3 Hierarchical data model 2.3 introduction to ER-Model 2.4 Component of ER Model 2.4.1 Entity 2.4.2 Relationship 2.4.3 Attributes 2.5 Types of relationship 2.6 ER Notations	2.1 Advantages and disadvantages of data models 2.2 Advantages and disadvantages of ER- Model

SW-2 Suggested Sessional Work (SW):

- a. Assignments:
 1. Describe and use of record based data model
 2. Describe and use of object based data model
- b. Mini Project:
 1. Draw ER-Diagram for transport management system
- c. Other Activities (Specify):
 1. A seminar on “ER-Diagram”

CO-3 Use of Structured Query Language SQL

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Interaction(CI)	Self Learning (SL)
------------------------	-----------------------------	----------------------------	--------------------

Session Outcomes	Laboratory	Class room Interaction(CI)	Self Learning
SO3.1 Identify different types of SQL commands SO3.2 Identify different types of constraints SO3.2 Use different types of SQL commands	LE3.1 Create table for students LE3.2 Insert record into student table LE3.3 Create a primary key on student table,	Unit 3.0 Query Language & Data Integrity 3.1 Introduction to SQL 3.2 SQL data types 3.3 SQL commands 3.3.1 DDL Commands 3.3.2 DML Commands 3.3.3 TCL Commands 3.3.4 DCL Commands 3.3.5 DQL Commands 3.4 SQL Operators 3.5 Constraints 3.5.2 primary key constraints 3.5.3 Foreign key constraints	3.1 Use different key constraints in a table 3.2 Identifying the purpose of different commands

SW-3 Suggested Sessional Work (SW) :

- a. Assignments:
 1. Describe super key and candidate key
 2. Explain Pattern matching Operator
- b. Mini Project:
 1. Create an employee table and perform insert and update operation by applying SQL constraints.
- c. Other Activities (Specify):
 1. A seminar on "SQL commands"

CO- 4 Use of Group Functions in Structured Query Language (SQL)

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Interaction(CI)	Self Learning (SL)
SO4.1 Identify different types of group functions of SQL SO4.2 Use math functions in SQL query SO4.3 Differentiate inner and outer join operations	LE4.1 prepare SQL query to find avg salary of employee LE4.2 Join two tables using Join Operation LE4.3 Use math functions in a query	Unit 4. SQL FUNCTIONS 4.1 Group functions , Group by , having and order by clause 4.2 Join operations 4.2.1 Inner Join 4.2.2 Outer Join 4.3 Nested query 4.3.1 Correlated Query 4.3.2 Uncorrelated Query 4.4 Math functions	4.1 Retrieve data from multiple tables by using nested Query.

SW-4 Suggested Sessional Work (SW):

- a. Assignments:
 1. Describe group functions.
 2. Describe order by clause.
- b. Mini Project:
 1. Perform a query to display minimum, maximum and total salary of employee.
- c. Other Activities (Specify):
 1. A seminar "Join operations"

CO-5: Apply functional dependencies for designing a robust database.

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Interaction(CI)	Self Learning (SL)
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Session Outcomes	Laboratory	Class room Interaction(CI)	Self Learning (SL)
SO5.1 Describe types of functional dependency SO5.2 classify different normal forms SO5.3 identify different types of keys	LE5.1Apply normalization into tables	Unit 5.0: Functional Dependencies 5.1 Introduction of functional dependency 5.1.1 trivial and nontrivial dependencies 5.1.2 inference rules 5.1.3 Closure of a set of dependencies 5.2 closure of a set attributes 5.3 types of keys 5.4 Normalization 5.5 Normal Forms	5.1 identify reduced set of functional dependency 5.2 identify relationship among keys

Legend: CI: Classroom Instruction (Includes different instructional strategies i.e. Lecture (L) and Tutorial (T) and others), LI: Laboratory Instruction (Includes Practical performances in Laboratory, Workshop, field or other locations using different instructional strategies) SL: Self Learning

SW-5 Suggested Sessional Work (SW) :

- a. Assignments:
 1. Describe different normal forms
 2. Explain different types of keys
- b. Mini Project:
 1. Find the candidate keys in a relation
- c. Other Activities (Specify):
 1. Seminar on a normal form

Note: Performance under Laboratory and Sessional work may appear in more than one COs/SOs.

