POORNIMA
COLLEGE OF ENGINEERING

Approved by AICTE
Affiliated to Rajasthan Technical University, Kota
Recognized by UGC under Section 2(f) of the UGC Act, 1956

1.2.1 Number of Add on/ Certificate/ value added programs offered during the last five years (Add-on courses Institute Level Brochures- Session 2020-21)

ISI-6, RIICO Institutional Area, Sitapura, Jaipur-302022 (Rajasthan)
• Phone: +91-9829255102, +91-9414728922 • E-mail: principal.pce@poornima.org
• Website: www.pce.poornima.org

POORNIMA
COLLEGE OF ENGINEERING

Affiliated to RTU, Kota • Approved by AICTE & UGC under 2(f) • Accredited by NBA

Brochure of Add-On Courses

SESSION 2020-21

IBM Career Education | Infosys campus connect | QEEE | Spoken Tutorial

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Director
Poornima College of Engineering
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Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
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Sitapura, JAIPUR

LIST OF ADD-ON COURSES OFFERED

TERMS AND CONDITIONSFOR ADD-ON COURSE ENROLMENT

1. One Department Course has to be compulsorily selected by every student in every session.
2. Course enrolment form has to be duly filled and submitted by the declared due date to the Tutor office, failing in which registration will not be accepted.
3. All Courses are free of cost, unless specified explicitly.
4. There is a mandatory attendance criteria for each course as specified in the brochure for achieving the certification.
5. In general a course will be conducted only after receiving a minimum 50 enrolment applications.
6. In case of any conflict or ambiguity the decision taken by the Head of the Department / IQAC will be considered standing and final.
7. In case of any unfair means used in Certification examination by an attendee, the course registration will be immediately cancelled.
8. Certification examination will not be re-conducted in any circumstances.
9. Department may issue additional instructions and criteria for their respective courses.

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

NAME OF COURSE	COURSE CODE
DEPARTMENT LEVEL COURSES	
DEPARTMENT OF CIVIL ENGINEERING	
Advance Building Construction and Drawing	*AOC-DEP-CIV-ABCD*
Analysis & Design of Tall Building	*AOC-DEP-CIV-ADTB*
Building Information Modelling	*AOC-DEP-CIV-BIM*
Residential House Planning as per NBC	*AOC-DEP-CIV-RHPN*
Sketch Up 3D Modeling	*AOC-DEP-CIV-TDM*
DEPARTMENT OF COMPUTER ENGINEERING	
Microsoft Azure Academia Program: Azure AI Fundamentals	*AOC-DEP-CSE-AZAI*
Microsoft Azure Academia Program: Python Programming	*AOC-DEP-CSE-AZPY*
Microsoft Azure Academia Program: Microsoft Azure Data Fundamentals	*AOC-DEP-CSE-AZDF*
Microsoft Azure Academia Program: Big Data	*AOC-DEP-CSE-AZBD*
Microsoft Azure Academia Program: POWER BI "DATA ANALYTICS"	*AOC-DEP-CSE-AZBI*
Microsoft Azure Academia Program: Cloud Infrastructure and Security	*AOC-DEP-CSE-AZCI*
Programming in Hadoop	*AOC-DEP-CSE-AZHD*
Data Science with Python	*AOC-DEP-CSE-DSPY*
Selenium Testing	*AOC-DEP-CSE-SETS*
DEPARTMENT OF ELECTRICAL ENGINEERING	
Understanding of Electrical Machines	*AOC-DEP-EE-EM*
Introduction to Internet of Things (IOT) in Electrical Engineering	*AOC-DEP-EE-IOT*
Applications of Arduino devices in Electrical Engineering	*AOC-DEP-EE-ARD*
Introduction to Raspberry PI and its applications	*AOC-DEP-EE-RSPI*
Introduction to PV Syst and its applications in Power Engineering	*AOC-DEP-EE-PVS*
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING	
Art of Technical Writing & Publishing Research Papers	*AOC-DEP-ECE-TWP*
PSpice: A modeling Tool	*AOC-DEP-ECE-PSP*
VLSI Circuit Design using Xilinx & Mentor Graphics Tools	*AOC-DEP-ECE-VLSI*
LABVIEW & its Hardware Application	*AOC-DEP-ECE-LABV*
Simulation using PROTEUS Software	*AOC-DEP-ECE-PCBD*
Application of MATLAB in Engineering	*AOC-DEP-ECE-MATL*
DEPARTMENTOFINFORMATIONTECHNOLOGY	
Introduction to Python Programming	*AOC-DEP-IT-PYP*
Web Design and Development	*AOC-DEP-IT-WEB*
DEPARTMENTOFMECHANICALENGINEERING	
Solid Works	*AOC-DEP-ME-SW*
Basics of Automobile Engineering	*AOC-DEP-ME-BAE*
Advances of Automobile Engineering	*AOC-DEP-ME-AAE*
DEPARTMENTOF FIRST YEAR	
Project Based Learnings	*AOC-DEP-FY-PBL*
Program on Logical Reasoning and Technical Skill Development	*AOC-DEP-FY-LRTS*
Skill Development Program in Project Oriented Training	*AOC-DEP-FY-SDPP*
Skill Development Program in Advanced C	*AOC-DEP-FY-ACP*
Skill Development Program in Machine Learning-Deep learning	*AOC-DEP-FY-SDPML*
Skill Development Program in Web Development using JAVASCRIPT and REACTJS	*AOC-DEP-FY-SDPWD*

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

SECTION–1

DEPARTMENT LEVEL COURSES

2.1 DEPARTMENT OF CIVIL ENGINEERING

S. No.	Course ID	Course Name	No. of Modules	Course Duration	Course Facilitator
1	AOC-DEP-CIV-ABCD	Advance Building Construction and Drawing	10	32 Hours	Mr. Balwan
2	AOC-DEP-CIV-ADTB	Analysis & Design of Tall Building	10	30 Hours	Mr. Laxmikant Saini
3	AOC-DEP-CIV-BIM	Building Information Modelling	17	72 Hours	Mr. Prateek Sharma
4	AOC-DEP-CIV-RHPN	Residential House Planning as per NBC	10	30 Hours	Dr. Harshvardhan Singh
5	AOC-DEP-CIV-TDM	Sketch Up 3D Modeling	10	30 Hours	Mr. Arpit Singh

2.1.1 COURSE TITLE: Advance Building Construction and Drawing (COURSE CODE: AOC-DEP-CIV-ABCD)

1. **COURSE DESCRIPTION:** The Department of Civil Engineering organizes the Advance Building Construction and drawing (ABCD) value added courses to all the students of civil engineering department. Faculty member shall deliver the lectures on demand for understanding and exposure of all parameters of civil engineering. The faculty members have been contributing significantly to the improvement of the quality of Civil Engineering education. The main focus of the ABCD Value aided course will be on providing comprehensive knowledge about fundamental of civil engineering topics relevant to the competition exam and industrial demand of modern world.

2. **COURSE OUTCOMES:**

S. No.	Course Outcomes
CO1	Apply the concept of building material and construction like building bye-laws, mix design, Sustainable building and construction.
CO2	Develop programs using REVIT software, architectural and structural drawing using AUTOCAD Software
CO3	Demonstrate the use of material for quality assurance using NDT Technique, instrumental adjustments technique by surveying
CO4	Design solutions of real-world civil engineering problems using bar bending Schedule, Estimating & Costing

3. **MAPPING COURSE OUTCOMES WITH PO AND PSO**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3

CO1	-	**2**	-	-	-	-	-	-	-	-	-	-	**3**	-	-
CO2	-	-	**3**	-	-	-	-	-	-	-	-	-	-	**2**	-
CO3	-	-	-	**2**	-	-	-	-	-	-	-	-	-	-	**3**
CO4	-	-	-	-	-	**3**	-	-	-	-	-	-	-	**2**	-

4. COURSE PRE-REQUISITES:

Students learn about recent techniques, case study & innovative outcome based learning to analyze and evaluate the concepts of civil engineering to make his personality competent enough to fulfill the gap between academic and industry.

5. ENROLMENT CRITERIA: Students of Civil Engineering

6. CERTIFICATION CRITERIA: Mandatory Fulfillments of Criteria 1 and 2

Criteria 1: 80% Attendance

Criteria 2: 80% or above marks in Certification Exam

7. WEEK-WISE COURSE OUTLINE:

S. No	Course	Content	Hours	Coordinator
1	**Basics of Building Construction**	Parts of buildings, Building Bye Laws, Sequence of construction works- Foundation, Walls, Columns, Beams, Floors, and Roofs	3	Mr. Shanker Prasad Mishra
2	**Basics of Building Materials**	Introduction to material and its properties and different test performed for material assessment. Introduce sustainable material and construction. Properties of fresh and hard concrete, Mix Design	4	Mr. Balwan
3	**Basics of Drawings**	Orthographic, Isometric and perspective Projection Drawing: Site plan, index plan, layout plan, plinth area, floor area, General Notes for drawing; Drawings: Architectural, Structural and Plumbing	3	Mr. Arpit Singh Bhadoriya
4	**Basics of Surveying**	Introduction to Survey, Instruments discussion, Instrument Adjustment, Error and Correction	3	Mr. Prateek Sharma
5	**Introduction of Revit**	About software, Structural Elements and Families, Dynamo Introduction, Inputs, Lists_ Dynamo Generic Workflow, Points_ Curves_ Surfaces, Create Revit Elements, Revits input and output, Custom Nodes, Creation of Modules, Tri dimensional Structure, Framing on Tridimensional Structure, Floor Based Creation, Using Lines to Create a multiple Structure, Setting Modules and Revit Elements	3	Mr. Mayank Gupta
6	**Basics of Quality Control and Quality Assurance**	Codal Provisions & Importance Of Codes For Ensuring Strength With Serviceability, Ensuring Quality Control And Quality, Assurance Before & After Construction: NDT Techniques	3	Mr. Laxmikant Saini

7	**Basics of Estimation**	**Measurement and Billing:** Measurement book, muster roll, piecework agreement and work order Valuation of Real estate; **Bar bending Schedule:** Bar bending Schedule of Reinforcement in R.C.C. Component by using MS- Excel; **Rate Analysis:** Rate analysis for earthwork, concrete work, D.P.C., stone masonry, brick masonry, pointing, painting and labours used in different work of Building Construction by using MS-Excel	4	Dr. Harshvardhan Singh Chouhan
ASSESSMENT				
8	**Mock Test**	MCQ paper	3	Respective Faculty
9	**Group Discussion**	Group discussion on general and current issues.	3	Mr. Shanker& Dr. Ankita Mr. Prateek& Mr. Arpit Mr. Lokesh&Ms.Supriya Mr. Laxmikant& Mr. Balwan
10	**Personal Interview**	Personal interview of each student on technical topics discussed in modules as well as important subjects such as Surveying, Geotechnical, Structure, materials and construction technology. 10-15 minutes assigned for each students.	3	Mr. Shanker& Dr. Ankita Mr. Prateek& Mr. Arpit Mr. Lokesh&Ms.Supriya Mr. Laxmikant& Mr. Balwan

2.1.2 COURSE TITLE: Analysis & Design of Tall Building (COURSE CODE: AOC-DEP-CIV-ADTB)

1. **COURSE DESCRIPTION:** In this course student will learn about the analysis and design of multistory RCC building through the technical concepts and industry grade software used in Structural engineering. Student will also learn to prepare detail drawing of various components of building
2. **COURSE OUTCOMES:**

S. No.	Course Outcomes
CO1	Describe the basic knowledge of tall building used in Architectural design
CO2	Apply the typical concept in analysis for building plan, elevation and section.
CO3	Discuss the bending moment and shear force for beams, columns, slabs and footings.
CO4	Apply the fundamental concept of design philosophies of Reinforced concrete member according to the IS code 456:2000

3. MAPPING COURSE OUTCOMES WITH PO AND PSO

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO 1	2	-	-	-	-	-	-	-	-	-	-	-	2	-	1
CO 2	3	-	-	-	-	-	-	-	-	-	-	-	-	1	2
CO 3	2	-	-	-	-	-	-	-	-	-	-	-	1	2	3
CO 4	3	-	-	-	-	-	-	-	-	-	-	-	2	2	3

4. COURSE PRE-REQUISITES:

Students learn about recent techniques, case study & innovative outcome based learning to analyze and evaluate the concepts to make his personality competent enough to fulfill the gap between academic and industry.

5. ENROLMENT CRITERIA: Interested Students of III Year (Civil Engineering)

6. CERTIFICATION CRITERIA: Mandatory Fulfillments of

Criteria 1 and 2 Criteria 1: 80% Attendance
Criteria 2: 80% or above marks in Certification Exam

7. WEEK-WISE COURSE OUTLINE:

S. No.	WEEK	Module	TOPIC	No. of Hours
1	WEEK-01	Description of fundamental terms of tall building	Introduction about tall building, Project configuration, methods of beam and column; Geometry tools- Add beam, Translational Repeat, Circular Repeat, Insert Node, merge Tool.	3
2	WEEK-02	Description of complex geometry and 3D model	Methods of 3D building, mirror command, Selection tool, view tool, rotation tool, cut section and renumber.	3
3	WEEK-03	Describe the Analysis features.	Apply property, support and load & load calculation for 2D and 3D geometry	3
4	WEEK-04	Description of various load calculation on a structure	Dead Load- Floor load, Floor finish load, Wall load and Live load, wind load, check Shear force and bending moments.	3
5	WEEK-05	RCC Design of a Building	Slab creation, Design beam, Design column, Design output Results, Detail Drawing sheet of beam column & slab	3
6	WEEK-06	Description of earthquake load parameters used for building and shear wall design	Earthquake load, response spectrum leadership definition; Loading Calculation, concept of shear wall & drawing sheet of shear wall design	3

7	WEEK-07	Analysis and design of superstructure and sub structure using vertical & horizontal Load	Study the results of beam, column and slab, create beam drawing, column drawing, slab drawing and footing drawing as per site requirement	3
8	WEEK-08	Structural Drawings	Preparation of structural drawings of beam, Column. Slab, shear wall and foundation.	3
9	WEEK-09	Site Visit	Visit of Tall building-Live Project	3
10	WEEK-10	Project	As per practical data or any live Project	3

2.1.3 COURSE TITLE: Building Information Modelling **(COURSECODE: AOC-DEP-CIV-BIM)**

1. **COURSE DESCRIPTION:** In this BIM Training Module, We teach you and guide you towards many career opportunities in BIM for civil engineers and architects. They need to know all aspects of the building designing processes like mechanical, electrical, structural, and environmental along with their Civil Engineering Concepts. As your mentors, we guide you to ensure you are on the right track. The tool training we provide is based on your practical life job experiences.
2. **COURSE OUTCOMES:**

S. No.	Course Outcomes
CO1	Describe the basic knowledge of BIM used in Architectural design
CO2	Apply the typical concept for building plan, elevation and section.
CO3	Create different building components like walls, doors, windows, stairs, roofs by using advance software like 3D Max.
CO4	Demonstrate the practical knowledge skill through software in the Orthographic and Isometric Projections drawing
CO5	Prepare map of residential and commercial buildings as per assumed specifications in the field of civil engineering

3. **MAPPING COURSE OUTCOMES WITH PO AND PSO**

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	2	-	-	-	-	-	-	-	-	-	-	-	2	-	1
CO 2	3	-	-	-	-	-	-	-	-	-	-	-	-	1	2
CO 3	-	-	3	-	-	-	-	-	-	-	-	-	1	2	-
CO 4	-	-	-	2	-	-	-	-	-	-	-	-	2	1	2

CO 5	-	-	-	-	-	2	-	-	-	-	-	-	2	2	1

4. COURSE PRE-REQUISITES:

Students learn about recent techniques, case study & innovative outcome based learning to analyze and evaluate the concepts to make his personality competent enough to fulfill the gap between academic and industry.

5. ENROLMENT CRITERIA: Interested Students of III Year (Civil Engineering)

6. CERTIFICATION CRITERIA: Mandatory Fulfillments of Criteria 1 and 2
Criteria 1: 80% Attendance
Criteria 2: 80% or above marks in Certification Exam

7. WEEK-WISE COURSE OUTLINE:

Module 01 – Understand the BIM Completely Before Getting into the Tool

- What is BIM?
- BIM Origins
- Necessity of BIM
- BIM requirement in current construction industries
- BIM Future
- Advantage over Traditional Construction Process
- Construction Pains & Hazards
- BIM Lifecycle
- BIM Benefits

Module 02 – Knowledge about ACS

- About Architecture
- Architecture Terms
- About Civil Site
- Civil Site Elements
- About Structure
- Structure Classified in Different ways

Module 03 -UI Tour, Project Navigation and View Creation

- Introducing of Revit Interface
- Plans
- Sections and elevations
- Call outs and drafting views
- Placement and properties of grids and levels
- Project Browser and Properties bar
- Introduction to basic Revit elements

Module 04 – ACS Overview

- Work Process & Flow of Work
- Sub Section
- Our Scope of Work
- Sample Input
- Sample Output

Module 05 – Advance Modeling of Structural Elements

- Foundation and types
- Columns
- Placing Structural Columns
- Beams and Framing Systems
- Adding Beams and Beam Systems
- Modifying Beams

Module 06 - Wall Creation Manipulation

- Wall types
- Working with levels
- Attaching walls
- Editing wall shapes
- Wall Openings
- Editing tools

Module 07 -Floors, Roofs and Ceilings

- Controlling slopes
- Basic roof design and examples
- Exercise on the creation of floors, roofs and ceilings introducing sketching

Module 08 -Window, Door and Component Use

- Family terminology
- Component placement
- Element hosting
- Exercise on Doors, Windows and Level-hosted elements

Module 09- Stairs Ramps and Railings

- Characteristics of simple staircases and ramps
- Hand railing integral to the stairs and ramps
- Exercise on stairs and ramps
- Modeling of railing

Module 10 – Types of Drawings & LOD Concept

- Scale of Drawings
- Concept Drawing/Sketches
- Design Drawing
- Construction Drawing/Working Drawing
- Shop Drawing
- As-built Drawing
- Specialized and Miscellaneous Drawing Type
- Fundamental LOD Definitions
- LOD Specifications
- Level of Development vs. Level of Detail
- Advantages of LOD BIM

Module 11 – Concept of Shop Drawings

- About Shop Drawing
- Architectural Shop Drawing
- Structural Shop Drawing
- Information to be included on Shop Drawing
- Different Aspects of Shop Drawing
- Dos & Don'ts of Shop Drawings
- IFC Drawing vs Shop Drawing

Module 12 - Basic Drafting Standards with Implementation in revit

- Purpose of Drafting
- List of Basic Rules of Drafting
- Drawing Sheet Sizes
- About Annotation
- Line
- Text
- Dimension
- Symbol
- Abbreviation
- Title Block

Module 13- Schedules, Legends and Quantity takeoff

- Creating different schedule
- Legends
- Extracting out quantity
- Material take off
- Different options in Schedule

Module 14- Basic Subdivision and Collaboration

- Central file creation

- Linking of other files
- Import and export tools
- Project team collaboration techniques
- Work sets
- Exercise on work sets

Module 15 - Input Document Study

- Purpose of Project Study
- Construction Document Sheet Numbers and Order
- Architectural Documents
- Structural Documents
- MEP Documents
- Some Basic Floor Plan Symbols
- Basic steps of Document Study
- Folding a Large Format Drawing

Module 16 - Basic Concept of MEP and Coordination

- BIM Coordination
- Benefits of using BIM Coordination
- Elementary Architectural and Structural Coordination
- Basic Concept of MEP
- Methods of MEP Coordination

Module 17 - Concept of RFI

- About RFI
- Why are RFIs important?
- RFI Process: When is an RFI needed?
- How to Submit Better RFIs
- What should a RFI look like?
- Pinnacle RFI Format
- Pinnacle RFI Log
- RFI best practices
- RFI Management Tools

2.1.4 COURSETITLE: Residential House Planning as per NBC **(COURSECODE: AOC-DEP-CIV-RHPN)**

1. **COURSE DESCRIPTION:** In this course student will learn residential house planning as per NBC and using software as well as site visits. Student will plan residential house using orientation and Vastu.

