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 2019-20)

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 2019-20

IBM Career Education
Infosys campus connect
QEEE
Spoken Tutorial

TABLE OF CONTENTS

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

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LIST OF ADD-ON COURSES OFFERED
TERMS AND CONDITIONS FOR ADD-ON COURSE ENROLMENT

1. One Department Course and one Campus Course has to be compulsorily selected by every student for 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.

10. For Additional courses from QEEE and Spoken Tutorials, students may have to explicitly contact department coordinators, for registering them formally on AICTE website.

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NAME OF COURSE	COURSE CODE
CAMPUS LEVEL COURSES	
IBM SOFTWARE LAB FOR EMERGING TECHNOLOGIES	
Application Development And Deployment For Cloud Using IBM Bluemix	*AOC-CP-IBM-BLU*
Learning Business Intelligence Using IBM Cognos	*AOC-CP-IBM-COG*
IoT Application Development And Deployment Using IBM Bluemix	*AOC-CP-IBM-IOT*
Spoken Tutorial- CPP	*AOC-CP-SPT-CPP*
Spoken Tutorial- PYTHON 3.4.3	*AOC-CP-SPT-PYTH*
DEPARTMENT LEVEL COURSES	
DEPARTMENT OF CIVIL ENGINEERING	
Revit Architecture	*AOC-DEP-CIV-REV*
Automatic Computer Aided Designing / Drafting	*AOC-DEP-CIV-CAD*
STADD PRO	*AOC-DEP-CIV-SPRO*
DEPARTMENT OF COMPUTER ENGINEERING	
Web Development	*AOC-DEP-CSE-WebD*
Dot Net Framework	*AOC-DEP-CSE-DotNet*
Programming in Java Script	*AOC-DEP-CSE-PJS*
Blockchain Technology	*AOC-DEP-CSE-BCT*
Cisco Certified Network Administrator	*AOC-DEP-CSE-CCNA*
Web Development with Django	*AOC-DEP-CSE-WDDJ*
Programming in Hadoop	*AOC-DEP-CSE-HDP*
Data Science with Python	*AOC-DEP-CSE-DSP*
DEPARTMENT OF ELECTRICAL ENGINEERING	
Applications of Arduino devices in Electrical Engineering	*AOC-DEP-EE-AAD*
Introduction to Internet of Things (IOT) in Electrical Engineering	*AOC-DEP-EE-IOT*
Introduction to MATLAB and its application in Electrical Engineering	*AOC-DEP-EE-MATL*
Overview of Photovoltaic Systems	*AOC-DEP-EE-PHVS*
Fundamentals of Autocad and its applications	*AOC-DEP-EE-CAD*
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING	
Foundation to Robotics	*AOC-DEP-EC-ROBO*
Hardware Integration with LabVIEW	*AOC-DEP-EC-LABV*
The Tool for Zotero Integration	*AOC-DEP-EC- LATZ*
Keil Embedded Development Tools SIMULATE, AND LAYOUT	*AOC-DEP-EC- KEIL*
Introduction to Programming with MATLAB	*AOC-DEP-EC- MATL*
PCB Designing	*AOC-DEP-EC- PCBD*
DEPARTMENT OF INFORMATION TECHNOLOGY	
Web Development using Angular JS	*AOC-DEP-IT-WEBD*
Automation Testing using Selenium	*AOC-DEP-IT-ATS*
DEPARTMENT OF MECHANICAL ENGINEERING	
CATIA	*AOC-DEP-ME-CAT*
DEPARTMENT OF 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*

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SECTION - 1

CAMPUS LEVEL COURSES

1.1 IBM Software Lab for Emerging Technologies (IBM Career Education Program)

A. INTRODUCTION

Poornima College of Engineering signed a MoU with IBM under its Career Education Program in May-2017 to develop required industry needed skills in students on emerging areas of the following IBM software technologies/ courses.

S. No.	Course Name	Course Code
1	Application Development and Deployment for Cloud usingIBM Bluemix	AOC-CP-IBM-BLU
2	Learning Business Intelligence using IBM Cognos BI	AOC-CP-IBM-COG
3	IoT Application Development and Deployment using IBMBlueMix	AOC-CP-IBM-IOT

IBM and PCE, acknowledge the need for IBM Software skills, in the IT education and training sector. The objective is to have a number of graduating professionals skilled on IBM Software. Under this MoU, both IBM Career Education and PCE are keen to cooperate in a way that shall benefit PCE students pursuing a career in the industry. As part of the MOU, the Faculty Enablement Programs were conducted by IBM subject matter experts in June-2017 and December-2017 to train the faculty members on above mentioned three IBM courses. The trainings on above three IBM courses will be imparted to the students by the trained faculty members in workshop mode or on weekly basis along with regular academics. The study material for the training will be provided by the IBM. Each IBM course requires at least 30 Hours training which is divided into basic and advanced modules.

B. THE PROCESS OF IBM CAREER EDUCATION TRAINING

Faculty Enablement Programs on IBM courses by IBM subject matter experts

↓

Students training by trained faculty members
Training Duration: 30 Hours (Regular & Workshop mode training)

↓

Regular Assessment & End of training Evaluation

↓

Award of IBM Course Completion Certificates to Eligible Students
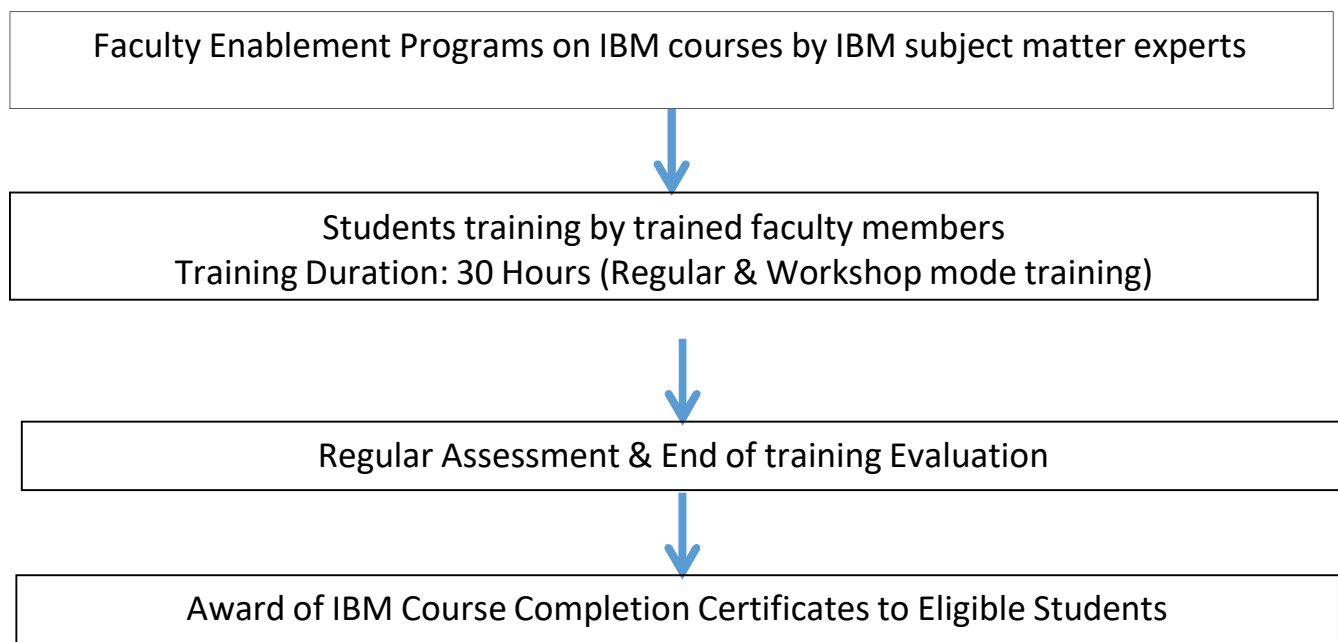
C. NUMBER OF HOURS PER COURSE: 30 HOURS
D. ENROLMENT CRITERIA

The duration of the course is 30 hours and will be offered to different branches of students in regularand workshop modes as per the table given below.

Branch/ Tech.	IBM Bluemix for Cloud	IBM Cognos for BI	IoT
CSE	2 hours per week classes in regular mode in II & III Years	2 hours per week classes in regular mode in II & III Years	Workshop mode
IT	2 hours per week classes in regular mode in II & III Years	2 hours per week classes in regular mode in II & III Years	Workshop mode
EC	2 hours per week classes in regular mode in II & III Years	Not Applicable	Workshop mode
EE	Not Applicable	Workshop mode	Workshop mode
ME	Not Applicable	Workshop mode	Workshop mode
Civil	Not Applicable	Workshop mode	Workshop mode

E. CERTIFICATION CRITERIA

a. There are two kinds of certificates for participating in IBM programs.
   i) IBM certificates
   ii) Poornima certificates (3 times in number of IBM certificates)
b. Certificates will be distributed on merit basis and evaluation will be done on the basis of thefollowing parameters.
   i) Attendance (minimum 75%)
   ii) End course evaluation (MCQ based test)

F. BRIEF INTRODUCTION ABOUT IBM CAREER EDUCATION COURSES

1.1.1 **Application Development and Deployment for Cloud using IBM Bluemix (Course** *(Code: AOC-CP-IBM-BLU)*

1. Course Overview

IBM Bluemix is IBM's cloud computing platform that offers mobile and web developers access toIBM software for integration, security, transactions, and other key functions, as well as software from business partners.

Built on Cloud Foundry open source technology, Bluemix makes application development easier with Platform as a Service (PaaS). Bluemix also provides prebuilt Mobile Backend as a Service (MBaaS) capabilities.

The goal is to simplify the delivery of an application by providing services that are ready for immediate use and hosting capabilities to enable internal scale development.

Following are the advantages of IBM Bluemix cloud platform -

• A range of services that enable you to build and extend web and mobile apps fast
• Processing power for you to deliver app changes continuously
• Fit-for-purpose programming models and services
• Manageability of services and applications
• Optimized and elastic workloads
• Continuous availability

2. Course Outcomes

At the end of the course, student will be able to:

CO	Course Outcomes
CO1	Develop the cloud services like SAAS and store the huge data on the cloud.
CO2	Create any web application and use the SQL DB as a backend.
CO3	Create different types of language translator like Google translator using Watson through Bluemix
CO4	Create a live chat application using Watson through Bluemix.
CO5	Run the application on the web and monitor via the Bluemix user interface, and cloud foundry command line interface
CO6	Manage the cloud resources i.e. increase and decrease the cloud resources in terms of memory, and CPU Utilization
CO7	Control the different home appliance through the mobile.
CO8	Create and run the mobile application via Bluemix.

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	-	-	-	-	-	-	-	-	-
CO5	-	-	-	2	-	-	-	-	-	-	-	-
CO6	-	-	-	3	-	-	-	-	-	-	-	-
CO7	-	-	-	2	-	-	-	-	-	-	-	-
CO8	-	-	3	-	-	-	-	-	-	-	-	-

4. Prerequisites of the course

The course is aimed for B. Tech. students of Computer Science/ IT/ EC branches. Basic knowledge of programming including web development is required. The course has a set of primers to help bridge the gaps of cloud computing and programming environments.

5. Course Modules and Sub Modules

Module - 1	
Week	**Sub Module**
1	Introduction to Cloud Computing (what and why, key characteristics) & IBM Bluemix Basic Components & Cloud Computing Architecture Cloud Computing Services (SAAS PAAS, IAAS) with Examples Types of Cloud (Public, Private, Hybrid) with Examples
2	Overview of HTML and use of HTML Tag Create a Resume using HTML Tag
3	Create a Registration form using HTML form tag
4	Overview of JAVA using Eclipse IDE with hands on Create a dynamic web page using Eclipse IDE
5	Overview of JSP, Servlet in Eclipse IDE with hands on
6	Overview of MySQL with hands on Create a Servlet program using database connectivity
7	Create a PHP program using database connectivity
8	Creation of ID on IBM Bluemix and IBM Bluemix Key terminology (Organization, space, region) Connecting smart devices to IBM Cloud Application (on runtime)
9	Creation of first application in Node.JS using cloud foundry using IBM Bluemix Creation of first application in Java Liberty using cloud foundry using IBM Bluemix
10	Creation of first application in PHP using cloud foundry using IBM Bluemix Creation of application using Command Line Interface (CLI) and deploy using IBM Bluemix Cloud
11	Create an application using Eclipse IDE and deploy on IBM Bluemix Cloud. Create an application IBM Bluemix and direct edit the application on Eclipse IDE
12	Integrating DB(PAAS) in College Admission Project Auto Scaling of college Application project
Module - 2	
Week	**Sub Module**

1	Introduction of Node Red with example, Introduction of IBM Watson and its services
2	Create a node red application to display the hello word
3	Create a node red application to send a message on Mobile, Email and Twitter

4	Introduction to IOT platform of Bluemix with demo and hands on
5	Introduction IBM Bluemix Data Analytics Service
6	Create an application to store the image on IBM Cloud using no SQLDB Cloudent
7	Create IBM Watson Services of Watson Chatbot
8	Create IBM Watson Services of Watson Language Translator
9	Create IBM Watson Services of Watson Image Recognition
10	Create IBM Watson Services of Watson Text to Speech
11	Create IBM Watson Services of Watson Speech to Text
12	Mobile Application Development using Bluemix (Introduction)

1.1.2 **Learning Business Intelligence using IBM Cognos BI** *(Code: AOC-CP-IBM-COG)*

1. Course Overview

IBM® Cognos® Business Intelligence is an integrated business intelligence suite that provides a wide range of functionality to help you understand your organization's data.
Everyone in an organization can use IBM Cognos BI to view or create business reports, analyze data, and monitor events and metrics so that they can make effective business decisions.
IBM Cognos BI integrates the following business intelligence activities in one Web-based solution.
Module 1: IBM Cognos Insight: Analyze and Share
Module 2: IBM Cognos Business Intelligence Advance

2. Course Outcomes

At the end of the course, student will be able to

CO	Course Outcomes
CO1	Explore information freely, analyze key facts, collaborate to gain alignment with key stakeholders and make decisions for better business outcomes
CO2	Access reports, analysis, dashboards, scorecards, planning and budgets, real time information, statistics andmanage information for more informed decisions.
CO3	Integrate the results of 'What-If' analysis modeling and predictive analytics into a unified workspace to viewpossible future outcomes alongside current and historical data
CO4	Work with business intelligence capabilities for the office and desktop, on mobile devices, online and offline.
CO5	Work with scalable and extensible solution that can adapt to the changing needs of IT and the business with flexible deployment options that include the cloud, mainframes and data warehousing appliances.

