POORNIMA
COLLEGE OF ENGINEERING

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

1.2.1 Number of Add on/ Certificate/ value added programs offered during the last five years (Add-on courses Institute Level Brochures- Session 2018-19)

ISI-6, RIICO Institutional Area, Sitapura, Jaipur-302022 (Rajasthan)
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POORNIMA
COLLEGE OF ENGINEERING

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

Brochure of Add-On Courses

SESSION 2018-19

IBM Career Education   Infosys campus connect   QEEE   Spoken Tutorial

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LISTOFADD-ONCOURSES 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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NAMEOF COURSE	COURSECODE
CAMPUSLEVELCOURSES	
IBMSOFTWARELABFOREMERGINGTECHNOLOGIES	
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 COURSES	
Spoken Tutorial- CPP	*AOC-CP-SPT-CPP*
Spoken Tutorial- PYTHON	*AOC-CP-SPT-PYTH*
Spoken Tutorial- JAVA	*AOC-CP-SPT-JAVA*
Spoken Tutorial- QCAD	*AOC-CP-SPT-QCAD*
DEPARTMENTLEVELCOURSES	
DEPARTMENTOFCIVILENGINEERING	
Basics of Remote Sensing, Geographical Information System & Global Navigation Satellite System	*AOC-DEP-CIV-RSGIS*
Practical Knowledge On Sewage Treatment Plant	*AOC-DEP-CIV-PKSTP*
DEPARTMENTOFCOMPUTERENGINEERING	
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*
Programming in Hadoop	*AOC-DEP-CSE-HDP*
Data Science with Python	*AOC-DEP-CSE-DSP*
DEPARTMENTOFELECTRICALENGINEERING	
Fundamental of Electrical Engineering and Energy studies	*AOC-DEP-EE-FEEES*
Introduction to ETAP for Electrical Engineering	*AOC-DEP-EE-ETAP*
Introduction to Electric Vehicle and Future Prospects	*AOC-DEP-EE-EVFP*
Fundamentals of Autocad and its Applications	*AOC-DEP-EE-FAA*
Introduction to State Space Modelling of Complex Engineering Problems in MATLAB	*AOC-DEP-EE-SSM*
DEPARTMENTOFELECTRONICS&COMMUNICATIONENGINEERING	
VLSI Design using Cadence Tools	*AOC-DEP-ECE-VLSI*
Introduction to Programming with MATLAB	*AOC-DEP-ECE-MATL*
Technical Writing with Latex and Zotero	*AOC-DEP-ECE-LATEX*
Circuit Maker Simulation	*AOC-DEP-EC-CMS*
DEPARTMENTOFINFORMATIONTECHNOLOGY	
Web Design & Development	*AOC-DEP-IT-WEB*
Introduction to Python Programming	*AOC-DEP-IT-PYP*
DEPARTMENTOFMECHANICALENGINEERING	
Solid Works	*AOC-DEP-ME-SW*
CATIA	*AOC-DEP-ME-CAT*
ANSYS	*AOC-DEP-ME-SYS*
DEPARTMENTOF FIRST YEAR	
Project Based Learnings	*AOC-DEP-FY-PBL*
Program on Logical Reasoning and Technical Skill Development	*AOC-DEP-FY-LRTS*
Skill Development Program in Project Oriented Training	*AOC-DEP-FY-SDPP*
Skill Development Program in Advanced C	*AOC-DEP-FY-ACP*
Skill Development Program in Machine Learning-Deep learning	*AOC-DEP-FY-SDPML*
Skill Development Program in Web Development using JAVASCRIPT and REACTJS	*AOC-DEP-FY-SDPWD*

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SECTION-1

CAMPUSLEVEL COURSES

1.1 IBM Software Lab for Emerging Technologies (IBMCareer 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 using IBM Bluemix	AOC-CP-IBM-BLU
2	Learning Business Intelligence using IBM Cognos BI	AOC-CP-IBM-COG
3	IoT Application Development and Deployment using IBM BlueMix	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 30Hourstrainingwhich is divided into basic and advanced modules.

B. THEPROCESSOFIBMCAREEREDUCATION TRAINING

```
┌─────────────────────────────────────────────────────────────────┐
│   Faculty Enablement Programs on IBM courses by IBM subject       │
│   matter experts                                                  │
└─────────────────────────────────────────────────────────────────┘
                                 │
                                 ▼
┌─────────────────────────────────────────────────────────────────┐
│          Students training by trained faculty members             │
│   Training Duration: 30Hours (Regular & Workshop mode training)   │
└─────────────────────────────────────────────────────────────────┘
                                 │
                                 ▼
┌─────────────────────────────────────────────────────────────────┐
│          Regular Assessment & End of training Evaluation          │
└─────────────────────────────────────────────────────────────────┘
                                 │
                                 ▼
┌─────────────────────────────────────────────────────────────────┐
│    Award of IBM Course Completion Certificates to Eligible        │
│    Students                                                        │
└─────────────────────────────────────────────────────────────────┘
```
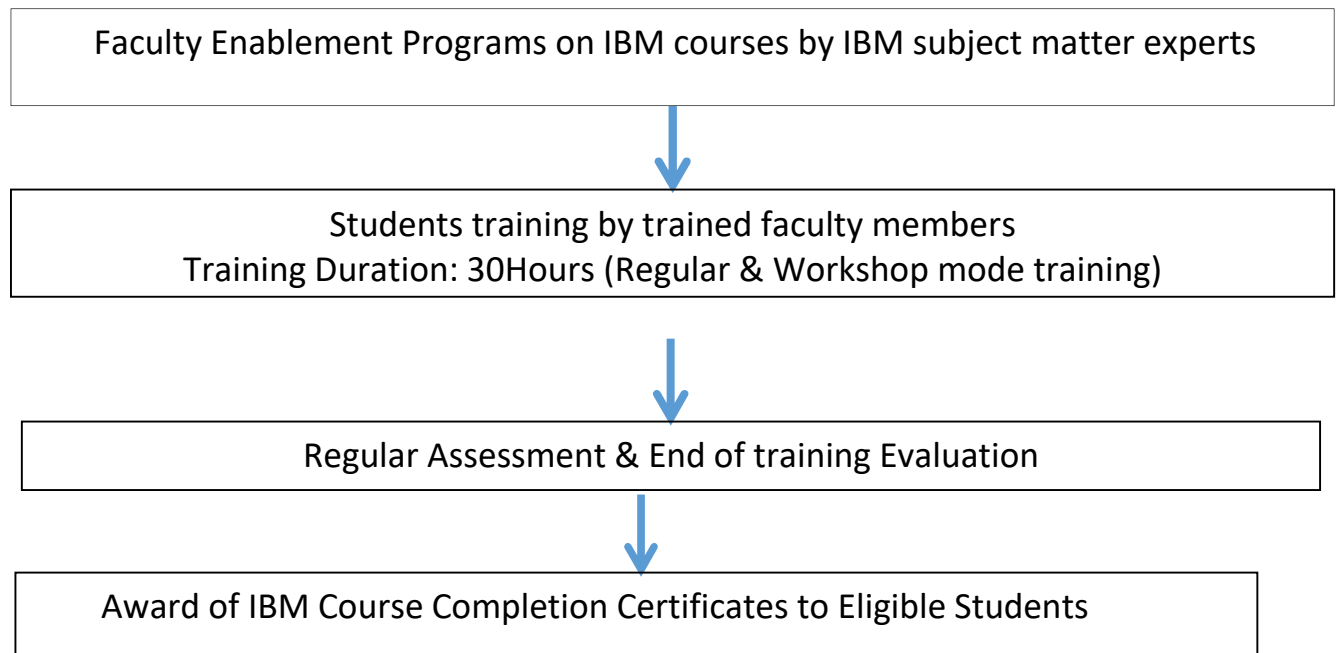
C. NUMBEROFHOURSPERCOURSE:30 HOURS

D. ENROLMENTCRITERIA

Thedurationofthecourseis30hoursandwillbeofferedtodifferentbranchesofstudentsinregularandwor kshop 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. CERTIFICATIONCRITERIA
  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 the following parameters.
      i)   Attendance (minimum75%)
      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 to IBM 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 areready 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. **MAPPINGCOURSEOUTCOMESWITHPOAND 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 and other branches.
Basic knowledge of programming and database fundamentals is assumed. To aid the students of
differentstreams, the course has a set of primers to help bridge the gaps of programming as well
as databaserelated concepts.