2. **COURSE OUTCOMES:**

S. No.	Course Outcomes
CO1	Describe the basic knowledge of planning used in Architectural design
CO2	Apply the typical concept for drawing building plan, elevation and section.
CO3	Create different building components like walls, doors, windows, stairs, roofs as per provision of NBC
CO4	Demonstrate the practical knowledge skill through Orthographic and Isometric Projections drawing
CO5	Prepare map of residential and commercial buildings as per assumed specifications in the field of civil engineering

3. **MAPPING COURSE OUTCOMES WITH PO AND PSO**

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1	2	-	-	-	-	-	-	-	-	-	-	-	2	-	1
CO2	3	-	-	-	-	-	-	-	-	-	-	-	-	1	2
CO3	-	-	3	-	-	-	-	-	-	-	-	-	1	2	-
CO4	-	-	-	2	-	-	-	-	-	-	-	-	2	1	2
CO5	-	-	-	-	-	2	-	-	-	-	-	-	2	2	1

4. **COURSE PRE-REQUISITES:**
Students learn about recent techniques, case study & innovative outcome based learning to analyze and evaluate the concepts to make his personality competent enough to fulfill the gap between academic and industry.

5. **ENROLMENT CRITERIA: Interested Students of II Year (Civil Engineering)**

6. **CERTIFICATION CRITERIA: Mandatory Fulfillments of Criteria 1 and 2**

   Criteria 1: 80% Attendance
   Criteria 2: 80% or above marks in Certification Exam

7. **WEEK-WISE COURSE OUTLINE:**

S. No.	WEEK	Module	TOPIC	No. of Hours

1	WEEK-01	Description of fundamental terms About AutoCAD	Introduction about CAD & its Advantages, future scope, User Interface, Line Command, Linear Aligned & Angular Dimension, Drawing related to Command	3
2	WEEK-02	Tools Related With Planning	Draw Tool (Circle, Rectangle etc.) Modify Tool (Copy, Mirror, Array etc.), Unit Setting, Drafting Setting, Properties Tab, Layer Tools	3
3	WEEK-03	Tools Related With Planning	Block Command & block Creation, Hatching & gradient, Dimension Tool, Text Command, Table Command, Tool palates & Design center	3
4	WEEK-04	Residential Building Plan & Building Planning Techniques	Drawing of a architectural plan based on Building By laws, Vastu Shasta, Sun Orientation	3
5	WEEK-05	Residential Building Plan & Building Planning Techniques	Drawing of a architectural plan based on Sun Orientation	3
6	WEEK-06	Building Elevation & Section	Drawing of Building Elevation & section, print	3
7	WEEK-07	3D Building & uses of 3D Tools With material	Convert 2D Building Into 3D building Using Tool, Extrude, Loft, Sweep And Revolve Command	3
8	WEEK-08	Plumbing &Electrical Plan	Drawing of a plumbing plan, tools used in plumbing, Fixture schedule, Symbol Drawing of a Electricity plan, tools used in Electricity, Plan, Fixture schedule, Symbol	3
9	WEEK-09	Site Visit	Visit Related with future development & enhance the knowledge of civil Engineering	3
10	WEEK-10	Project	As per practical data or any live Project	3

2.1.5 COURSE TITLE: Sketch Up 3D Modeling (COURSE CODE: AOC-DEP-CIV-TDM)

1. **COURSE DESCRIPTION:** In this Sketch up 3D Modeling Training Module, We teach you and guide you towards many career opportunities in 3D modeling for civil engineers and architects. They need to know all aspects of the building designing processes like mechanical, electrical, structural, and environmental along with their Civil Engineering Concepts. As your mentors, we guide you to ensure you are on the right track. The tool training we provide is based on your practical life job experiences**.**

2. **COURSE OUTCOMES:**

S. No.	Course Outcomes
CO1	To remember the basic commands of Sketch up modeling

CO2	To understand the different plans of building like Orthographic projections, Isometric Projections
CO3	To Apply the typical Sketch up commands in software.
CO4	To Analyze the different Structural Component by using of Sketch up modelings
CO5	To Prepare map of residential and commercial buildings as per assumed specifications in the field of civil engineering

3. MAPPING COURSE OUTCOMES WITH PO AND PSO

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO 1	2	-	-	-	-	-	-	-	-	-	-	-	2	-	1
CO 2	3	-	-	-	-	-	-	-	-	-	-	-	-	1	2
CO 3	-	-	3	-	-	-	-	-	-	-	-	-	1	2	-
CO 4	-	-	-	2	-	-	-	-	-	-	-	-	2	1	2
CO 5	-	-	-	-	-	2	-	-	-	-	-	-	2	2	1

4. COURSE PRE-REQUISITES:

Students learn about recent techniques, case study & innovative outcome based learning to analyze and evaluate the concepts to make his personality competent enough to fulfill the gap between academic and industry.

5. ENROLMENT CRITERIA: Interested Students of II Year (Civil Engineering)

6. CERTIFICATION CRITERIA: Mandatory Fulfillments of Criteria 1 and 2

Criteria 1: 80% Attendance
Criteria 2: 80% or above marks in Certification Exam

7. WEEK-WISE COURSE OUTLINE:

Civil 2nd Year			
2D & 3D Planning and Modeling Using Skectchup			
To model a house from scratch using SKETCHUP 3D modeling Software			
Week	Description of Program	Resource Person	Hours
1	Hand drafting session Light drafting of plan, Dark drafting of plan and Elevation drafting	Ms. Supriya Bansal	3

2	Learning basics of AutoCAD & Drafting plan in AutoCAD	Ms. Supriya Bansal	3
3	Drafting elevation and finishing drawings in AutoCAD	Ms. Supriya Bansal	3
4	Learning basics of sketch up	Ms. Supriya Bansal	3
5	Fundamentals of 3D Modelling in Skectchup	Ms. Supriya Bansal	3
6	Designing Components & Materials from scratch	Ms. Supriya Bansal	3
7	Essentials like Scenes, Styles, and Plugging	Ms. Supriya Bansal	3
8	Parametric Design using Skectchup	Ms. Supriya Bansal	3
9	Interior and exterior design with lighting components	Ms. Supriya Bansal	3
10	Project Planning and Modeling	Ms. Supriya Bansal	3

2.2 DEPARTMENT OF COMPUTER ENGINEERING

S. No.	Course ID	Course Name	No. of Modules	Course Duration	Course Facilitator
1	AOC-DEP-CSE-AZAI	Microsoft Azure Academia Program: Azure AI Fundamentals	12	36 Hours	Mr. Manish Dubey
2	AOC-DEP-CSE-AZPY	Microsoft Azure Academia Program: Python Programming	12	36 Hours	Dr. Praveen Gupta
3	AOC-DEP-CSE-AZDF	Microsoft Azure Academia Program: Microsoft Azure Data Fundamentals	12	36 Hours	Dr. Neelam Chaplot
4	AOC-DEP-CSE-AZBD	Microsoft Azure Academia Program: Big Data	12	36 Hours	Dr. Shalini Puri
5	AOC-DEP-CSE-AZBI	Microsoft Azure Academia Program: POWER BI“DATA ANALYTICS”	12	36 Hours	Ms. Nikita Jain
6	AOC-DEP-CSE-AZCI	Microsoft Azure Academia Program: Cloud Infrastructure and Security	12	36 Hours	Dr. Sonal Sharma

7	AOC-DEP-CSE-AZHD	Programming in Hadoop	12	36 Hours	Mr. Vishal Chaudhary
8	AOC-DEP-CSE-DSPY	Data Science with Python	12	36 Hours	Mr. Praveen Yadav
9	AOC-DEP-CSE-SETS	Selenium Testing	12	36 Hours	Mr Nimish Arvind

2.2.1 COURSE TITLE: Microsoft Azure Academia Program: Azure AI Fundamentals **(COURSE CODE:** AOC-DEP-CSE-AZAI**)**

1. COURSE DESCRIPTION: The Azure AI Fundamentals course is designed for anyone interested in learning about the types of solution artificial intelligence (AI) makes possible, and the services on Microsoft Azure that you can use to create them.

2. COURSE OUTCOMES:

S.No.	Course Outcomes
CO1	Demonstrate fundamental understanding of the history of artificial intelligence (AI) and its foundations
CO2	Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.
CO3	Demonstrate awareness and a fundamental understanding of various applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.
CO4	Demonstrate proficiency developing applications in an 'AI language', expert system shell, or data mining tool.
CO5	Demonstrate proficiency in applying scientific method to models of machine learning

3. MAPPING COURSE OUTCOMES WITH PO AND PSO

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	-	3	-	-	-	-	-	-	-	-	-	-	3	-	-
CO 2	-	-	3	-	-	-	-	-	-	-	-	-	-	2	-
CO 3	-	-	-	3	-	-	-	-	-	-	-	-	3	-	2
CO 4	-	-	-	-	3		-	-	-	-	-	-	-	3	-
CO 5	-	-	-	-	-	3	-	-	-	-	-	-	3	2	-

4. COURSE PRE-REQUISITES: Artificial Intelligence is considered to be one of the most rewarding fields in the domain of IT and in order to learn Artificial Intelligence, there are first

some subjects that you will have to learn and gain the required knowledge of. These are usually referred to as the prerequisites to learning Artificial Intelligence. In this we consider the Strong knowledge of Mathematics, Good command over programming languages, Good Analytical Skills, Ability to understand complex algorithms and Basic knowledge of Statistics and modeling.

5. ENROLMENT CRITERIA: Interested Students of II Year (All Branches)

6. CERTIFICATION CRITERIA: Mandatory Fulfilment of Criteria 1 and 2

Criteria 1: 80% Attendance, and

Criteria 2: 60% or above marks in Certification Exam

7. WEEK-WISE COURSE OUTLINE:

WEEK	MODULE-WISE CONTENTS
WEEK – 1 (3 Hours)	**MODULE – 1: ARTIFICIAL INTELLIGENCE: HISTORY, TRENDS & FUTURE** • Introduction to artificial intelligence • Problem solving at state space search • Uniformed Search **MODULE – 2: PROBLEM SOLVING INARTIFICIAL INTELLIGENCE** • Heuristic search • Informed search • Constraints satisfaction problems
WEEK – 2 (3 hours)	**MODULE – 3: PROBLEM SOLVING BY SEARCH** • Search AND / OR graphs • Game playing • Minimax and alpha / beta
WEEK – 3 (3 hours)	**MODULE – 4: INTRODUCTION TO KNOWLEDGE REPRESENTATION & REASONING** • Introduction to Knowledge Representation • Propositional logic
WEEK – 4 (3 hours)	**MODULE – 5: KNOWLEDGE REPRESENTATION & REASONING: FIRST ORDER LOGIC** • First Order Logic I • First Order Logic II
WEEK – 5 (3 hours)	**MODULE – 6: DIPLOMA IN FUNDAMENTALS OF ARTIFICIAL INTELLIGENCE – FIRST ASSESSMENT** • Fundamentals of Artificial Intelligence – First Assessment
WEEK – 6 (3 hours)	**MODULE-7: KNOWLEDGE REPRESENTATION & REASONING: INFERENCE IN FIRST ORDER LOGIC** • Inference in First Order Logic I • Inference in First Order Logic II • Answer Extraction • Procedural Control of Reasoning
WEEK – 7 (3 hours)	**MODULE-8: REASONING UNDER UNCERTAINTY** • Bayesian Network • Decision Network

WEEK – 8 (3 hours)	**MODULE-9: PLANNING** • Introduction to Planning • Plan Space Planning • Planning Graph and Graph Plan
WEEK – 9 (3 hours)	**MODULE-10: PLANNING AND DECISION MAKING** • Practical Planning and Acting • Sequential Decision Problems • Making Complex Decisions
WEEK – 10 (3 hours)	**MODULE-11: MACHINE LEARNING** • Introduction to Machine Learning • Learning Decision Trees
WEEK-11 (3 Hours)	**MODULE-13: DIPLOMA IN FUNDAMENTALS OF ARTIFICIAL INTELLIGENCE – SECOND ASSESSMENT** • Fundamentals of Artificial Intelligence – Second Assessment Data Column
WEEK - 12	1. CERTIFCATION EXAMINATION **2.** CLOSING AND VALEDICTORY CEREMONY

2.2.2 COURSETITLE: Microsoft Azure Academia Program: Python Programming **(COURSE CODE:** AOC-DEP-CSE-AZPI**)**

1. COURSE DESCRIPTION: Python is a popular general-purpose programming language. It is used in machine learning, web development, desktop applications, and many other fields. Fortunately for beginners, Python has a simple, easy-to-use syntax. This makes Python a great language to learn for beginners. This Python training course leads students from the basics of writing and running Python scripts to more advanced features such as file operations, regular expressions, working with binary data, and using the extensive functionality of Python modules. Extra emphasis is placed on features unique to Python, such as tuples, array slices, and output formatting.

2. **COURSE OUTCOMES:**

CO1	Apply the programming constructs like variables, data structures and control flow structures
CO2	Develop programs using file handling, Object oriented paradigms, GUI controls
CO3	Demonstrate the use of exception handling, different libraries and database connectivity
CO4	Use Python IDEs like IDLE, Spyder, and PyCharm to develop programs
CO5	Design solutions of real-world computational problems using Python programs
CO1	Apply the programming constructs like variables, data structures and control flow structures

3. MAPPING COURSE OUTCOMES WITH PO AND PSO

CO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO1	PO1	PO1	PSO	PSO	PSO

	1	2	3	4	5	6	7	8	9	0	1	2	1	2	3
CO 1	-	3	-	-	-	-	-	-	-	-	-	-	3	-	-
CO 2	-	-	3	-	-	-	-	-	-	-	-	-	-	2	-
CO 3	-	-	-	3	-	-	-	-	-	-	-	-	3	-	2
CO 4	-	-	-	-	3		-	-	-	-	-	-	-	3	-
CO 5	-	-	-	-	-	3	-	-	-	-	-	-	3	2	-

4. COURSE PRE-REQUISITES:

Students should already be comfortable using the operating system like Linux or Windows on which they will be running Python. While not mandatory, basic skills with at least one other programming language like C, C++ are desirable.

5. ENROLMENT CRITERIA: Interested Students of II Year (CSE Branch)

6. CERTIFICATION CRITERIA: Mandatory Fulfilment of Criteria 1 and 2

Criteria 1: 80% Attendance, and

Criteria 2: 70% or above marks in Certification Exam

7. WEEK-WISE COURSE OUTLINE:

WEEK	MODULE-WISE CONTENTS
WEEK – 1 (3 Hours)	**MODULE – 1: An Overview of Python** • What is Python? • Interpreted languages • Advantages and disadvantages • Downloading and installing • Which version of Python • Where to find documentation **MODULE – 2: The Python Environment** • Structure of a Python script • Using the interpreter interactively • Running standalone scripts under Unix and Windows
WEEK – 2 (3 hours)	**MODULE – 3: Getting Started** • Using variables • String types: normal, raw and Unicode • String operators and expressions • Math operators and expressions • Writing to the screen • Command line parameters • Reading from the keyboard **MODULE – 4: Flow Control**

	• About flow control • Indenting is significant • The if and elif statements • while loops • Using lists • Using the for statement • The range () function
WEEK – 3 (3 hours)	**MODULE – 5: Array Types** • list operations • list methods • Strings are special kinds of lists • tuples
WEEK – 4 (3 hours)	**MODULE – 6: Working with Files**
	• Text file I/O overview • Opening a text file • Reading text files • Raw (binary) data • Writing to a text file
WEEK – 5 (3 hours)	**MODULE-7: Dictionaries and Sets** • Dictionary overview • Creating dictionaries • Dictionary functions • Fetching keys or values • Testing for existence of elements • Deleting elements • Sets And Frozen Sets
WEEK – 6 (3 hours)	**MODULE-8: Functions** • Syntax of function definition • Formal parameters • Global versus local variables • Passing parameters and returning values
WEEK – 7 (3 hours)	**MODULE-9: Sorting** • The sorted() function • Alternate keys • Multiple keys • Lambda functions
WEEK – 8 (3 hours)	**MODULE-10: Errors and Exception Handling** • Dealing with syntax errors • Exceptions • Handling exceptions with try/except • Cleaning up with finally

WEEK – 9 (3 hours)	**MODULE-11: Modules and Packages** • What is a module? • The import statement • Function aliases • Packages
WEEK – 10 (3 hours)	**MODULE-12: Regular Expressions** • RE Objects • Pattern matching • Parsing data • Sub expressions • Complex substitutions • RE tips and tricks
WEEK-11 (3 Hours)	**MODULE-13: Highlights of the Standard Library** • Working with the operating system • Grabbing web pages • Sending email • math and random • Accessing dates and times with date time • Working with compressed files
Week-12	**1. CERTIFCATION EXAMINATION** **2. CLOSING AND VALEDICTORY CEREMONY**

2.2.3 COURSE TITLE: Microsoft Azure Academia Program: Microsoft Azure Data Fundamentals **(COURSECODE:** AOC-DEP-CSE-AZDF**)**

1. COURSE DESCRIPTION: The **Microsoft Azure Academia Program: Microsoft Azure Data Fundamentals** course offers the foundation you need to build your technical skills to start working with data in the cloud. Mastering the basics can help you jump-start your career and prepare you to dive deeper into other technical opportunities Azure offers.

2. COURSE OUTCOMES:

S.No.	Course Outcomes
CO1	Students will be able to learn knowledge of core data concepts and related Microsoft Azure data services.
CO2	Students will be able to learn familiar with the concepts of relational and non-relational data
CO3	Students will be able to distinguish between the concepts of relational and non-relational data.
CO4	Students will be able to apply different types of data workloads such as transactional or analytical.

5. MAPPING COURSE OUTCOMES WITH PO AND PSO

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO 1	3	-	-	-	-	-	-	-	-	-	-	-	3	-	-
CO 2	-	3	-	-	-	-	-	-	-	-	-	-	-	2	-
CO 3	-	-	-	2	-	-	-	-	-	-	-	-	3	-	2
CO 4	-	-	2	-	-		-	-	-	-	-	-	-	3	-

3. COURSE PRE-REQUISITES:

Students should already know the basic concept of computing and Internet, and an interest in extracting insights from data. Student should be familiar with basic data-related concepts, such as working with tables of data in a spreads.