3. Course Outcomes

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

4. Prerequisites of the course

The course is aimed for B. Tech. students of Computer Science/ IT/ EC and other branches. Basic knowledge of programming and database fundamentals is assumed. To aid the students of different streams, the course has a set of primers to help bridge the gaps of programming as well as database related concepts.

5. Course Modules and Sub Modules

Module - 1	
Week	**Sub Module**
1	IBM Cognos Insight.Use of IBM Cognos Insight.
2	Navigate and Explore Data: IBM Cognos-Insight to explore profitability data contained in a .csv file. You will import a file and navigate and explore the imported data.
3	Perform a Guided import from a file: You want to analyze sales data in the profitability csv file. You will examine the file contents, and then perform a Guided import to map the data according to your needs.
4	Perform a Guided import a spreadsheet: You want to examine forecasted sales for various camping, Equipment product types through our top two distribution channels. You will import thedata from Microsoft excel spread sheet formatted in across tab.
5	Restructuring of Data: Analyze data from different perspective. Insert totals, Calculate
6	Create Visualizations: Identify chart type, Describe chart options Choose an effective chart Choose a chart type Area charts, Bar charts, Column charts, Line charts, Pie charts, Point charts.
7	Aggregation of rows and column: create parent child relation in between rows and column.
8	Create calculation in column: how to manipulate data in column , multiply, divide, average etc.
9	Construct a workspace: Improve the appearance of work spaces by applying themes.
10	Construct a workspace: Organize your work space with tabs and action buttons.
11	Import from a Relational ODBC sources: You can import relational data using the same guided import used to import data from file.
12	Create a Multi-Page Work spaces: Design the button, navigation, link one workspace with other work space.
Module - 2	
Week	**Sub Module**
1	IBM Cognos BI. Advanced Configuration and Installation.
2	Briefly explained and hand on practice on 'How to Install Configuration Manager'.
3	To create Content store, to choose database in content store.

4	To define server name and port number and to test the content store.DB2 configuration: To give the path to data source in db2 administration command line window. Explained the data source batch fileexecution step and configuration on command line.
5	Configuration of work space advanced, How to create the data source, How to define the database, Howto make connection, How to test connection, How to import source file, How to run the source file, How to open work space, How to view different reports, chart.
6	Complex chart: combine area and bar charts in a single presentation.
7	Create a gauge and pie chart report & to show data graphically and numerically on report chart.
8	Create a prompt by adding a parameter, cascading prompt & to Add calculations to report.
9	Display prompt selections in report titles & to create a multilingual report
10	Create a report with a conditionally rendered column.
11	Drill through from one report to another.
12	Create report using relational data.

1.1.3   IoT Application Development and Deployment using IBM BlueMix
            (Code: AOC-CP-IBM-IOT)

1. Course Overview

The Internet of Things (IoT) is the network of physical devices, vehicles, home appliances, and other items embedded with electronics, software, sensors, actuators, and connectivity which enables thesethings to connect and exchange data creating opportunities for more direct integration of the physical world into computer-based systems, resulting in efficiency improvements, economic benefits, and reduced human exertions.

Embedded with technology, these devices can communicate and interact over the Internet, and they can be remotely monitored and controlled.

2. Course Outcomes

At the end of the course, student will be able to

CO	Course Outcomes
CO1	Setup the Raspberry Pi, Node.js and familiar with working in the Linux environment
CO2	Use Node.js environment to make Raspberry Pi blink
CO3	Gain familiarity with the Bluemix IOT services, its UI/ navigation and deploy a Node-RED application on Bluemix
CO4	Understand devices and gateway registration process and explore the world of sensors in Node-RED environment with Raspberry Pi.
CO5	Develop and deploy Node-RED applications as prescribed in the coursework on Bluemix
CO6	Function effectively in a team during training/ project work, prepare and present reports.

3. Mapping of Course Outcomes with Program Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	3	-	-	-	-	-	-	-
CO2	-	-	2	-	3	-	-	-	-	-	-	-
CO3	-	-	-	3	-	-	-	-	-	-	-	-
CO4	-	-	3	-	-	-	-	-	-	-	-	-
CO5	-	-	-	2	-	-	-	-	-	-	-	-
CO6	-	-	3	-	-	-	-	-	-	-	-	-

4. Prerequisites of the course

The course is aimed for B. Tech. students of Computer Science/ IT/ EC and other branches. Basic knowledge of programming and electronics fundamentals is required. To aid the students of differentstreams, the course has a set of primers to help bridge the gaps of hardware concepts as well as programming environments.

5. Course Modules and Sub Modules

Module - 1	
Week	**Sub Module**
1	*** Introduction to the Internet of Things**

	The Internet of Things History of IoT Advantages of IoT Disadvantages of IoT Applications of IoT The Basics of Sensors & Actuators ***Introduction to Python Programming** Python Introduction History of Python Basic Programming of Python Variables, Loops, Input, Functions Programming File Handling Programming ***Introduction to Raspberry Pi 3** Features of Raspberry Pi 3 Installation Basics Raspberry Pi3 Board Layout & Architecture Pin Configuration of Raspberry Pi 3 GPIO Introduction **Experiment 1: Simple LED Program**
2	**Experiment 2: Simple LED Programs with switch. If we press the push button switchthe LED should glow otherwise it should remain off.** **Experiment 3: if switch is pressed the first time first LED should blink then for the second time second Led should blink and for the third time pressing the switch third should glow. This should be in periodic manner.** ***Introduction to Sensors & Actuators:** With a recap of contextually essential Electronics, Signals, and Control Systems concepts various popular sensors and actuators such as motion/temperature/light sensors and relays/stepper motors will be introduced **Experiment 3:** **Integrating Temperature Sensors & Reading Environmental Physical Values using Raspberry Pi3.** **Experiment 4:** **Integrating Temperature Sensors & Reading Environmental Physical Values using Raspberry Pi3 on cloud.** **Experiment 5: Sending Email using NodeMCU (ESP8266).SMTP Server interfacing Creating Program for sending email using gmail id.**

1.1.4 Spoken Tutorial

Spoken Tutorial- CPP

1.1.4 Spoken Tutorial- CPP

Introduction Spoken Tutorial: The Spoken Tutorial project is funded and developed by the NMEICT, IIT Bombay and launched by the Ministry of Education (MoE), Government of India. The aim of spoken tutorials is to popularize E-learning. It is coordinated through ICT based system. Spoken Tutorial is an audio-video educational content platform. Here one can learn various Free and Open Source Software all by oneself. From past 8 years we have been associated with the same. Approximately 700 students have been certified through this program each year. There are several certification courses which were conducted for students per semester, e.g. Python, Advance Java, Linux and many more.

Objective:

i) Students will learn about the basic structure and contructs of C and C++ language.

ii) Students will learn about the structure, pointers, functions in the C

and C++ language.

iii) Students will learn about the file handling in the C and C++.

Course Prerequisite: The course is aimed for B. Tech. students of Computer Science/ IT/ EC and other branches.

Enrolled Students: There are 21 enrolled students of Information technology of batch 2018 all got certificates.

Module:

i)   Introduction to C and C++.
ii)   Basic Level
iii)   Intermediate level
iv)   Advance level

1.1.5 Spoken Tutorial- PYTHON

Introduction Spoken Tutorial: The Spoken Tutorial project is funded and developed by the NMEICT, IIT Bombay and launched by the Ministry of Education (MoE), Government of India. The aim of spoken tutorials is to popularize E-learning. It is coordinated through ICT based system. Spoken Tutorial is an audio-video educational content platform. Here one can learn various Free and Open Source Software all by oneself. From past 8 years we have been associated with the same. Approximately 700 students have been certified through this program each year. There are several certification courses which were conducted for students per semester, e.g. Python, Advance Java, Linux and many more.

Objective:
i)   Students will learn about basic python contructs.
ii)   Students will learn about array and matrix manipulations through python.
iii)   Students will learn about graph plotting through python.
iv)   Students will learn about numpy.

Course Prerequisite: The course is aimed for B. Tech. students of Computer Science/ IT/ EC and other branches.

Enrolled Students: There are 28 enrolled students of Information and Technology of batch 2017, 26 got certificates.

Module:
i)   Python Language: Basics
ii)   Basic Plotting
iii)   Plotting Experimental Data
iv)   Handling Large Data Files
v)   Arrays and Matrices

Web Link for Spoken Tutorial: https://spoken-tutorial.org/
National Mission on Education through Information and Communication
Technology (NMEICT) www.sakshat.ac.in
Funded by MHRD, Government of India.

SECTION – 2

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-REV	Revit Architecture	3	30 Hours	Mr. Arpit Singh Bhadoriya
2	AOC-DEP-CIV-CAD	Automatic Computer Aided Designing / Drafting	9	30 Hours	Mr. Sourabh
3	AOC-DEP-CIV-SPRO	STADD PRO	7	45 Hours	Mr. Divya Vishnoi

2.1.1 COURSE TITLE: Revit Architecture (COURSE CODE: AOC-DEP-CIV-REV)

1. **COURSE DESCRIPTION:** Revit Architecture is software that helps in capturing and analyzing design concepts. Not only this, Revit Architecture accurately maintains the coordinated design data with the help of construction and documentation. This course aims to make the participants productive by giving them the ability to produce drawings and redefine images of buildings. Also, it will help you navigate user interface, architectural objects such as floor, walls, roofs, windows, and stairs. Covering the basics of Revit Architecture, This course will assist in the creation of schematic design through construction documentation.

2. **COURSE OUTCOMES:**

S. No.	Course Outcomes
CO1	Apply the concept of Revit Architecture and coordinate of all data inputs (including CAD) and produce federated project.
CO2	Develop programs using REVIT software, architectural and structural drawing using Revit Architecture Software.
CO3	Demonstrate the use of Revit Architecture for with BIM and CAD specialists working on Different elements of a project.
CO4	Design solutions of real-world civil engineering problems using Revit Architecture.

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, latest software & 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: 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. **COURSE OUTLINE:**

0	Course	Content	Hours	Course Coordinator
1	Revit Architecture	Introduction to Revit	3	Mr. ARPIT SINGH BHADORIYA
		Basic design tools	6	Mr. ARPIT SINGH BHADORIYA
		Operating co-ordinate systems	5	Mr. ARPIT SINGH BHADORIYA
		Basic 2-d design	6	Mr. ARPIT SINGH BHADORIYA
		Creating parts.	6	Mr. ARPIT SINGH BHADORIYA
		Dimensioning & drafting of the parts	5	Mr. ARPIT SINGH BHADORIYA
		ASSESSMENT		
2	Mock Test	MCQ paper	3	RESPECTIVE FACULTY
3	Group Discussion	Group discussion on general and current issues.	3	Ms. BHARTI JOSHI Mr. BALWAN
4	Personal Interview	Personal interview of each student on topics discussed in modules	3	Ms. BHARTI JOSHI Mr. BALWAN

2.1.2 COURSE TITLE: Automatic Computer Aided Designing / Drafting (COURSE CODE: AOC-DEP-CIV-CAD)

1. **COURSE DESCRIPTION:** Automatic CAD is a computer-aided drafting software program used to create blueprints for buildings, bridges, and computer chips, among other things. Generate design ideas in any form, turn 2D designs into digital 3D objects and create fully dimensioned drawings to document your designs. This course focuses from Basics concepts in the field of designing and increases the imagination power of the students 2-d designing is the 1st design after making the 2-d view of any element it is necessary to provide the accurate dimension to our parts and finally we make the 3-d view of our element. It is necessary to the

students to 1st the 2- d design. It covers introduction of designing, 2-d design, drafting and dimensioning, presenting design sheet and in the final work on some project.