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 BluemixCreation 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. CourseOverview

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. Pre requisites 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. Basicknowledgeofprogrammingandelectronicsfundamentalsisrequired.Toaidthestudentsofdiffere ntstreams, 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.**

1.2 Spoken Tutorial Courses

1.2.1 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 28 enrolled students of Information technology and 27 got certificates.

Module:

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

1.2.2 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.

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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 119 enrolled students of Computer Science and Engineering and 109 got certificates.

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

1.2.3 Spoken Tutorial- JAVA

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 Java.

ii)   Students will learn about the advance constructs of JAVA.

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

Enrolled Students: There are 40 enrolled students of Information technology and 37 got certificates.

Module:

    i)   Basic Level
    ii)   Intermediate level

1.2.4 Spoken Tutorial- QCAD

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 basics of QCAD.
    ii)   Students will learn about the Drawing Methods in QCAD.
    iii)   Students will learn about the Using Modification Tools.
    iv)   Students about the modification tools to Stretch and Mirror in QCAD
    v)   Students will learn modification tools to Scale and Rotate in QCAD

Course Prerequisite: The course is aimed for B. Tech. students of Mechanical Engineering.

Enrolled Students: There are 178 enrolled students of Btech Chemical Engineering and 154 got certificates.

Module:

    i)   Introduction to QCAD
    ii)   Drawing Methods in QCAD
    iii)   Using Modification Tools
    iv)   Modification Tools to Stretch and Mirror in QCAD
    v)   Modification Tools to Scale and Rotate in QCAD

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 LEVELCOURSES

2.1 DEPARTMENT OF CIVIL ENGINEERING

LIST OF DEPARTMENT COURSES OFFERED

S. No.	Course ID	Course Name	No. of Modules	Course Duration	Course Facilitator
2.1.1	AOC-DEP-CIV-RSGIS	RS-GIS & GNSS	4	30 Hours	Mr. Balwan Sheshma
2.1.2	AOC-DEP-CIV-PKSTP	PKSTP	7	45 Hours	Mr. Siddharth

2.1.1COURSETITLE: RS-GIS & GNSS (COURSECODE: AOC-DEP-CIV-RSGIS)

1. COURSEDESCRIPTION: The Department of Civil Engineering organized a add course on Basics of Remote Sensing, Geographical Information System & Global Navigation Satellite System with IIRS Outreach Programme. The use of Remote Sensing, Geographical Information System, Global Navigation Satellite System and associated geospatial technologies is increasing rapidly, creating an urgent demand for trained manpower. IIRS utilizes the Ku- Band facility of INSAT-4CR, an ISRO Satellite and Internet, for conducting Distance Learning Programme to primarily complement the educational programmes of the Indian Universities. IIRS has established its own Teaching end studio and up linking facility in the campus under national beam coverage of ISRO satellites, connecting numerous classroom end users. Internet bandwidth is also used as an alternative option.

2. COURSEOUTCOMES:

S. No.	Course Outcomes
CO1	To remember the basic knowledge of GIS.
CO2	To understand the data preparation, data mining, data management, and data visualization.
CO3	Apply basic graphic and data visualization concepts such as color theory, symbolization, and use of white space
CO4	Demonstrate proficiency in the use of GIS tools to create maps that are fit-for-purpose and effectively convey the information they are intended to

3. MAPPINGCOURSEOUTCOMESWITHPOAND PSO

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

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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 III Year (Civil Engineering)
6. CERTIFICATION CRITERIA: Mandatory Fulfillments of Criteria1 and 2
   Criteria1:80%Attendance, and
   Criteria2:80%orabove marks in Certification Exam

7. COURSE OUTLINE:

Sn.	Course	Content	Hours	Course Coordinator
1	Basics of Remote Sensing, Geographical Information	Remote Sensing and Digital Image Analysis	7	Mr. Balwan Sheshma
2	System & Global Navigation Satellite System	Global Navigation Satellite System	8	Mr. Balwan Sheshma
		Geographical Information System	8	Mr. Balwan Sheshma
		Administration	7	Mr. Balwan Sheshma
ASSESSMENT				
3	Mock Test	MCQ paper	3	Respective Faculty
4	Group Discussion	Group discussion on general and current issues.	3	Mr. Alok Kumar
5	Personal Interview	Personal interview of each student (10-15 minutes assigned for each students) on technical topics discussed in modules	3	Mr. Siddharth

2.1.2COURSETITLE: PRACTICAL KNOWLEDGE ON SEWAGE TREATMENT PLANT (COURSECODE:AOC-DEP-CIV-PKSTP)

1. **COURSE DESCRIPTION**: The course is quite helpful for the students to get the practical knowledge regarding the Functioning and process of municipal Sewage treatment plant. Sewage treatment is the process of removing contaminants from municipal wastewater, containing mainly household sewage plus some industrial wastewater. Physical, chemical, and biological processes are used to remove contaminants and produce treated wastewater (or treated effluent) that is safe enough for release into the environment. A by-product of sewage treatment is a semi-solid waste or slurry, called sewage sludge. The sludge has to undergo further treatment before being suitable for disposal or application to land. Students are clearly understood the concept of treatment process of sewage**.**

2. **COURSEOUTCOMES**:

S. No.	Course Outcomes
CO1	To remember the concept of STP.
CO2	To understand the function of STP Units.
CO3	Apply the Knowledge of STP in field.
CO4	To analyze the different Structural Component STP.

3. **MAPPINGCOURSEOUTCOMESWITHPOAND PSO**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	-	-	-	3	2	-	-	-	-	3	-	-
CO2	2	-	3	-	-	-	2	-	-	-	-	-	-	2	-
CO3	-	-	3	2	-	-	-	-	-	-	-	-	-	-	3
CO4	-	-	3	-	-	2	-	-	-	-	-	-	-	2	-

4. **COURSE**PRE-REQUISITES:

This course provides an overview of the different treatment stage of Sewage treatment plant. It also provides the detailed calculations required to design the preliminary, primary, secondary and tertiary unit operations (sizing of different tanks) of the STP. Also this course provides details on how to design the sludge treatment system of a Sewage treatment plant. The design of a STP is explained with a help of a case study.