4. ENROLMENT CRITERIA:

Interested Students of II Year (All Branches)

5. CERTIFICATION CRITERIA: Mandatory Fulfillment of Criteria 1 and 2

Criteria 1: 75% Attendance, and

Criteria 2: 70% or above marks in Certification Exam

6. WEEK-WISE COURSE OUTLINE:

WEEK	MODULE-WISE CONTENTS
WEEK – 1 (3 Hours)	**MODULE – 1: Common Data Format** • Identify common data formats • Options for storing data in files • Options for storing data in databases • Transactional data processing solutions • Characteristic of data processing solutions
WEEK – 2 (3 Hours)	**MODULE – 2: Data Processing Solutions** • Transactional data processing solutions • Characteristic of data processing solutions • Analytical data processing solutions • Characteristic of Analytical data processing solutions
WEEK – 3 (3 hours)	MODULE – 3: Data Formats • Identify data formats • Structured data • Semi-structured data • Unstructured data

WEEK – 4 (3 hours)	**MODULE – 4: Data stores** • File stores • Databases • Explore file storage • Delimited text files
WEEK – 5 (3 hours)	**MODULE-5: Object Notation** • JavaScript Object Notation (JSON) • Extensible Markup Language (XML) • Binary Large Object (BLOB) • Optimized file formats
WEEK – 6 (3 hours)	**MODULE-6: DATABASE** • Explore databases • Relational databases • Non-relational databases • Key-value databases • Document databases • Column family databases
WEEK-7 (3 Hours)	**MODULE-7: Transactional Data Processing** • Atomicity • Consistency • Isolation • Durability
WEEK – 8 (3 Hours)	MODULE-8: Analytical Data Processing • Data lakes • Data warehouse • OLAP model
WEEK – 9 (3 Hours)	**MODULE-9: Roles And Responsibilities For Data Workloads** • Responsibilities of Database Administrators • Responsibilities of Data Engineers • Responsibilities of Data Analysts
WEEK – 10 (3 Hours)	**MODULE-10: Azure storage** • Azure Blob storage • Azure File storage • Azure Table storage
WEEK – 11 (3 Hours)	**MODULE-11: Azure Cosmos DB** • Use cases for Azure Cosmos DB • Azure Cosmos DB APIs
WEEK – 12 (3 Hours)	**1. CERTIFCATION EXAMINATION** **2. CLOSING AND VALEDICTORY CEREMONY**

2.2.4 COURSE TITLE: Microsoft Azure Academia Program: Big Data **(COURSECODE:** AOC-DEP-CSE-AZBD)

1. COURSE DESCRIPTION: Microsoft Azure provides robust services for analyzing big data. One of the most effective ways is to store your data in Azure Data Lake Storage Gen2 and then process it using Spark on Azure Data bricks. Azure Stream Analytics (ASA) is Microsoft's service for real-time data analytics. Some examples include stock trading analysis, fraud detection, embedded sensor analysis, and web click stream analytics. ASA uses Stream Analytics Query Language, which is a variant of T-SQL. That means anyone who knows SQL will have a fairly easy time learning how to write jobs for Stream Analytics.

2. COURSE OUTCOMES:

S.No.	Course Outcomes
CO1	Get data into Azure Data Lake Storage (ADLS)
CO2	Monitor and optimize the performance of your data lakes
CO3	Create and run a Stream Analytics job
CO4	Scale a Stream Analytics job
CO5	Monitor and troubleshoot errors in Stream Analytics jobs

3. MAPPING COURSE OUTCOMES WITH PO AND PSO

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	3	-	-	-	-	-	-	-	-	-	-	-	3	-	-
CO 2	-	3	-	-	-	-	-	-	-	-	-	-	-	2	-
CO 3	-	-	2	-	-	-	-	-	-	-	-	-	3	-	2
CO 4	-	-	-	3	-	-	-	-	-	-	-	-	-	3	-
CO 5	-	-	-	-	3	-	-	-	-	-	-	-	3	2	-

4. COURSE PRE-REQUISITES:

- Basic database knowledge
- SQL experience (recommended)
- Microsoft Azure account (recommended)

5. ENROLMENT CRITERIA: Interested Students of III Year (All Branches)

6. CERTIFICATION CRITERIA: Mandatory Fulfilment of Criteria 1 and 2

Criteria 1: 60% Attendance, and

Criteria 2: 40% or above marks in Certification Exam

7. WEEK-WISE COURSE OUTLINE:

WEEK	MODULE-WISE CONTENTS
WEEK – 1 (3 Hours)	**MODULE – 1: Introduction To Big Data** • Data Storage and Analysis • Characteristics of Big Data • Big Data Analytics • Typical Analytical Architecture • Requirement for new analytical architecture Challenges in Big Data Analytics Need of big data frameworks
WEEK – 2 (3 hours)	**MODULE – 2: Hadoop Framework** • Hadoop • Requirement of Hadoop Framework • Design principle of Hadoop • Comparison with other system • Hadoop Components • Hadoop 1 vs Hadoop 2 • Hadoop Daemon's
WEEK – 3 (3 hours)	**MODULE – 3: HDFS** • HDFS Commands • Map Reduce Programming: I/O formats • Map side join • Reduce Side Join • Secondary sorting, • Pipelining Map Reduce jobs
WEEK – 4 (3 hours)	**MODULE – 4: Hadoop Ecosystem** • Introduction to Hadoop ecosystem technologies: • Serialization: AVRO, • Co-ordination: Zookeeper • Databases: HBase • Hive • Scripting language: Pig • Streaming: Flink • Storm
WEEK – 5 (3 hours)	**MODULE – 5: Spark Framework** • Introduction to GPU Computing • CUDA Programming Model • CUDA API • Simple Matrix • Multiplication in CUDA • CUDA Memory Model • Shared Memory Matrix Multiplication • Additional CUDA API Features.

WEEK – 6 (3 hours)	**MODULE-6: Data Analysis with Spark Shell** • Writing Spark Application • Spark Programming in Scala • Python • R Java - Application Execution.
WEEK-7 (3 Hours)	**MODULE-7: Spark SQL and GraphX** • SQL Context • Importing and Saving data • Data frames – using SQL • GraphX overview • Creating Graph • Graph Algorithms
WEEK-8 (3 Hours)	**MODULE-8: Spark Streaming** • Overview • Errors and Recovery • Streaming Source • Streaming live data with spark
WEEK-9 (3 Hours)	**MODULE-9: Recent Trends in Big Data Analytics** • Latest trends in Big Data Analytics • Data as service • Predictive Analysis • Quantum Computing • Edge Computing • Natural Language Processing • Hybrid Clouds
WEEK-10 (3 Hours)	**MODULE-10: Key roles for New Big Data Ecosystems** • Sensing • Collection • Wrangling • Analysis • Storage
WEEK-11 (3 Hours)	**MODULE-11: Traditional Business Intelligence versus Big Data** • Inverted Indexing in Spark Sequence alignment problem in Spark • Implementation of Matrix algorithms in Spark SparkSql programming • Building Spark Streaming application
WEEK - 12 (3 Hours)	**1. CERTIFCATION EXAMINATION** **2. CLOSING AND VALEDICTORY CEREMONY**

2.2.5 COURSE TITLE: Microsoft Azure Academia Program: POWER BI"DATA ANALYTICS" **(COURSE CODE:** AOC-DEP-CSE-AZBI**)**

1. COURSE DESCRIPTION: Microsoft Business Intelligence or Power BI is a suite of business analytics tools to analyze data and share insights. Monitor your business and get answers quickly with rich dashboards available on every device. Data Analytics field is growing exponentially! Power BI (Microsoft Business Intelligence) offers basic data wrangling capabilities similar to Excel's Power Query. It also lets you create interactive visualizations, reports and dashboards with a few clicks or drag-and-drops; type natural-language questions about your data on a dashboard; and handle files that are too large for Excel. Power BI transforms your company's data into rich visuals for you to collect and organize so you can focus on what matters to you. Stay in the know, spot trends as they happen, and push your business further

2. **COURSE OUTCOMES**:

S. No.	**Course Outcomes**
CO1	Student should be able to apply the basic knowledge of data mining, SQL and Data visualization.
CO2	Student should be able to analyze the queries, functions, techniques and Modeling of data.
CO3	Student should be able to design Dashboard and workspace by extracting and visualizing datasets.
CO4	Student should be able to create a dataset and based on that dataset design dashboard by extracting data.

3. MAPPING COURSE OUTCOMES WITH PO AND PSO

CO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO1 0**	**PO1 1**	**PO1 2**	**PSO 1**	**PSO 2**	**PSO 3**
CO 1	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**
CO 2	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**-**
CO 3	**-**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**2**
CO 4	**-**	**-**	**-**	**3**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**

4. COURSE PRE-REQUISITES:
Students should already be comfortable using the operating system like Linux or Windows on which they will be running Power BI tools. While not mandatory, basic skills with at least one other programming language like Excel, Data Mining are desirable.

- Understanding core data concepts.
- Knowledge of working with relational data in the cloud.
- Knowledge of working with non-relational data in the cloud.

- Knowledge of data analysis and visualization concepts.

5. ENROLMENT CRITERIA: Interested Students of III Year (All Branches)
6. CERTIFICATION CRITERIA: Mandatory Fulfilment of Criteria 1 and 2
Criteria 1: 70% Attendance, and
Criteria 2: 60% or above marks in Certification Exam

7. WEEK-WISE COURSE OUTLINE:

WEEK	MODULE-WISE CONTENTS
WEEK – 1 (3 Hours)	**MODULE – 1: SQL SERVER INTRODUCTION** • Data, Databases and RDBMS Software • Database Types: OLTP, DWH, OLAP • Microsoft SQL Server Advantages, Use • BI Components, Data Science Components • ETL, MSBI and Power BI Components
WEEK – 2 (3 hours)	**MODULE-2: Introduction to Power BI** • Power BI Job Roles in Real-time • Power BI Data Analyst Job Roles • Business Analyst - Job Roles • Power BI Developer - Job Roles • Power BI for Data Scientists • Power BI Training: Lab Plan • Understanding the Power BI Tools
WEEK – 3 (3 hours)	**MODULE-3: Basic Report Design** • Power BI Desktop Installation • Data Sources & Visual Types • Get Data and Memory Tables • In-Memory xvelocity Database • Table and Tree Map Visuals • Format Button and Data Labels • Visual Interaction, Data Points • CSV and PDF Exports. Tooltips • Power BI Eco System, Architecture
WEEK-4 (3 Hours)	**MODULE-4: Visual Sync, Grouping** • Slicer Visual: Real-time Usage • Orientation, Selection Properties • Single & Multi Select, CTRL Options • Slicer: Number, Text and Date Data • Slicer List and Slicer Dropdowns • Visual Sync Limitations with Slicer • Grouping: Real-time Use, Examples • Grouping Static / Fixed Data Values • Grouping Dynamic / Changing Data • Grouping Binned Data, Classification
WEEK-5 (3 Hours)	**MODULE-5: Hierarchies, Filters** • Creating Hierarchies in Power BI

	• Independent Drill-Down Options • Dependent Drill-Down Options • Conditional Drilldowns, Data Points • Drill Up Buttons and Operations • Filters: Types and Usage in Real-time • Visual Filter, Page Filter, Report Filter • Basic, Advanced and TOP N Filters
WEEK–6 (3 hours)	**MODULE-6: Bookmarks, Azure, Modeling-I** • Drill-thru Filters, Page Navigations • Bookmarks for Visual Filters • Bookmarks for Page Navigations • Buttons, Images with Actions • Bookmarks View & Selection Pane **MODULE-7: Bookmarks, Azure, Modeling-II** • Azure Database Access, Reports • Import & Direct Query with Power BI • SQL Queries and Enter Data • Data Modeling: Currency, Relations
WEEK–7 (3 hours)	**MODULE-8: Visualization Properties-I** • Stacked Charts and Clustered Charts • Line Charts, Area Charts, Bar Charts • 100% Stacked Bar & Column Charts • Map Visuals: Tree, Filled, Bubble • Cards, Funnel, Table, Matrix • Scatter Chart: Play Axis, Labels • Series Clusters & Selections
WEEK–8 (3 hours)	**MODULE-9: Visualization Properties-II** • Waterfall Chart and ArcGIS Maps • Info graphics, Icons and Labels • Color Saturation, Sentiment Colors • Column Series, Column Axis in Lines • Join Types: Round, Bevel, Miter • Shapes, Markers, Axis, Plot Area
WEEK-9 (3 Hours)	**MODULE–10: Power Query** • Power Query M Language Purpose • Power Query Architecture and ETL • Data Types, Literals and Values • Power Query Transformation Types • List, Record and Table Structures • Get Data, Table Creations and Edit • Group By and Advanced Options • Aggregations with Power Query • Replace Nulls: Fill Up, Fill Down • Extract, Format and Numbers • Removing Columns and Duplicates

	• Testing Parameters and PBI Canvas • Converting Lists to Table Data • Data Type Conversions, Expressions • Data Type Conversions, Expressions
WEEK-10 (3 Hours)	**MODULE–11: DAX Functions** • DAX: Importance in Real-time • DAX Architecture, Entity Sets • ROW Context and Filter Context • Creating, Using Measures with DAX • Dynamic Expressions, IF in DAX • Data Modeling Options in DAX • Detecting Relations for DAX • Modeling: Missing Relations • Logical, Mathematical Functions • Connection with CSV, MS Access
WEEK-11 (3 Hours)	**MODULE-12: Power BI Service & Power BI Mobile** • Why Power Bi Service? • Comparison Power BI Free & Premium • Logging into Power Bi Service • Importing data from Desktop to Service • Dataset menu • Working on reports • Dashboard overview • Workspace & Gateways • Power Bi Mobile Overview • Excluding dataset from sharing
WEEK-12 (3 Hours)	**1. CERTIFCATION EXAMINATION** **2. CLOSING AND VALEDICTORY CEREMONY**

2.2.6 COURSE TITLE: Microsoft Azure Academia Program: Cloud Infrastructure and Security **(COURSE CODE:** AOC-DEP-CSE-AZCI**)**

1. COURSE DESCRIPTION:

This course will provide a foundational understanding of what is required to secure a cloud ecosystem, regardless of the vendor. The concepts and principles discussed will help bridge the gaps between traditional and cloud architectures while accounting for the shifting thought patterns involving enterprise risk management. Students who complete this course will enter into any organization utilizing the cloud and immediately bring value to the infrastructure and security teams.

2. COURSE OUTCOMES:

S.No.	Course Outcomes
CO1	Apply cloud computing fundamental principles, including standard delivery models

	and service designs
CO2	Ability to analyze the foundational security practices that are required to secure modern cloud computing infrastructures.
CO3	Develop standard cloud security network designs and architecture models.
CO4	Develop complexity of cloud threat actors and techniques used to attack a cloud computing infrastructure.
CO5	Implement the regulatory requirements needed to secure data in the cloud.

3. MAPPING COURSE OUTCOMES WITH PO AND PSO

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO 1	-	3	-	-	-	-	-	-	-	-	-	-	3	-	-
CO 2	-	-	2	-	-	-	-	-	-	-	-	-	-	3	-
CO 3	-	-	-	3	-	-	-	-	-	-	-	-	3	-	-
CO 4	-	-	-	-	2		-	-	-	-	-	-	-	2	-
CO 5	-	-	-	-	-	3	-	-	-	-	-	-	3	2	-

4. COURSE PRE-REQUISITES:

Cloud computing is an advanced sector and requires you to be familiar with multiple subjects because it is related to many technologies. Here are the primary topics you should know to start learning cloud computing:

- **Programming Skills**
- **Familiarity with Databases**
- **Basics of Security and Privacy**
- **Knowledge of Agile Development**
- **Understanding of Virtualization**

5. **ENROLMENT** CRITERIA: Interested Students of III Year (All Branches)

6. CERTIFICATION CRITERIA: Mandatory Fulfilment of Criteria 1 and 2

Criteria 1: 75% Attendance, and

Criteria 2: 75% or above marks in Certification Exam

7. WEEK-WISE COURSE OUTLINE:

WEEK	MODULE-WISE CONTENTS
WEEK – 1 (3 Hours)	**MODULE – 1: Fundamentals of Cloud Computing and Architectural Characteristics.** • Understand what is Cloud computing • Architectural and Technological Influences of Cloud Computing • Understand the Cloud deployment models • Public, Private, Community and Hybrid models

	• Software as a Service (SaaS) • Platform as a Service (PaaS) • Infrastructure as a Service (IaaS)
WEEK – 2 (3 hours)	**MODULE – 2: - Security Design and Architecture for Cloud Computing.** • Guiding Security design principles for Cloud Computing • Secure Isolation • Comprehensive data protection • End-to-end access control • Monitoring and auditing • Quick look at CSA, NIST and ENISA guidelines for Cloud Security
WEEK – 3 (3 hours)	**MODULE – 3: - Secure Isolation of Physical & Logical Infrastructure.** • Compute, Network and Storage • Common attack vectors and threats • Secure Isolation Strategies • Multitenancy, Virtualization strategies • Inter-tenant network segmentation strategies • Storage isolation strategies
WEEK – 4 (3 hours)	**MODULE – 4: - Data Protection for Cloud Infrastructure and Services.** • Understand the Cloud based Information Life Cycle • Data protection for Confidentiality and Integrity • Common attack vectors and threats • Encryption, Data Redaction, Tokenization, Obfuscation, PKI and Key • Management, Assuring data deletion • Data retention, deletion and archiving procedures for tenant data • Data Protection Strategies
WEEK – 5 (3 hours)	**MODULE-5:- Enforcing Access Control for Cloud Infrastructure based Services** • Understand the access control requirements for Cloud Infrastructure. • Common attack vectors and threats. • Enforcing Access Control Strategies • Compute, Network and Storage. • Authentication and Authorization. • Roles-based Access Control, Multi-factor authentication • Host, storage and network access control options.
WEEK – 6 (3 hours)	**MODULE-6: - Monitoring, Auditing and Management** • Proactive activity monitoring, Incident Response • Monitoring for unauthorized access, malicious traffic, abuse of system privileges, intrusion • detection, events and alerts • Auditing – Record generation, Reporting and Management • Tamper-proofing audit logs • Quality of Services • Secure Management

	• User management
WEEK-7 (3 Hours)	**MODULE-7: Introduction to Cloud Design Patterns** • Introduction to Design Patterns • Understanding Design Patterns Template • Architectural patterns for Cloud Computing • Platform-to-Virtualization & Virtualization-to-Cloud • Cloud bursting
WEEK-8 (3 Hours)	**MODULE-8: Introduction to Identity Management in Cloud Computing.** • User Identification, Authentication, and Authorization in Cloud • Infrastructure • Be able to understand the concepts of Identity & Access • Management • Single Sign-on • Identity Federation • Identity providers and service consumers • The role of Identity provisioning
WEEK-9 (3 Hours)	**MODULE -9: Cloud Computing Security Design Patterns - I** • Security Patterns for Cloud Computing • Trusted Platform Geo-tagging • Cloud VM Platform Encryption • Trusted Cloud Resource Pools • Secure Cloud Interfaces
WEEK-10 (3 Hours)	**MODULE-10: Cloud Computing Security Design Patterns - II** • Security Patterns for Cloud Computing – Network Security, Identity & • Access Management & Trust • Secure On-Premise Internet Access • Secure External Cloud Connection • Cloud Denial-of-Service Protection • Cloud Traffic Hijacking Protection • Automatically Defined Perimeter • Cloud Authentication Gateway
WEEK-11 (3 Hours)	**Module-11: Policy, Compliance & Risk Management in Cloud Computing** • Be able to understand the legal, security, forensics, personal & data privacy issues within Cloud environment

	• Cloud security assessment & audit reports. • Laws & regulatory mandates • Personal Identifiable Information & Data Privacy • Privacy requirements for Cloud computing (ISO 27018) • Metrics for Service Level Agreements (SLA) • Metrics for Risk Management
WEEK – 12 (3 Hours)	**1. CERTIFCATION EXAMINATION** **2. CLOSING AND VALEDICTORY CEREMONY**

2.2.7 COURSE TITLE: Programming in Hadoop (COURSE CODE: AOC-DEP-CSE-HDP)

1. COURSE DESCRIPTION:

- Fundamentals of Hadoop and YARN and write applications using them
- HDFS, MapReduce, Hive, Pig, Sqoop, Flume, and ZooKeeper
- Spark, Spark SQL, Streaming, Data Frame, RDD, GraphX and MLlib writing Spark applications
- Working with Avro data formats
- Practicing real-life projects using Hadoop and Apache Spark

2. COURSE OUTCOMES:

S.No.	Course Outcomes
CO1	Apply the concepts of Big Data and Hadoop ecosystem.
CO2	Ability to analyze the Hadoop distributed file system (HDFS) for storing big data files
CO3	Develop Leverage Hadoop as a reliable, scalable Map Reduce framework.
CO4	Develop Map Reduce programs and implementing HBase.
CO5	Implement Hive and Pig scripts.