2. COURSE OUTCOMES:

S. No.	Course Outcomes
CO1	To remember the basic commands of Automatic CAD 2D & 3D.
CO2	To understand the different plans of building like Orthographic projections, Isometric Projections
CO3	Apply the typical Automatic CAD commands in software.
CO4	To preparing the different building plans by using of software

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	3	2	1	-	-	-	-	-	-	-	-	-	3	-	-
CO2	2	-	3	-	-	-	-	-	-	-	-	-	-	2	-
CO3	-	-	3	2	-	-	-	-	-	-	-	-	-	-	3
CO4	-	-	-	-	-	3	-	-	-	-	-	-	-	2	-

4. COURSE PRE-REQUISITES:

Students learn about recent techniques, latest software & 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: 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. COURSE OUTLINE:

Sn.	Course	Content	Hours	Coordinator
1	AUTOMATIC CAD	• Introduction to Automatic cad	3	Mr. RAHUL SHARMA
2	AUTOMATIC CAD	• Basic design tools.	4	Mr. RAHUL SHARMA
3	AUTOMATIC CAD	• Operating co-ordinate systems.	3	Mr. RAHUL SHARMA
4	AUTOMATIC CAD	• Basic 2-d design.	3	Mr. RAHUL SHARMA
5	AUTOMATIC CAD	• Creating parts.	3	Mr. RAHUL SHARMA

6	AUTOMATIC CAD	• Dimensioning & drafting of the parts	6	Mr. RAHUL SHARMA
7	AUTOMATIC CAD	• Overview of isometric view	4	Mr. RAHUL SHARMA
7	AUTOMATIC CAD	• Design of parts in isometric view	6	Mr. RAHUL SHARMA
		ASSESSMENT		
8	Mock Test	MCQ paper	3	RESPECTIVE FACULTY
9	Group Discussion	Group discussion on general and current issues.	3	Mr. MUKUL NAMA Mr. ALOK YADAV
10	Personal Interview	Personal interview of each student on topics discussed in modules	3	Mr. MUKUL NAMA Mr. ALOK YADAV

2.1.3 COURSE TITLE: Structural Analysis and Designing Program (COURSE CODE: AOC-DEP-CIV-SPRO)

1. **COURSE DESCRIPTION:** STAAD is the abbreviation for Structural Analysis and Design. STAAD Pro is one of the popular software that is used for analyzing & designing structures like – buildings, towers, bridges, industrial, transportation and utility structures. Designs may include any building structures like tunnels, culverts, bridges, piles, petrochemical plants; and building materials like timber, concrete, steel, cold-formed steel, and aluminum. STAAD or STAAD Pro was developed by Research Engineers International at Yorba Linda, CA in 1997. To get rid of the boring & time-consuming manual procedures Structural Engineers started using automated software. STAAD Pro is one of the most widely-used software for developing and analyzing the designs of various structures, such as petrochemical plants, tunnels, bridges etc. STAAD Pro® v8i, the latest version, allows civil engineering individuals to analyze structural designs in terms of factors like force, load, displacements etc. STAAD Pro® v8i online training builds expertise in using the software at a professional level in domains, including construction companies, government agencies, architecture firms etc. Participants are equipped with various software functionalities like model generation and editing; loading analysis; concrete designing etc. The STAAD Pro® v8i software training also offers proficiency in using the seismology; report generation; and steel and foundation design features. After completing the STAAD Pro® v8i training, individuals can work as Structure Designers, Project Managers, Building Analysts, Quality Analysts, Bridge, Designers etc.

2. **COURSE OUTCOMES:**

S. No.	Course Outcomes
CO1	To remember the basic commands of STADD Pro.
CO2	To understand the different plans of building like Orthographic projections, Isometric Projections
CO3	Apply the typical STADD Pro commands in software.
CO4	To Analyze the different Structural Component by using of STADD Pro software

3. MAPPING COURSE OUTCOMES WITH PO AND PSO

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	3	2	1	-	-	-	3	2	-	-	-	-	3	-	-
CO2	2	-	3	-	-	-	2	-	-	-	-	-	-	2	-
CO3	-	-	3	2	-	-	-	-	-	-	-	-	-	-	3
CO4	-	-	3	-	-	2	-	-	-	-	-	-	-	2	-

4. COURSE PRE-REQUISITES:

Students learn about recent techniques, latest software & 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: Interested Students of IV 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. COURSE OUTLINE:

Sn.	Course	Content	Hours	Coordinator
1	STADD Pro	Introduction to STADD Pro	4	MR. DIVYA VISNOI
2	STADD Pro	Analysis using STADD	5	MR. DIVYA VISNOI
3	STADD Pro	Assigning property	6	MR. DIVYA VISNOI
4	STADD Pro	Applying loading	5	MR. DIVYA VISNOI
5	STADD Pro	Analyzing and designing structure	4	MR. DIVYA VISNOI
6	STADD Pro	Quantity takeoff	7	MR. DIVYA VISNOI
7	STADD Pro	Result Analysis	7	MR. DIVYA VISNOI
		ASSESSMENT		
8	**Mock Test**	MCQ paper	2	RESPECTIVE FACULTY
9	**Group Discussion**	Group discussion on general and current issues.	2	MR. MUKUL NAMA MR. BALWAN
10	**Personal Interview**	Personal interview of each student on topics discussed in modules	3	MR. MUKUL NAMA MR. BALWAN

2.2 DEPARTMENT OF COMPUTER ENGINEERING

S. No.	Course ID	Course Name	No. of Modules	Course Duration	Course Facilitator
1	AOC-DEP-CSE-WebD	Web Development	12	36 Hours	Dr. Sonal Sharma
2	AOC-DEP-CSE-DotNet	Dot Net Framework	12	36 Hours	Mr. Vishal Chaudhary
3	AOC-DEP-CSE-PJS	Programming in Java Script	12	36 Hours	Mr. Vivek Sharma
4	AOC-DEP-CSE-BCT	Blockchain Technology	12	36 Hours	Ms. Shalini Puri
5	AOC-DEP-CSE-CCNA	Cisco Certified Network Administrator	12	36 Hours	Dr. Sunil Gupta
6	AOC-DEP-CSE-WDDJ	Web Development with Django	14	36 Hours	Ms. Prachi Sharma
7	AOC-DEP-CSE-HDP	Programming in Hadoop	12	36 Hours	Mr. Md Nawaid Anjum
8	AOC-DEP-CSE-DSP	Data Science with Python	12	36 Hours	Mr. Sumit Kumar

2.2.1 COURSE TITLE: Web Development (COURSE CODE: AOC-DEP-CSE-WebD)

1. COURSE DESCRIPTION: Typically it refers to the coding and programming side of web site production as opposed to the web design side. It encompasses everything from a simple page of HTML text to complex, feature-rich applications designed to be accessed from various Internet-connected devices.

2. COURSE OUTCOMES:

S.No.	Course Outcomes
CO1	Apply the concepts of World Wide Web, and the requirements of effective web design.
CO2	Develop web pages using the HTML and CSS features with different layouts as per need of applications.
CO3	Use the JavaScript to develop the dynamic web pages.
CO4	Construct simple web pages in PHP and to represent data in XML format.
CO5	Use server side scripting with PHP to generate the web pages dynamically using the database connectivity.

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	-	3	-	-	-	-	-	-	-	-	-	-	3	-	-
CO2	-	-	2	-	-	-	-	-	-	-	-	-	-	2	-
CO3	-	-	-	2	-	-	-	-	-	-	-	-	2	-	-
CO4	-	-	-	-	2		-	-	-	-	-	-	-	3	-
CO5	-	-	-	-	-	2	-	-	-	-	-	-	-	2	-

4. COURSE PRE-REQUISITES:

Students should already be comfortable using a basic understanding of the HTML, understanding of software development. Other than this basic knowledge of web browser and Internet connectivity.

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: Introduction** • Introduction to mobile devices and mobile platforms • Development environments
WEEK – 2 **(3 hours)**	**MODULE – 2: Architecture** • Mobile OS architectures of android • iOS and Windows • Setting up the mobile app development environment along with an emulator.
WEEK – 3 **(3 hours)**	**MODULE – 3: Mobile App development using android-I** • Mobile App development using android: interface design – Layout • UI elements, Draw-able, Menu, Activity- states and life cycle Interaction among activity,
WEEK – 4 **(3 hours)**	**MODULE – 4: Mobile App development using android-II** • Mobile App development using android: interface design – Layout • UI elements, Draw-able, Menu, Activity- states and life cycle • Interaction among activity, Services- states and life cycle • Notifications, Broadcast receivers, Telephony, SMS APIs • Native data handling- on device file I/O Shared preferences.

WEEK – 5 (3 hours)	**MODULE – 5: Database Connectivity-I** • Introduction to Working with mobile database (SQLite) • Interacting with database via internet/intranet • Graphics and animations- custom views, Canvas • Animation APIs, location awareness • Multimedia- audio/video playback and record Native hardware access.
WEEK – 6 (3 hours)	**MODULE – 6: Database Connectivity-II** • Animation APIs, location awareness • Multimedia- audio/video playback and record Native hardware access
WEEK-7 (3 Hours)	**MODULE – 7: Testing Phase-I** • Testing Mobile Application • Debugging mobile application • White box testing, Black box testing • Test automation of mobile apps using JUnit for android • Robotium MonkeyTalk.
WEEK – 8 (3 Hours)	**MODULE – 8: Testing Phase-II** • White box testing, Black box testing • Test automation of mobile apps using JUnit for android
WEEK – 9 (3 hours)	**MODULE – 9: Testing Phase-III** • Robotium • MonkeyTalk.
WEEK – 10 (3 hours)	**MODULE – 10: Market Distribution** • Versioning mobile apps • Signing mobile apps
WEEK – 11 (3 hours)	**MODULE – 11: Packaging** • Packaging mobile apps • Distributing apps on market place Designing an App using various services provided by android.

WEEK – 12 (3 hours)	**MODULE – 12: Designing App**
	• Designing an App using various services provided by android.
	   1. **CERTIFCATION EXAMINATION**
	   2. **CLOSING AND VALEDICTORY CEREMONY**

2.2.2 COURSE TITLE: Dot Net Framework **(COURSE CODE:** AOC-DEP-CSE-DotNet**)**

1. COURSE DESCRIPTION: .NET Framework is a managed execution environment for Windows that allows software developers to create a software application in one programming language and be assured that the app will be able to work with code written in other languages. NET Framework is a software development framework for building and running applications on

Windows. . NET Framework is part of the .NET platform, a collection of technologies for building apps for Linux, macOS, Windows, iOS, Android, and more.

2. COURSE OUTCOMES:

S.No.	Course Outcomes
CO1	Apply the Microsoft .NET Framework and ASP.NET page structure
CO2	Design web application with variety of controls
CO3	Access the data using inbuilt data access tools
CO4	Use Microsoft, ADO .NET to access data in web application
CO5	Configure and deploy web application

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	-	3	-	-	-	-	-	-	-	-	-	-	3	-	-
CO2	-	-	3	-	-	-	-	-	-	-	-	-	-	2	-
CO3	-	-	-	3	-	-	-	-	-	-	-	-	3	-	2
CO4	-	-	-	-	3		-	-	-	-	-	-	-	3	-
CO5	-	-	-	-	-	3	-	-	-	-	-	-	3	2	-

4. COURSE PRE-REQUISITES:

Students should already be comfortable using the C and C++ Programming Languages. So knowledge of C and C++ are necessary.