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

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

Criteria1:80%Attendance, and
Criteria2:80%orabove marks in Certification Exam

7. COURSEOUTLINE:

Sn.	Course	Content	Hours	Coordinator
1	Practical Knowledge on Sewage Treatment Plant	Screening and Pumping	4	Mr. Siddharth
2	Practical Knowledge on Sewage Treatment Plant	Grit Removal	5	Mr. Siddharth
3	Practical Knowledge on Sewage Treatment Plant	Primary Settling	6	Mr. Siddharth
4	Practical Knowledge on Sewage Treatment Plant	Aeration / Activated Sludge	5	Mr. Siddharth
5	Practical Knowledge on Sewage Treatment Plant	Secondary Settling	4	Mr. Siddharth
6	Practical Knowledge on Sewage Treatment Plant	Filtration	8	Mr. Siddharth
7	Practical Knowledge on Sewage Treatment Plant	Disinfection	8	Mr. Siddharth
	ASSESSMENT			
8	Mock Test	MCQ paper	5	Respective Faculty

2.2 DEPARTMENT OF COMPUTER ENGINEERING

LIST OF DEPARTMENT COURSES OFFERED IN THE SESSION

S. No.	Course ID	Course Name	No. of Modules	Course Duration	Enrolment Criteria	Certification Criteria	Course Facilitator
1.	AOC-DEP-CSE-WebD	Web Development	12	36 Hours	For II Year Students	1. 80% attendance 2. 60% Certificate Exam	Dr. Sonal Sharma
2.	AOC-DEP-CSE-DotNet	Dot Net Framework	12	36 Hours (3 hours per week for 12 weeks)	For II Year Students	1. 80% attendance 2. 60% Certificate Exam	Ms. Ankita Jiyani
3.	AOC-DEP-CSE-PJS	Programming in Java Script	12	36 Hours	For II Year Students	60% Attendance 70% Certificate Exam	Ms. Richa Mehra
4.	AOC-DEP-CSE-BCT	Blockchain Technology	12	36 Hours	For III Year Students	1. 75% attendance 2. 60% Certificate Exam	Ms. Shalini Puri
5.	AOC-DEP-CSE-CCNA	Cisco Certified Network Administrator	12	36 Hours (3 hours per week for 12 weeks)	For III Year Students	1. 60% attendance 2. 40% Certificate Exam	Dr. Sunil Gupta
6.	AOC-DEP-CSE-HDP	Programming in Hadoop	12	36 Hours	For IV Year Students	1. 75% attendance 2. 75% Certificate Exam	Mr. Md Nawaid Anjum
7.	AOC-DEP-CSE-DSP	Data Science with Python	12	36 Hours	For IV Year Students	1. 75% attendance 2. 75% Certificate Exam	Mr. Sumit Kumar

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** o Introduction to mobile devices and mobile platforms o Development environments
WEEK – 2 (3 hours)	**MODULE – 2: Architecture** o Mobile OS architectures of android o iOS and Windows o Setting up the mobile app development environment along with an emulator.
WEEK – 3 (3 hours)	**MODULE – 3: Mobile App development using android-I** o Mobile App development using android: interface design – Layout o 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** o Mobile App development using android: interface design – Layout o UI elements, Draw-able, Menu, Activity- states and life cycle o Interaction among activity, Services- states and life cycle o Notifications, Broadcast receivers, Telephony, SMS APIs o Native data handling- on device file I/O Shared preferences.
WEEK – 5 (3 hours)	**MODULE – 5: Database Connectivity-I** o Introduction to Working with mobile database (SQLite) o Interacting with database via internet/intranet o Graphics and animations- custom views, Canvas o Animation APIs, location awareness o Multimedia- audio/video playback and record Native hardware access.
WEEK – 6 (3 hours)	**MODULE – 6: Database Connectivity-II** o Animation APIs, location awareness o Multimedia- audio/video playback and record Native hardware access
WEEK-7 (3 Hours)	**MODULE – 7: Testing Phase-I** o Testing Mobile Application o Debugging mobile application o White box testing, Black box testing o Test automation of mobile apps using JUnit for android o Robotium o Monkey Talk.
WEEK – 8 (3 Hours)	**MODULE – 8: Testing Phase-II** o White box testing, Black box testing o Test automation of mobile apps using JUnit for android
WEEK – 9 (3 hours)	**MODULE – 9: Testing Phase-III** o Robotium o 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 COURSETITLE: DOT NET FRAMEWORK COURSECODE: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	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO12	PSO1	PSO2	PSO3
CO1	-	3	-	-	-	-	-	-	-	-	-	-	3	-	-
CO2	-	-	3	-	-	-	-	-	-	-	-	-	-	2	-
CO3	-	-	-	3	-	-	-	-	-	-	-	-	3	-	2
CO4	-	-	-	-	3		-	-	-	-	-	-	-	3	-

CO 5	-	-	-	-	-	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** o CLR Architecture and Services o The .Net Intermediate Language (IL) o Just- In- Time Compilation and CLS o Disassembling .Net Application to IL o Strict Type Checking **MODULE – 2: .NET FRAMEWORK CLASS LIBRARY** o System Namespace o System .Object Namespace o System .Collection Namespace o System .Type o Exception
WEEK – 2 (3 hours)	**MODULE – 3: LANGUAGE FUNDAMENTAL** o Data type and Control Constructs o Value and Reference Types o Declaring and Initializing Variables o Unicode Characters and Strings o C.T.S Type o Implicitly Typed Local Variables o Conditional Syntax o C# Operator o Looping Syntax o Structure
WEEK – 3 (3 hours)	**MODULE – 4: ARRAY & STRING** o Arrays in General o Declaring of different type Arrays o Initializing Arrays o Accessing element of different type Array Members o Arrays of Objects o Structure type array

	o Using for each with Arrays o Understanding System. String class and its various operations
WEEK – 4 **(3 hours)**	**MODULE – 5: OOPS CONCEPTS CLASSES** o Encapsulating Attribute o Class & Object Creation o Define Constructor o Type of Constructor o Define Methods and their Type o Overloading Methods and Constructor overloading o Define Property and their Types o The Memory Allocation with New Keyword o Passing Initial Values with Constructor o Invoking Property and Methods
WEEK – 5 **(3 hours)**	**MODULE – 6: INHERITANCE** o Implementing Inheritance Hierarchies o Class Access Modifiers o Method Overloading, Overriding and Hiding Concepts o Run time polymorphism o Abstract and Sealed Class o Exposing Interface o Implementation Interface in a Class o Play with Namespaces o Interface Polymorphism o Operator Overloading Partial Class
WEEK – 6 **(3 hours)**	**MODULE-7: EXCEPTION HANDLING** o Means of Error, Bug and Exceptions o Role of .Net Exception Handling o System Level Exception o Application Level Exception o Try and Catch Block o Handling Multiple Exception o Finally Block o Throw Exception on Request Custom Exception
WEEK – 7 **(3 hours)**	**MODULE-8: EVENTS AND DELEGATES** o Event Driven Programming o Delegate, Event and its association o Synchronous and asynchronous operation with delegate o User Defined events and delegates o Multicasting with Delegates o Anonymous methods www.stepconsultancy.in www.fb.com/stepconsultancy www.stepgndec.in o Anonymous Methods with events Generic Delegates