3. MAPPING COURSE OUTCOMES WITH PO AND PSO

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO 2	PSO 3
CO 1	-	3	-	-	-	-	-	-	-	-	-	-	2	-	-
CO 2	-	-	2	-	-	-	-	-	-	-	-	-	-	2	-
CO 3	-	-	-	3	-	-	-	-	-	-	-	-	3	-	-
CO 4	-	-	-	-	2		-	-	-	-	-	-	-	2	-

CO 5	-	-	-	-	-	**3**	-	-	-	-	-	-	**3**	**2**	-

4. COURSE PRE-REQUISITES:

To learn the core concepts of big data and hadoop ecosystem, the two important skills that professionals must know are –Java and Linux. Enterprise folks who have not previously worked with either of these can still get ahead in the hadoop mainstream by just getting their hands dirty on some basic knowledge of Java and Linux.

5. ENROLMENT CRITERIA: Interested Students of IV Year (All Branches)

6. CERTIFICATION CRITERIA: Mandatory Fulfilment of Criteria 1 and 2

Criteria 1: 75% Attendance, and

Criteria 2: 75% or above marks in Certification Exam

7. WEEK-WISE COURSE OUTLINE:

WEEK	MODULE-WISE CONTENTS
WEEK – 1 (3 Hours)	**MODULE – 1: Installation and Setup Hadoop** • The architecture of Hadoop cluster • What is High Availability and Federation? • How to setup a production cluster? • Various shell commands in Hadoop • Understanding configuration files in Hadoop • Installing a single node cluster with Cloud era Manager • Understanding Spark, Scala, Sqoop, Pig, and Flume
WEEK – 2 (3 hours)	**MODULE – 2: - Introduction to Big Data Hadoop and Understanding HDFS and Map Reduce** • Introducing Big Data and Hadoop • Where does Hadoop fit in? • Two important Hadoop ecosystem components, namely, Map Reduce and HDFS.
WEEK – 3 (3 hours)	• **MODULE – 3: - Deep Dive in Map Reduce** • Learning the working mechanism of Map Reduce • Understanding the mapping and reducing stages in MR • Various terminologies in MR like Input Format, Output Format, Practitioners, Combiners, Shuffle, and Sort.
WEEK – 4 (3 hours)	**MODULE – 4: - Introduction to Hive** • Introducing Hadoop Hive • Detailed architecture of Hive • Comparing Hive with Pig and RDBMS • Working with Hive Query Language Creation of a database, table, group by and other clauses

WEEK – 5 (3 hours)	**MODULE-5:Advanced Hive and Impala** • Indexing in Hive • The ap Side Join in Hive • Working with complex data types • The Hive user-defined functions • Introduction to Impala • Comparing Hive with Impala
WEEK – 6 (3 hours)	**MODULE-6: - Introduction to Pig** • Apache Pig introduction and its various features • Various data types and schema in Hive • The available functions in Pig, Hive Bags, Tuples, and Fields • Working with Pig in Map Reduce and local mode • Loading of data
WEEK-7 (3 Hours)	**MODULE-7: Flume, Sqoop and HBase** • Apache Sqoop introduction. • Importing and exporting data. • Performance improvement with Sqoop • Sqoop limitation. • Introduction to Flume and understanding the architecture of Flume
WEEK-8 (3 Hours)	**MODULE-8: Writing Spark Applications Using Scala** • Using Scala for writing Apache Spark applications • Detailed study of Scala • The need for Scala • The concept of object-oriented programming Executing the Scala code
WEEK-9 (3 Hours)	**MODULE -9: Spark framework** • Detailed Apache Spark and its various features • Comparing with Hadoop • Various Spark components • Combining HDFS with Spark and Scalding
WEEK-10 (3 Hours)	**MODULE-10: RDD in Spark** • Understanding the Spark RDD operations • Comparison of Spark with Map Reduce • What is a Spark transformation? • Loading data in Spark
WEEK-11 (3 Hours)	**Module-11: Data Frames and Spark SQL** • The detailed Spark SQL • The significance of SQL in Spark for working with structured data processing. • Spark SQL JSON support • Working with XML data and parquet files • Creating Hive Context

WEEK – 12 (3 Hours)	**1. CERTIFCATION EXAMINATION** **2. CLOSING AND VALEDICTORY CEREMONY**

2.2.8 COURSE TITLE: Data Science with Python **(COURSE CODE:** AOC-DEP-CSE-DSPY**)**

1. COURSE DESCRIPTION: This course will introduce the learner to the basics of the python programming environment, including fundamental python programming techniques such as lambdas, reading and manipulating csv files, and the numpy library. The course will introduce data manipulation and cleaning techniques using the popular python pandas data science library and introduce the abstraction of the Series and Data Frame as the central data structures for data analysis, along with tutorials on how to use functions such as group by, merge, and pivot tables effectively. By the end of this course, students will be able to take tabular data, clean it, manipulate it, and run basic inferential statistical analyses.

2. COURSE OUTCOMES:

S.No.	Course Outcomes
CO1	Apply the programming constructs like variables, data structures and control flow structures
CO2	Develop programs using file handling, Object oriented paradigms, GUI controls
CO3	Demonstrate the use of pandas library, the main methods for Data Frames.
CO4	Use Python IDEs like IDLE, Spyder, and PyCharm to develop programs
CO5	Design solutions of real-world data science problems using Python programs

3. MAPPING COURSE OUTCOMES WITH PO AND PSO

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO 1	-	3	-	-	-	-	-	-	-	-	-	-	3	-	-
CO 2	-	-	3	-	-	-	-	-	-	-	-	-	-	2	-
CO 3	-	-	-	3	-	-	-	-	-	-	-	-	3	-	2
CO 4	-	-	-	-	3		-	-	-	-	-	-	-	3	-
CO 5	-	-	-	-	-	3	-	-	-	-	-	-	3	2	-

4. COURSE PRE-REQUISITES:

Students should already be comfortable using the operating system like Linux or Windows on which they will be running Python. While not mandatory, basic skills with at least one other programming language like C, C++ are desirable.

5. ENROLMENT CRITERIA: Interested Students of IV Year (CSE Branch)

6. CERTIFICATION CRITERIA: Mandatory Fulfilment of Criteria 1 and 2

Criteria 1: 80% Attendance, and

Criteria 2: 70% or above marks in Certification Exam

7. WEEK-WISE COURSE OUTLINE:

WEEK	MODULE-WISE CONTENTS
WEEK – 1 (3 Hours)	**MODULE – 1: An Overview of Python** • What is Python? • Interpreted languages • Advantages and disadvantages • Downloading and installing • Which version of Python • Where to find documentation
WEEK – 2 (3 hours)	**MODULE – 2: The Python Environment** • Structure of a Python script • Using the interpreter interactively • Running standalone scripts under Unix and Windows • Using variables • String types: normal, raw and Unicode • String operators and expressions • Math operators and expressions • Writing to the screen • Command line parameters • Reading from the keyboard • About flow control • Indenting is significant • The if and elif statements • while loops • Using lists • Using the for statement • The range () function
WEEK – 3 (3 hours)	**MODULE – 3: Getting Started** • Using variables • String types: normal, raw and Unicode • String operators and expressions • Math operators and expressions • Writing to the screen • Command line parameters Reading from the keyboard • list operations

	• list methods • Strings are special kinds of lists tuples Array Types
WEEK – 4 (3 hours)	**MODULE – 4: Flow Control** • About flow control • Indenting is significant • The if and elif statements • while loops • Using lists • Using the for statement The range () function **Dictionaries and Sets** • Dictionary overview • Creating dictionaries • Dictionary functions • Fetching keys or values • Testing for existence of elements • Deleting elements • Sets And Frozen Sets **Functions** • Syntax of function definition • Formal parameters • Global versus local variables • Passing parameters and returning values
WEEK – 5 (3 hours)	**MODULE-5: Python Data Frames I** • Analysis, selection, and visualization techniques with Pandas Data Frames • Extracting and transforming Data Frames **MODULE-6: Python Data Frames II** • Advanced indexing • Rearranging and reshaping data Multiple keys
WEEK – 6 (3 hours)	**MODULE-7: Modules and Packages** • What is a module? • The import statement • Function aliases • Packages • RE Objects • Pattern matching • Parsing data • Sub expressions • Complex substitutions • RE tips and tricks

WEEK-7 (3 Hours)	**MODULE-8: Dictionaries and Sets** • Dictionary overview • Creating dictionaries • Dictionary functions • Fetching keys or values • Testing for existence of elements • Deleting elements • Sets And Frozen Sets **Importing Data in Python** • Import data into Python from flat files such as .txt and .csv • Import data into Python from files native to other software such as Excel spreadsheets, Stata, SAS, and MATLAB files • Importing Data in Python from files from relational databases such as SQLite and PostgreSQL
WEEK – 8 (3 Hours)	**MODULE-9: Functions** • Syntax of function definition • Formal parameters • Global versus local variables
WEEK 9 (3 Hours)	**MODULE-10 Importing Data in Python** • Import data into Python from flat files such as .txt and .csv • Import data into Python from files native to other software such as Excel spreadsheets, Stata, SAS, and MATLAB files Importing Data in Python from files from relational databases
WEEK10 (3 Hours)	**MODULE-11** • Creating Pig and Hive UDF in Python • Deploying Python for Map Reduce programming
WEEK11 (3 Hours)	**MODULE-12** **Environment for scientific programming in Python** • Jupiter Notebook as an environment for scientific programming in Python, its structure and features.
WEEK 12 (3 Hours)	Passing parameters and returning values 1. **CERTIFCATION EXAMINATION** 2. **CLOSING AND VALEDICTORY CEREMONY**

2.2.9 COURSETITLE: Selenium Testing **(COURSECODE:** AOC-DEP-CSE-SETS**)**

1. COURSE DESCRIPTION: Selenium certification training helps you master this automation testing tool and become a certified A4Q Tester. This Selenium training covers Web Driver, Grid, IDE, handling IFrames, Alerts, and Modal Dialog box. With this Selenium course, you will learn to use supported plugins such as TestNG Framework, Robot Class, Cucumber, and Gherkin to

control your automation environment. Get hands-on experience on widely used automation frameworks such as Data-Driven Framework, Keyword-Driven Framework, Hybrid Framework, and Behavior Driven Development (BDD) Framework. This Instructor-led automation testing training online is created by top industry experts and allows you to work on real-life industry use cases.

2. COURSE OUTCOMES:

S.No.	Course Outcomes
CO1	Describe Selenium automated testing advantages
CO2	Deploying Selenium IDE functions and commands
CO3	Deploying JUnit and TestNG Plugin in Eclipse
CO4	Describe and use to Selenium Web Driver
CO5	Using Selenium Grid for software testing

3. MAPPING COURSE OUTCOMES WITH PO AND PSO

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	-	3	-	-	-	-	-	-	-	-	-	-	3	-	-
CO 2	-	-	3	-	-	-	-	-	-	-	-	-	-	2	-
CO 3	-	-	-	3	-	-	-	-	-	-	-	-	3	-	2
CO 4	-	-	-	-	3		-	-	-	-	-	-	-	3	-
CO 5	-	-	-	-	-	3	-	-	-	-	-	-	3	2	-

4. COURSE PRE-REQUISITES:

Students should already be comfortable using the operating system like Linux or Windows on which they will be running Python. While not mandatory, basic skills with at least one other programming language like C, C++ are desirable.

5. ENROLMENT CRITERIA: Interested Students of IV Year (CSE Branch)

6. CERTIFICATION CRITERIA: Mandatory Fulfilment of Criteria 1 and 2

Criteria 1: 80% Attendance, and

Criteria 2: 70% or above marks in Certification Exam

7. WEEK-WISE COURSE OUTLINE:

WEEK	MODULE-WISE CONTENTS
WEEK – 1 (3 Hours)	Module 1: • Introduction to Selenium • Selenium IDE Part I

WEEK – 2 (3 hours)	Module 2: • Selenium IDE Part II • Selenium IDE Part III • Selenium IDE Part IV
WEEK – 3 (3 hours)	Module 3: Selenium Web Driver Automation
WEEK – 4 (3 hours)	Module 4: Fire Path installation
WEEK – 5 (3 hours)	Module 5: Searching elements
WEEK – 6 (3 hours)	Module 6: Advance user interactions cross browser testing
WEEK-7 (3 Hours)	Module 7: Introduction to TestNG PlugIn
WEEK – 8 (3 Hours)	Module 8: TestNG Terminologies
WEEK 9 (3 Hours)	Module 9: TestNG Data Providers
WEEK10 (3 Hours)	Module 10: Maven Integration Tool
WEEK11 (3 Hours)	Module 11: Web Driver Sample Programs
WEEK 12 (3 Hours)	Passing parameters and returning values 1. CERTIFCATION EXAMINATION 2. CLOSING AND VALEDICTORY CEREMONY

2.3DEPARTMENTOF ELECTRICAL ENGINEERING

S. No.	Course ID	Course Name	No. of Modules	Course Duration	Course Facilitator
1	AOC-DEP-EE-EM	Understanding of Electrical Machines	4	35 Hours	Dr. Pankaj Gakhar Dr. Virendra Sangtani Dr. Gaurav Jain Dr. Himani Goyal Sharma
2	AOC-DEP-EE-IOT	Introduction to Internet of Things (IOT) in Electrical Engineering	5	35 Hours	Dr. Asif Iqbal Mr. Gaurav Srivastava
3	AOC-DEP-EE-ARD	Applications of Arduino devices in Electrical Engineering	5	35 Hours	Dr. Babita Kumari Jain Dr. Pankaj Gakhar
4	AOC-DEP-EE-RSPI	Introduction to Raspberry PI and its applications	4	35 Hours	Dr. Virendra Sangtani Ms. Deepika Chauhan
5	AOC-DEP-	Introduction to PV Syst and its	5	35 Hours	Mr. Ranjeet Kumar

	EE-PVS	applications in Power Engineering			Mr. Arpit Khandelwal

2.3.1COURSETITLE: Understanding of Electrical Machines **(COURSE CODE:** AOC-DEP-EE-EM**)**

1. **Course Summary:** This course teaches the principles and analysis of electromechanical systems. Students will develop analytical techniques for predicting device and system interaction characteristics as well as learn to design major classes of electric machines. Problems used in the course are intended to strengthen understanding of the phenomena and interactions in electro mechanics, and include examples from current research. It is a gateway to a career in engineering, a tool for Science, Technology, Engineering, and Mathematics education, a vehicle for artistic and creative expression.

2. **Course Outcomes:**
   1. Students will be able to identify standard tests for different electrical machines such as transformers, Generators etc.
   2. Students will be able to Design and perform standard test sequence for electrical machines
   3. Students will be able to Perform standard test sequence for different types of motors
   4. Students will be able to Perform tests for housing electrical equipment's after installation

3. **Course Outcomes & Program Outcomes Mapping:**

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1									3		3		3		
CO2									3						
CO3											3		3		
CO4											3				
CO5															
Target									3		3		3		

4. **Enrollment Criteria:**
   1. Participants must be interested and engineering student (II Year Only)
   2. Must provide the NOC if from other department.

5. **Certification Criteria: Minimum 70% marks in Certification Exam**
6. **Course** Prerequisites: **Basic Electrical Engineering**
7. **Course Duration: 35 Hours**
8. **Course Outline:**

Module	Contents	Hours
1	The standard types of electrical machines tests, testing of transformers, Testing of the synchronous generators and synchronous motors	**7**
2	Testing of 3-phase induction motors, testing of dc motors	**8**

3	Maintenance of single-phase induction motors, 3-phase induction motors	**10**
4	Testing and maintenance of household electrical machines	**10**

2.3.2 COURSETITLE: Introduction to Internet of Things (IOT) in Electrical Engineering **(COURSECODE:** AOC-DEP-EE-IOT**)**

1. **Course Summary:** Internet of Things (IOT) is presently a new technology worldwide. Government, academia, and industry are involved in different aspects of research, implementation, and business with IOT. IOT cuts across different application domain verticals ranging from civilian to defense sectors. This course specialization in agriculture, space, healthcare, manufacturing, construction, water, and mining, which are presently transitioning their legacy infrastructure to support IOT. Today it is possible to envision pervasive connectivity, storage, and computation, which, in turn, gives rise to building different IOT solutions. During the course students will develop a professional IOT-based applications such as innovative shopping system, infrastructure management in both urban and rural areas, remote health monitoring and emergency notification systems,. The goal of IOT is not only just connecting things such as machines, devices and appliances, but also allows the things to communicate, exchange control data and other necessary information while executing applications towards machine goal.

2. **Course Outcomes:**
   1. Students will be able to explain the definition and usage of the term "Internet of Things" in different contexts
   2. Students will be able to understand the key components that make up an IoT system
   3. Students will be able to apply the knowledge and skills acquired during the course to build and test a complete, working IoT system involving prototyping, programming and data analysis
   4. Students will be able to Recognize the factors that contributed to the emergence of IoT

3. **Course Outcomes & Program Outcomes Mapping:**

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1										3				3	
CO2										3					
CO3										3				3	
CO4										3					
CO5															
Targ et										3				3	

4. **Enrollment Criteria:**
   1. Participants must be interested and engineering student (IV Year Only)
   2. Must provide the NOC if from other department.
5. **Certification Criteria: Minimum 70% marks in Certification Exam**
6. **Course Prerequisites:** Basic Electrical Engineering

7. **Course Duration: 35 Hours**
8. **Course Outline:**

Module	Contents	Hours
1	Introduction to Home and Building Automation Smart lighting by adapting ambient conditions based switching, Web application and mobile apps enabled wireless and internet connected lights Smart appliances management and control, Intrusion detection systems, alarm systems and surveillance systems	**7**
2	Introduction to Industrial Internet of Things (IIOT) Real-time monitoring and control of processes, Deploying smart machines, smart sensors, and smart controllers with proprietary communication and internet technologies, Maximize safety, security and reliability through high precision automation and control	**7**
3	Introduction to Energy IOT Advanced Metering Infrastructure (AMI), SCADA (Supervisory Control and Data Acquisition), Smart Inverters, Remote control operation of energy consuming devices	**7**
4	Introduction to Transportation IOT Smart traffic control, Unmanned autonomous navigation, Inter and intra vehicular communication, Automatic transmission for emergency rescue, Electronic toll collection system	**7**
5	Project Development	**7**

2.3.3 COURSETITLE: Applications of Arduino devices in Electrical Engineering **(COURSECODE:** AOC-DEP-EE-ARD**)**

1. **Course Summary:** This course specialization entails to Tech Explorations Arduino Step by Step, where you will extend your knowledge of Arduino components and techniques and build up new skills in the largest, and the most comprehensive course on the Web. Arduino is the world's favorite electronics learning and prototyping platform. Millions of people from around the world use it to learn electronics, engineering, programming, and create amazing things, from greenhouse controllers to tree climbing robots remotely controlled lawnmowers. It is a gateway to a career in engineering, a tool for Science, Technology, Engineering, and Mathematics education, a vehicle for artistic and creative expression.