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: COMMON LANGUAGE RUNTIME** • CLR Architecture and Services • The .Net Intermediate Language (IL) • Just- In- Time Compilation and CLS • Disassembling .Net Application to IL • Strict Type Checking **MODULE – 2: .NET FRAMEWORK CLASS LIBRARY** • System Namespace • System .Object Namespace • System .Collection Namespace • System .Type • Exception
WEEK – 2 (3 hours)	**MODULE – 3: LANGUAGE FUNDAMENTAL** • Data type and Control Constructs • Value and Reference Types • Declaring and Initializing Variables • Unicode Characters and Strings • C.T.S Type • Implicitly Typed Local Variables • Conditional Syntax • C# Operator • Looping Syntax • Structure
WEEK – 3 (3 hours)	**MODULE – 4: ARRAY & STRING** • Arrays in General • Declaring of different type Arrays • Initializing Arrays • Accessing element of different type Array Members • Arrays of Objects • Structure type array • Using for each with Arrays Understanding System. String class and its various operations
WEEK – 4 (3 hours)	**MODULE – 5: OOPS CONCEPTS CLASSES** • Encapsulating Attribute • Class & Object Creation • Define Constructor • Type of Constructor • Define Methods and their Type • Overloading Methods and Constructor overloading • Define Property and their Types • The Memory Allocation with New Keyword • Passing Initial Values with Constructor • Invoking Property and Methods
WEEK – 5	**MODULE – 6: INHERITANCE**

(3 hours)	• Implementing Inheritance Hierarchies • Class Access Modifiers • Method Overloading, Overriding and Hiding Concepts • Run time polymorphism • Abstract and Sealed Class • Exposing Interface • Implementation Interface in a Class • Play with Namespaces • Interface Polymorphism • Operator Overloading Partial Class
WEEK – 6 **(3 hours)**	**MODULE-7: EXCEPTION HANDLING** • Means of Error, Bug and Exceptions • Role of .Net Exception Handling • System Level Exception • Application Level Exception • Try and Catch Block • Handling Multiple Exception • Finally Block • Throw Exception on Request Custom Exception
WEEK – 7 **(3 hours)**	**MODULE-8: EVENTS AND DELEGATES** • Event Driven Programming • Delegate, Event and its association • Synchronous and asynchronous operation with delegate • User Defined events and delegates • Multicasting with Delegates • Anonymous methods www.stepconsultancy.in www.fb.com/stepconsultancy www.stepgndec.in • Anonymous Methods with events Generic Delegates
WEEK – 8 **(3 hours)**	**MODULE-9: MULTITHREADING** • Understand multithreading process • The System Threading namespace • The Thread and Thread Start class • Thread life cycle • Thread Safety Concept • Thread synchronization • Understanding Thread Pool • Understanding Role of Thread Background Worker Component
WEEK – 9 **(3 hours)**	**MODULE-10: I/O OPERATIONS WITH FILE SYSTEMS** • File and Directory Class • Marshal Classes, File Info and Directory Info • Path Class • Drive Info Class • Stream Object with Files: Stream Reader, Stream Writer • File Stream and Memory Stream

WEEK – 10 (3 hours)	**MODULE-11: INTRODUCTION TO ADO.NET** • How ADO.NET works and how it differs from ADO? • Evolution of ADO to ADO.NET **MODULE-12: ADO.NET AND IT'S ARCHITECTURE** • Connection Object • Command Object • Dataset • Data Reader Object • Data Adapter Object • Concurrency and the Disconnected Data Architecture Provider
WEEK-11 (3 Hours)	**MODULE-13: DATA SET** • Creating Tables in Dataset • Data Column • Data Row • Data Table www.stepconsultancy.in www.fb.com/stepconsultancy www.stepgndec.in • Updating, Inserting and Modification in Data Table • Saving Changes into Data Base using Command Builder • Working With Command and Connection **MODULE-14: CONNECTIONS AND COMMAND OBJECT** • Connection Object • Command Object • Execute Non Query • Execute Scala
WEEK - 12	1. **CERTIFCATION EXAMINATION** 2. **CLOSING AND VALEDICTORY CEREMONY**

2.2.3 COURSE TITLE: Programming in Java Script **(COURSE CODE:** AOC-DEP-CSE-PJS)

1. COURSE DESCRIPTION: The **Programming in Java Script** course focuses on the fundamental concepts of the JavaScript language. This course will empower you with the skills to design client-side, platform-independent solutions that greatly increase the value of your Web site by providing interactivity and interest. You will learn how to use JavaScript to communicate with users, modify the Document Object Model (DOM), control program flow, validate forms, and change HTML on the fly at run time.

2. COURSE OUTCOMES:

S. No.	Course Outcomes
CO1	Students will be able to learn JavaScript fundamentals: variables, if/else, operators, Boolean logic, functions, arrays, objects, loops, strings and able to apply on any use-cases.
CO2	Students will be able to learn about the DOM (document object model) and Window Object, able to manipulate the DOM at run time.
CO3	Students will be able to learn about How JavaScript works behind the scenes i.e. engines, the call stack, hoisting, scoping, the 'this' keyword, reference values.
CO4	Students will be able apply functions in Java script and able to implement the function in real world case studies.
CO5	Students will be able to learn the object oriented features of Java script like classes, inheritance and polymorphism.

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:

Students should already be comfortable using the operating system like Linux or Windows on which they will be running JAVA. 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 (All Branches)

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

Criteria 1: 60% 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: Brief Introduction to Java Script** • What is Java Scripts? • Advantages and disadvantages • Downloading and installing

	• Which version of JAVA • Where to find documentation **MODULE – 2: Variables and Constants** • Let and Var Keyword • if else statements • Truthy and Falsy Values • Switch Statement
WEEK – 2 **(3 Hours)**	**MODULE – 3: Function and Array** • Difference between Function and Array • Example of Function and Array • Objects • How to define object • Loops • Application of Loops • Uses of Loop in Programming • Strings • Application of String • operators and expressions • Uses of String in Program
WEEK – 3 **(3 hours)**	**MODULE – 4: Window Object** • Controlling of Object • DOM and DOM Manipulation • Handling Click Events • Manipulating the CSS styles
WEEK – 4 **(3 hours)**	**MODULE – 5: High-Level Overview of JavaScript** • JavaScript Engine • JavaScript Runtime • Execution Contexts • Scope and Scope Chains **MODULE – 6: Dead Zone** • Hoisting Dead Zone (HDZ) • Temporal Dead Zone(TDZ)
WEEK – 5 **(3 hours)**	**MODULE-7: Functions in Java Script** • Default Parameters • How Passing Arguments Works • First-Class Function • Higher-Order Functions **MODULE-8: Functions** • Function Definition • Returning Functions • Call Method • Apply Method • Immediately Invoked Function Expressions (IIFE)

WEEK – 6 **(3 hours)**	**MODULE-9: OOPs in JS** • Constructor • New Operator • ES6 Classes • Setters • Getters
WEEK-7 **(3 Hours)**	**MODULE-10: Inheritance** • Protected Properties • Protected Methods • Private Class Fields • Chaining Methods
WEEK – 8 **(3 Hours)**	**MODULE-11: Java Script Application** • Understand JavaScript statements • Learn how to comment code. • Store data in variables • Apply arithmetic, comparison and logic operators in program.
WEEK – 9 **(3 Hours)**	**MODULE-11: Asynchronous JavaScript** • Event loop • Promises • Async/Await • AJAX calls • APIs
WEEK – 10 **(3 Hours)**	**MODULE-12: JS Frameworks** • JS libraries • React or JS frameworks • Angular or Backbone • Advanced JavaScript concepts
WEEK – 11 **(3 Hours)**	**MODULE-13: Basic Idea of Modern Tools** • NPM • Parcel • Babel • ES6 modules
WEEK – 12 **(3 Hours)**	1. **CERTIFCATION EXAMINATION** 2. **CLOSING AND VALEDICTORY CEREMONY**

2.2.4 COURSE TITLE: Blockchain Technology **(COURSE CODE:** AOC-DEP-CSE-BCT**)**

1. COURSE DESCRIPTION: The **Blockchain** is a permanent, sequential list of transaction records distributed over a network. Each block in the chain contains a hash of the previous block, along with a timestamp and transaction data. This makes the blockchain inherently resistant to attack or manipulation. Blockchain technology is ideal for recording various types of transactions where data is sensitive or targeted by hackers for unauthorized duplication or other fraudulent

activity. Bitcoin and other cryptocurrencies use blockchain technology to record transactions. Blockchain for business applications can include recording of contracts, medical records, monetary transactions and much more.

2. COURSE OUTCOMES:

S.No.	Course Outcomes
CO1	application of specific block chain architecture for a given problem
CO2	Analyze the role of block chain applications in different domains including cyber security
CO3	Evaluate the usage of Block chain implementation/features for the given problem
CO4	Exemplify the usage of bitcoins and its impact on the economy
CO5	Demonstrate the basics of Block chain concepts using modern tools/technologies

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	-	-	-	2	-		-	-	-	-	-	-	-	3	-
CO 4	-	-	-	-	3	-	-	-	-	-	-	-	-	3	-

4. COURSE PRE-REQUISITES:

An individual should have a good knowledge of Information technologies, Information security, and computer science. The basic understanding of an aspiring blockchain developer should be clear in distributed systems, networking, cryptography and data structures.

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: 60% or above marks in Certification Exam

7. WEEK-WISE COURSE OUTLINE:

WEEK	MODULE-WISE CONTENTS
WEEK – 1 (3 Hours)	**MODULE – 1: Introduction to Blockchain** • What Is Blockchain?

	• How Blockchain Works • Blockchain Vs Bitcoin • Practical Applications • Public And Private Key Basics
WEEK – 2 **(3 hours)**	**MODULE-2: Properties of Blockchain** • Hash Function • Hash pointer and Data Structure • Blockchain Platform Implementation • Hash Function and Block Rewards • Generate Public Keys • Create a Ledger of Transactions • Validation Codes Work
WEEK – 3 **(3 hours)**	**MODULE-3: Blockchain Architecture** • Versions, variants • Life Use Case of Blockchain • Blockchain vs Shared Database
WEEK-4 **(3 Hours)**	**MODULE-4: Bitcoin Blockchain** • Introduction to bitcoin • Decentralization In Blockchain • Consensus Mechanism • Blockchain Growth Dynamics • Working Principles of Bitcoin • Running Nodes and Block Rewards • Incentive Mechanism • Proof of Work Properties
WEEK-5 **(3 Hours)**	**MODULE-5: Blockchain Mechanics-I** • Bitcoin Blockchain Mechanics • Bitcoin Transactions • Bitcoin Scripting Language • Application of Bitcoin Scripts
WEEK–6 **(3 hours)**	**MODULE-6: Blockchain Mechanics-II** • Bitcoin Blocks and Network • Blocks and Nodes • Forking • Hard Fork **MODULE-7: Introduction to Ethereum Blockchain** • What is Ethereum? • Ethereum Insight • Advantages and Disadvantages • Ethereum vs Bitcoin • Introduction to Smart contracts

WEEK–7 (3 hours)	**MODULE-8: Ethereum Blockchain-I** • Ethereum Networks • Ethereum Design Principles • Accounts And UTXOs • Storing Blocks on The Blockchain
WEEK–8 (3 hours)	**MODULE-9: Ethereum Blockchain-II** • Creating Contracts • Ethereum Overview • Collection Of On-Chain Smart Contracts • Contract Creation Analysis • Security Of Ethereum
WEEK-9 (3 Hours)	**MODULE–10: Permission and Permissionless Blockchain-I** • Blockchain for Business • Hyper Ledger Project • Hyper Ledger Consesus • Hyper Ledger Fabric Model • Order-Execute Paradigm
WEEK-10 (3 Hours)	**MODULE–11: Permission and Permissionless Blockchain-II** • Trust Modules and Fabric Blockchain • Hyper Ledger Fabric and Order-Execute Paradigm • Limitations of Order-Execute Paradigm • State Machine Replication • SMR Requirements and Implementation
WEEK-11 (3 Hours)	**MODULE-12: Blockchain Applications** • Byzantine Tolerance and Fabric Overview • Endorsement Policy and Fabric Transactions Tangle in Place of Blockchain • Tangle Simulations I • Tangle Simulations II • Corda Blockchain
WEEK-12 (3 Hours)	1. **CERTIFCATION EXAMINATION** 2. **CLOSING AND VALEDICTORY CEREMONY**

2.2.5 COURSE TITLE: Cisco Certified Network Administrator **(COURSE CODE:** AOC-DEP-CSE-CCNA**)**

1. COURSE TITLE: Cisco Certified Network Administrator (CCNA)

2. COURSE DESCRIPTION: CCNA introduces the architecture, structure, functions, components, and models of the Internet and other computer networks. The principles and structure of IP addressing and the fundamentals of Ethernet concepts, media, and operations are introduced to provide a foundation for the curriculum. By the end of the course, students will be able to build

simple LANs, perform basic configurations for routers and switches, and implement IP addressing schemes, Licensing/Certification Agency: Cisco Corporation.

3. COURSE OUTCOMES:

S. No.	Course Outcomes
CO1	Identification of network fundamentals
CO2	Identification and configuration of LAN switching technologies
CO3	Description, implementation and verification of IP routing technologies
CO4	Identification and configuration of WAN technologies
CO5	Identification and configuration of infrastructure services.

4. 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	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	-	-	-	-	3	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-	-	2	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-	3	-	2
CO4	-	-	-	3	-	-	-	-	-	-	-	-	-	3	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-	3	2	-

5. COURSE PRE-REQUISITES:

Students should already be to possess a minimum of one year of experience working with Cisco solutions. In addition, a basic understanding of IP addressing and network fundamentals is recommended to ensure success in CCNA training.