WEEK – 8 (3 hours)	**MODULE-9: MULTITHREADING** o Understand multithreading process o The System Threading namespace o The Thread and Thread Start class o Thread life cycle o Thread Safety Concept o Thread synchronization o Understanding Thread Pool o Understanding Role of Thread Background Worker Component
WEEK – 9 (3 hours)	**MODULE-10: I/O OPERATIONS WITH FILE SYSTEMS** o File and Directory Class o Marshal Classes, File Info and Directory Info o Path Class o Drive Info Class o Stream Object with Files: Stream Reader, Stream Writer o File Stream and Memory Stream
WEEK – 10 (3 hours)	**MODULE-11: INTRODUCTION TO ADO.NET** o How ADO.NET works and how it differs from ADO? o Evolution of ADO to ADO.NET **MODULE-12: ADO.NET AND IT'S ARCHITECTURE** o Connection Object o Command Object o Dataset o Data Reader Object o Data Adapter Object o Concurrency and the Disconnected Data Architecture Provider
WEEK-11 (3 Hours)	**MODULE-13: DATA SET** o Creating Tables in Dataset o Data Column o Data Row o Data Table www.stepconsultancy.in www.fb.com/stepconsultancy www.stepgndec.in o Updating, Inserting and Modification in Data Table o Saving Changes into Data Base using Command Builder o Working With Command and Connection **MODULE-14: CONNECTIONS AND COMMAND OBJECT** o Connection Object o Command Object o Execute Non Query o Execute Scala
WEEK - 12	3. **CERTIFCATION EXAMINATION** 4. **CLOSING AND VALEDICTORY CEREMONY**

2.3COURSETITLE: PROGRAMMING IN JAVA SCRIPT (COURSECODE: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	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	-

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** o What is Java Scripts? o Advantages and disadvantages o Downloading and installing o Which version of JAVA o Where to find documentation **MODULE – 2: Variables and Constants** o Let and Var Keyword o if else statements o Truthy and Falsy Values o Switch Statement
WEEK – 2 (3 Hours)	**MODULE – 3: Function and Array** o Difference between Function and Array o Example of Function and Array o Objects o How to define object o Loops o Application of Loops o Uses of Loop in Programming o Strings o Application of String o operators and expressions o Uses of String in Program
WEEK – 3 (3 hours)	**MODULE – 4: Window Object** o Controlling of Object o DOM and DOM Manipulation o Handling Click Events o Manipulating the CSS styles

WEEK – 4 (3 hours)	**MODULE – 5:High-Level Overview of JavaScript** o JavaScript Engine o JavaScript Runtime o Execution Contexts o Scope and Scope Chains **MODULE – 6: Dead Zone** o Hoisting Dead Zone (HDZ) o Temporal Dead Zone(TDZ) o
WEEK – 5 (3 hours)	**MODULE-7: Functions in Java Script** o Default Parameters o How Passing Arguments Works o First-Class Function o Higher-Order Functions **MODULE-8: Functions** o Function Definition o Returning Functions o Call Method o Apply Method o Immediately Invoked Function Expressions (IIFE)
WEEK – 6 (3 hours)	**MODULE-9: OOPs in JS** o Constructor o New Operator o ES6 Classes o Setters o Getters
WEEK-7 (3 Hours)	**MODULE-10: Inheritance** o Protected Properties o Protected Methods o Private Class Fields o Chaining Methods
WEEK – 8 (3 Hours)	**MODULE-11: Java Script Application** o Understand JavaScript statements o Learn how to comment code. o Store data in variables o Apply arithmetic, comparison and logic operators in program.
WEEK – 9 (3 Hours)	**MODULE-11: Asynchronous JavaScript** o Event loop o Promises o Async/Await o AJAX calls o APIs

WEEK – 10 (3 Hours)	MODULE-12: JS Frameworks o JS libraries o React or JS frameworks o Angular or Backbone o Advanced JavaScript concepts
WEEK – 11 (3 Hours)	MODULE-13: Basic Idea of Modern Tools o NPM o Parcel o Babel o ES6 modules
WEEK – 12 (3 Hours)	5. CERTIFCATION EXAMINATION 6. CLOSING AND VALEDICTORY CEREMONY

2.4COURSETITLE: BLOCKCHAIN TECHNOLOGY (COURSECODE: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	PO1 0	PO1 1	PO1 2	PSO 1	PS O2	PS O3
CO 1	3	-	-	-	-	-	-	-	-	-	-	-	3	-	-
CO	-	3	-	-	-	-	-	-	-	-	-	-	-	2	-

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** o What Is Blockchain? o How Blockchain Works o BlockchainVsBitcoin o Practical Applications o Public And Private Key Basics
WEEK – 2 (3 hours)	**MODULE-2: Properties of Blockchain** o Hash Function o Hash pointer and Data Structure o Blockchain Platform Implementation o Hash Function and Block Rewards o Generate Public Keys o Create a Ledger of Transactions o Validation Codes Work
WEEK – 3 (3 hours)	**MODULE-3: Blockchain Architecture** o Versions, variants o Life Use Case of Blockchain o Blockchainvs Shared Database o
WEEK-4 (3 Hours)	**MODULE-4: BitcoinBlockchain** o Introduction to bitcoin o Decentralization In Blockchain o Consensus Mechanism o Blockchain Growth Dynamics

	o Working Principles of Bitcoin o Running Nodes and Block Rewards o Incentive Mechanism o Proof of Work Properties
WEEK-5 **(3 Hours)**	**MODULE-5: Blockchain Mechanics-I** o Bitcoin Blockchain Mechanics o Bitcoin Transactions o Bitcoin Scripting Language o Application of Bitcoin Scripts
WEEK–6 **(3 hours)**	**MODULE-6: Blockchain Mechanics-II** o Bitcoin Blocks and Network o Blocks and Nodes o Forking o Hard Fork **MODULE-7: Introduction to EthereumBlockchain** o What is Ethereum? o Ethereum Insight o Advantages and Disadvantages o EthereumvsBitcoin o Introduction to Smart contracts
WEEK–7 **(3 hours)**	**MODULE-8: Ethereum Blockchain-I** o Ethereum Networks o Ethereum Design Principles o Accounts And UTXOs o Storing Blocks on The Blockchain
WEEK–8 **(3 hours)**	**MODULE-9: EthereumBlockchain-II** o Creating Contracts o Ethereum Overview o Collection Of On-Chain Smart Contracts o Contract Creation Analysis o Security Of Ethereum
WEEK-9 **(3 Hours)**	**MODULE–10: Permission and PermissionlessBlockchain-I** o Blockchain for Business o Hyper Ledger Project o Hyper Ledger Consesus o Hyper Ledger Fabric Model o Order-Execute Paradigm
WEEK-10 **(3 Hours)**	**MODULE–11: Permission and Permission lessBlockchain-II** o Trust Modules and Fabric Blockchain o Hyper Ledger Fabric and Order-Execute Paradigm o Limitations of Order-Execute Paradigm o State Machine Replication o SMR Requirements and Implementation
WEEK-11 **(3 Hours)**	**MODULE-12: Blockchain Applications** o Byzantine Tolerance and Fabric Overview

	o Endorsement Policy and Fabric Transactions Tangle in Place of Blockchain o Tangle Simulations I o Tangle Simulations II o CordaBlockchain
WEEK-12 (3 Hours)	**7. CERTIFCATION EXAMINATION** **8. CLOSING AND VALEDICTORY CEREMONY**

2.5COURSETITLE: CISCO CERTIFIED NETWORK ADMINISTRATOR (CCNA) (COURSECODE:AOC-DEP-CSE-CCNA)

1. 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.

2. 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.

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 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.