2. **Course Outcomes:**

1. Students will be able to Use communications technologies like Wifi, BLE, and radio
2. Students will be able to Use servo, DC and stepper motors with various controllers
3. Students will be able to Use LCD, OLED and TFT screens with buttons and touch interfaces
4. Students will be able to Store data in external storage like SD Cards and EEPROM
5. Students will be able to Optimize a sketch to minimize memory footprint, reduce power consumption and increase performance
6. Students will be able to Control large loads like relays and lights
7. Students will be able to Improve button reliability with hardware de bouncing

3. Course Outcomes & Program Outcomes Mapping:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1											3			3	
CO2														3	
CO3											3				
CO4															
CO5															
Target											3			3	

4. Enrollment Criteria:

1. Participants must be interested and engineering student (II Year Only)
2. Must provide the NOC if from other department.

5. Certification Criteria: Minimum 70% marks in Certification Exam

6. Course Duration: 35 Hours

7. Course Prerequisites: Fundamental of Electrical Engineering

8. Course Outline:

Module	Contents	Hours
1	**a. <u>Embedded System design: Basics</u>** Introduction to embedded systems. Components of embedded system. Advantages and applications of embedded systems. Examples of real time embedded systems and how they are manufactured industry ready. Different Microcontroller Architectures (CISC, RISC, ARISC). Internal Resources & Hardware Chips in Details. History of AVR Microcontrollers and Features. Memory Architectures (RAM/ROM).	7
2	**Learning Arduino Platform** Introduction to ARDUINO, ARDUINO History and Family. Programming in Embedded-C, Concepts of C language. General Hardware Interfacings: LED's Switches Seven Segment Display Multi Segment Displays Relays (AC Appliance Control) LCD Buzzer IR Sensors	7
3	**The basic sensors and actuators using Arduino** Introduction to sensors and actuators. How to connect and work with different sensors, such as Humidity, Proximity, IR Motion, Accelerometer, Sound, Light Distance, Pressure,	7

	Thermal etc to ARDUINO Board. Reading various sensor data on serial monitor and LCD Display. Functioning of actuator.	
4	**Controlling embedded system based devices using Arduino** Work with LED Controlled by Switch/potentiometer, 7 segment displays. How to connect relays and servomotors to ARDUINO Board. Work with 5V/3V Power supply using voltage regulator IC'S.	7
5	**Project Based on embedded system design using Arduino board** Students can make many projects on ARDUINO Based Embedded systems, few are listed below, i.e.: ARDUINO based home automation. ARDUINO Based Solar Street Light system. ARDUINO Based Alarm Clock. ARDUINO Based Car Parking System, etc.	7

2.3.4 COURSETITLE: Introduction to Raspberry PI and its applications **(COURSECODE:** AOC-DEP-EE-RSPI**)**

1. **Course Summary:** In this course, students will learn to develop Python applications on LINUX Operating System installed on Raspberry Pi. Students will use the Raspberry Pi, a popular micro-controller, to learn Linux command, coding with Python, build a circuit and watch the code come alive with the circuit board. This is an excellent introductory course to a programming language and operating system for students interested in computer science, software development, or Engineering.
2. **Course Outcomes:**
   1. Students will be able to Use Python Turtle to draw Geometric Shapes
   2. Students will be able to Use Python to develop application
   3. Students will be able to Have an understanding of the fundamentals of programming concepts
   4. Students will be able to decompose a complex problem into manageable code.
3. **Course Outcomes & Program Outcomes Mapping:**

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1				3											
CO2					3										3
CO3				3					3						3
CO4									3						
CO5															
Target				3	3				3						3

4. **Enrollment Criteria:**
   1. Participants must be interested and engineering student (III Year Only)
   2. Must provide the NOC if from other department.
5. **Certification Criteria: Minimum 70% marks in Certification Exam**
6. **COURSE PREREQUISITES:** Basic Electrical Engineering
7. **Course Duration: 35 Hours**
8. **Course Outline:**

Module	Contents	Hours
1	Getting started with Raspberry Pi • Introduction to Raspberry Pi • Comparison of various Rpi Models • Understanding SoC architecture and SoCs used in Raspberry Pi • Pin Description of Raspberry Pi • On-board components of Rpi • Projects using Raspberry Pi	7
2	Booting Up RPi- Operating System and Linux Commands • Linux- Introduction, Architecture, File System • Raspbian O.S.- Introduction, Tools like Leafpad Editor • Installing Raspbian on Pi • First boot and Basic Configuration of Pi • Popular Linux Commands	8
3	Working with RPi using Python and Sensing Data using Python • Introduction, Python vs. Other Languages, Applications of Python • Understanding Python, Interpreted Languages • Variables, Keywords, Operators and Operands • Data Types in Python, Importing Libraries • Flow Control, Conditional Statement, Loops • Sensors Interfacing- Temperature and Humidity Sensor (DHT11), Motion Sensor • (PIR), Obstacle detection using Ultrasonic sensor, etc. • Communicating using RPi- GSM interfacing, Accessing on-board Wi-Fi • Connecting Database with RPi	10
4	IoT Design using Raspberry Pi • IoT Applications based on Pi • LAMP Web-server • GPIO Control over Web Browser • Creating Custom Web Page for LAMP • Communicating data using on-board module • Home automation using Pi • Node-RED, MQTT Protocol • Using Node-RED Visual Editor on Rpi	10

2.3.5COURSETITLE: Introduction to PV Syst and its applications in Power Engineering **(COURSECODE:** AOC-DEP-EE-PVS**)**

1. **Course Summary:** This course specialization entails how to estimate and optimize the power output of a solar power plant. PVSyst is an industry standard solar PV design tool. As software, it allows the user to simulate the energy output, detailed losses, analyze near shadings, carry out financial analysis, probability reports, and horizon profile and generate many more outputs that help solar designers in understanding the overall performance of a solar power plant. During the course students will simulate the potential performance of a power plant, after specifying information such as the location, metro data, components to be used, arrangement, and budgets. The main results to be derived from PVSyst reports are the total energy production, performance ratio, specific energy and the gains/losses involved in the simulation. The final report produced from a PVSyst simulation plays a key role in the proposal to be submitted to potential clients and investors in order to understand the bankability of the solar PV project.

2. **Course Outcomes:**
   1. Students will be able to design and professional sales proposal of solar plant using PVSyst software
   2. Students will be able to add science, mathematics & art behind solar PV system design
   3. Students will be able to use the knowledge of losses, 3D modeling and near shading analysis
   4. Students will be able to apply responsive design for grid-connected PVSyst simulations of up to 1-2 MW

3. **Course Outcomes & Program Outcomes Mapping:**

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1						3			3						3
CO2					3	3						3			3
CO3						3						3			
CO4							3		3						
CO5															
Target					3	3	3		3			3			3

4. **Enrollment Criteria:**
   1. Participants must be interested and engineering student (IV Year Only)
   2. Must provide the NOC if from other department.

5. **Certification Criteria: Minimum 70% marks in Certification Exam**
6. **Course Prerequisites:** Basic Electrical Engineering, Power System
7. **Course Duration: 35 Hours**
8. **Course Outline:**

Module	Contents	Hours
1	Introduction to solar energy system and the main components, Know about PV Solar Module, Technical Specification, Best Module selection ,Introduce with up to date Module Technology, Technical Parameters of PV Module	**7**

2	Understand the principle of solar panel works, the types of the PV modules and the panels datasheet, Inverter Datasheet and MPPT technology, shading effect and the bypass diodes, difference between Galvanized steel and Aluminum structures and the temperature effect according to structure type, Circuit Breakers used in the solar system	**7**
3	Site survey and how you can benefit from the site survey in the design stage, install the PV system in simple way, and you can image the principle of work in the site	**7**
4	Introduction to SketchUp and the main tools and how we can use it, Introduction to PVSYST and its focus on GRID solar system, principle of pricing PV system in the companies and the market, Technical & Financial Reports and you understand how can make solar plant.	**7**
5	Project Development	**7**

2.4 DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

S. No.	Course ID	Course Name	No. of Modules	Course Duration	Course Facilitator
1	AOC-DEP-ECE-TWP	Art of Technical Writing & Publishing Research Papers	6	30 Hours	Mr. Manish Sharma
2	AOC-DEP-ECE-PSP	PSpice: A modeling Tool	6	30 Hours	Dr. Garima Mathur
3	AOC-DEP-ECE-VLSI	VLSI Circuit Design using Xilinx & Mentor Graphics Tools	6	30 Hours	Mr. Amit Jain
4	AOC-DEP-ECE-LABV	LABVIEW &its Hardware Application	6	30 Hours	Mr. Tarun Mishra
5	AOC-DEP-ECE-PCBD	Simulation using PROTEUS Software	6	30 Hours	Dr. Payal Bansal
6	AOC-DEP-ECE-MATL	Application of MATLAB in Engineering	6	30 Hours	Dr. AnilaDhingra

2.4.1 COURSETITLE: Art of Technical Writing & Publishing Research Papers (COURSECODE: AOC-DEP-EC-TWP)

1. COURSE DESCRIPTION: We noticed most of the scholars looking for number of queries regarding scientific writing of Research paper, Assignment. Scientific writing is a necessary skill that repetitive practice of reading, writing, and revising must learn. Scientific writing can take many forms such as project reports or dissertation or scientific articles in an academic journal. This workshop is intended to impart researchers with basic skills in writing.

2. COURSE OUTCOMES:

S.No.	Course Outcomes
CO1	Explain the basics of programming constructs like variables, data structures and numeric keys, commands etc.
CO2	Apply the skill of using high-quality typesetting system, for publication of research papers, thesis and book chapter
CO3	Write various types of formulae, equations, matrices etc.
CO4	Using LaTeX and Zotero Create Tables, Graphics and Pictures Lists, Arrays and Bibliography
CO5	Create Slides with Beamers and posters.

3. MAPPING COURSE OUTCOMES WITH PO AND PSO

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	2		-	-	-	-	-	-	-	-	-	-	3		-
CO 2	3	3	3	3	3	-	-	-	-	-	-	-	3	2	2
CO 3	3	3	-		-	-	-	-	-	-	-	-	3	-	
CO 4	2	2	3	3	3		-	-	-	-	-	-	3	3	3
CO 5	2	2	3	3	3	3	-	-	-	-	-	-	3	3	3

4. COURSE PRE-REQUISITES:
Knowledge of MS-Word
5. ENROLMENT CRITERIA: Interested Students of IV Year.
6. CERTIFICATION CRITERIA: Mandatory Fulfilment of
Criteria 1: 80% Attendance, and
Criteria 2: 60% Marks in Quiz

7. WEEK-WISE COURSE OUTLINE:

WEEK	MODULE-WISE CONTENTS
WEEK – 1 (5 Hours)	MODULE – 1: Introduction: Writing for a scientific journal Manuscript Writing Military Applications

WEEK – 2 (5 hours)	**MODULE – 2: Getting Started Introduction to Latex and Tex Studio**
WEEK – 3 (5 hours)	**MODULE – 3: Hands-on Latex (Exercise)**
WEEK – 4 (5 hours)	**MODULE – 4: Getting Started Reference Management: Zotero**
WEEK – 5 (5 hours)	**MODULE – 5: Reference Management: Zotero – Hands-on**
WEEK – 6 (5 hours)	**MODULE – 6: Introduction to Overleaf and Hands-on session**
WEEK - 7	**CLOSING AND VALEDICTORY CEREMONY**

2.4.2 COURSE TITLE: PSpice: A modeling Tool **(COURSE CODE:** AOC-DEP-EC-PSP**)**

1. COURSE DESCRIPTION: SPICE is a very popular software for analyzing electrical and electronics. PSPICE is a computer-aided simulation program that enables you to design a circuit and then simulate the design on a computer. As this is one of its main purposes, it is used extensively by electronic design engineers for building a circuit and then testing out how that circuit will simulate.

2. COURSE OUTCOMES:

S.No.	Course Outcomes
CO1	Understand the main features and importance of the PSPICE programming environment.
CO2	Apply knowledge of simulation software for analyzing the various circuits
CO3	Acquaint students with the Installation Process & steps for creating Circuit Using Pspice
CO4	Evaluate the circuits response with the help of measurements in Pspice environment
CO5	Simulation of various Analog and Digital Circuits using Pspice.

3. MAPPING COURSE OUTCOMES WITH PO AND PSO

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	-	3	-	-	-	-	-	-	-	-	-	-	3	-	-
CO 2	-	-	3	-	-	-	-	-	-	-	-	-	-	2	-
CO 3	-	-	-	3	-	-	-	-	-	-	-	-	3	-	2
CO 4	-	-	-	-	3		-	-	-	-	-	-	-	3	-

CO 5	-	-	-	-	-	**3**	-	-	-	-	-	-	**3**	**2**	-

4. COURSE PRE-REQUISITES:
Basics of Electronics Circuit, Modern Integrated circuits**,** Computer-Aided Circuit Analysis.
5. ENROLMENT CRITERIA: Interested Students of II Year.
6. CERTIFICATION CRITERIA: Mandatory Fulfilment of
Criteria 1: 80% Attendance, and
Criteria 2: 60% Marks in Quiz

8. WEEK-WISE COURSE OUTLINE:

WEEK	MODULE-WISE CONTENTS
WEEK – 1 (5 Hours)	**MODULE – 1:** • Introduction of PSPICE (including installation) • Verification of Thevenin and Norton theorems in DC and AC Circuits using PSPICE. • Verification of principle of Superposition with DC and AC source using PSPICE
WEEK – 2 (5 Hours)	**MODULE – 2:** • Determination of transient response of current in RL and RC circuits with step voltage input. • Determination of transient response of current in RLC circuit with step voltage input for under damped, critically damped and over damped cases.
WEEK – 3 (5 hours)	**MODULE – 3:** • Frequency response of a R-C coupled CE amplifier • Finding the instantaneous, rms, and real parts of currents in a three phase circuit. • Finding the Fourier coefficients.
WEEK – 4 (5 hours)	**MODULE – 4:** • Frequency response of a R-C coupled CE amplifier • Finding the instantaneous, rms, and real parts of currents in a three phase circuit. • Finding the Fourier coefficients. • Diode model parameters and plotting diode characteristics. • Transient response of a half wave rectifier with capacitor filter • Output voltage of a single phase full wave rectifier
WEEK – 5 (5 hours)	**MODULE – 5:** • Plotting the BJT characteristics • Transient and frequency response of a BJT amplifier • Plotting the output characteristics of JFETs • Modelling of half wave controlled rectifier • Introduction to lab VIEW (Virtual Instruments)

	• LabVIEW Environment • Building the Front Panel
WEEK – 6 (5 hours)	**MODULE-6:** • Building the Block Diagram • Running and Debugging Vis • Creating VIs and SubVIs • Loops and Structures • Grouping Data Using Strings, Arrays, and Clusters • Graphs and Charts • Application with project
WEEK - 7	**CLOSING AND VALEDICTORY CEREMONY**

2.4.3 COURSETITLE: VLSI Circuit Design using Xilinx & Mentor Graphics Tools **(COURSECODE:** AOC-DEP-EC-VLSI**)**

1. COURSE DESCRIPTION: The workshop will provide a platform to disseminate knowledge and share experiences, among participants and experts, highlighting open research problems for the next generation VLSI Design. Workshop participants will learn about the recent trends in digital and analog VLSI Design. They will also learn to apply the knowledge in practical circuits and systems and can enhance their fundamentals. Some hand-on session will give practical exposure to the application of VLSI system designs. It is necessary for Electronics and Communication engineers, students and researchers to understand the fundamentals of the emerging VLSI technologies. Aim of the course is to introduce the evolution of both analog and digital design flow and to provide overview of related CMOS and other recent technologies. This course would cover Fundamentals of VLSI Design, Design and modeling of basic analog modules, like Voltage Reference, Basic Amplifiers, OTA etc., Design of different digital logic gates, Reconfigurable system design using FPGA, Introduction to Embedded system design and Introduction to IOT system design for different industrial applications.

2. COURSE OUTCOMES:

S.No.	Course Outcomes
CO1	Provide fundamental hands-on experience on the state-of-the-art Cadence EDA tools for VLSI Design.
CO2	Apply knowledge on the Circuit Design & implement IC design solutions on FPGAs and using state-of-the-art EDA tools.
CO3	Demonstrate the Circuit Design & Simulation, Layout, Physical Verification (DRC, LVS), and Extraction.
CO4	Evaluate practice sessions on the Cadence design and simulation tools (Encounter, RTL Compiler, Virtuoso, Specter, Assura and Incisive).

3. MAPPING COURSE OUTCOMES WITH PO AND PSO

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1	-	3	-	-	-	-	-	-	-	-	-	-	3	-	-
CO2	-	-	3	-	-	-	-	-	-	-	-	-	-	2	-
CO3	-	-	-	3	-	-	-	-	-	-	-	-	3	-	2
CO4	-	-	-	-	3		-	-	-	-	-	-	-	3	-

4. COURSE PRE-REQUISITES:

Basic knowledge of electronics components, Basic knowledge of modelling, simulation and result analysis.

5. ENROLMENT CRITERIA: Interested Students of III Year.

6. CERTIFICATION CRITERIA: Mandatory Fulfilment of

Criteria 1: 80% Attendance, and

Criteria 2: 60% Marks in Quiz

7. WEEK-WISE COURSE OUTLINE:

WEEK	MODULE-WISE CONTENTS
WEEK – 1 (5 Hours)	**MODULE – 1: FPGA design flow using Vivado** Basics of PCB material & production 2. Types of PCB a) Single Layer PCB b) Double Layer PCB Basics of PCB material & production 2. Types of PCB a) Single Layer PCB b) Double Layer PCB a) 7-Series Architecture Overview b) Lab 1: Vivado Design Flow c) Lab 2: Synthesizing a RTL Design d) Implementation and Static Timing Analysis e) Lab 3: Implementing the Design
WEEK – 2 (5 Hours)	**MODULE – 2: Hardware required – Basys3/Nexys4DDR** a) IP Integrator b) Lab 4: Using the IP Catalog and IP Integrator c) Xilinx Design Constraints d) Lab 5: Xilinx Design Constraints e) Hardware Debugging
WEEK – 3	**MODULE – 3:**

(5 hours)	a) Introduction to Embedded System Design using Zynq b) Create a Vivado project and use IP Integrator to develop a basic embedded system for a target board. c) Zynq Architecture d) Extending the Embedded System into Programmable Logic e) Adding Peripherals in Programmable Logic
WEEK – 4 **(5 hours)**	**MODULE – 4:** Introduction to Proteus a) Basics of Circuit designing b) Introduction to Symbols Introduction to Proteus a) Basics of Circuit designing b) Introduction to Symbols a) Introduction to IC/ASIC Design Flow and Mentor EDA Tools. b) Detailed Semi-Custom IC Design Flow. c) Hands-On Lab Sessions.
WEEK – 5 **(5 hours)**	**MODULE – 5:** a) Detailed Semi-Custom IC Design Flow (Contd) b) Hands-On Lab Sessions. c) Detailed Full-Custom IC Design Flow.
WEEK – 6 **(5 hours)**	**MODULE-6:** a) Hands-On Lab Sessions
WEEK - 7	**CLOSING AND VALEDICTORY CEREMONY**

2.4.4 COURSETITLE: LABVIEW &Its Hardware Application **(COURSECODE:** AOC-DEP-EC-LABV)

1. COURSE DESCRIPTION: Lab VIEW offers a graphical programming environment that helps visualizing every aspect of the program, including hardware configuration, measurement data, and debugging. This visualization makes it simple to integrate measurement hardware from any vendor and to develop own data acquisition/analysis programs with customized user interfaces. Lab VIEW programs are called virtual instruments, or VIs, because their appearance and operation imitate physical instruments, such as oscilloscopes and millimeters. Lab VIEW contains a comprehensive set of tools for acquiring, analyzing, displaying, and storing data, as well as tools to help you troubleshoot program you write.