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

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

Criteria 1: 60% Attendance, and

Criteria 2: 40% or above marks in Certification Exam

8. WEEK-WISE COURSE OUTLINE:

WEEK	MODULE-WISE CONTENTS
WEEK – 1 (3 Hours)	**MODULE – 1: Introduction to Networking** • The Internet • Requirements for Internet connection • PC basics • Network interface card

	• NIC and modem installation • High-speed and dialup connectivity • TCP/IP description and configuration • Testing connectivity with Ping • Web browser and plug-Ins • Troubleshooting Internet connection problems **MODULE – 2: Networking Fundamentals** • Data networks • Network history • Networking devices • Network topology • Network protocols • LANs • WANs • Metropolitan-area networks • Storage-area networks • Virtual private networks • Benefits of VPNs • Intranets and extranets
WEEK – 2 (3 hours)	**MODULE – 3: Networking Media** • Wireless LAN organizations and standards • Wireless devices and topologies • How wireless LANs communicate • Authentication and association • The radio wave/microwave spectrum • Signals and noise on a WLAN • Wireless security
WEEK – 3 (3 hours)	**MODULE – 4: Cable Testing** • Waves • Sine waves • Square waves • Exponents and logarithms • Decibels • Viewing signals in time and frequency • Analog and digital signals in time and frequency • Noise in time and frequency • Bandwidth
WEEK – 4 (3 hours)	**MODULE – 5: Cabling LANs and WANs** • LAN physical layer • Ethernet in the campus • Ethernet media and connector requirements • UTP implementation • Repeaters • Hubs

	• Wireless
	• Bridges
	• Switches
	• Host connectivity (NIC)
	• Peer-to-peer
	• Client-server
	• Building hubbed and switched workgroups
WEEK – 5 (3 hours)	**MODULE – 6: Ethernet Fundamentals** • Introduction to Ethernet • IEEE Ethernet naming rules • Ethernet and the OSI model • Naming • Framing in general • Ethernet frame structure • Ethernet frame fields
WEEK – 6 (3 hours)	**MODULE-7: Ethernet Operation** • Media Access Control • MAC rules and collision detection/backoff • Ethernet timing • Interframe Spacing and Backoff • Error Handling • Types of collisions • Ethernet errors • Ethernet errors: FCS and beyond • Ethernet auto-negotiation • Link Establishment and full/half duplex
WEEK-7 (3 Hours)	**MODULE-8: Ethernet Technologies** • 10 Mbps Ethernet • 10BASE5 • 10BASE2 • 10BASE-T • 10BASE-T wiring and architecture • 100 Mbps Ethernet • 100BASE-TX • 100BASE-FX • Fast Ethernet architecture • Network and protocol analysis software
WEEK-8 (3 Hours)	**MODULE-9: Ethernet Switching** • Ethernet Switching • L2 bridging • L2 switching • Switch operation • Latency • Switch modes • Spanning Tree Protocol

WEEK-9 (3 Hours)	**MODULE-10**: TCP/IP Protocol Suite and IP Addressing • Introduction to TCP/IP • History and future of TCP/IP • Application layer • Transport layer • Internet layer • Network access layer • Comparing the OSI seven layer and the TCP/IP four layer models • Internet architecture • Internet Addresses • IP addressing • Decimal and binary conversion review • IP v4 addressing • Address class higher-order bits; Class A, B, C, D, and E • Reserved IP addresses • Public/private IP addresses • Introduction to subnetting • IP v4 vs. IP v6
WEEK-10 (3 Hours)	**MODULE-11: Routing Fundamentals and Subnets** • Routed Protocol • Routable/routed protocols • IP as a routed protocol • Packet propagation and switching with a router • Internet Protocol (IP) • Anatomy of an IP packet • IP Routing Protocols • Routing overview • Routing versus switching • Routed versus routing • Path determination • Routing tables • Routing algorithms and metrics • IGP and EGP • Link-state and distance vector • Routing protocols • Mechanics of Subnetting • Classes of network IP addresses • Introduction to and reason for subnetting • Establishing the subnet mask address • Applying the subnet mask • Subnetting Class A and B networks • The logical ANDing process

WEEK-11 (3 Hours)	MODULE-12: TCP/IP Transport and Application Layer • TCP/IP Transport Layer • Transport layer functions • Flow control • Session establishment, maintenance, and termination • 3-way handshake • Windowing • Acknowledgement • TCP (Transmission Control Protocol) • UDP (User Datagram Protocol) • TCP and UDP port numbers • DNS • FTP • HTTP • SMTP • SNMP • Telnet
WEEK -12 (3 Hours)	1. CERTIFCATION EXAMINATION 2. CLOSING AND VALEDICTORY CEREMONY

2.2.6 COURSE TITLE: Web Development with Django **(COURSE CODE:** AOC-DEP-CSE-WDDJ**)**

1. COURSE DESCRIPTION: Django is the most popular and most mature Python web development framework around. It makes it easier to build better Web apps more quickly and with less code. Building web sites with Django is not just smart and efficient, but fun too! This course is for candidate who wants to learn Django from scratch and work through a fully functional Project. This course is apt for those who have been working on Python and intend to move the expertise to the web. Through the ORM framework candidate can achieve relatively complex functionality quite rapidly. This Python Web App Development with Django Training Course will give existing Python developers great experience building robust, commercial web applications with the Django framework.

2. COURSE OUTCOMES:

S. No.	Course Outcomes
CO1	Apply the programming fundamentals concept of the Python programming language
CO2	Develop programs of dynamic, database-backed web applications using Django
CO3	Demonstrate the reuse built-in Django apps for common web functionalities
CO4	ORM layer of Django for interaction with the database.
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	-	-	-	-	-	-	-	-	2	-	1
CO 4	-	-	-	-	3		-	-	-	-	-	-	-	3	-
CO 5	-	-	-	-	-	3	-	-	-	-	-	-	3	2	-

4. COURSE PRE-REQUISITES: Students should already be comfortable using the operating system (Linux, Unix, Windows, Solaris, macOS, etc.) on which they will be running Python. While not mandatory, basic skills with at least one other programming language are desirable. All students should have a working knowledge of HTML5 and CSS.

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: 70% or above marks in Certification Exam

7. WEEK-WISE COURSE OUTLINE:

WEEK	MODULE-WISE CONTENTS
WEEK – 1 35 Hours)	**MODULE – 1: Intro to Python** • Variables • Numeric Data Types: Int & Float • Sequential Types: Str & List • If-Else Statements • Creating Python Scripts/Files • Definite loops: For loops
WEEK – 2 (3 hours)	**MODULE – 2: Writing Iterative Code and Algorithms** • Indefinite loops: while loops • Runtime complexity • Searching and sorting algorithms • Custom functions in Python • Args and Kwargs • Importing files
WEEK – 3 (3 hours)	**MODULE – 3: Object Oriented Programming with Python** **Introduction to Object Oriented Programming** • Classes • Methods • Inheritance

	• Abstract Classes **Working with APIs** • RESTful architecture • Working with APIs • Request library
WEEK – 4 **(3 hours)**	**MODULE-4: Introduction to Developer Tools and SQL** • Assert statements • Testing • Git • Intro to SQL • CRUD
WEEK – 5 **(3 hours)**	**MODULE-5: Introduction to Django** • HTTP protocol • MVC model • Virtual environment • Django structure • Generic Views • HTML templates • URL dispatcher
WEEK – 6 **(3 hours)**	**MODULE-6: Modules and Packages** • What is a module? • The import statement • Function aliases • Packages
WEEK-7 **(3 Hours)**	**MODULE-7: Highlights of the Standard Library** • Working with the operating system • Grabbing web pages • Sending email • math and random • Accessing dates and times with datetime • Working with compressed files
WEEK-8 **(3 Hours)**	**MODULE-8: Advanced Django for Web and Automation** • Custom Views • GET and POST methods • URL shortener • User model • Logic in templates • Querying models
WEEK-9 **(3 Hours)**	**MODULE-9: Django REST** • Generic Views in Django Rest • Serializers • JSON • Building RESTful APIs • Filtering Models

	• Working with Images
	• Authentication with tokens
	• Postman
WEEK-10 (3 Hours)	**MODULE-10: Final Project and Presentation** • Concept presentation • Approval by committee • Working on the project • Intermediate report to committee • Finishing the project
WEEK-11 (3 Hours)	**MODULE-11: Preparing to enter the job market** • Resume review and mock interviews • Understanding the job market • How to identify the right company for you • Final presentation of working project
WEEK - 12	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 MapReduce framework.
CO4	Develop MapReduce programs and implementing HBase.
CO5	Implement Hive and Pig scripts.

3. MAPPING COURSE OUTCOMES WITH PO AND PSO

CO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PS	PS	PS

	1	2	3	4	5	6	7	8	9	10	11	12	O1	O2	O3
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 Cloudera Manager • Understanding Spark, Scala, Sqoop, Pig, and Flume
WEEK – 2 (3 hours)	**MODULE – 2: - Introduction to Big Data Hadoop and Understanding HDFS and MapReduce** • Introducing Big Data and Hadoop • where does Hadoop fit in? • Two important Hadoop ecosystem components, namely, MapReduce and HDFS.
WEEK – 3 (3 hours)	• **MODULE – 3: - Deep Dive in MapReduce** • Learning the working mechanism of MapReduce • 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 MapReduce 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 MapReduce • 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-DSP)

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 DataFrame as the central data structures for data analysis, along with tutorials on how to use functions such as groupby, 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 DataFrames.
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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	3	-	-	-	-	-	-	-	-	-	-	3	-	-
CO2	-	-	3	-	-	-	-	-	-	-	-	-	-	2	-
CO3	-	-	-	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	**MODULE – 3: Getting Started** • Using variables

(3 hours)	• 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 • Subexpressions • 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**

2.3 DEPARTMENT OF ELECTRICAL ENGINEERING

S. No.	Course ID	Course Name	No. of Modules	Course Duration	Course Facilitator
1	AOC-DEP-EE-AAD	Applications of Arduino devices in Electrical Engineering	5	35 Hours	Mr. Gaurav Srivastava Mr. Pravin Kumar
2	AOC-DEP-EE-IOT	Introduction to Internet of Things (IOT) in Electrical Engineering	5	35 Hours	Dr. Amit Srivastava Dr. Virendra Sangtani
3	AOC-DEP-EE-MATL	Introduction to MATLAB and its application in Electrical Engineering	5	35 Hours	Mr. Devendra Doda Mr. Mahesh Meena
4	AOC-DEP-EE-PHVS	Overview of Photovoltaic Systems	4	35 Hours	Dr. Pankaj Gakhar Ms. Deepika Chauhan Mr. Mayank Sharma
5	AOC-DEP-EE-CAD	Fundamentals of Autocad and its applications	5	35 Hours	Dr. Virendra Sangtani Mr. Ravi Shankar Singh

2.3.1 COURSE TITLE: Applications of Arduino devices in Electrical Engineering **(COURSE CODE:** AOC-DEP-EE-AAD**)**

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

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						
CO4									3					3	
CO5															
Target					3				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: Fundamental of Electrical Engineering

7. Course Duration: 35 Hours

8. Course Outline:

Module	Contents	Hours
1	Multiple Examples Of Code, Introduction to embedded system, Understanding Embedded System, Overview of basic electronics and digital electronics, Microcontroller vs. Microprocessor, Common features of Microcontroller, Comparison between the two, Different types of microcontroller	7
2	Wiring Schematics, introduction to Arduino, Pin configuration and architecture, Device and platform features, Concept of digital and analog ports, Familiarizing with Arduino Interfacing Board, Introduction to Embedded C and Arduino platform	7
3	Demonstrations Of A Completed Circuit, Arduino data types, Variables and constants, Operators, Control Statements, Arrays, Functions, Pins Configured as INPUT, Pull-up Resistors, Pins Configured as OUTPUT, pinMode() Function, digitalWrite() Function, analogRead() function, Arduino Interrupts	7
4	Alternative Scenarios, Working with Serial Monitor, Line graph via serial monitor, Interfacing a 8 bit LCD to Arduino, Fixed one line static message display, Running message display, Using the LCD Library of Arduino, Arduino – Humidity Sensor, Arduino – Temperature Sensor, Arduino – Water Detector / Sensor, Arduino – PIR Sensor, Arduino – Ultrasonic Sensor, Arduino – Connecting Switch (Magnetic relay switches)	7
5	Design Your Own Circuit, Types of Relay, Controlling Electrical appliances with electromagnetic relays, Working of a matrix keypad, Using the keypad library to interface with Arduino, Interfacing Servo motors to Arduino, Interfacing a RF Module	7

2.3.2 COURSE TITLE: Introduction to Internet of Things (IOT) in Electrical Engineering
(COURSE CODE: 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	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1									3					3	3
CO2					3										3
CO3					3										
CO4					3				3					3	3
CO5															
Target					3				3					3	3

4. **Enrollment Criteria:**
1. Participants must be interested and engineering student (III/IV Yr 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 COURSE TITLE: Introduction to MATLAB and its application in Electrical Engineering **(COURSE CODE:** AOC-DEP-EE-MATL**)**

1. **Course Summary:** This course is known about the programming of matlab and its application system. It is easy to learn, versatile and very useful for engineer's students and other professionals. MATLAB is a special-purpose language that is an excellent choice for writing moderate-size programs that solve problems involving the manipulation of numbers. The design of the language makes it possible to write a powerful program in a few lines. The problems may be relatively complex, while the MATLAB programs that solve them are relatively simple: relative that is, to the equivalent program written in a general-purpose language, such as C++ or Java. As a result, MATLAB is being used in a wide variety of domains from the natural sciences, through all disciplines of engineering, to finance, and beyond, and it is heavily used in industry. Hence, a solid background in MATLAB is an indispensable skill in today's job market. It is an introductory programming course that uses MATLAB to illustrate general concepts in computer science and programming. Students who successfully complete this course will become familiar with general concepts in computer

science, gain an understanding of the general concepts of programming, and obtain a solid foundation in the use of MATLAB.