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: 40% or above marks in Certification Exam

7. WEEK-WISE COURSE OUTLINE:

WEEK	MODULE-WISE CONTENTS
WEEK – 1 **(3 Hours)**	**MODULE – 1: Introduction to Networking** o The Internet o Requirements for Internet connection o PC basics o Network interface card o NIC and modem installation o High-speed and dialup connectivity o TCP/IP description and configuration o Testing connectivity with Ping o Web browser and plug-Ins o Troubleshooting Internet connection problems **MODULE – 2: Networking Fundamentals** o Data networks o Network history o Networking devices o Network topology o Network protocols o LANs o WANs o Metropolitan-area networks o Storage-area networks o Virtual private networks o Benefits of VPNs o Intranets and extranets
WEEK – 2 **(3 hours)**	**MODULE – 3: Networking Media** o Wireless LAN organizations and standards o Wireless devices and topologies o How wireless LANs communicate o Authentication and association o The radio wave/microwave spectrum o Signals and noise on a WLAN o Wireless security
WEEK – 3	**MODULE – 4: Cable Testing**

(3 hours)	o Waves o Sine waves o Square waves o Exponents and logarithms o Decibels o Viewing signals in time and frequency o Analog and digital signals in time and frequency o Noise in time and frequency o Bandwidth
WEEK – 4 **(3 hours)**	**MODULE – 5: Cabling LANs and WANs** o LAN physical layer o Ethernet in the campus o Ethernet media and connector requirements o UTP implementation o Repeaters o Hubs o Wireless o Bridges o Switches o Host connectivity (NIC) o Peer-to-peer o Client-server o Building hubbed and switched workgroups
WEEK – 5 **(3 hours)**	**MODULE – 6: Ethernet Fundamentals** o Introduction to Ethernet o IEEE Ethernet naming rules o Ethernet and the OSI model o Naming o Framing in general o Ethernet frame structure o Ethernet frame fields
WEEK – 6 **(3 hours)**	**MODULE-7: Ethernet Operation** o Media Access Control o MAC rules and collision detection/backoff o Ethernet timing o Interframe Spacing and Backoff o Error Handling o Types of collisions o Ethernet errors o Ethernet errors: FCS and beyond o Ethernet auto-negotiation o Link Establishment and full/half duplex
WEEK-7 **(3 Hours)**	**MODULE-8: Ethernet Technologies** o 10 Mbps Ethernet o 10BASE5 o 10BASE2

	o 10BASE-T o 10BASE-T wiring and architecture o 100 Mbps Ethernet o 100BASE-TX o 100BASE-FX o Fast Ethernet architecture o Network and protocol analysis software
WEEK-8 **(3 Hours)**	**MODULE-9: Ethernet Switching** o Ethernet Switching o L2 bridging o L2 switching o Switch operation o Latency o Switch modes o Spanning Tree Protocol
WEEK-9 **(3 Hours)**	**MODULE-10:** TCP/IP Protocol Suite and IP Addressing o Introduction to TCP/IP o History and future of TCP/IP o Application layer o Transport layer o Internet layer o Network access layer o Comparing the OSI seven layer and the TCP/IP four layer models o Internet architecture o Internet Addresses o IP addressing o Decimal and binary conversion review o IP v4 addressing o Address class higher-order bits; Class A, B, C, D, and E o Reserved IP addresses o Public/private IP addresses o Introduction to subnetting o IP v4 vs. IP v6
WEEK-10 **(3 Hours)**	**MODULE-11: Routing Fundamentals and Subnets** o Routed Protocol o Routable/routed protocols o IP as a routed protocol o Packet propagation and switching with a router o Internet Protocol (IP) o Anatomy of an IP packet o IP Routing Protocols o Routing overview o Routing versus switching o Routed versus routing

	o Path determination o Routing tables o Routing algorithms and metrics o IGP and EGP o Link-state and distance vector o Routing protocols o Mechanics of Subnetting o Classes of network IP addresses o Introduction to and reason for subnetting o Establishing the subnet mask address o Applying the subnet mask o Subnetting Class A and B networks o The logical ANDing process
WEEK-11 **(3 Hours)**	**MODULE-12: TCP/IP Transport and Application Layer** o TCP/IP Transport Layer o Transport layer functions o Flow control o Session establishment, maintenance, and termination o 3-way handshake o Windowing o Acknowledgement o TCP (Transmission Control Protocol) o UDP (User Datagram Protocol) o TCP and UDP port numbers o DNS o FTP o HTTP o SMTP o SNMP o Telnet
WEEK -12 **(3 Hours)**	9. **CERTIFCATION EXAMINATION** 10. **CLOSING AND VALEDICTORY CEREMONY**

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2.6 COURSE TITLE: PROGRAMMING IN HADOOP (COURSE CODE: AOC-DEP-CSE-HDP)

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1. COURSE DESCRIPTION:

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

2. COURSE OUTCOMES:

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

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	-	-
CO2	-	-	2	-	-	-	-	-	-	-	-	-	-	2	-
CO3	-	-	-	3	-	-	-	-	-	-	-	-	3	-	-
CO4	-	-	-	-	2	-	-	-	-	-	-	-	-	2	-
CO5	-	-	-	-	-	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** o The architecture of Hadoop cluster o What is High Availability and Federation? o How to setup a production cluster? o Various shell commands in Hadoop o Understanding configuration files in Hadoop o Installing a single node cluster with Cloudera Manager o Understanding Spark, Scala, Sqoop, Pig, and Flume
WEEK – 2 **(3 hours)**	**MODULE – 2: - Introduction to Big Data Hadoop and Understanding HDFS and MapReduce** o Introducing Big Data and Hadoop o where does Hadoop fit in? o Two important Hadoop ecosystem components, namely, MapReduce and HDFS.
WEEK – 3 **(3 hours)**	o **MODULE – 3: - Deep Dive in MapReduce** o Learning the working mechanism of MapReduce o Understanding the mapping and reducing stages in MR o Various terminologies in MR like Input Format, Output Format, Practitioners, Combiners, Shuffle, and Sort.
WEEK – 4 **(3 hours)**	**MODULE – 4: - Introduction to Hive** o Introducing Hadoop Hive o Detailed architecture of Hive o Comparing Hive with Pig and RDBMS o Working with Hive Query Language o Creation of a database, table, group by and other clauses
WEEK – 5 **(3 hours)**	**MODULE-5:Advanced Hive and Impala** o Indexing in Hive o The ap Side Join in Hive o Working with complex data types o The Hive user-defined functions o Introduction to Impala o Comparing Hive with Impala

WEEK – 6 (3 hours)	**MODULE-6: - Introduction to Pig** o Apache Pig introduction and its various features o Various data types and schema in Hive o The available functions in Pig, Hive Bags, Tuples, and Fields o Working with Pig in MapReduce and local mode o Loading of data
WEEK-7 (3 Hours)	**MODULE-7: Flume, Sqoop and HBase** o Apache Sqoop introduction. o Importing and exporting data. o Performance improvement with Sqoop o Sqoop limitation. o Introduction to Flume and understanding the architecture of Flume
WEEK-8 (3 Hours)	**MODULE-8: Writing Spark Applications Using Scala** o Using Scala for writing Apache Spark applications o Detailed study of Scala o The need for Scala o The concept of object-oriented programming Executing the Scala code
WEEK-9 (3 Hours)	**MODULE -9: Spark framework** o Detailed Apache Spark and its various features o Comparing with Hadoop o Various Spark components o Combining HDFS with Spark and Scalding
WEEK-10 (3 Hours)	**MODULE-10: RDD in Spark** Understanding the Spark RDD operations o Comparison of Spark with MapReduce o What is a Spark transformation? o Loading data in Spark
WEEK-11 (3 Hours)	**Module-11: Data Frames and Spark SQL** The detailed Spark SQL o The significance of SQL in Spark for working with structured data processing. o Spark SQL JSON support o Working with XML data and parquet files o Creating Hive Context
WEEK – 12 (3 Hours)	**11. CERTIFCATION EXAMINATION** **12. CLOSING AND VALEDICTORY CEREMONY**