2. COURSE OUTCOMES:

S.No.	Course Outcomes
CO1	Configure the general physical and software layouts of the Lab VIEW programming environment.
CO2	Develop and edit functional block diagrams and front panels
CO3	Load, save, and debug Virtual Instruments and utilize composite data in the form of

	Arrays and Clusters
CO4	Control program execution through structures such as 'For-While' loops and 'Case Structures'
CO5	Develop programs that respond to user interface events using a variety of event-driven design patterns

3. MAPPING COURSE OUTCOMES WITH PO AND PSO

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO 1	-	3	-	-	-	-	-	-	-	-	-	-	3	-	-
CO 2	-	-	3	-	-	-	-	-	-	-	-	-	-	2	-
CO 3	-	-	-	3	-	-	-	-	-	-	-	-	3	-	2
CO 4	-	-	-	-	3		-	-	-	-	-	-	-	3	-
CO 5	-	-	-	-	-	3	-	-	-	-	-	-	3	2	-

4. COURSE PRE-REQUISITES:

Experience with Microsoft Windows, Experience writing algorithms in the form of flowcharts or block diagrams

5. ENROLMENT CRITERIA: Interested Students of III Year.

6. CERTIFICATION CRITERIA: Mandatory Fulfilment of

Criteria 1: 80% Attendance, and

Criteria 2: 60% Marks in Quiz

7. WEEK-WISE COURSE OUTLINE:

WEEK	MODULE-WISE CONTENTS
WEEK – 1 (5 Hours)	**MODULE – 1:** Basics of PCB material & production 2. Types of PCB a) Single Layer PCB b) Double Layer PCB Basics of PCB material & production 2. Types of PCB a) Single Layer PCB b) Double Layer PCB Introduction to Graphical User Interface of Lab VIEW: Programming without Writing Commands.
WEEK – 2	**MODULE – 2:**

(5 Hours)	How to use Built-in Virtual Instruments (VIs) to Design Programs for Different Applications.
WEEK – 3 (5 hours)	**MODULE – 3:** How to Automate Data Acquisition and Interface Instruments with PC using Lab VIEW.
WEEK – 4 (5 hours)	**MODULE – 4:** Introduction to Proteus a) Basics of Circuit designing b) Introduction to Symbols Introduction to Proteus a) Basics of Circuit designing b) Introduction to Symbols Live Demonstrations: I-V Characteristics, Temperature Measurement, Resistivity Measurements etc.
WEEK – 5 (5 hours)	**MODULE – 5:** Plotting, Analyzing and Simulation of Data with Lab VIEW Programs.
WEEK – 6 (5 hours)	**MODULE-6: Basics of Product Used** NI-DAQmx 21.0 or later NI-488.2 21.0 or later NI VISA 21.0 or later
WEEK - 7	**CLOSING AND VALEDICTORY CEREMONY**

2.4.5 COURSE TITLE: Simulation using PROTEUS Software **(COURSE CODE:** AOC-DEP-EC-PCBD**)**

1. COURSE DESCRIPTION: In this course we are going to cover all the necessary aspect to design a high quality printed circuit board. This is a step by step course. We are going to start in the sematic circuit then the PCB layout and get the 3d visualization, also we are going to learn how to get the output files like PDF and Gerber files. The main objective of this workshop was to provide basic knowledge of electronics components, designing and simulation of basic circuits using software Proteus ISIS and development of PCB design using ARES software, which is beneficial for students in their projects development.

2. COURSE OUTCOMES:

S.No.	Course Outcomes
CO1	Determine appropriate components to make circuits on Printed Circuit Board (PCB) and Proteus software
CO2	Interpret test results and measurements on electric circuits
CO3	Analyze the fabrication processes of printed circuit boards
CO4	Simulation of basic electronic circuits using software Proteus.
CO5	Evaluate an electronic printed circuit board for a specific application using industry

	standard software.

3. MAPPING COURSE OUTCOMES WITH PO AND PSO

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO 1	3	3	2	-	-	-	-	-	-	-	-	1	3	2	1
CO 2	3	3	3	-	-	-	-	-	-	-	-	1	3	2	1
CO 3	3	3	3	3	-	-	-	-	-	-	-	1	3	2	1
CO 4	3	3	3	-			-	-	-	-	-	1	3	2	1
CO 5	3	3	3	3	3		-	-	-	-	-	1	3	2	1

4. COURSE PRE-REQUISITES:
Basic knowledge of electronics components, Basic knowledge of modelling, simulation and result analysis.

5. ENROLMENT CRITERIA: Interested Students of IV Year.
6. CERTIFICATION CRITERIA: Mandatory Fulfilment of
Criteria 1: 80% Attendance, and
Criteria 2: 60% Marks in Quiz

7. WEEK-WISE COURSE OUTLINE:

WEEK	MODULE-WISE CONTENTS
WEEK – 1 (5 Hours)	**MODULE – 1:** Basics of PCB material & production 2. Types of PCB a) Single Layer PCB b) Double Layer PCB Basics of PCB material & production 2. Types of PCB a) Single Layer PCB b) Double Layer PCB Basics of PCB material and Production Types of PCB: Single Layer PCB, Double Layer PCB
WEEK – 2 (5 Hours)	**MODULE – 2:** Introduction to Proteus Basics if Circuit Designing Introduction to Symbol
WEEK – 3	**MODULE – 3:**

(5 hours)	Introduction to PCB design. PCB manufacturing. Components selection and connection in Proteus. Simple circuit schematic design.
WEEK – 4 **(5 hours)**	**MODULE – 4:** Introduction to Proteus a) Basics of Circuit designing b) Introduction to Symbols Introduction to Proteus a) Basics of Circuit designing b) Introduction to Symbols Studying capacitor charging/discharging in DC circuit. Circuit Implementation & Building Layouts using ARES.
WEEK – 5 **(5 hours)**	**MODULE – 5:** Placement of Component and Routing Enhanced Routing Technology
WEEK – 6 **(5 hours)**	**MODULE-6:** Design DC power supply (Mobile Charger).
WEEK - 7	**CLOSING AND VALEDICTORY CEREMONY**

2.4.6 COURSE TITLE: Application of MATLAB in Engineering **(COURSE CODE:** AOC-DEP-EC-MATL**)**

1. COURSE DESCRIPTION: The course provides a gentle introduction to the MATLAB computing environment, and is intended for beginning users and those looking for a review. It is designed to give students a basic understanding of MATLAB, including popular toolboxes. The course consists of interactive lectures and sample MATLAB problems given as assignments and discussed in class. No prior programming experience or knowledge of MATLAB is assumed. Concepts covered include basic use, graphical representations and tips for designing and implementing MATLAB code.2

2. COURSE OUTCOMES:

S.No.	Course Outcomes
CO1	Apply the Knowledge to the students with MATLAB software.
CO2	Develop a working introduction to the Matlab technical computing environment
CO3	Demonstrate the use of programming knowledge in Research and Development
CO4	Use of a high-level programming language, Matlab. [scientific problem solving with applications and examples from Engineering].
CO5	Design solutions of real-world computational problems using Matlab programs

3. MAPPING COURSE OUTCOMES WITH PO AND PSO

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO 1	-	3	-	-	-	-	-	-	-	-	-	-	3	-	-
CO 2	-	-	3	-	-	-	-	-	-	-	-	-	-	2	-
CO 3	-	-	-	3	-	-	-	-	-	-	-	-	3	-	2
CO 4	-	-	-	-	3		-	-	-	-	-	-	-	3	-
CO 5	-	-	-	-	-	3	-	-	-	-	-	-	3	2	-

4. COURSE PRE-REQUISITES:

It is advisable to have a have a good familiarity with PC operations and a working knowledge of some basic application software (Excel). Basic knowledge of computer programming and an understanding of matrix and linear algebra are highly beneficial.

5. ENROLMENT CRITERIA: Interested Students of II Year.

6. CERTIFICATION CRITERIA: Mandatory Fulfilment of

Criteria 1: 80% Attendance, and

Criteria 2: 60% Marks in Quiz

7. WEEK-WISE COURSE OUTLINE:

WEEK	MODULE-WISE CONTENTS
WEEK – 1 (5 Hours)	**MODULE – 1: MATLAB basics** Basics of PCB material & production 2. Types of PCB a) Single Layer PCB b) Double Layer PCB Basics of PCB material & production 2. Types of PCB a) Single Layer PCB b) Double Layer PCB The MATLAB environment Basic computer programming Variables and constants, operators and simple calculations Formulas and functions - MATLAB toolboxes
WEEK – 2	**MODULE – 2: Matrices and vectors** Matrix and linear algebra review Vectors and matrices in MATLAB

(5 Hours)	Matrix oerations and functions in MATLAB
WEEK – 3 (5 hours)	**MODULE – 3: Computer programming** Algorithms and structures MATLAB scripts and functions (m-files) Simple sequential algorithms Control structures (if…then, loops)
WEEK – 4 (5 hours)	**MODULE – 4: Numerical simulations** Introduction to Proteus a) Basics of Circuit designing b) Introduction to Symbols Introduction to Proteus a) Basics of Circuit designing b) Introduction to Symbols Numerical methods and simulations Random number generation Monte carlo methods
WEEK – 5 (5 hours)	**MODULE – 5: Conditional Statement** Conditional Statements: Logical Operators Conditional Statements: if, else, and else if Conditional Structures: Switch
WEEK – 6 (5 hours)	**MODULE-6: Hands-on session** Interactive hands-on-session where the whole class will develop one or more MATLAB scripts that solve an assigned problem
WEEK - 7	**CLOSING AND VALEDICTORY CEREMONY**

2.5 DEPARTMENT OF INFORMATION TECHNOLOGY

S. No.	Course ID	Course Name	No. of Modules	Course Duration	Course Facilitator
1	AOC-DEP-IT-PYP	Introduction to Python Programming	8	35 Hours	Mr. Shirish Nagar
2	AOC-DEP-IT-WEB	Web Design and Development	10	35 Hours	Ms. Seeta Gupta

2.5.1 COURSE TITLE: Introduction to Python Programming (COURSE CODE: AOC-DEP-IT-PYP)

1. COURSE DESCRIPTION: Python is a very versatile and easy-to-learn programming language with an extensive library of open tools allowing users to solve a variety of problems. Python has a rich ecosystem of libraries and tools for scientific computing and data science. There

are libraries that provide a powerful interactive computing environment both on the console as well as on a web-browser. Python can interface relatively easily with other well- established languages like FORTRAN/C and C++. In addition to this Python also has libraries to build user interfaces, build web applications, interface to hardware, and a whole host of other domains. This makes Python an excellent language to learn opening up a world of possibilities to users who desire to use their computers more effectively.

2. COURSE OUTCOMES:

S.No.	Course Outcomes
CO1	Apply the programming constructs like variables, data structures and control flow structures
CO2	Develop programs using file handling, Object oriented paradigms, GUI controls
CO3	Demonstrate the use of network programming, threads and database connectivity
CO4	Use Python to extend and embed in C and C++ programs
CO5	Design solutions of real-world computational problems using Python programs

3. MAPPING COURSE OUTCOMES WITH PO AND PSO

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO 1	-	3	-	-	-	-	-	-	-	-	-	-	3	-	-
CO 2	-	-	3	-	-	-	-	-	-	-	-	-	-	2	-
CO 3	-	-	-	3	-	-	-	-	-	-	-	-	3	-	2
CO 4	-	-	-	-	3		-	-	-	-	-	-	-	3	-
CO 5	-	-	-	-	-	3	-	-	-	-	-	-	3	2	-

4. COURSE PRE-REQUISITES:

Students should already be comfortable using the operating system like Linux or Windows on which they will be running Python. While not mandatory, basic skills with at least one other programming language like C, C++ are desirable.

5. ENROLMENT CRITERIA: Interested Students of II Year and III Year IT

6. CERTIFICATION CRITERIA: Mandatory Fulfilment of Criteria 1 and 2

Criteria 1: 80% Attendance and

Criteria 2: 70% or above marks in Certification Exam

7. WEEK-WISE COURSE OUTLINE:

WEEK	MODULE-WISE CONTENTS
WEEK – 1 (5 Hours)	**MODULE – 1: Functional Programming** • Lambdas • List Comprehensions • Set and Dictionary Comprehensions • Closures and Decorators

	• Generators and Coroutines • Generator Expressions • Declarative Programming **MODULE – 2: Systems Programming** • File Descriptors • Reading and Writing Files • Files and Directories • File Locking • Memory Mapped I/O • Creating Processes • Process Management • Pipes and Signals
WEEK – 2 (5 hours)	**MODULE-3: Classes and Objects** • New Style Classes • Inheritance • Properties and Slots • Static and Class Methods • Abstract Base Classes • Method Overriding • Attributes and Functions • Decorators and Factories • Descriptors and Meta Classes
WEEK – 3 (5 hours)	**MODULE-4: Persistence and Databases** • Shelve and Pickle • SQL Relational Databases • Connection, Cursor, Row Objects • Create, Read, Update, Delete • Error Handing • Query Results and Metadata • Create and Aggregate Functions • Exporting and Importing • Transactions and Rollbacks • Database Objects
WEEK – 4 (5 hours)	**MODULE-5: Network Programming** • Sockets and Addresses • Establishing Connections • TCP Clients and Servers • UDP Clients and Servers • UDS Clients and Servers • Network Objects • Socket Servers • Secure Sockets Layer

WEEK – 5 (5 hours)	**MODULE-6: Web Programming** • JSON and XML • Using XML-RPC • Rest Interfaces • WSGI and HTML • Flask Framework • Controller Functions • Templates and Forms • Database ORMs
WEEK – 6 (5 hours)	**MODULE-7: Threads and Concurrency** • Creating and Joining Threads • Daemon Threads • Thread Objects • Timer Threads • Locks and Semaphores • Events and Conditions • Thread Locals • Thread Queues • Process Queues and Tasks • Process Pools
WEEK-7 (5 Hours)	**MODULE-8: Extending and Embedding Python** • Calling C/C++ from Python • Using ctypes • Extension Modules in C/C++ • Raising Python Exceptions • Calling Python from C/C++ • Embedding Python Interpreter • Importing Python Modules from C/C++ • Converting Python Objects to C/C++ • Invoking Python Functions from C/C++
WEEK - 8	**1. CERTIFCATION EXAMINATION** **2. CLOSING AND VALEDICTORY CEREMONY**

2.5.2 COURSE TITLE: Web Design and Development **(COURSE CODE:** AOC-DEP-IT-WEB**)**

1. COURSE DESCRIPTION: Python is a very versatile and easy-to-learn programming language with an extensive library of open tools allowing users to solve a variety of problems. Python has a rich ecosystem of libraries and tools for scientific computing and data science. There are libraries that provide a powerful interactive computing environment both on the console as well as on a web-browser. Python can interface relatively easily with other well- established languages like FORTRAN/C and C++. In addition to this Python also has libraries to build user interfaces, build web applications, interface to hardware, and a whole host of other domains. This

makes Python an excellent language to learn opening up a world of possibilities to users who desire to use their computers more effectively.

2. COURSE OUTCOMES:

S.No.	Course Outcomes
CO1	Apply the programming constructs like variables, data structures and control flow structures
CO2	Develop programs using file handling, Object oriented paradigms, GUI controls
CO3	Demonstrate the use of network programming, threads and database connectivity
CO4	Use Python to extend and embed in C and C++ programs
CO5	Design solutions of real-world computational problems using Python programs

3. MAPPING COURSE OUTCOMES WITH PO AND PSO

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO 1	-	3	-	-	-	-	-	-	-	-	-	-	3	-	-
CO 2	-	-	3	-	-	-	-	-	-	-	-	-	-	2	-
CO 3	-	-	-	3	-	-	-	-	-	-	-	-	3	-	2
CO 4	-	-	-	-	3		-	-	-	-	-	-	-	3	-
CO 5	-	-	-	-	-	3	-	-	-	-	-	-	3	2	-

4. COURSE PRE-REQUISITES:

Students should already be comfortable using the operating system like Linux or Windows on which they will be running Python. While not mandatory, basic skills with at least one other programming language like C, C++ are desirable.

5. ENROLMENT CRITERIA: Interested Students of II Year and III Year IT

6. CERTIFICATION CRITERIA: Mandatory Fulfilment of Criteria 1 and 2

Criteria 1: 80% Attendance and

Criteria 2: 70% or above marks in Certification Exam

7. WEEK-WISE COURSE OUTLINE:

WEEK	MODULE-WISE CONTENTS
WEEK – 1 (5 Hours)	**MODULE – 1: Functional Programming** • Lambdas • List Comprehensions • Set and Dictionary Comprehensions • Closures and Decorators • Generators and Coroutines • Generator Expressions • Declarative Programming **MODULE – 2: Systems Programming**

	• File Descriptors • Reading and Writing Files • Files and Directories • File Locking • Memory Mapped I/O • Creating Processes • Process Management • Pipes and Signals
WEEK – 2 (5 hours)	**MODULE-3: Classes and Objects** • New Style Classes • Inheritance • Properties and Slots • Static and Class Methods • Abstract Base Classes • Method Overriding • Attributes and Functions • Decorators and Factories • Descriptors and Meta Classes
WEEK – 3 (5 hours)	**MODULE-4: Persistence and Databases** • Shelve and Pickle • SQL Relational Databases • Connection, Cursor, Row Objects • Create, Read, Update, Delete • Error Handing • Query Results and Metadata • Create and Aggregate Functions • Exporting and Importing • Transactions and Rollbacks • Database Objects
WEEK – 4 (5 hours)	**MODULE-5: Network Programming** • Sockets and Addresses • Establishing Connections • TCP Clients and Servers • UDP Clients and Servers • UDS Clients and Servers • Network Objects • Socket Servers • Secure Sockets Layer

WEEK – 5 (5 hours)	**MODULE-6: Web Programming** • JSON and XML • Using XML-RPC • Rest Interfaces • WSGI and HTML • Flask Framework • Controller Functions • Templates and Forms • Database ORMs
WEEK – 6 (5 hours)	**MODULE-7: Threads and Concurrency** • Creating and Joining Threads • Daemon Threads • Thread Objects • Timer Threads • Locks and Semaphores • Events and Conditions • Thread Locals • Thread Queues • Process Queues and Tasks • Process Pools
WEEK-7 (5 Hours)	**MODULE-8: Extending and Embedding Python** • Calling C/C++ from Python • Using ctypes • Extension Modules in C/C++ • Raising Python Exceptions • Calling Python from C/C++ • Embedding Python Interpreter • Importing Python Modules from C/C++ • Converting Python Objects to C/C++ • Invoking Python Functions from C/C++
WEEK - 8	**1. CERTIFCATION EXAMINATION** **2. CLOSING AND VALEDICTORY CEREMONY**

2.6 DEPARTMENT OF MECHANICAL ENGINEERING

S. No.	Course ID	Course Name	No. of Modules	Course Duration	Course Facilitator
1	AOC-DEP-ME-SW	SOLID WORKS	11	32 Hours	Mr. Ratnesh Sharma
2	AOC-DEP-ME-BAE	Basics of Automobile Engineering	9	30 Hours (3 hours per week for 10	Mr. Kalpit Jain

				weeks)	
3	AOC-DEP-ME-AAE	Advances of Automobile Engineering	9	30 Hours (3 hours per week for 10 weeks)	Mr. Kalpit Jain

2.6.1 COURSETITLE: SOLID WORKS **(COURSE CODE:** AOC-DEP-ME-SW**)**

1. COURSE DESCRIPTION:-SOLIDWORKS is used by millions of designers and engineers at hundreds of thousands of companies. It's one of the most popular design and engineering software on the market. Known for its range of features and high functionality, SOLIDWORKS is used across multiple professions and industries around the world.