I) Suggested Specification Table (For ESA of Classroom Instruction CI+SW+SL):

Unit Number	Unit Title	Total Marks
I	Overview Of Database Management System	10
II	Data Models & ER Model	16
III	Query Language & Data Integrity	14
IV	SQL Functions	16
V	Functional Dependencies	14
Total		70

J) Suggested Specification Table (For ESA of Laboratory Instruction*):

Note: The student at the end of semester examination of **30 Marks**; has to undertake any **ONE** of the listed practical's.

Laboratory Instruction Number	Short Laboratory Experiment Title	
1.	Install and configure ORACLE DBMS software.	30 Marks are allocated for performance under ESA
2.	Create and alter table using CREATE and ALTER , DDL commands	
3.	Perform DROP and TRUNCATE, DDL Commands on a Table.	
4.	Apply Different Data types in table.	
5.	Perform various DML Commands like INSERT, SELECT, UPDATE and DELETE on a given table.	
6.	perform nested Queries on multiple Tables.	
7.	Perform join Operation on multiple Tables.	
8.	perform set operations on multiple Tables.	
9.	Perform various math operations on table data using MATH functions.	
10.	Implement COMMIT, ROLLBACK and CHECKPOINT TCL commands in a given table.	

K) Suggested Instructional/Implementation Strategies:

1. Improved Lecture
2. Tutorial
3. Case Method
4. Group Discussion
5. Industrial visits
6. Industrial Training
7. Field Trips
8. Portfolio Based Learning
9. Role Play
10. Demonstration
11. ICT Based Teaching Learning (Video Demonstration, CBT, Blog, Face book, Mobile)
12. Brainstorming

L) Suggested Learning Resources:

(a) Books :

S.No.	Title	Author	Publisher	Edition & Year
1.	Database System Concepts	Avi Silberschatz · Henry F.Korth · S. Sudarshan	McGraw Hill Education	Sixth edition (1 December 2013)

				or latest
2.	Fundamentals of database systems	Ramez Elm sari, Shamkant , B. Navathe	Pearson Education India	seventh edition (8 June 2015) or latest
3.	Database Management Systems	Raghu Ramkrishnan, Gehrke	McGraw Hill Education	Third edition (1 July 2014) or latest
4.	SQL, PL/SQL the Programming Language of Oracle	Ivan Bayross	BPB Publications	(4 th Edition) or latest

(b) Open source software and website address:

1. Oracle Software: www.oracle.com
2. SQL Basic Concepts: <http://www.w3schools.com/sql/>

(c) Others:

1. Database Tutorials: <http://www.roseindia.net/programming-tutorial /Database Tutorials>
2. DBMS: <http://nptel.iitm.ac.in/video.php?subjectId=106106093>

M) List of Major Laboratory Equipment and Tools:

S. No.	Name of Equipment	Broad Specifications	Relevant Experiment Number
1	Personal computer	2GB RAM, windows 7, 80 GB HDD, Pentium 4 processor	All
2	Oracle software	Version 12c or Latest	all

N) Mapping of POs & PSOs with COs:

Course Outcomes (COs) Titles	Programme Outcomes (POs)										Programme Specific Outcomes (PSOs)	
	Basic knowledge PO-1	Discipline knowledge PO-2	Experiments & Practice PO-3	Engineering Tools PO-4	The Engineer & Society PO-5	Environment & Sustainability PO-6	Ethics PO-7	Individual & Team work PO-8	Communication PO-9	Life Long learning PO-10	PSO-1	PSO-2
CO-1 Describe basic concepts of database system.	3	3	1	1	1	1	1	3	2	3	2	2
CO-2 Design a data model and schemas in RDBMS.	3	3	2	2	1	1	1	2	2	2	2	2
CO-3 Use of Structured Query Language (SQL)	3	3	3	3	2	1	2	3	3	3	2	2
CO-4 use of Group Functions in Structure Query Language (SQL)	3	3	3	3	2	1	1	3	3	3	2	2
CO-5 Apply functional dependencies for designing a robust database	3	3	2	1	1	1	1	2	2	2	2	2

Legend: 0- No Correlation, 1- Low, 2- Medium, 3- High

O) Course Curriculum Map:

POs & PSOs No.	COs No. & Title	SOs No.	Laboratory Instruction (LI)	Classroom Instruction (CI)	Self Learning (SL)
PO1-PO3, PO5, PO7- PO10 PSO1-PSO2	CO-1 Describe basic concepts of database system.	SO1.1-SO1.3	LE1.1	Unit 1.0: Overview Of Database Management System	SL1.1
PO1-PO5, PO7-PO10 PSO1-PSO2	CO-2 Design a data model and schemas in RDBMS.	SO.2.1 -SO2.3	LE2.1 -LE2.3	Unit 2.0: Data Models & ER Model	SL2.1-SL2.2
PO1-PO5, PO7-PO10 PSO1-PSO2	CO-3 use of Structured Query Language (SQL)	SO3.1-SO3.3	LE3.1-LE3.3	Unit 3.0: Query Language & Data Integrity	SL3.1-SL3.2
PO1-PO5, PO7-PO10 PSO1-PSO2	CO-4 use of Group Functions in Structure Query Language (SQL)	SO4.1-SO4.3	LE4.1-LE4.3	Unit 4: SQL Functions	SL4.1
PO1-PO5, PO7-PO10 PSO1-POS2	CO-5 Apply functional dependencies for designing a robust database	SO5.1-SO5.3	LE5.1	Unit 5.0: Functional Dependencies	SL5.1-SL5.2

Legend: CI: Classroom Instruction (Includes different instructional strategies i.e. Lecture (L) and Tutorial (T) and others), LI: Laboratory Instruction (Includes Practical performances in Laboratory, Workshop, field or other locations using different instructional strategies) SL: Self Learning

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Diploma in Computer Science and Engineering

Semester-IV

- A) Course Code : 2000457(037)
B) Course Title : Entrepreneurship Development and Management
C) Pre- requisite Course Code and Title :
D) Rationale :

Our fast growing economy provides ample opportunities for diploma engineers to succeed in entrepreneurship. Diploma engineers can be their own masters and job provider to others by starting their service industry/assembly/marketing/consultancy/manufacturing enterprises. As entrepreneurship requires distinct set of skills which may not be developed while undergoing technical subjects. Hence a separate course has been introduced for developing such skills set amongst diploma students. This course aims at developing competencies in the diploma engineer for becoming an intrapreneur or a successful entrepreneur. After successfully completing this course students who develop qualities of successful entrepreneur can set up their own manufacturing industry/service industry/business/startup or be self employed and those who prefer job can become intrapreneur and share profits with their company.

E) **Course Outcomes**

- CO-1 Demonstrate traits of a successful intrapreneur/entrepreneur
CO-2 Analyze the level of achievement motivation by preparing one's own portfolio.
CO-3 Innovate products and services using creativity techniques.
CO-4 Manage critical resources from support institutions.
CO-5 Prepare sustainable small business plans.

F) **Scheme of Studies:**

Board of Study	Course Code	Course Title	Scheme of Studies (Hours/Week)			
			L	P	T	Total Credits(C) (L+T+P/2)
Mechanical	2000457 (037)	Entrepreneurship Development and Management	2	-	1	3

Legend: L- Lecture, T- Tutorial, P -Practical

Lecture (L) --> CI : Classroom Instruction (Includes different instructional strategies i.e. Lecture and others).

Practical (P) --> LI : Laboratory Instruction (Includes Practical performances in laboratory workshop, field or other locations using different instructional strategies.

Tutorial (T) --> Includes sessional work (SW) (assignment, seminar, mini project etc.), SL: Self Learning.

G) **Scheme of Examination:**

Board of Study	Course Code	Course Title	Scheme of Examination					Total Marks
			Theory			Practical		
			ESE	CT	TA	ESE	TA	
Mechanical	2000457 (037)	Entrepreneurship Development and Management	70	20	30	-	-	120

Legend: ESE: End of Semester Exam, CT: Class Test, TA: Teachers Assessment

G) Course-Curriculum Detailing:

This course curriculum detailing depicts learning outcomes at course level and session level and their attainment by the students through Classroom Instruction (CI), Laboratory Instruction (LI), Sessional Work (SW) and Self Learning (SL). Students are expected to demonstrate the attainment of Session Outcomes (SOs) and finally Course Outcomes (COs) upon the completion of course.