2. **Course Outcomes:**
   1. Students will be able to understand features and importance of MATLAB in mathematical Programming environment.
   2. Students will be able to solve problems related to Electrical circuit applications in simulation tool.
   3. Students will be able to articulate the importance of MATLAB in research by simulation work.
   4. Students will be able to apply responsive design to enable page to be viewed by various devices.

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		
CO3								3							
CO4										3					3
CO5															
Targ et								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, Control System
7. **Course Duration:** 35 Hours
8. **Course Outline:**

Module	Contents	Hours
1	Introduction to MatLab The dominance of MatLab over other languages, Power of Matrix computations, The application of Matlab in various fields of engineering	7
2	Matlab functions Basic mathematical functions offered by Matlab Matrix computations	7
3	Matlab Modelling & Basic Electrical Circuit Analysis Advanced mathematical functionalities of matlab, Advanced system modelling using Matlab, Analysis of basic electrical circuits using Matlab Obtaining different characteristic plots	7
4	Introduction to Simulink Introduction to Simulink, Applications of simulink in System modelling Modelling Basic electrical Circuit in Simulink and obtaining characteristic plots.	7

| 5 | Project Development | 7 |

2.3.4 COURSE TITLE: Fundamentals of AutoCAD and its applications **(COURSE CODE: AOC-DEP-EE-CAD)**

1. **Course Summary:** This course covers the essential core topics for working with the AutoCAD software. The strategy is to start with a few basic tools that enable the student to create and edit a simple drawing, and then continue to develop those tools. More advanced tools are introduced throughout the class. During the course students will develop complete instruction for mastering fundamental AutoCAD commands and drawing techniques. The text provides comprehensive coverage of AutoCAD 2D drafting and design. Topics are presented in an easy-to-understand sequence, building upon prior chapter knowledge. The heavily illustrated text not only tells you how to use AutoCAD, it also shows you how to use AutoCAD and provides step-by-step use of AutoCAD commands.

2. **Course Outcomes:**
   1. Students will be able to Understanding the AutoCAD workspace and user interface.
   2. Students will be able to make design using basic drawing, editing, Adding text, hatching, dimensions and viewing tools.
   3. Students will be able to Preparing a knowledge of drafting procedures and terminology.
   4. Students will be able to Understand and demonstrate dimensioning concepts and techniques devices.

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						
CO4									3						
CO5															
Target					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 AutoCAD Starting the Software, User Interface, Working with Commands, Cartesian Workspace, Opening an Existing Drawing File, Viewing Your Drawing, Saving Your Work	7

2	Basic Drawing and Editing Commands Drawing Lines, Erasing Objects, Drawing Vertical and Horizontal Lines, Drawing Rectangles, Drawing Circles, Undo and Redo Actions	7
3	Drawing Precision in AutoCAD Using Running Object Snaps, Using Object Snap Overrides, Polar Tracking at Angles, Object Snap Tracking, Drawing with Snap and Grid	7
4	Advanced Editing Commands Trimming and Extending Objects, Stretching Objects, Creating Fillets and Chamfers, Offsetting Objects, Creating Arrays of Objects	7
5	Project Development	7

2.3.5 COURSE TITLE: Overview of Photovoltaic Systems (COURSE CODE: AOC-DEP-EE-PHVS)

1. **Course Summary:**

This course offers you advanced knowledge within the field of photovoltaic system technology. The students will learn about the solar resource and how photovoltaic energy conversion is used to produce electric power. From this fundamental starting point we'll cover the design and fabrication of different solar cell and module technologies, the various photovoltaic system components, how to design a photovoltaic plant and carry out energy yield simulations, essentials in energy economics, O&M and reliability assessment, as well as the role of photovoltaic energy in sustainable energy systems.

2. **Course Outcomes:**
   1. Students will be able to understand the principle of direct solar energy conversion to power using PV.
   2. Students will be able to Contrast the performance measures of PV.
   3. Students will be able to Infer on various solar cells & design aspects of solar PV.
   4. Students will be able to Develop ideas for working on solar PV systems & associated safety practices

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

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1				3		3						3			
CO2				3					3			3			
CO3					3	3			3			3			
CO4				3		3									
CO5															
Target				3	3	3			3			3			

4. **Enrollment Criteria:**
   1. Participants must be interested and engineering student
   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, Control System

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

Module	Contents	Hours
1	Principle of solar energy conversion, Photovoltaic effect, Semiconductor properties, energy levels, basic equations. Solar cell structure, parameters of solar cell.	7
2	Solar PV modules & arrays, I-V &P-V characteristics, maximum power point, series parallel combination, cell efficiency, fill factor, role of bypass & blocking diode, factors affecting output of a solar cell.	8
3	Classification - Central Power Station System, Distributed PV System, Stand alone PV system, grid Interactive PV System, small system for consumer applications, hybrid solar PV system, concentrator solar photovoltaic. System components - PV arrays, inverters, batteries, charge controllers , net metering ,. PV array installation, operation, costs, reliability. Troubleshooting of PV system components.	10
4	Building-integrated photovoltaic units, grid connected central power stations, stand-alone devices for distributed power supply in remote and rural areas, Outlook for the Indian PV industry& challenges, Applications: solar home system, solar cars, Solar Charger, aircraft, space solar power satellites. Socio-economic and environmental merits of photovoltaic systems safety in Installation of solar PV systems	10

2.4 DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

S. No.	Course ID	Course Name	No. of Modules	Course Duration	Course Facilitator
1	AOC-DEP-EC-ROBO	Foundation to Robotics	6	30 Hours	Dr. Garima Mathur
2	AOC-DEP-EC-LABV	Hardware Integration with LabVIEW	6	30 Hours	Mr. Tarun Mishra
3	AOC-DEP-EC-LATZ	The tool for Zotero Integration	6	30 Hours	Mr. Manish Sharma
4	AOC-DEP-EC-KEIL	Keil Embedded Development Tools SIMULATE, AND LAYOUT	6	30 Hours	Mr. Manish Sharma
5	AOC-DEP-EC-MATL	Introduction to Programming with MATLAB	6	30 Hours	Dr. Anila Dhingra
6	AOC-DEP-EC-PCBD	PCB Designing	6	30 Hours	Ms. Manisha Kumawat & Mr. Tarun Mishra

2.4.1 COURSE TITLE: Foundation to Robotics **(COURSE CODE:** AOC-DEP-EC-ROBO**)**

1. COURSE DESCRIPTION: Robotics is a branch of engineering and science that includes electronics engineering, mechanical engineering and computer science and so on. This branch deals with the design, construction, use to control robots, sensory feedback and information processing. These are some technologies which will replace humans and human activities in coming years. These robots are designed to be used for any purpose but these are using in sensitive environments like bomb detection, deactivation of various bombs etc.

2. COURSE OUTCOMES:

S.No.	Course Outcomes
CO1	Understand the industry requirement towards robotics
CO2	Apply principles and techniques in varied application domains related to IT and Engineering
CO3	Formulate solutions to solve problems related to robotics and automation
CO4	Evaluate the current practice and predict future trends
CO5	Demonstrate conversance in key soft skills, such as communication, analysis and inquiry, problem solving, independent and group working, professionalism and social responsibility.

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	3	3	-	-	-	-	-	-	-	-	-	1	3	2	1
CO2	3	3	3	-	-	-	-	-	-	-	-	1	3	2	1
CO3	3	3	2	2	-	-	-	-	-	-	-	1	3	2	1
CO4	3	2	2	2			-	-	-	-	-	1	3	2	1
CO5	3	3	2	2	2		-	-	-	-	-	1	3	2	1

4. COURSE PREREQUISITES:
Basic Mathematics: Matrices, Differential equations

5. ENROLMENT CRITERIA: Interested Students of III Year and IV Year
6. CERTIFICATION CRITERIA: Mandatory Fulfillment 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 to robotics** Introduction to robotics, classification of robots, workspace analysis, Manipulator Kinematics: Convention for affixing frames to links.
WEEK – 2 (5 hours)	**MODULE – 2: DH Parameter** DH Representation, Derivation of Direct kinematic equations for various types of robots. Inverse Manipulator Kinematics: Solvability, algebraic vs. geometric, Pipers solution when three axes intersect, Examples of inverse manipulator kinematics, repeatability and accuracy.
WEEK – 3 (5 hours)	**MODULE – 3: Jacobian** Jacobian: Velocities and static forces: Linear and rotational velocity of rigid bodies, velocity propagation from link to link,
WEEK – 4 (5 hours)	**MODULE – 4: Singularities** Singularities, static forces in manipulators, jacobians in force domain, Cartesian transformation of velocities and static forces.
WEEK – 5 (5 hours)	**MODULE – 5: Trajectory Generation** Trajectory Generation: General consideration in path description and generation, joint space schemes, collision free path planning, Robot programming.
WEEK – 6 (5 hours)	**MODULE-6: Sensing and vision** Sensing and vision – range sensors, proximity sensors, touch sensors, force and torque sensors – Low level and high-level vision. Robot intelligence and task planning.
WEEK - 7	**CLOSING AND VALEDICTORY CEREMONY**

2.4.2 COURSE TITLE: Hardware Integration with LabVIEW **(COURSE CODE:** AOC-DEP-EC-LABV**)**

1. COURSE DESCRIPTION: LabVIEW 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. LabVIEW programs are called virtual instruments, or VIs, because their appearance and operation imitate physical instruments, such as oscilloscopes and multimeters. LabVIEW contains a comprehensive set of tools for acquiring, analysing, displaying, and storing data, as well as tools to help you troubleshoot program you write.

2. COURSE OUTCOMES:

S.No.	Course Outcomes
CO1	Apply to communicate between parallel sections of code without forcing an execution order.
CO2	Develop programs that respond to user interface events using a variety of event-driven

		design patterns.
CO3		Demonstrate how to use property nodes and control references to programmatically control front panel objects.
CO4		Use the benefits of the object-oriented approach in LabVIEW programming
CO5		Design solutions teaches how to manage configuration settings for your application by using a configuration file.

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
CO1	-	3	-	-	-	-	-	-	-	-	-	-	3	-	-
CO2	-	-	3	-	-	-	-	-	-	-	-	-	-	2	-
CO3	-	-	-	3	-	-	-	-	-	-	-	-	3	-	2
CO4	-	-	-	-	3		-	-	-	-	-	-	-	3	-
CO5	-	-	-	-	-	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 LabVIEW: Programming without Writing Commands.
WEEK – 2 (5 Hours)	**MODULE – 2:** How to use Built-in Virtual Instruments (VIs) to Design Programs for Different Applications.
WEEK – 3	**MODULE – 3:**

(5 hours)	How to Automate Data Acquisition and Interface Instruments with PC using LabVIEW.
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, Analysing and Simulation of Data with LabVIEW 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**

2.4.3 COURSE TITLE: The tool for Zotero Integration **(COURSE CODE:** AOC-DEP-EC-LATZ)

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:

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	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO 1	3		-	-	-	-	-	-	-	-	-	-	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 Fulfillment 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

2.4.4 COURSE TITLE: Keil Embedded Development Tools SIMULATE, AND LAYOUT
(COURSE CODE: AOC-DEP-EC-KEIL**)**

1. COURSE DESCRIPTION: To develop and produce electronic and electric circuits requires many skills. The advent of computers has also touched the area of design and drawing of electronic circuits. Hence it will be beneficial to learn to take computers aid in drawing, designing and enhancing the quality of electronic circuits. This programme intends to help the participants to use the knowledge of computer software for preparing drawings and conduct analysis of electrical

circuits. He/she will also be able to draw and design electronic circuits. The programme also aims to develop the skills to build and test electrical circuits, analog & digital electronic circuits using Multisim software on a computer. It will also be beneficial if the participants are aware about other software's being currently used for drawing, drafting and designing of electronic circuits. These skills are required to develop prototype designs, printed circuit board design, electronic maintenance and troubleshooting in the industry.

2. COURSE OUTCOMES:

CO1	Explain the Multisim user interface
CO2	Apply modular design with sub circuits, hierarchical blocks or multipage designs.
CO3	Create custom components.
CO4	Simulate MCU projects along with SPICE
CO5	Transfer your design to PCB layout software

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	-	3	-	-	-	-	-	-	-	-	-	-	3	-	-
CO2	-	-	3	-	-	-	-	-	-	-	-	-	-	2	-
CO3	-	-	-	3	-	-	-	-	-	-	-	-	3	-	2
CO4	-	-	-	-	3		-	-	-	-	-	-	-	3	-
CO5	-	-	-	-	-	3	-	-	-	-	-	-	3	2	-

4. COURSE PRE-REQUISITES:
Basic knowledge of Electronics Circuit, Digital Electronics, Analog Electronics.
5. ENROLMENT CRITERIA: Interested Students of II Year.
6. CERTIFICATION CRITERIA: Mandatory 80% Attendance
7. WEEK-WISE COURSE OUTLINE:

WEEK	MODULE-WISE CONTENTS
WEEK – 1 (5 Hours)	**MODULE – 1:** Computer aided electrical and electronics drawing, Overview of analog & digital modules of Multisim software.
WEEK – 2 (5 hours)	**MODULE – 2:** Understand the Multisim user interface. Use Multisim to capture circuit schematics, building & testing an analog circuit, analog instruments.
WEEK – 3 (5 hours)	**MODULE – 3:** Use interactive simulation to check your design, Use virtual instruments and analyses, building & testing a digital circuit, digital instruments.