SOLIDWORKS uses parametric design, which is why it's such an effective tool for designers and engineers. This means that the designer can see how changes will affect its neighboring components, or even the overall solution. For example, if the size of a single component is increased, this would affect the joint or hole it's attached to. This allows designers to spot and correct issues quickly and easily.

SOLIDWORKS was developed by MIT graduate Jon Hirschtick and was bought by Dassault Systems in 1997. The software now encompasses a number of programs that can be used for both 2D and 3D design.

SOLIDWORKS is used to develop mechatronics systems from beginning to end. At the initial stage, the software is used for planning, visual ideation, modeling, feasibility assessment, prototyping, and project management. The software is then used for design and building of mechanical, electrical, and software elements. Finally, the software can be used for management, including device management, analytics, data automation, and cloud services.

The SOLIDWORKS software solutions are used by mechanical, electrical, and electronics engineers to form a connected design. The suite of programs is aimed at keeping all engineers in communication and able to respond to design needs or changes.

SOLIDWORKS Features

- Simple but sophisticated 3D CAD design
- Use templates and the CAD library for improved efficiency
- Automation and design reuse to speed up the process
- Cost estimation tools allow you to keep track in real-time
- Ensure potential risks are caught early with interference check
- Quickly produce 2D drawings for production
- Easily create animations and photorealistic renderings

Course Objectives

The course aims to give students and professionals the essentials that is needed to become a certified SOLIDWORKS associate. The course will help individuals use the software with confidence and design/draft the next innovative thing.

2. COURSE OUTCOMES: After successful completion of this course students will be able to

S. No.	Course Outcomes
CO1	Understand sketcher profile toolbar, modification toolbar, constraining toolbar, iso constraining of sketches using sketcher module of SOLID WORKS.
CO2	Creation of solids with following toolbars in part design module of SOLID WORKS: Sketch based features, Dress up features, Reference elements etc
CO3	Generate 2D drawings with dimensions, tolerances & surface finish from 3D model. Generate assembly drawings with BOM
CO4	Prepare assembly models using top down and bottom up approach. Generate assembly constraints, flexible assemblies, use of patterns in assembly

3. MAPPING COURSE OUTCOMES WITH PO AND PSO

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO 1	3	-	-	-	3	-	-	-	-	-	-	2	-	3	2
CO 2	-	3	-	-	3	-	-	-	-	-	-	2	-	3	2
CO 3	-	2	-	-	3	-	-	-	-	-	-	2	-	3	2
CO 4	-	-	3	-	3	-	-	-	-	-	-	2	-	3	2

4. COURSE PRE-REQUISITES:

To be a successful SOLIDWORKS designer, one should have some necessary skills, which will help them to grow in this field. Some important skills are:

- Drawing: It is the ability to draw shape & structure of any components of products.
- Imagination: The designer should have the ability to imagine the design.
- Visualization: This ability helps in visualizing the idea.
- Prior knowledge of CAD, CAM, CAE will be beneficial.
- Basic knowledge of the subjects.
- Ability to select material based on its properties to use it for designing.

5. ENROLMENT CRITERIA: Interested Students of III Year (6th Semester)

6. CERTIFICATION CRITERIA: Mandatory Fulfilment of Criteria 1 and 2
Criteria 1: 80% Attendance, and
Criteria 2: 70% or above marks in Certification Exam

7. WEEK-WISE COURSE OUTLINE:

WEEK	MODULE-WISE CONTENTS
WEEK – 1 (3 Hours)	**MODULE-1: SolidWorks Basics and the User Interface** • Design Intent • File References • Opening Files • The SolidWorks User Interface • Using the Command Manager
WEEK – 2 (3 hours)	**MODULE-2: Introduction to Sketching** • The Sketcher Workbench • 2D Sketching • Saving Files • What are We Going to Sketch? Sketching • Sketch Entities • Basic Sketching • Rules That Govern Sketches • Design Intent Sketch Relations Dimensions Extrude • Sketching Guidelines • Tutorial and Exercise
WEEK – 3 (3 hours)	**MODULE-3: Basic Part Modeling** • Other Sketching Tools in the Sketcher Workbench- Drawing Ellipses, Drawing Elongated Holes, Drawing Keyhole Profiles, • Basic Modeling • Terminology • Choosing the Best Profile • Choosing the Sketch Plane Details of the Part • Boss Feature • Sketching on a Planar Face • Cut Feature • View Selector • Using the Hole Wizard • Filleting Editing Tools Detailing Basics Drawing Views Center Marks • Dimensioning • Changing Parameters • Tutorial and Exercise
WEEK – 4 (3 hours)	**MODULE-4: Symmetry, Draft & Patterning** **Symmetry and Draft** • Constraining Sketches • Boss Feature with Draft Symmetry in the Sketch • Sketching Inside the Model View Options

	• Using Model Edges in a Sketch • Creating Trimmed Sketch Geometry • Creating Views of Assemblies **Patterning** • Why Use Patterns? • Linear Pattern Circular Patterns • Reference Geometry Planes • Mirror Patterns • Using Pattern Seed Only • Sketch Driven Patterns • Tutorial and Exercise
WEEK – 5 (3 hours)	**MODULE-5: Revolved Features & Shelling and Ribs** **Revolved Features** • Revolved Features • Building the Rim • Building the Spoke • Edit Material • Mass Properties • File Properties • SolidWorks Simulation Xpress • Using SolidWorks Simulation Xpress • The Simulation Xpress Interface **Shelling and Ribs** • Shelling and Ribs • Analyzing and Adding Draft • Other Options for Draft Shelling • Ribs • Full Round Fillets • Thin Features • Tutorial and Exercise
WEEK – 6 (3 hours)	**MODULE-6: Creating Dress-Up and Hole Features** **Editing: Repairs** • Part Editing • Editing Topics • Sketch Issues • Freezing Features • Fillet Xpert • Tutorial and Exercise
WEEK-7 (3 Hours)	**MODULE-7: Editing Features of a Model** • Design Changes • Part Editing • Design Changes • Information From a Model • Rebuilding Tools • Replace Sketch Entity • Sketch Contours

	• Tutorial and Exercise
WEEK-8 (3 Hours)	**MODULE-8: Working with the Drafting Workbench Using Drawings** • More about Making Drawings • Section View • Model Views • Broken View Detail Views • Drawing Sheets and Sheet Formats • Projected Views • Annotations • Tutorial and Exercise
WEEK-9 (3 Hours)	**MODULE-9: Assembly Modeling** • Bottom-Up Assembly Modeling • Creating a New Assembly • Position of the First Component • Feature Manager • Design Tree and Symbols • Adding Components • Mating Components • Using Part Congurations in assemblies • Sub-assemblies • Smart Mates • Inserting Sub-assemblies • Pack and Go • Tutorial and Exercise
WEEK-10 (3 Hours)	**MODULE-10: Working with Assembly & Assembly Drawings** • Using Assemblies • Analyzing the Assemblies • Checking for Clearances • Changing the values of Dimensions • Exploded Assemblies • Exploded Assemblies • Explode Line Sketch • Bill of Materials • Assembly Drawing • Tutorial and Exercise
WEEK – 11 (2 Hours)	**1. CERTIFCATION EXAMINATION** **2. CLOSING AND VALEDICTORY CEREMONY**

2.6.2 COURSE TITLE: Basics of Automobile Engineering **(COURSE CODE:** AOC-DEP-ME-BAE**)**

COURSE DESCRIPTION: Automobile engineering is a branch that deals with the designs, manufacture, as well as operation of mechanical mechanisms of automobiles. It is also an introduction to vehicle engineering, which includes cars, motorcycles, trucks & buses, etc. Automobile engineering has gained recognition & importance ever since motor vehicles capable of carrying passengers have been in vogue. Now due to the rapid development of auto component manufacturers and automobile industries, automobile engineers are in great demand. This includes understanding the vehicle chassis, the mechanism of the internal combustion engine. Automobile Engineer is mainly classified into three-stream, namely Product or Design Engineers, Development Engineers & Manufacturing Engineers.

2. COURSE OUTCOMES:

S. No.	Course Outcomes
CO1	Explain the working of different parts of an automobile.
CO2	Apply the knowledge of engine, transmission, clutch and brakes for smooth functioning of vehicles
CO3	Analyze the study of an angle for steering and the suspension systems.
CO4	Design and develop a strong base for understanding future developments in the automobile industry.
CO1	Explain the working of different parts of an automobile.

3. MAPPING COURSE OUTCOMES WITH PO AND PSO

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	-	-	-	-	-	-	-	2	-	2	3
CO2	3	-	-	-	-	-	-	-	-	-	-	2	-	2	3
CO3	-	2	-	-	-	-	-	-	-	-	-	2	-	2	3
CO4	-	3	-	-	-		-	-	-	-	-	2	-	2	3

4. COURSE PRE-REQUISITES:

The first and foremost requirement to become an Automobile Engineer is “passion and interest” in cars and other automotive products. Students should also have an aptitude for resolving mechanical problems. Creativity and innovative solutions in drawing, designing and repairs are few essential skill-sets for this course.

5. ENROLMENT CRITERIA: Interested Students of I Year and II Year (All Branches)

6. CERTIFICATION CRITERIA: Mandatory Fulfilment of Criteria 1 and 2

Criteria 1: 80% Attendance, and

Criteria 2: 70% or above marks in Certification Exam

7. WEEK-WISE COURSE OUTLINE:

WEEK	MODULE-WISE CONTENTS
WEEK – 1 (3 Hours)	**MODULE – 1: An Introduction of Automobile Engineering** ● What is Automobile? ● Types of Automobile ● Vehicle Construction And Components ● Components of Engine
WEEK – 2 (3 hours)	**MODULE – 2: IC Engine** ● Types of I.C Engines ● 2- Stroke Engines ● 4 Stroke Engines ● CVT Engines
WEEK – 3 (3 hours)	**MODULE – 3: New Technology in Automobile Engines** ● Automobile New Technologies in 2021. ● CRDI Engines ● MPFI Engines ● S.I Engines ● C.I Engines
WEEK – 4 (3 hours)	**MODULE – 3: Layout of Automobile** ● Frame & Body ● Clutches ● Brakes ● Gear Boxes ● Drives
WEEK – 5 (3 hours)	**MODULE – 4: Steering and Suspension Systems** ● Wheels and Tyres ● Steering system ● Suspension system ● Fuel System
WEEK – 6 (3 hours)	**MODULE –6: Automobile Engine Servicing-I** ● Checking Engine Compression ● Checking Engine Vacuum ● Removing Timing Chain ● Dismantling cylinder head
WEEK-7 (3 Hours)	**MODULE –7: Automobile Engine Servicing -II** ● Decarbonizing ● Testing valve, valve seat and valve guide ● Reassembling cylinder head

	• Adjusting valve clearance
WEEK - 8	**MODULE-8: Dismantling and Assembly of Two Wheelers** • Dismantling and Assembling Bajaj Pulsar DTSI Engine • Dismantling and Assembling TVS Apche RTR Engine • Dismantling and Assembling Honda Activa CVT Engine
WEEK - 9	**MODULE-9: Dismantling and Assembly of Four Wheelers** • Dismantling and Assembling Maruti Suzuki Petrol Engine • Dismantling and Assembling Maruti Suzuki Car Transmission
WEEK - 10	**1. CERTIFCATION EXAMINATION** **2. CLOSING AND VALEDICTORY CEREMONY**

2.6.3 COURSE TITLE: Advances of Automobile Engineering **(COURSE CODE: AOC-DEP-ME-AAE**

1. **COURSE DESCRIPTION:** Automobile engineering is a branch that deals with the designs, manufacture, as well as operation of mechanical mechanism of automobiles. Now a days HEV system introduce the latest trends in field of an automobile engineering. A hybrid electric vehicle (HEV) is a type of hybrid vehicle that combines a conventional internal combustion engine (ICE) system with an electric propulsion system (hybrid vehicle drivetrain). The presence of the electric powertrain is intended to achieve either better fuel economy than a conventional vehicle or better performance. There is a variety of HEV types and the degree to which each function as an electric vehicle (EV) also varies. The most common form of HEV is the hybrid electric car, although hybrid electric trucks (pickups and tractors), buses, boats and aircraft also exist.
2. **Course Outcomes:**

S.No.	Course Outcomes
CO1	Explain the basics of electric and hybrid electric vehicles, their architecture, technologies and fundamentals for the exhaust & features.
CO2	Apply the knowledge of ignition and lighting system for the working of an automobile systems.
CO3	Analyze the use of different power converters and electrical system in hybrid electric vehicles.
CO4	Create a strong base of HEV for understanding the future developments in the HEV.

3. **MAPPING COURSE OUTCOMES WITH PO AND PSO:**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	-	-	-	-	-	-	-	2	-	2	3
CO2	3	-	-	-	-	-	-	-	-	-	-	2	-	2	3

CO3	-	2	-	-	-	-	-	-	-	-	-	2	-	2	3
CO4	-	3	-	-	-		-	-	-	-	-	2	-	2	3

4. COURSE PRE-REQUISITES:

The first and foremost requirement to become an Automobile Engineer is "passion and interest" in cars and other automotive products. Students should also have an aptitude for resolving mechanical problems. Creativity and innovative solutions in drawing, designing and repairs are few essential skill-sets for this course.

5. ENROLMENT CRITERIA: Interested Students of I Year and II Year (All Branches)

6. CERTIFICATION CRITERIA: Mandatory Fulfilment of Criteria 1 and 2

Criteria 1: 80% Attendance, and

Criteria 2: 70% or above marks in Certification Exam

7. WEEK-WISE COURSE OUTLINE:

WEEK	MODULE-WISE CONTENTS
WEEK – 1 (3 Hours)	**MODULE – 1: Hybrid & Electric Vehicle** • Bs-6 • Electrical Vehicles • Hybrid Vehicles • Hydrogen cars • Fuel Cell Cars
WEEK – 2 (3 hours)	**MODULE – 2: Exhaust System** • Testing Exhaust Smoke • Cleaning Secondary Air Injection System • Silencer Cleaning in 2stroke Engine Vehicles
WEEK – 3 (3 hours)	**MODULE – 3: AC System & Safety Feature** • Turbochargers • A.C Systems • Air Bag Systems • Car Scanning's • NVS (Night Vision System) • GPS (Global Positioning System)
WEEK – 4 (3 hours)	**MODULE – 4: Electrical System** • Battery Type & Construction • Battery Charging, Testing and Starting
WEEK – 5 (3 hours)	**MODULE – 5: Ignition & Lighting System** • Magneto and Coil Ignition Systems • Automotive lighting • Wiring Systems • Electrical instrument

WEEK – 6 (3 hours)	**MODULE – 6: Demonstration of Technologies in Vehicles** ● Demonstration of Mercedes C Class Car Technologies ● Demonstration of BMW 5 Series Car Technologies ● Demonstration of Electric Car Technologies
WEEK-7 (3 Hours)	**MODULE –7: Dismantling and Assembly of Engines-I** ● Dismantling of Honda City I-V Tech 16 Valves New Engine ● Assembling of Honda City I-V Tech 16 Valves New Engine
WEEK - 8	**MODULE –8: Dismantling and Assembly of Engines-II** ● Dismantling of Mercedes Benz CDI Engine ● Assembling of Mercedes Benz CDI Engine
WEEK - 9	**MODULE-9: Dismantling and Assembly of Engines-III** ● Dismantling and Assembling Honda Accord V-6 Engine ● Dismantling and Assembling AUDI/BMW/Mercedes Automatic Transmission
WEEK - 10	**1. CERTIFCATION EXAMINATION** **2. CLOSING AND VALEDICTORY CEREMONY**

2.7 DEPARTMENT OF FIRST YEAR

S. No.	Course ID	Course Name	No. of Modules	Course Duration	Course Facilitator
1	AOC-DEP-FY-PBL	Project Based Learnings	8	32 Hours	Mr. Abhishek Singh
2	AOC-DEP-FY-LRTS	Program on Logical Reasoning and Technical Skill Development	20	60 Hours	Mr. Kuldeep Sharma
3	AOC-DEP-FY-SDPP	Skill Development Program in Project Oriented Training	10	30 Hours	Mr. Manoj Sharma
4	AOC-DEP-FY-ACP	Skill Development Program in Advanced C	10	30 Hours	Mr. Sanjay Kumar Gupta
5	AOC-DEP-FY-SDPML	Skill Development Program in Machine Learning-Deep learning	10	30 Hours	Dr. Meenakshi Nawal
6	AOC-DEP-FY-SDPWD	Skill Development Program in Web Development using	10	30 Hours	Dr. Sunil Kumar Gupta

		JAVASCRIPT and REACTJS			

2.7.1 COURSE TITLE: Project Based Learnings **(COURSE CODE:** AOC-DEP-FY-PBL**)**

1. **COURSE DESCRIPTION:** With respect to 'Project based Learning for the students of Poornima College of Engineering, B. Tech. (1st year), Poornima College of Engineering offers Program on Technical and skill development 'to upgrade the knowledge and technical skills of the students to prepare them for various industrial requirements.

2. Course Outcomes:

- **CO 1:** students will be able to have knowledge about various electronics components
- **CO 2:** Students will be able to analyze selection of sensors and motors
- **CO 3:** Students will be able to develop their software collaborating with hardware programming skills.
- **CO 4: Students** will be able to Design various types of Real world projects

3. MAPPING COURSE OUTCOMES WITH POs:

Mapping for Course Outcomes with Program Outcomes.
(3/2/1 indicates strength of correlation, 3-Strong, 2-Medium, 1-weak)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	**3**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO-2	**-**	**3**	**-**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**1**
CO-3	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**2**	**-**	**-**	**3**
CO-4	**3**	**3**	**-**	**2**	**3**	**1**	**1**	**-**	**2**	**-**	**-**	**3**
Avg.	**2**	**1.5**	**-**	**0.5**	**1.75**	0.25	0.25	**0.5**	1	-	-	**1.75**

4. Pre-requisites of the course:

Participant must be a student of B. Tech. 1st year at Poornima college of Engineering.

5. Enrollment Criteria

Participant must be a student of B. Tech. 1st year at Poornima College of Engineering.

6. Evaluation Criteria:

QUIZ

7. Certification Criteria:

(i) 75% attendance (ii) At least 50% marks in quiz.