CO-1 Demonstrate traits of a successful intrapreneur/entrepreneur

(Approx. Hrs: L+T+P = 10)

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self Learning (SL)
SO1.1 Select intrapreneurship or entrepreneurship as a career based on the qualities possessed by an individual. SO1.2 Identify various avenues of entrepreneurship for diploma engineers. SO1.3 Demonstrate qualities of successful intrapreneur/entrepreneur. SO1.4 Explain various steps in establishment of enterprise. SO1.5 Select an area of business opportunity as per your interest.		Unit 1.0 Characteristics of entrepreneurs Concept of entrepreneur and intrapreneur Benefits of becoming an intrapreneur/entrepreneur. Scope of entrepreneurship in local and global market. Planning for establishment of an enterprise. Traits of successful intrapreneur/entrepreneur and passion, initiative, independent decision making, teamwork, assertiveness, persuasion, persistence, information seeking, commitment to work contract etc. SW analysis. Team work simulation. Trait of successful entrepreneur: calculated risk taking. Risk taking simulation exercise. Business opportunity Guidance	<ul style="list-style-type: none"> • History of entrepreneurs hip. • Definition of entrepreneurs hip • Social entrepreneurs hip

SW-1 Suggested Sessional Work(SW):

a. Assignments:

- i. Identify existing needs of the institute/college and convert them into business opportunity.
- ii. Enumerate characteristics of assigned first generation successful entrepreneurs, intrapreneurs, managers by preparing a presentation.
- iii. Analyze the reasons for success and failure of the assigned entrepreneurs by

preparing ppt on the basis of news, articles, reviews, video etc.

b. Mini project:

- i. Interviewing few local entrepreneurs and prepare a collage on “Traits of successful entrepreneurs”.
- ii. Identify traits to be developed in you for becoming a successful entrepreneur based on your strength and weakness analysis and submit an action plan to develop the same.
- iii. Organize “best from waste” competition.

c. Other Activities:

- i. Identify your hobbies and interests and convert them into business idea.
- ii. Organize seminar on history of entrepreneurship, Definition and selected case studies of social entrepreneurship.

CO-2 Analyze the level of achievement motivation by preparing one’s own portfolio.

(Approx. Hrs: L+T+P = 08)

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self Learning (SL)
SO2.1 Explain the concept of achievement motivation. SO2.2 Assess level of need for Achievement in the individual through different tools. SO2.3 Prepare an action plan for enhancing need for achievement		Unit 2.0 Motivation Management 2.1 Motives, motivation and motivational cycle. Concept of Need for Achievement. Need for Achievement assessment through various tools. <ul style="list-style-type: none"> • Ring toss game • Boat making exercise • Building block exercise • TAT stories • Who am I? Interpretation and action plan for self development.	<ul style="list-style-type: none"> • Kakinada experiment • Techno-preneurship.

SW-2 Suggested Sessional Work(SW):

a. Assignments:

- i. Prepare a portfolio based on achievement motivation exercise and tasks.

b. Mini project:

- i. Prepare a report on need for achieve men exercises.
- ii. Develop achievement motivation field exercises.

c. Other Activities:

- i. Prepare a plan for development of achievement motivation and execute it.
- ii. Develop case studies on Techno-preneurship.
- iii. Prepare a report on Kakinada experiment.

CO-3 Innovate products using creativity techniques.

(Approx. Hrs: L+T+P = 10)

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self Learning (SL)
SO3.1 Elucidate the use of creativity techniques for entrepreneurs. SO3.2 Improve a chosen product using brainstorming technique. SO3.3 Differentiate between creativity and innovation. SO3.4 Apply concept of product life cycle for conceiving a project. SO3.5 Design a product using new product development process.		Unit 3.0 Management of Creativity. Creativity: Divergent thinking, creativity techniques. Innovation, types and applications Product life cycle, New product development process. Product development and innovation through creativity and innovation.	<ul style="list-style-type: none"> • Check list of questions. • Six thinking hats. • Case study of innovative first generation entrepreneur. Schemes and incentives for innovation. • Innovative solutions for social problems.

SW-3 Suggested Sessional Work(SW):

a. Assignments:

- i. Use the assigned creativity technique for improvement of product characteristic.
- ii. Use the assigned creativity technique for improvement of service process characteristic.

b. Mini project:

- i. Apply innovative practices in different process of an enterprise.

c. Other Activities:

- i. Prepare a prototype of a creative solution to industrial/ social problem.
- ii. Organise seminar on Schemes and incentives for innovation, Innovative solutions for social problems and Kakinada experiment.

CO-4 Manage critical resources from support institutions.