WEEK – 4 (5 hours)	**MODULE –4:** Apply modular design with sub circuits, hierarchical blocks or multipage designs, Blocks or multipage designs.
WEEK – 5 (5 hours)	**MODULE– 5:** Create custom title blocks, Properly document your circuit designs, Work with design variants, Create custom components
WEEK – 6 (5 hours)	**MODULE– 6:** Overview of similar software**.**
WEEK - 7	1. **CLOSING AND VALEDICTORY CEREMONY**

2.4.5 COURSE TITLE: Introduction to Programming with MATLAB **(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. 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	-	-	-	-	-	3	-	-	-	-	-	-	3	2	-

5												

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 **(5 Hours)**	**MODULE – 2: Matrices and vectors** - Matrix and linear algebra review - Vectors and matrices in MATLAB - Matrix operations 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 elseif • 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**

2.4.6 COURSE TITLE: PCB Designing **(COURSE CODE:** AOC-DEP-EC-PCBD**)**

1. COURSE DESCRIPTION: A printed circuit board (PCB) mechanically supports and electrically connects electronic components using conductive tracks, pads and other features etched from copper sheets laminated onto a non-conductive substrate. Components — capacitors, resistors or active devices — are generally soldered on the PCB.

Today, many of our daily appliances and equipment use electronics, sensors and sophisticated computer technologies. Circuit Designing & PCB Designing is an integral part of any Electronic Gadget or Robotics. If you know how to design any circuit & logic behind it then you can do any innovation with your creative ideas.

2. COURSE OUTCOMES:

CO1	Determine appropriate components to make circuits.
CO2	Interpret test results and measurements on electric circuits
CO3	Analyze the fabrication processes of printed circuit boards.
CO4	Apply the software and hardware for PCB Design
CO5	Evaluate an electronic printed circuit board for a specific application using industry standard software.

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	3	3	2	-	-	-	-	-	-	-	-	1	3	2	1
CO2	3	3	3	-	-	-	-	-	-	-	-	1	3	2	1
CO3	3	3	3	3	-	-	-	-	-	-	-	1	3	2	1
CO4	3	3	3	-			-	-	-	-	-	1	3	2	1
CO5	3	3	3	3	3		-	-	-	-	-	1	3	2	1

4. COURSE PRE-REQUISITES:

There are no prerequisite. Anyone interested, can join this workshop.

5. ENROLMENT CRITERIA: Interested Students of II Year.
6. CERTIFICATION CRITERIA: Mandatory 80% Attendance
7. WEEK-WISE COURSE OUTLINE:

WEEK	MODULE-WISE CONTENTS
WEEK – 1 (5 Hours)	**MODULE – 1: Session I: Introduction to Basic Electronics** Basic Electronics Components Resistor (Ohms Law, Voltage & Current) Capacitors Diode Integrated Circuit LEDs Transistor Breadboard Printed Circuit Board (PCB) Practical Use of Electronics Components like Resistor, Capacitor & Diode.
WEEK – 2 (5 hours)	**MODULE – 2: Session II: Introduction to Circuit Designing (My First Circuit)** Introduction Breadboard Description
WEEK – 3 (5 hours)	**MODULE – 3: Hands on Session** **Circuit 1:** Multi Level Water Tank Full Alert **Circuit 2:** Clap Controlled ON & OFF Circuit
WEEK – 4 (5 hours)	**MODULE – 4: PCB Designing** PCB Design Software Installation Express PCB/Tina/Eagle. Introduction to PCB Design Understanding Board Layouts & Tools Schematic Editor Basics Schematic Capture PCB Compiling/Building the Project **Project:** Multi Level Water Tank Full Alert / Clap Controlled ON & OFF Circuit **PCB Design Printing**
WEEK – 5 (5 hours)	**MODULE-5: PCB Etching & Drilling** Printing Circuit on PCB PCB Etching Drilling Holes on PCB for Components
WEEK – 6 (5 hours)	**MODULE-6: Components Soldering**
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-WEBD | Web Development using Angular JS | 8 | 30 Hours | Mr. Amit Kumar Jha |
| 2 | AOC-DEP-IT-ATS | Automation Testing using Selenium | 11 | 30 Hours | Mr. Shirish Nagar |

2.5.1 COURSE TITLE: Web Development using Angular JS **(COURSE CODE:** AOC-DEP-IT-WEBD**)**

1. COURSE DESCRIPTION:

Angular Js is a structural framework for creating a dynamic web pages and web applications. AngularJS is one of the open source web application frameworks for JavaScript which are generally used to add an HTML page with a tag. AngularJS's main goal is to simplify application development and test performance by providing a framework called MVC (Model View Controller) architecture. It allows the application to change from a large amount of programming code to a simple coding.

This training will empower students to learn front-end web development with Angular. The training will also provide a canonical guidance to learn in-depth knowledge TypeScript, Bootstrap, Dependency Injections, SPA (Single Page Application), Directives, Forms, Pipes, Promises, Observables, and understand the testing of Angular 4 class.

2. COURSE OUTCOMES:

S. No.	Course Outcomes
CO1	Understand client-side web UI frameworks
CO2	Understand and use various directives offered by Angular
CO3	Use dependency injection for better maintainability and Exploit two-way binding offered by Angular
CO4	Build RIA using Angular
CO5	Create dynamic web applications and deploy to different environments

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	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	2	-	-	-	-	-	-	-	-	-	-	3	-	-
CO2	-	-	3	-	-	-	-	-	-	-	-	-	-	2	-
CO3	-	-	-	2	-	-	-	-	-	-	-	-	3	-	2
CO4	-	-	-	-	3		-	-	-	-	-	-	-	3	-
CO5	-	-	-	-	-	3	-	-	-	-	-	-	3	2	-

4. COURSE PRE-REQUISITES:
A basic understanding of JavaScript and HTML is necessary to understand the material and complete the challenges.
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5. ENROLMENT CRITERIA: Interested Students of II Year & III Year
6. CERTIFICATION CRITERIA: Mandatory Fulfilment of Criteria 1 and 2
Criteria 1: 75% Attendance, and
Criteria 2: 60% or above marks in Certification Exam

7. WEEK-WISE COURSE OUTLINE:

Week	Module wise course contents
Week-1 **(5 Hours)**	**Module-1** **Getting Started With Typescript** • What is Typescript? • ES6 Features • Installing Typescript • Transpilation • Typescript datatype • Typescript to javascript **Typescript Fundamentals** • Variables and Types • Type Assertion • Enum • Access Specifiers • Function with Data Types • Custom Type • Building Classes and Interface **Typescript Functions** • Function Typing • Function Typing • Function overloading **Module-2** **Typescript Classes** • What is Class • Class members • Member function **Typescript Interfaces** • What is Interface • Blueprint • Custom typing **Inheritance and Interface** • What is Inheritance • How to Inherit classes • How to Inherit Interface **Typescript Modules**

Week-2 (5 Hours)	**Module-3** **Introduction to Angular** • What is angular 2.x • Difference between Angular-1 and Angular-2.x • Angular-2.x Architecture • Installation of Angular • Working with Angular-CLI **Angular CLI** • Creating Component • Creating Module • Creating Service • Creating guard • Creating pipe Directives Module-4 **Angular Fundamentals** • What is Component • What is modules • What is Service • Running our first sample angular app • Display data into our template • Interpolation Syntax • Data binding • Adding CSS to Components • One way Data Binding • Two Way Data Binding
Week-3 (5 Hours)	**Module-5** **Application Architectural view** • Single Page Application • Component, Bootstrap and DOM • Project Directory Structure • Angular Server • Webpack • Polyfills **Components** • Creating Component • Component metadata • Generic in Typescript **Iterators and Generators** • Working with For..in • Working with for..of
Week-4 (5 Hours)	**Module-6** **Angular Services** • What is Service ?

Importing exporting data
Modules in Typescript

	• Service dependency Injection • Class Constructor Injection • Injector Decorators **Angular Routing & Navigation** • Angular router • Router configuration • Router outlets • RouterLink • Route Guard
Week-5 **(5 Hours)**	**Module-7** **HTTP, Error Handling** • Angular HTTP bundle • HTTP module • Using HTTP Client • Using HTTP for GET calls • Using HTTP for POST calls • Using HTTP for PUT and PATCH • Using HTTP for DELETE calls • The Component Selector • The Component Template • Styling a Component • Property Binding • Event Binding • Dependency Injection • Communication between Components **Error Handling** • Error Handling • Angular Error Handling
Week-6 **(5 Hours)**	**Module-8** **Angular Forms, Directives and Pipes** • Angular form • Template - driven forms • Model driven-form • Built-In Validation • Custom Validation • Error Handling • Reactive Form • Dynamic Form **Directives** • Structural Directives • Attribute Directives • Creating Custom Directives **Pipes** • Angular Pipes Built-In • Custom Angular Pipe

2.5.2 COURSE TITLE: Automation Testing using Selenium **(COURSE CODE:** AOC-DEP-IT-ATS**)**

1. COURSE DESCRIPTION:

Selenium is an open-source and a portable automated software testing tool for testing web applications. It has capabilities to operate across different browsers and operating systems. Selenium is not just a single tool but a set of tools that helps testers to automate web-based applications more efficiently. Selenium supports a variety of programming languages through the use of drivers specific to each language. Languages supported by Selenium include C#, Java, Perl, PHP, Python and Ruby. Selenium Web driver is most popular with Java and C#. Selenium can be used to automate functional tests and can be integrated with automation test tools such as Maven, Jenkins, & Dockers to achieve continuous testing.

2. COURSE OUTCOMES:

S. No.	Course Outcomes
CO1	Understand the need and usage of software tools required for manual and automated testing.
CO2	Identify various software testing problems, and solve these problems by designing and selecting software test models, criteria, strategies, and methods.
CO3	Design and conduct a software test process for a software testing project.
CO4	Analyze the performance of different websites using Selenium
CO5	Generate Test sequences and compare using Selenium tool for different websites.

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	3	-	-	-	-	-	-	-	-	-	-	-	3	-	-
CO2	-	-	3	-	-	-	-	-	-	-	-	-	-	2	-
CO3	-	-	-	3	-	-	-	-	-	-	-	-	3	-	2
CO4	-	-	-	-	3		-	-	-	-	-	-	-	3	-
CO5	-	-	-	-	-	3	-	-	-	-	-	-	3	2	-

4. COURSE PRE-REQUISITES:

Students should have basic understanding of Java or any other object-oriented programming language. In addition, students should have prior knowledge of software testing techniques like automation testing, functional testing, etc.

5. ENROLMENT CRITERIA: Interested Students of IV Year.

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 course contents
Week-1 (3 Hours)	**MODULE – 1: An Overview of Testing** **What is testing?** **Type of Software testing** **Manual testing** • White Box Testing • Black Box Testing • Gray Box Testing **Automation Testing** **Software Testing Principles** • Testing shows the presence of defects • Exhaustive Testing is not possible • Early Testing • Defect Clustering • Pesticide Paradox • Testing is context dependent • Absence of Error Fallacy
Week-2 (3 Hours)	**MODULE – 2: Setting up Eclipse** • Download and install java • Download and start Eclipse • Download and configure WebDriver java client • Set up a project • Create packages • Create a First Java test case • Import WebDriver Source file
Week-3 (3 Hours)	**MODULE – 3: An Overview of Selenium** **What is Selenium?** **Selenium Basic Terminology** **Selenium Features** **Selenium vs QTP** **Selenium Limitations** **Selenium Tool Suite** • Selenium IDE • Selenium Remote Control • Web Driver • Selenium Grid
Week-4	**MODULE – 4: Selenium Integrated Development**

(3 Hours)	**Environment (IDE)** • Selenium IDE Download • Selenium IDE Installation • Selenium IDE-Features **MODULE – 5: Selenium IDE- First Test Case** • Recording • Playing Back • Saving the test suite • Login Test • Raw (binary) data • o Writing to a text file
Week-5 **(3 Hours)**	**MODULE-6: Selenium IDE- Commands** • Types of Selenium Commands • Actions • Accessors • Assertions • Creating Test Cases Manually • o Insert Commands
Week-6 **(3 Hours)**	**MODULE-7: WebDriver Interface** • Architecture of WebDriver • WebDriver Interface • WebElement Interface • Launching Firefox/ Google chrome browser
WEEK-7 **(3 Hours)**	**MODULE-8: Browser & Navigation Commands** • How to Open a URL • Verify Page title • Strategy to get the Page Source • Difference between Close & Quit • Ways to Navigate Back & Forward • How to Refresh Page • **o** Another way of Navigating to specific Page
WEEK – 8 **(3 Hours)**	**MODULE-9: Web Element Commands** • Difference between FindElement & FindElements • Enter & Clear text from Input field • How Click action works differently on different elements • Managing Input fields, Buttons & Links
WEEK – 9 **(3 Hours)**	**MODULE-10: Advanced Commands** • Finding all links on the Page • Strategy to check dead links on the page • Extracting More than one object from a page • Extracting Objects from a specific area of a web page • Check if element is Present, Displayed, Enabled or Selected
WEEK – 10 **(3 Hours)**	**MODULE-11: Locators** • What are locators • HTML Basics

	• HTML language tags and attributes • ID, Name, Xpath, CSS etc • Difference between Absolute & Complete Xpath • Finding your first elemen • WebElement Commands
WEEK - 11	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-CAT	CATIA	11	32 Hours	Mr. Sanjay Kumawat

2.6.2 COURSE TITLE: CATIA (COURSE CODE: AOC-DEP-ME-CAT)

1. COURSE DESCRIPTION:- CATIA is the reduced form of Computer Aided Three-Dimensional Interactive Application developed by French company Dassault Systems and marketed worldwide by IBM. Dassault is a French engineering giant active in the field of aviation, 3D design, 3D digital mock-ups, and product lifecycle management (PLM) software. CATIA is a solid modelling tool that unites the 3D parametric features with 2D tools and also addresses every design-to-manufacturing process. In addition to creating solid models and assemblies, CATIA also provides generating orthographic, section, auxiliary, isometric or detailed 2D drawing views. It is also possible to generate model dimensions and create reference dimensions in the drawing views. The bi-directionally associative property of CATIA ensures that the modifications made in the model are reflected in the drawing views and vice-versa.