2.7 COURSE TITLE: DATA SCIENCE WITH PYTHON (COURSECODE: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	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	-	3	-	-	-	-	-	-	-	-	-	-	3	-	-
CO 2	-	-	3	-	-	-	-	-	-	-	-	-	-	2	-
CO 3	-	-	-	3	-	-	-	-	-	-	-	-	3	-	2
CO 4	-	-	-	-	3		-	-	-	-	-	-	-	3	-
CO 5	-	-	-	-	-	3	-	-	-	-	-	-	3	2	-

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

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

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

7. WEEK-WISE COURSE OUTLINE:

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

WEEK – 3
(3 hours)
	MODULE – 3: Getting Started
	○ Using variables
	○ String types: normal, raw and Unicode
	○ String operators and expressions
	○ Math operators and expressions
	○ Writing to the screen
	○ Command line parameters
	   Reading from the keyboard
	○ list operations
	○ list methods
	○ Strings are special kinds of lists
	   tuples
	   Array Types

WEEK – 4 (3 hours)	**MODULE – 4: Flow Control** o About flow control o Indenting is significant o The if and elif statements o while loops o Using lists o Using the for statement The range () function **Dictionaries and Sets** o Dictionary overview o Creating dictionaries o Dictionary functions o Fetching keys or values o Testing for existence of elements o Deleting elements o Sets And Frozen Sets **Functions** o Syntax of function definition o Formal parameters o Global versus local variables o Passing parameters and returning values
WEEK – 5 (3 hours)	**MODULE-5: Python Data Frames I** o Analysis, selection, and visualization techniques with Pandas Data Frames o Extracting and transforming Data Frames **MODULE-6: Python Data Frames II** o Advanced indexing o Rearranging and reshaping data Multiple keys
WEEK – 6 (3 hours)	**MODULE-7: Modules and Packages** o What is a module? o The import statement o Function aliases o Packages o RE Objects o Pattern matching o Parsing data o Sub expressions o Complex substitutions o RE tips and tricks
WEEK-7 (3 Hours)	**MODULE-8: Dictionaries and Sets** o Dictionary overview o Creating dictionaries o Dictionary functions o Fetching keys or values o Testing for existence of elements

	o Deleting elements o Sets And Frozen Sets **Importing Data in Python** o Import data into Python from flat files such as .txt and .csv o Import data into Python from files native to other software such as Excel spreadsheets, Stata, SAS, and MATLAB files o Importing Data in Python from files from relational databases such as SQLite and PostgreSQL
WEEK – 8 **(3 Hours)**	**MODULE-9: Functions** o Syntax of function definition o Formal parameters o Global versus local variables
WEEK 9 **(3 Hours)**	**MODULE-10 Importing Data in Python** o Import data into Python from flat files such as .txt and .csv o 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** o Creating Pig and Hive UDF in Python o 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**

1.

2.3 DEPARTMENT OF ELECTRICAL ENGINEERING

S. No.	Course ID	Course Name	No. of Modules	Course Duration	Course Facilitator
1	AOC-DEP-EE-FEEES	Fundamental of Electrical Engineering and Energy studies.	6	35 Hours	Mr. Manish Sharma Mr. Brijraj Singh
2	AOC-DEP-EE-ETAP	Introduction to ETAP for Electrical Engineering	5	35 Hours	Dr. HimaniGoyal Sharma Mr. Asif Iqbal Mr. Gaurav Srivastava
3	AOC-DEP-EE-EVFP	Introduction to Electric Vehicle and Future Prospects	5	35 Hours	Ms. Deepika Chauhan Mr. Krishan Kant Kataria
4	AOC-DEP-EE-FAA	Fundamentals of Autocad and its applications	5	35 Hours	Mr. Ravi Shankar Singh Mr. Mayank Sharma
5	AOC-DEP-EE-SSM	Introduction to State Space Modelling of Complex Engineering Problems in MATLAB	5	35 Hours	Dr. VirendraSangtani Mr. Brijraj Singh

2.3.1 COURSE TITLE: Fundamental of Electrical Engineering and Energy studies (COURSECODE: *AOC-DEP-EE-FEEES*)

1. **Course Summary:** This course is mainly for undergraduate First year engineering students from all specializations. This course will introduce and explain the fundamental concepts of basic electrical engineering. The basic concepts of DC and AC (Single Phase and Three phase circuits) network analysis, first order DC transients, steady state and phasors analysis of AC networks, series and parallel resonance and magnetic coupled circuits This course will also cover single phase transformer, three phase induction machine and DC machine. By the end of the course, the student should be able to gather high quality knowledge of basic electrical engineering.

2. **Course Outcomes:**
1. Students will be able to learn about basic concept of AC and DC circuits
2. Students will be able to solve the problems on network theorems

3. Students will be able to learn about AC, DC machines and about transformers
4. Students will be able to learn about electrical energy basics.

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	3
CO2					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 (II & 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 Sciences
7. Course Duration: 35 Hours

8. Course Outline:

Module	Contents	Hours
1	Basic Concepts and Basic Laws, Kirchhoff's voltage law, Kirchhoff's current law, mesh analysis, nodal analysis, resistance, inductance, capacitance, phasor diagrams, linear & non-linear circuits.	3
2	DC Network Theorems, Thevenin's theorem, Norton theorem, superposition theorem, maximum power transfer theorem, duality, and condition for maximum power transfer.	7
3	AC Circuit Analysis and Network Theorems, root mean square and average values, concept of frequency and cycles, R-L, R-C, and RLC circuits, Power triangle, concept of active power, reactive power & apparent power.	7
4	AC and DC Machines, types of AC machines, induction motors, synchronous machines, various types, operation, tests, characteristics. Types of DC machines, series motor, shunt motor, separately excited motor, applications, characteristics, operation & performance.	7
5	Transformer, ideal transformer, practical transformer, phasor diagrams, testing of transformer, analysis of losses, efficiency, concept of voltage regulation, & autotransformer.	6
6	Electrical Energy, types of energy sources, their characteristics, voltage source and current sources, emf generators, difference between energy and power, integrating devices.	5

1. **Course Summary:** This course specialization entailis based on ETAP usage for Power System Modeling, Design and Analysis. In this course, we'll be introducing basic user interface of ETAP, its functionality and different features that are useful in Power System modeling and analysis.

   ETAP is the most comprehensive analysis platform for the design, simulation, operation, and automation of generation, distribution, and industrial power systems. ETAP is developed under an established quality assurance program and is used worldwide as a high impact software. ETAP is completely localized in four languages with translated output reports in six languages. ETAP extends to a Real-Time Intelligent Power Management System to monitor, control, automate, simulate, and optimize the operation of power systems.

2. **Course Outcomes:**
1. Students will be able to learn about ETAP
2. Students will be able to learn about various features of ETAP.
3. Students will be able to apply responsive design to enable various transient problems
4. Students will be able to see future prospects of ETAP on the basis of application.