(Approx. Hrs: L+T+P = 10)

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self Learning (SL)
SO4.1 Select appropriate form of business organization for enterprise SO4.2 Identify entrepreneurship support institutions for technical/marketing and finance. SO4.3 Explain salient features of entrepreneurship promotion schemes of centre and state. SO4.4 Prepare a marketing mix plan for identified industry. SO4.5 Develop a materials management plan. SO4.6 Develop a human resource plan.		Unit 4.0 Critical Resources Forms of business organization: Proprietorship, Partnership, Cooperative, Private, Public Ltd Company, Section 8 company, LLP Institutional Support for entrepreneurship: MSMESI, CED, DTIC, CITCON, CSIDC, LUN, NSIC, KVIC, NABARD, Banks, SIDBI Entrepreneurship promotion schemes of centre and state. Marketing Mix, Market survey for project identification Inventory control, vendor development, material movement, store management. Manpower plan, hiring process, compensation, performance appraisal.	<ul style="list-style-type: none"> • Establishment procedure of Proprietorship, LLP, Cooperative, Section 8 company, LLP Factory Act, Labour Laws, GST,

SW-4 Suggested Sessional Work(SW):

a. Assignments:

- i. Examine suitability of different forms of business organization for the given project and prepare a presentation for the same.
- ii. Conduct a market survey and prepare a report along with marketing mix plan for the given project.
- iii. Prepare materials management strategy for a business or manufacturing unit and submit as report.
- iv. Prepare a man power plan chart and job specifications for identified positions.

b. Mini project:

- i. Explore facilities extended by support institutions to entrepreneurs for marketing of the given situation.
- ii. Investigate facilities extended by support institutions to entrepreneurs for technical support of the given situation.

- iii. Identify facilities extended by support institutions to entrepreneurs for financial support of the given situation

c. Other Activities:

- i. Visit the assigned agencies engaged in institutional support for entrepreneurship and make a report.
- ii. For your selected project decide a unique name of the enterprise, logo, signboard, letterhead and pamphlet.
- iii. Organise a seminar on establishment procedure of proprietorship, LLP, cooperative, section 8 company, factory act, labour laws and GST.

CO-5 Prepare sustainable small business plans.

(Approx. Hrs: L+T+P = 10)

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self Learning (SL)
SO5.1 Prepare business plan/techno economic feasibility report. SO5.2 Calculate and comment on breakeven point for given project. SO5.3 Explain financing of startups.		Unit 3.0 Sustainable business plan Format of business plan/techno-economic feasibility report. Demand and annual production target based on market survey. Outline production/service process. Land, building and machinery requirement. Power, utilities and raw material requirement. Fixed capital, Working capital, Subsidy and Cost of Project. Means of finance, calculation of interest. Profitability analysis, Break-evenpoint.	<ul style="list-style-type: none"> • Techno-economic feasibility report of MSME. • Startup process. • Angel Investors. • Venture capitalist. • Incubators.

SW-5 Suggested Sessional Work(SW):

a. Assignments:

- i. Describe the procedure of registration and availing of facilities from the assigned support institution.
- ii. Prepare a process plan for the selected project.

b. Mini project:

- i. Prepare a marketing plan for the assigned project.
- ii. Prepare a financial plan for the assigned project.
- iii. Prepare a technical feasibility plan for the assigned project.
- iv. Prepare a techno-economical feasibility report of the assigned project.

c. Other Activities:

- i. Analyse a case study on startups focusing on financing from angel investor and venture capitalist.
- ii. Organise seminar on Starup process, Angel investors, Venture Capitalist and Incubators

Note: Performance under Laboratory and Sessional work may appear in more than one COs/SOs.

H) Suggested Specification Table (For ESA of Classroom Instruction):

Unit Number	Unit Title	Total Marks
I	Characteristics of entrepreneurs	14
II	Motivation Management	10
III	Management of Creativity and Innovation	14
IV	Resource Management	16
V	Sustainable Business Plan	16
Total		70

I) Suggested Specification Table (For ESA of Laboratory Instruction*): Not Applicable

J) Suggested Instructional/Implementation Strategies:

1. Improved Lecture
2. Tutorial
3. Case Method
4. Group Discussion
5. Field Trips
6. Portfolio Based Learning
7. Demonstration
8. ICT Based Teaching Learning (Video Demonstration, CBT, Blog, Face book, Mobile)
9. Brainstorming

K) Suggested Learning Resources:

(a) Books :

S. No.	Titles	Author	Publisher	Edition & Year
1.	Entrepreneurial Development	Desai Vasant	Himalaya Publishing House	Mumbai/2017 ISBN 978 93 5097 383 7
2	Starting your own business, step by step Blue print for the First – time Entrepreneur	Harper Stephen C.	Mc Craw-Hill	2003 ISBN13: 9780071410120
3.	The Business Planning GUIDE	H.Bangs David	Upstart Publishing Company in Chicago	978-0793154098
4	Entrepreneurship Development in India	Gupta Dr.C.B. Shrinivasa NP	Sultan Chand & Sons	9788180548185
5	Entrepreneurship Development	Khanka Dr.S.S.	S.Chand New Delhi	ISBN 81 219 1801 4