CATIA is a product design software, which is ideal for surfaces, creating solids, drawings, assemblies, fabrication and analysis. This software is used in multiple industries like in manufacturing industries, automobile, aerospace, etc. to visualize designs in 3D. These industries use CATIA to model any product, to integrate 3D features with 2D tools and to develop 2D drawing views.

In developing countries like India, CATIA is largely in demand. The software delivers to most industrial CAD, CAM and CAE requirements. Various industries need experts in the various modules offered by CATIA.

An individual possessing skills of CATIA has numerous scope in various industries. The industries dealing in mechanical engineering, electrical engineering, system engineering, electrical systems & fluid systems need such experts. The responsibilities of a CATIA expert includes designing, drawings, sheet processing, engineering, machine development, developing equipment, electrical wiring, 3D circuit board layout, piping design or digital validation.

What does CATIA do?

CATIA provides the capability to visualize designs in 3D. When it was introduced, this concept was innovative. Since Dassault Systemes did not have an expertise in marketing, they had revenue sharing tie-up with IBM which proved extremely fruitful to both the companies to market CATIA. In the early stages, CATIA was extensively used in the design of the Mirage aircrafts; however the potential of the software soon made it a popular choice in the automotive sector as well. As

CATIA was accepted by more and more manufacturing companies, Dassault changed the product classification from CAD / CAM software to Project Lifecycle Management. The company also expanded the scope of the software.

CATIA can be used at different stages of the design - ideate, draw, test and iterate. The software comes with different workbenches ("modules") that allow CATIA to be used across varied industries – from parts design, surface design and assembly to sheet metal design. CATIA can also be used for CNC.

2. **OBJECTIVE:**

The objective of this lab is to equip students with knowledge in the interface of three dimensional designing software and to make students efficient to produce CAD designs. By the end of course one should also be able to understand what a machine drawing is and will also be able to produce machine drawings and gain knowledge about all symbols used in production drawings and how they are inserted in production drawings using design software's.

3. 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 CATIA.
CO2	Creation of solids with following toolbars in part design module of CATIA: 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 a top down and bottom up approach. Generate assembly constraints, flexible assemblies, use of patterns in assembly

4. 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	-	-	-	-	-	-	3	3	3	2
CO 2	-	3	-	-	3	-	-	-	-	-	-	2	3	3	2
CO 3	-	2	-	-	3	-	-	-	-	-	-	2	3	3	2
CO 4	-	-	3	-	3	-	-	-	-	-	-	2	3	3	2

5. COURSE PRE-REQUISITES:
To be a successful CATIA 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.

6. ENROLMENT CRITERIA: Interested Students of III Year (5ᵗʰ Semester)
7. CERTIFICATION CRITERIA: Mandatory Fulfilment of Criteria 1 and 2
Criteria 1: 80% Attendance, and
Criteria 2: 70% or above marks in Certification Exam

8. WEEK-WISE COURSE OUTLINE:

WEEK	MODULE-WISE CONTENTS
WEEK – 1 (3 Hours)	**MODULE-1: Introduction to CATIA V5** Introduction to CATIA V5R20 CATIA V5 Workbenches System Requirements Getting Started with CATIA V5R20 Important Terms and Definitions Important Terms and Definitions Understanding the Functions of Mouse Buttons Toolbars Hot Keys Color Scheme
WEEK – 2 (3 hours)	**MODULE-2: Drawing Sketches in the Sketcher Part-I** The Sketcher Workbench Starting a New File Invoking the Sketcher Workbench Using the Sketch Tool Invoking the Sketcher Workbench Using the Positioned Sketch Tool Setting the Sketcher Workbench, Modifying Units, Modifying, Grid Settings Understanding Sketcher Terms, Specification Tree, Grid, Snap to Point, Construction/Standard Element, Select Toolbar, Inferencing Lines Drawing Sketches Using Sketcher Tools, Drawing Lines, Drawing Center Lines, Drawing Rectangles, Oriented Rectangles, and Parallelograms, Drawing Rectangles, Creating Points, Drawing Circles, Drawing Arcs, Drawing Profiles Drawing Display Tools, Fit All In, Pan, Zoom In, Zoom Out, Zoom Area, Normal View, Splitting the Drawing Area into Multiple Viewports, Hiding and Showing Geometric Elements, Swapping Visible Space, Tutorial and Exercise
WEEK – 3 (3 hours)	**MODULE-3: Drawing Sketches in the Sketcher Part-II** Other Sketching Tools in the Sketcher Workbench- Drawing Ellipses, Drawing Elongated Holes, Drawing Keyhole Profiles, Drawing Centered Rectangles Editing and Modifying Sketches- Trimming Unwanted Sketched Elements, Trimming by Using the Quick Trim Tool, Filleting Sketched Elements, Chamfering Sketched Elements, Mirroring Sketched Elements, Translating Sketched Elements, Modifying Sketched Elements, Scaling Sketched Elements

	Tutorial and Exercise
WEEK – 4 (3 hours)	**MODULE-4:** Constraining Sketches and Creating Base Features Constraining Sketches Concept of Constrained Sketches, Iso-Constraint Under-Constraint Over-Constrained Inconsistent Applying Geometrical Constraints Automatically, Applying Additional Constraints to the Sketch Applying Dimensional Constraints, Applying Contact Constraints, Applying Fix Together Constraints, Applying Auto Constraints Editing Multiple Dimensions Analyzing and Deleting Over-Defined Constraints Exiting the Sketcher Workbench Creating Base Features by Extrusion Extruding the Sketch along a Directional Reference Creating Thin Shaft Features Display Modes of the Model Shading (SHD) Shading with Edges Shading with Edges without Smooth Edges Shading with Edges and Hidden Edges, Shading with Material Assigning a Material to the Model Tutorial and Exercise
WEEK – 5 (3 hours)	**MODULE-5:** Reference Elements and Sketch-Based Features Importance of Sketching Planes Reference Elements, Creating New Planes, Creating Points, Creating Reference Lines. Creating Drafted Filleted Pad Features Creating Multi-Pad Features Creating Pocket Features Creating Drafted Filleted Pocket Features Creating Multi-Pocket Features Creating Groove Features Extruding and Revolving Planar and Non planar Faces Projecting 3D Elements Tutorial and Exercise
WEEK – 6 (3 hours)	**MODULE-6:** Creating Dress-Up and Hole Features Advanced Modeling Tools- Creating Hole Features Creating Fillets Creating Chamfers Adding a Draft to the Faces of the Model Creating a Shell Feature Tutorial and Exercise
WEEK-7 (3 Hours)	**MODULE-7:** Editing Features of a Model Editing Using the Definition Option Editing by Double-Clicking Editing the Sketch of a Sketch-Based Feature Redefining the Sketch Plane of Sketches Copying and Pasting Part Bodies

	Deactivating Features
	Activating Deactivated Features
	Defining Features in Work Object
	Reordering Features
	Understanding the Parent-Child Relationships
	Measuring Elements
	Tutorial and Exercise
WEEK-8 (3 Hours)	**MODULE-8:** Transformation Features and Advanced Modeling Tools Transformation Features Translating Bodies, Rotating Bodies Creating Symmetry Features Mirroring Features and Bodies Transforming the Axis System Creating Rectangular Patterns Creating Circular Patterns Creating User Patterns Uniform Scaling of Model Non-uniform Scaling of Model Working With Additional Bodies- Inserting a New Body Inserting Features in the New Body Applying Boolean Operations to Bodies Adding Stiffeners to a Model Generating Solid Combine Tutorial and Exercise
WEEK-9 (3 Hours)	**MODULE-9: Assembly Modeling** Types of Assembly Design Approaches Creating Bottom-up Assemblies Creating Top-down Assemblies Editing Assemblies Exploding an Assembly Tutorial and Exercise
WEEK-10 (3 Hours)	**MODULE-10:** Working with the Drafting Workbench Starting a New File in the Drafting Workbench Type of Views Generating Drawing Views Generating Views Automatically Generating Individual Drawing Views Generating the Exploded View Working with Interactive Drafting in CATIA V5 Editing and Modifying Drawing Views Changing the Scale of Drawing Views Modifying the Project Plane of the Parent View Deleting Drawing Views Rotating Drawing Views Hiding Drawing Views Modifying the Hatch Pattern of Section Views

	Tutorial and Exercise
WEEK – 11 (2 Hours)	**CERTIFCATION EXAMINATION 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	Mr. Abhishek Singh
2	AOC-DEP-FY-LRTS	Program on Logical Reasoning and Technical Skill Development	20	60	Mr. Kuldeep Sharma
3	AOC-DEP-FY-SDPP	Skill Development Program in Project Oriented Training	10	30	Mr. Amber Batwara
4	AOC-DEP-FY-ACP	Skill Development Program in Advanced C	10	30	Mr. Sanjay Kumar Gupta
5	AOC-DEP-FY-SDPML	Skill Development Program in Machine Learning-Deep learning	10	30	Mr. Deepak Baberwal
6	AOC-DEP-FY-SDPWD	Skill Development Program in Web Development using JAVASCRIPT and REACTJS	10	30	Mr. Prashant Hemrajani

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

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12
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:
- Project demonstrations
- 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 nodemcu
	History of nodemcu
	Types of nodemcu

	Selection of nodemcu
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 HyperText 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.

1. **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.

2. **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)

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

3. **Pre-requisites of the course:**
   Participant must be a student of B. Tech. 1st year at Poornima college of Engineering.
4. **Enrollment Criteria:**
   Participant must be a student of B. Tech. 1st year at Poornima College of Engineering.
5. **Evaluation Criteria:**
   Quiz
6. **Certification Criteria:**
   (i)75% attendance (ii) At least 50% marks in quiz.

7. **Course Content with week-wise planning:**

Week 1 (Module 1)	Awareness about different Competitive ExamsSWOT 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 (Module 18)	Video/ Case Study Analysis, Article/Film/Book Review
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 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 software 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 software 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	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	-	-	-	-	3	-	-
CO2	-	2	-	-	-	-	-	-	-	-	-	-	-	2	-
CO3	-	3	-	-	-	-	-	-	-	-	-	-	3	-	2
CO4	-	-	2	-	-	-	-	-	-	-	-	-	-	3	-
CO5	-	-	3	-	-	-	-	-	-	-	-	-	3	2	-

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 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:

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	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	-	-	-	-	-	-	-	-	-	-	-	-
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.
4. Function	Function Introduction
	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	PO1 0	PO1 1	PO1 2	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 • <u>Fundamental Image Processing Steps</u>	**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	• Threshold evaluation with ROCR. • Hands-on Exercise – Logistic regression, Confusion matrix Implementation

		• Confusion matrix and accuracy • True positive rate v/s false positive rate
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 hyperparameters • 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 **(COURSE CODE:** AOC-DEP-FY-SDPWD**)**

1. COURSE DESCRIPTION: Two weeks "Web Development Using JavaScript and ReactJS" 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, JavaScript for client-side scripts.
CO3	Analyze the significance of ReactJS client-side scripts.
CO4	Develop the Live Project using concept of JavaScript and ReactJS.

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	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO 2	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO 3	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-
CO 4	-	-	-	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	• Anatomy of an HTML Tag

	• Basic HTML Document Structure	• HTML Content Models • Creating Links
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 • Javascript 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