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

Module	Contents	Hours
1	Electrical Transient Analyzer Program (ETAP), Types of conductors, calculation of resistance for solid conductors, Calculation of inductance for single phase and three phase, single and double circuit lines, concept of	7

	GMR & GMD, symmetrical and asymmetrical conductor configuration with and without transposition.	
2	ETAP Toolbars, Classification of Transmission Lines, Short, medium and long line and their model representations, Nominal-T, Nominal-Pie and A, B, C, D Constants for symmetrical & Asymmetrical Network, Numerical Problems. Mathematical Solutions to estimate regulation and efficiency of all types of lines, Numerical Problems.	7
3	Mode Toolbar, Types of System Transients, Travelling or Propagation of Surges, Attenuation, Distortion, Reflection and Refraction Coefficients, Termination of lines with different types of conditions, Open Circuited Line, Short Circuited Line, T-Junction, Lumped Reactive Junctions (Numerical Problems). Bewley's Lattice Diagrams.	7
4	Analysis Toolbar, Skin and Proximity effects, Description and effect on Resistance of Solid Conductors, Ferranti effect, Charging Current, Effect on Regulation of the Transmission Line, Shunt Compensation. Corona, Description of the phenomenon, factors affecting corona, critical voltages and power loss, Radio Interference.	7
5	Summary, Types of Insulators, String efficiency and Methods for improvement, Numerical Problems, voltage distribution, calculation of string efficiency, Capacitance grading and Static Shielding	7

2.3.3COURSETITLE: Introduction to Electric Vehicle and Future Prospects
(COURSECODE:*AOC-DEP-EE-EVFP*)

1. **Course Summary:** This course specialization entails about the electric vehicles mechanics & modelling step by step to enhance the awareness about the component used in electric vehicle. Deterioration in air quality, global warming, and a decrease in petroleum resources are becoming the major threats to human beings. More and more stringent emissions and fuel consumption regulations are stimulating an interest in the development of safe, clean, and high-efficiency transportation. The global roadmap from the International Renewable Energy Agency (IRENA) to double renewables in the energy mix by 2030. In recent decades, the research and development activities related to of high efficiency, clean, and Modern Electric, Hybrid Electric Vehicles safe transportation.

2. **Course Outcomes:**
1. Students will be able to learn about govt. policies for electric vehicles in India.
2. Students will be able to learn about the element used (Power converter, battery, charger & motor etc.) in Electric vehicles.
3. Students will be able to design & modelling of Electric vehicle.
4. Students will be able to learn future trends in Electric vehicles.

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				
CO3									3				
CO4						3			3				
CO5													
Target						3			3				

4. Enrollment Criteria:

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

5. Certification Criteria: Minimum 70% marks in Certification Exam
6. Course Prerequisites: Undergraduate Student
7. Course Duration: 35 Hours
8. Course Outline:

Module	Contents	Hours
1	Over View of Electric Vehicle & Govt. Policies, Modelling Vehicle Acceleration, Acceleration performance parameters, modelling the acceleration of an electric scooter, modelling the acceleration of a small car.	7
2	Electric Vehicle Mechanics and Modelling, Electric Vehicle Modelling, Tractive Effort, Rolling resistance force, Aerodynamic drag, Hill climbing force, Acceleration force, Total tractive effort, Modelling Electric Vehicle Range, Driving cycles, Range modelling of battery electric vehicles, Constant velocity range modelling, Range modelling of fuel cell vehicles, Range modelling of hybrid electric vehicles	7
3	Power Converters, PM motor Drives and High energy batteries for EVs, Modelling and Characteristics of EV/HEV Powertrains Components- ICE Performance, Characteristics, Electric Motor Performance Characteristics - Battery Performance Characteristics, Transmission and Drivetrain Characteristics-Regenerative Braking Characteristics-Driving Cycles, Modelling and Analysis of Electric and Hybrid Electric Vehicles Propulsion and Braking, Longitudinal Dynamics Equation of Motion, Vehicle Propulsion Modelling and Analysis, Vehicle, Braking Modelling and Analysis	11
4	Charging Stations & Wireless Chargers, Handling Analysis of Electric and Hybrid Electric Vehicles, Simplified Handling Models Energy/Power, Allocation and Management, Power/Energy Management Controllers, Rule Based Control Strategies, Optimization-Based Control Strategies	7
5	Future Prospects of EVs, Control of Electric and Hybrid Electric Vehicle Dynamics, Fundamentals of Vehicle Dynamic Control, (VDC) Systems, VDC Implementation on Electric and Hybrid Vehicles – Case Studies, Rechargeable, Battery vehicles, Hybrid Vehicles, Fuel Cell Powered Bus	3

2.3.4COURSETITLE: Fundamentals of Autocad and its Applications (**COURSECODE:***AOC-DEP-EE-FAA*)

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										
CO3					3				3						
CO4									3						
CO5															
Targ et					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, Power System, Control System**
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: Introduction to State Space Modelling of Complex Engineering Problems in MATLAB **(COURSE CODE:** *AOC-DEP-EE-SSM***)**

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	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1				3					3						
CO2				3		3			3						

CO3				3						3				
CO4			3		3					3				
CO5														
Targ et			3	3	3			3		3				

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

5. Certification Criteria: Minimum 70% marks in Certification Exam
6. Course Prerequisites: **Basic Electrical Engineering, Power System, 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, basic Matllab terminology, Matrix operation, engineering examples	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, X-Y plot basics, Scale change operations, Axis properties variations.	7
5	Project Development	7

2.4 DEPARTMEN OF ELECTRONICS & COMMUNICATION ENGINEERING

S. No.	Course ID	Course Name	No. of Modules	Course Duration	Course Facilitator
1	AOC-DEP-ECE-VLSI	VLSI Design using Cadence Tools	6	30 Hours	Mr. Amit Jain
2	AOC-DEP-ECE-MATL	Introduction to Programming with MATLAB	6	30 Hours	Dr. Anila Dhingra
3	AOC-DEP-ECE-LATEX	Technical Writing with Latex and Zotero	6	30 Hours	Mr. Manish Sharma
4	AOC-DEP-EC-CMS	Circuit Maker Simulation	6	30 Hours	Dr. Garima Mathur

2.4.1 COURSE TITLE: VLSI Design using Cadence Tools **(COURSE CODE:** AOC-DEP-ECE-VLSI**)**

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

2. COURSE OUTCOMES:

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

	RTL Compiler, Virtuoso, Specter, Assura and Incisive).

3. MAPPING COURSE OUTCOMES WITH PO AND PSO

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

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

5. ENROLMENT CRITERIA: Interested Students of III Year.
6. CERTIFICATION CRITERIA: Mandatory Fulfilment of
Criteria 1: 80% Attendance, and
Criteria 2: 60% Marks in Quiz
7. WEEK-WISE COURSE OUTLINE:

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

	d) Lab 5: Xilinx Design Constraints e) Hardware Debugging
WEEK – 3 (5 hours)	**MODULE – 3:** a) Introduction to Embedded System Design using Zynq b) Create a Vivado project and use IP Integrator to develop a basic embedded system for a target board. c) Zynq Architecture d) Extending the Embedded System into Programmable Logic e) Adding Peripherals in Programmable Logic
WEEK – 4 (5 hours)	**MODULE – 4:** Introduction to Proteus a) Basics of Circuit designing b) Introduction to Symbols Introduction to Proteus a) Basics of Circuit designing b) Introduction to Symbols a) Introduction to IC/ASIC Design Flow and Mentor EDA Tools. b) Detailed Semi-Custom IC Design Flow. c) Hands-On Lab Sessions.
WEEK – 5 (5 hours)	**MODULE – 5:** a) Detailed Semi-Custom IC Design Flow (Contd) b) Hands-On Lab Sessions. c) Detailed Full-Custom IC Design Flow.
WEEK – 6 (5 hours)	**MODULE-6:** a) Hands-On Lab Sessions
WEEK - 7	**CLOSING AND VALEDICTORY CEREMONY**