S. No.	Titles	Author	Publisher	Edition & Year
6	Entrepreneurship Development and small Business Enterprises	Charantimath M.	Pearson Edu.Soc. INDIA	2013/ISBN 13 978 8131 762264
7.	Entrepreneurship Development	Sharma Sangita	PHI, DELHI	ISBN 978 81 203 5270 4

(b) Open source software and websiteaddress:

1. Free e books:<https://www.free-ebooks.net/book-list/entrepreneurship>
2. Startups:https://inc42.com/startups/?utm_source=top-menu&utm_medium=website&utm_campaign=menu
3. Indian Tech Startup funding report: https://pages.inc42.com/annual-indian-tech-startup-funding-report-2017/?utm_source=top-menu&utm_medium=website&utm_campaign=menu
4. Project profile:
<https://my.msme.gov.in/MyMsmeMob/MsmeProjectProfile/Home.htm>
5. Project profile:<http://www.dcmsme.gov.in/publications/pmryprof/pjseries.html>
6. Project profile<http://www.dcmsme.gov.in/reports/ProjectProfile.htm>

L) List of Major Laboratory Equipment and Tools: Not Applicable

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M) Mapping of POs & PSOs with COs:

Course Outcomes (COs)	Programme Outcomes (POs)										Programme Specific Outcomes (PSOs)	
	PO-1 Basic knowledge	PO-2 Discipline knowledge	PO-3 Experiments and practice	PO-4 Engineering Tools	PO-5 The engineer and society	PO-6 Environment and sustainability	PO-7 Ethics	PO-8 Individual and team work	PO-9 Communication	PO-10 Life-long learning	PSO-1	PSO-2
CO-1 Demonstrate traits of a successful intrapreneur/entrepreneur.	-	3	-	-	2	2	2	2	2	2	-	-
CO-2 Analyse the level of achievement motivation by preparing one's own portfolio.	-	3	-	-	2	2	2	2	2	2	-	-
CO-3 Innovate products using creativity techniques.	-	3	-	-	2	2	2	2	2	2	-	-
CO-4 Manage critical resources from support institutions.	-	3	-	-	2	2	2	2	2	2	-	-
CO-5 Prepare sustainable small business plans.	-	3	-	-	2	2	2	2	2	2	-	-

Legend: 1 – Low, 2 – Medium, 3 – High

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Semester-IV

N) Course Curriculum Map:

POs & PSOs No.	COs No. & Title	SOs No.	Laboratory Instruction (LI)	Classroom Instruction (CI)	Self Learning (SL)
PO-2,5,6,7,8,9,10	CO-1 Demonstrate traits of a successful intrapreneur/entrepreneur.	SO1.1 SO1.2 SO1.3 SO1.4 SO1.5		Unit 1.0 Characteristics of entrepreneurs 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7	As mentioned in relevant page numbers
PO-2,5,6,7,8,9,10	CO-2 Analyse the level of achievement motivation by preparing one's own portfolio.	SO2.1 SO2.2 SO2.3		Unit 2.0 Motivation Management 2.1, 2.2, 2.3, 2.4	
PO-2,5,6,7,8,9,10	CO-3 Innovate products using creativity techniques.	SO3.1 SO3.2 SO3.3 SO3.4 SO3.5		Unit 3.0 Management of Creativity and Innovation 3.1, 3.2, 3.3	
PO-2,5,6,7,8,9,10	CO-4 Manage critical resources from support institutions.	SO4.1 SO4.2 SO4.3 SO4.4 SO4.5 SO4.6		Unit 4.0 Resource Management 4.1, 4.2, 4.3, 4.4,4.5,4.6	
PO-2,5,6,7,8,9,10	CO-5 Prepare sustainable small business plans.	SO5.1 SO5.2 SO5.3		Unit 5.0 Sustainable Business Plan 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 5.8	

Legend: CI: Classroom Instruction (Includes different instructional strategies i.e. Lecture (L) and Tutorial (T) and others), LI: Laboratory Instruction (Includes Practical performances in Laboratory, Workshop, field or other locations using different instructional strategies) SL: Self Learning