8. Course Content with week-wise planning:

Week 1	Introduction
	History of Electrical and Electronic Component
	Various Electrical and Electronic Components
	How to use Electrical and Electronic Components
Week 2	Introduction of node mcu
	History of node mcu
	Types of node mcu
	Selection of node mcu
Week 3	ESP8266,ESP32 Specifics
	Setting up the Arduino IDE for using the ESP8266 , ESP32
	Network protocols
	Setting up a Wi-Fi connection
Week 4	Setting up a simple web server
	Wirelessly controlling your RGB lighting
	Development boards with a USB interface
	Basics of making a Hyper Text Transfer Protocol (HTTP) request
Week 5	Introduction of Sensor
	Various Basic Industrial Sensors-IR- Analog Sensor
	IR Digital Sensor Color IR _TSOP Sensor , Light Sensor , Sound Sensor , DTMF Module
	Basic working Technique of Sensor
Week 6	Introduction of Electrical Machine
	DC Motor
	Stepper Motor
	Servo Motor
Week 7	Various programming Languages
	Selection of programming Language
	Need of Flow Diagram
	How to write First "LEDBLINKING" Code in Embedded C
Week 8	Intelligent home locking system.
	Intelligent water level management system.
	Home automation using RFID.
	Real time clock-based home automation.
	Intelligent Automatic Irrigation System

2.7.2 COURSE TITLE: Program on Logical Reasoning and Technical Skill Development
(COURSE CODE: AOC-DEP-FY-LRTS)

1. **COURSE DESCRIPTION:** With respect to Technical Training Program for the students of Poornima College of Engineering, B. Tech. (1st year, Poornima College of Engineering offers' Program on logical reasoning and skill development 'to upgrade the aptitude, knowledge and soft skills of the students to develop their personality and prepare them for various competitive examinations.

2. COURSE OUTCOMES:

- **CO 1:** Students will be able to have knowledge about number system, quadratic equation, percentage, simple interest, compound interest, probability, permutation - combination and Vedic mathematics.
- **CO 2:** Students will be able to analyze the problems related to syllogism, patterns, puzzles and solve them.
- **CO 3:** Students will be able to develop their soft skills like communication skill (both speaking skill and writing skill). They will study about basic rules of English grammar to improve their communication.
- **CO 4 :** Students will be able to improve their reasoning and logical thinking and also apply short cut tricks to solve the problems fast.
- **CO5:** Students will be able to interpret the data and evaluate the outcomes based on it.

3. MAPPING COURSE OUTCOMES WITH POs:

Mapping for Course Outcomes with Program Outcomes.

(3/2/1 indicates strength of correlation, 3-Strong, 2-Medium, 1-weak)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO-2	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO-3	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**2**	**3**	**-**	**3**
CO-4	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**
CO-5		**3**										**2**
Avg.	**0.6**	**1.6**	**-**	**0.4**	**-**	-	-	**0.4**	0.4	0.6	-	**1.6**

4. Pre-requisites of the course:

Participant must be a student of B. Tech. 1st year at Poornima college of Engineering.

5. Enrollment Criteria:

Participant must be a student of B. Tech. 1st year at Poornima College of Engineering.

6. Evaluation Criteria:

Quiz

7. Certification Criteria:

(i) 75% attendance (ii) At least 50% marks in quiz.

8. Course Content with week-wise planning :

Week 1 (Module 1)	Awareness about different Competitive Exams SWOT Analysis: Self Awareness,
Week 2 (Module 2)	Basic Calculation & Simplification: Addition & Subtraction, Divisible & Multiplication, Square & Cube root
Week 3 (Module 3)	Ice Breaking Session: Self- Introduction, Team Building and Group Dynamics, Vocabulary Building
Week 4 (Module 4)	Number System: Numbers, HCF & LCM, Cyclicity, Algebraic Formulae
Week 5 (Module 5)	Public Speaking, Word & Sentence Formation, Basic Usage of Grammar, Environmental Awareness
Week 6 (Module 6)	Ratio & Proportion: Types & Problems
Week 7 (Module 7)	Time Management & Goal Setting, Stress Management, Assertiveness
Week 8 (Module 8)	Creative & Analytical skills, Language Skills, Basic Usage of Grammar
Week 9 (Module 9)	Percentage & Partnership: Explanation & Conditions
Week 10 (Module 10)	Social & Business Etiquettes- Dealing in Social &Business Environment
Week 11 (Module 11)	Profit & Loss: Basic Formulae & Problems
Week 12 (Module 12)	Time & Work: Conditions, Pipes & Cisterns, Concept of Efficiency, Problems
Week 13 (Module 13)	Letter Writing, Business Comm. E-mail Etiquettes, Telephonic Etiquettes
Week 14 (Module 14)	Inter & Intra Personal Skills, Group Communication
Week 15 (Module 15)	Leadership Skills, Pro-activeness, News Paper Reading
Week 16 (Module 16)	Time, Speed & Distance: Units of Measurements, Cases or Conditions, Boat and Streams, Problems
Week 17 (Module 17)	Listening with Understanding, Memory Enhancement, Resume & CV Writing
Week 18	Video/ Case Study Analysis, Article/Film/Book Review

(Module 18)	
Week 19 (Module 19)	Logistics: Analogy, Coding/ decoding, Venn Diagrams, Seating Arrangements, Syllogism
Week 20 (Module 20)	Interview Skills, Personal Grooming

2.7.3 COURSE TITLE: Skill Development Program in Project Oriented Training **(COURSE CODE:** AOC-DEP-FY-SDPP**)**

1. COURSE DESCRIPTION: The main objective of the program is to enhance the skill of students to apply the technical concept into real life to develop the society with the application of modern engineering tools. This program is a multi-dimensional learning experience and gives a student an edge over competitors. The programs give a varied experience and exposure to every student in various activities.

2. COURSE OUTCOMES:

S.No.	Course Outcomes
CO1	Understand the knowledge of basic machine tools related to the electrical as well as mechanical engineering.
CO2	Apply the knowledge of some engineering software like EAGLE and Auto CAD in the industrial field by making some capstan projects.
CO3	Analyze some basic problems in the field of electrical as well as mechanical engineering with the help of some advanced engineering tools and softwares for example Auto Cad, EAGLE, Basic Machine Tools and SMD Components.
CO4	Evaluate themselves by working on some basic and fundamental projects with the help of some advanced engineering tools and softwares like Auto Cad, EAGLE, Basic Machine Tools, and SMD Components.
CO5	Design & create some basic projects of ROBO Car with the help of some advanced engineering tools and softwares like Auto Cad, EAGLE, Basic Machine Tools, and SMD Components.

3. MAPPING COURSE OUTCOMES WITH PO AND PSO

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	2	-	-	-	-	-	-	-	-	-	-
CO3	-	3	-	-	-	-	-	-	-	-	-	-
CO4	-	-	2	-	-	-	-	-	-	-	-	-
CO5	-	-	3	-	-	-	-	-	-	-	-	-

4. COURSE PRE-REQUISITES:

Students should already be comfortable using the operating system Windows on which they will be running Software AutoCAD and EAGLE CAD.

5. ENROLMENT CRITERIA: Interested Students of I Year (All Branches)

6. CERTIFICATION CRITERIA: Mandatory Fulfillment of Criteria 1 and 2

Criteria 1: 80% Attendance, and

Criteria 2: 60% or above marks in Certification Exam

7. WEEK-WISE COURSE OUTLINE:

Days/Time		
Day 1	**Basic introduction of electrical and Mechanical component** • Resistance • Capacitance • multi meter • CRO • Breadboard	**Introduction of SMD component and Machine Tools** • Drilling operation • Soldering • Cutting tools • Filling
Day 2	**Software introduction (CAD)** Software Interfacing with Basic drawing commands	**Software introduction (CAD)** • Basic Drawing by using Draw tool bar • Editing Commands
Day 3	**Software introduction (CAD)** • Editing Commands	**Software introduction (CAD)** • Hands on Practice by creating basic drawings
Day 4	**Detailed procedure of Schematic design on Design software (CAD)** • Introduction to modify tool bar • Making changes in drawing • Making drawings more precise	**Detailed procedure of Schematic design on Design software (CAD)** Dimensioning Setting of drawing in layout
Day 5	**Detailed procedure of Schematic design on Design software (CAD)** • Circuit design on CAD • Printing your drawing	**Detailed procedure of Schematic design on Design software (CAD)** • Hands on Practice creating standard drawings
Day 6	**Detailed procedure of Schematic design on Design software (CAD)** • Designing of robo car on software	**Detailed procedure of Schematic design on Design software (CAD)** • Printing and detailing of robo car

Day 7	**Software introduction (EAGLE)** • Detailing about the EAGLE	**Software introduction (EAGLE)** • Circuit design on EAGLE • Making drawings more precise
Day 8	• Design circuit on bread board • Design layout of circuit on software • Board layout design	• Create the schematic. • Create a blank PCB layout. • Schematic capture: linking to PCB. • Designing PCB stack up.
Day 9	**Start PCB Design** • Defining design rules and DFM requirements. • Place components. • Insert drill holes. • Route Traces.	• **Tasting of circuit** • **Expert talk by:** **Dr. Bhavesh Vyas,** Department of Electrical and Electronics Engineering, K R Mangalam University, Gurugram
Day 10	**Hands on practices with mechanical and electrical components** • Cutting of board • Pasting of board	**Hands on practices with mechanical and electrical components** • Drilling • Assembly of components

2.7.4 COURSE TITLE: Skill Development Program in Advanced C **(COURSE CODE:** AOC-DEP-FY-ACP**)**

1. COURSE DESCRIPTION: A 15 days C Language has been organized by PCE, JAIPUR for the enhancement of the skill of students. This program has been organized for the students to develop their skill and for sustainability of the students in the current competitive market.

2. COURSE OUTCOMES:

S. No.	**Course Outcomes**
CO1	Understand the basic concepts of C programming
CO2	Design and develop various programming problems using C programming concepts.
CO3	Implement advance C programming concepts like function, pointer, structure, union and file handling.
CO4	Develop the project using concept of advance and data structure

3. MAPPING COURSE OUTCOMES WITH PO AND PSO

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	**3**	-	-	-	-	-	-	-	-	-	-	-

CO2	-	-	**3**	-	-	-	-	-	-	-	-	-
CO3	-	-	-	**3**	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-		-	-	-	-	**3**	**2**

4. COURSE PRE-REQUISITES:
Students should already be comfortable using the operating system like Linux or Windows. While not mandatory, basic skills with at least one other programming language like C or C++ desirable.

5. ENROLMENT CRITERIA: Interested Students of I Year (All Branches)

6. CERTIFICATION CRITERIA: Mandatory Fulfilment of Criteria 1 and 2

Criteria 1: 80% Attendance, and

Criteria 2: 60% or above marks in Certification Exam

7. WEEK-WISE COURSE OUTLINE:

Day No./ Module	Topic
1. Introduction to C Programming	Introduction to Linux and gcc
	C program execution steps
	C Tokens and Data Types
	Keywords, Variable, Identifiers and Constants
	Signed and Unsigned Concept
	Exceed the limit and MOD function
	Hands on practice on various types of programs.
2. C Operators	Input/Output Functions
	Introduction to C operators
	Expression Evaluation
	Concept of short circuit in Logical Operator
	Bitwise Operators
	Misc Operators
	Operator Precedence and Associativity
	More about Bitwise Operators
	Hands on practice on various types of programs.
3. Control Statements	Decision Making & Selection Statements
	If statement
	Switch case statement
	More about Switch case statement
	Decision Making and Looping
	Nested loop
	Jump Statements
	Hands on practice on various types of programs.
	Function Introduction

4. Function	Storage Classes
	Static members
	Function and pointers
	Recursion and Call stack
	Multifile Program and Project File
	Hands on practice on various types of programs.
5. Array and String	Introduction to Array and Strings
	Variable length array
	Array of string
	Concept of sprintf and sscanf function
	Insertion and Deletion in an Array
	Hands on practice on various types of programs.
6. Pointers	Pointers and Dynamic Array
	Malloc, calloc, realloc and free function
	Chain of pointers
	Dangling pointer
	Concept of Void pointer
	Hands on practice on various types of programs.
7. Stack	Introduction of Stack Data Structure
	Array Representation of Stack
	Push, Pop, Peek Operations
	Hands on practice on various types of programs.
8. Queue	Introduction to Queue Data Structure
	Terminology used in Queue
	Insertion and deletion in Queue
	Introduction to Circular Queue
	Introduction to Priority Queue
	Hands on practice on various types of programs.

9. Structure	Introduction to Structure
	Structure padding and packing
	Passing structure as an argument
	Pointer to structure
	Introduction to Union
	Self referential structure
	Hands on practice on various types of programs.
10. Linked List	Introduction to Linked List
	Linked List representation
	Traversing, insertion, deletion and searching in Linked List
	Hands on practice on various types of programs.

2.7.5 COURSE TITLE: Skill Development Program in Machine Learning-Deep learning **(COURSE CODE:** AOC-DEP-FY-SDPML**)**

1. COURSE DESCRIPTION:

To develop skills of using and developing machine learning deep learning models. By the end of the program, students will be able to develop machine learning deep learning models and can analyze the results. Students will be able to optimize the neural networks.

2. COURSE OUTCOMES:

S.No.	Course Outcomes
CO1	Understanding the fundamentals of Image Processing, Data Science, Python for Machine Learning and artificial intelligence (AI).
CO2	Apply basic principles of Machine Learning in solutions that require problem solving, inference, perception, knowledge representation, and learning.
CO3	Analyzing basic machine learning algorithms.
CO4	Design solutions of real-world computational problems using ML and DL algorithms

3. MAPPING COURSE OUTCOMES WITH PO AND PSO

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO 2	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
CO 3	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO 4	-	-	3	-	-	-	-	-	-	-	-	3	-	-	-

4. COURSE PRE-REQUISITES:

Students should already be comfortable using the operating system like Linux or Windows on which they will be running Python or Google Colab. While not mandatory, basic skills with at least one other programming language like C, C++, Java are desirable.

5. ENROLMENT CRITERIA: Interested Students of I Year (All Branches)

6. CERTIFICATION CRITERIA: Mandatory Fulfilment of Criteria 1 and 2

Criteria 1: 75% Attendance, and

Criteria 2: 50% or above marks in Certification Exam

7. WEEK-WISE COURSE OUTLINE:

Days/Time		

Day 1	**Introduction to Image Processing** • Introduction to Image Processing • Application of Image Processing • Fundamental Image Processing Steps	**Image Processing Techniques** • Image Acquisition • Image Preprocessing • Image Enhancement • Image Restoration • Morphological Processing • Image Segmentation • Object Recognition • Image Data Compression
Day 2	**Introduction to Python** • Variable Declaration • Data Types • Functions	• Loops • Conditional Programming
Day 3	**Package Description for ML and Data Science** • Numpy • Pandas • Matplotlib • Seaborn	**Python Practice** • Numpy • Scipy • Scikit-learn • Theano
Day 4	**"Data Analytics Techniques, Applications and Use Cases"** **(Guest Lecture by Dr. Jagannath Singh, Associate Professor, KIIT Deemed to be University, Bhubaneswar)**	**Data Extraction & Visualization** • Define Data Science • Role of a Data Scientist • Data Acquisition techniques • Different types of Data • Evaluate Input Data • Data Extraction • Hands-On: - Loading different types of dataset in Python
Day 5	**Introduction to Machine Learning** • Need of Machine Learning • Introduction to Machine Learning • Types of Machine Learning, such as supervised, unsupervised and reinforcement learning • Why Machine Learning with Python and applications of Machine Learning.	**Supervised Learning and Linear Regression** • Introduction to supervised learning • Types of supervised learning - regression and classification • Introduction to regression • Simple linear regression • Multiple linear regression, • Assumptions in linear regression, and math behind linear regression

Day 6	**Classification based Learning** • Introduction to classification • Linear regression vs logistic regression • Confusion matrix and accuracy • True positive rate v/s false positive rate	• Threshold evaluation with ROCR. • Hands-on Exercise – Logistic regression, Confusion matrix Implementation
Day 7	**SPL**	**Unsupervised Learning** • Types of unsupervised learning • Clustering and dimensionality reduction • Types of clustering • Introduction to k-means clustering
Day 8	**Introduction to Deep Learning** • Introduction to Deep Learning with neural networks • Biological neural network vs artificial neural network • Understanding perceptron learning algorithm • Introduction to Deep Learning frameworks • Tensor Flow constants • Variables and place-holders.	**"Evaluation Parameters for Classifiers"** **(Guest Lecture by Dr. Jitendra Kumar Rout, Assistant Professor II, NIT-Raipur, Chhatisgarh)**
Day 9	**SPL**	**Artificial Neural Networks** • Various methods that are used to train artificial neural networks • Perceptron learning rule • Gradient descent rule • Tuning the learning rate • Regularization techniques • Optimization techniques • Stochastic process • Vanishing gradients • Transfer learning • Dropout layer • Unsupervised pre-training
Day 10	**Multi-layered Neural Networks** • Multi-layer network introduction • Regularization • Deep neural networks • Multi-layer perceptron	• Overfitting and capacity • Neural network hyper parameters • Different activation functions used in neural networks: - ReLu, Softmax, Sigmoid, and hyperbolic functions,

2.7.6 COURSE TITLE: Skill Development Program in Web Development using JAVASCRIPT and REACTJS **(COURSECODE:** AOC-DEP-FY-SDPWD**)**

1. COURSE DESCRIPTION: Two weeks "Web Development Using JavaScript and React JS" has been organized by Poornima College of Engineering for the enhancement of the skill of students. This program has been organized for the students to develop their skill and for sustainability of the students in the current competitive market.

The skill development program has been initiated in "Web Development Using java Script and ReactJS".

2. COURSE OUTCOMES:

S.No.	Course Outcomes
CO1	Understand the basic concepts of HTML, CSS and JavaScript.
CO2	Apply the concept of HTML, CSS, Java Script for client-side scripts.
CO3	Analyze the significance of React JS client-side scripts.
CO4	Develop the Live Project using concept of JavaScript and React JS.

3. MAPPING COURSE OUTCOMES WITH PO AND PSO

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	2	-		-	-	-	-	-	3

4. COURSE PRE-REQUISITES:
Students should already be comfortable using the operating system like Linux or Windows. While not mandatory, basic skills with at least one other programming language like C, C++, Java are desirable.

5. ENROLMENT CRITERIA: Interested Students of I Year and II Year (All Branches)

6. CERTIFICATION CRITERIA: Mandatory Fulfilment of Criteria 1 and 2

Criteria 1: 75% Attendance, and

Criteria 2: 50% or above marks in Certification Exam

7. WEEK-WISE COURSE OUTLINE:

Days/Time		
Day 1	Introduction to HTML5 Basic HTML Document Structure	Anatomy of an HTML Tag HTML Content Models Creating Links

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area
Sitapura, JAIPUR

Day 2	Build tables for even more HTML structure Create Forms with in depth form examples and HTML tag explanations	Add iframes and more cool HTML elements
Day 3	Create your own mini HTML site using only HTML	Create your own mini HTML site using only HTML
Day 4	**"Data Analytics Techniques, Applications and Use Cases"** **(Guest Lecture by Dr. Jagannath Singh, Associate Professor, KIIT Deemed to be University, Bhubaneswar)**	Guest Lecture
Day 5	**Guest Lecture**	Guest Lecture
Day 6	Power of CSS Anatomy of a CSS Rule	Element, Class, and ID Selectors Style Placement
Day 7	The Box Model The background Property	Responsive Design
Day 8	Introduction to Bootstrap The Bootstrap Grid System	CSS positioning Working with Hyperlinks and making it look good CSS Pseudo Class
Day 9	Adjusting Development Environment for Javascript Development Java script Types	Common Language Constructs Creating Objects Functions
Day 10	Passing Variables by Value vs. by Reference Function Constructors, prototype, and the 'this' Keyword Array and Fake Namespaces	Immediately Invoked Function Expressions Conditions and Switches to apply logic Loops and iterating through data