2.4.2 COURSE TITLE: Introduction to Programming with MATLAB **(COURSE CODE:** AOC-DEP-ECE-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	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	-	3	-	-	-	-	-	-	-	-	-	-	3	-	-
CO2	-	-	3	-	-	-	-	-	-	-	-	-	-	2	-
CO3	-	-	-	3	-	-	-	-	-	-	-	-	3	-	2
CO4	-	-	-	-	3		-	-	-	-	-	-	-	3	-
CO5	-	-	-	-	-	3	-	-	-	-	-	-	3	2	-

4. COURSE PREREQUISITES:
It is advisable to 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 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: MATLAB basics** • 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** • 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**

2.4.3 COURSE TITLE: Technical Writing with Latex and Zotero **(COURSE CODE:**AOC-DEP-ECE-LATEX)

1. COURSE DESCRIPTION: We noticed most of the scholars looking for a 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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3-		-	-	-	-	-	-	-	-	-	-	3		-
CO2	3	3	3	3	3	-	-	-	-	-	-	-	3	2	2
CO3	3	3	-		-	-	-	-	-	-	-	-	3	-	
CO4	2	2	3	3	3		-	-	-	-	-	-	3	3	3
CO5	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 COURSETITLE: Circuit Maker Simulation **(COURSECODE:**AOC-DEP-ECE-CMS**)**

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

2. COURSE OUTCOMES:

S.No.	Course Outcomes
CO1	Apply the knowledge about the basic electronic components and its usage in electric circuits on Simulation and PCB Design of the circuit.
CO2	Develop programs using Proteus software, Printed Circuit Board (PCB) and 3D visualizer of the circuit.
CO3	Synthesis PCB in copper plate hardware by etching. Drilling to place components Soldering and Desoldering of components
CO4	Evaluate output of the hardware developed PCB with the simulation output
CO5	Create interest for learning further and making small projects.

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

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

7. WEEK-WISE COURSE OUTLINE:

WEEK	MODULE-WISE CONTENTS
WEEK – 1 (5 Hours)	**MODULE – 1:** Basics of PCB material & production 2. Types of PCB a) Single Layer PCB b) Double Layer PCB Basics of PCB material & production 2. Types of PCB a) Single Layer PCB b) Double Layer PCB • Basics of PCB material and Production • Types of PCB: Single Layer PCB, Double Layer PCB
WEEK – 2 (5 Hours)	**MODULE – 2:** • Introduction to Proteus • Basics if Circuit Designing • Introduction to Symbol
WEEK – 3 (5 hours)	**MODULE – 3:** • Introduction to PCB design. • PCB manufacturing. • Components selection and connection in Proteus. • Simple circuit schematic design.
WEEK – 4 (5 hours)	**MODULE – 4:** Introduction to Proteus a) Basics of Circuit designing b) Introduction to Symbols Introduction to Proteus a) Basics of Circuit designing b) Introduction to Symbols • Studying capacitor charging/discharging in DC circuit. • Circuit Implementation & Building Layouts using ARES.
WEEK – 5 (5 hours)	**MODULE – 5:** • Placement of Component and Routing • Enhanced Routing Technology
WEEK – 6 (5 hours)	**MODULE-6:** • Design DC power supply (Mobile Charger).
WEEK - 7	**CLOSING AND VALEDICTORY CEREMONY**

2.5 DEPARTMENTOFINFORMATION TECHNOLOGY

S. No.	Course ID	Course Name	No. of Modules	Course Duration	Course Facilitator
1	AOC-DEP-IT-WDD	Web Design & Development	12	30 Hours	Ms. Seeta Gupta
2	AOC-DEP-IT-PYP	Introduction to Python programming	14	35 Hours	Mr. Shirish Nagar

2.4.1 COURSE TITLE: Web Design & Development (COURSECODE:AOC-DEP-IT-WDD)

1. COURSE DESCRIPTION: The term "**Web Development**" refers to the process of designing, developing, and maintaining websites. Web design, web publishing, web development, and database management are all included. It is the building of an internet-based application, such as a website. The word Web Development is made up of two words, that is:

- Web: It refers to websites, web pages or anything that works over the internet.
- Development: Building the application from scratch.

Web Development can be classified into two ways:

- **Frontend Development**: The part of a website that the user interacts directly is termed as front end. It is also referred to as the 'client side' of the application. It includes HTML, CSS, JavaScript and Bootstrap
- **Backend Development**: Backend is the server side of a website. It is the part of the website that users cannot see and interact. It is the portion of software that does not come in direct contact with the users. It is used to store and arrange data. It includes PhP, Python, Java, Node.js etc.

2. COURSE OUTCOMES:

S.No.	Course Outcomes
CO1	Use different functions, variables, syntax and different technical tools for building any application
CO2	Apply the knowledge of web technology in developing web applications.
CO3	Develop solution to problems using appropriate method, technologies, framework, and web services.
CO4	Implement small to large scale project to provide live solution in web application development fields.

3. MAPPING COURSE OUTCOMES WITH PO AND PSO

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

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

4. COURSE PRE-REQUISITES:

There are no pre requisites for learning Web development. 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

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	MODULE-WISE CONTENTS
WEEK – 1 (3 Hours)	**MODULE – 1: Introduction of Web Technologies** • Introduction of web technologies • Careers in web technologies • Client and Server scripting languages • Difference b/w a Web Designer and Web Developer • Types of Websites (Static and Dynamic Websites) **MODULE – 2: Html Introduction** • What is Markup language? • Basic structure of Html • What are Html Elements? • What are Html Attributes?
WEEK – 2 (3 hours)	**MODULE – 3: Html Structured and Media Tags** • Table Tag, Div Tag, Frames, Header Tags • Paragraph, spans, pre tags • Anchor Links, Image tags, Iframe tags
WEEK – 3 (3 hours)	**MODULE – 4: Working with Forms** • Form Tag, Post and Get Method • Text Input, Text Area, Checkbox, Image Input and Radio • Select Option, Option Group, File Upload and Hidden Fields • Submit Button, Reset Button, Relation b/w Html Form and PHP • Create a Live Website Form
WEEK – 4 (3 hours)	**MODULE – 5: Introduction of CSS** • Introduction of CSS • Types of Style Sheets, Inline, Internal and External CSS

	• CSS for Website Layout and Print Layout **MODULE – 6: CSS Properties** • Type Properties, Font Properties • Block Properties, Box Model Properties • List Properties, Border Properties • Positioning Properties, Properties Useful in Real-time Designing
WEEK – 5 (3 hours)	**MODULE-7: JavaScript** • Introduction of JavaScript • Introduction of Client Side Scripting • JavaScript Introduction, JavaScript Syntax • External JavaScript, Basics of JavaScript • JavaScript Comments, Variable, Global Variable • JavaScript Data Types, Operators, If Statement • JavaScript Switch, Loop, Function
WEEK – 6 (3 hours)	**MODULE-8: PHP and Mysql** • Introduction of PHP • What is php?, Install Php, Php Example • Php echo and Print, Php $ and $$ • Php variable and constant
WEEK – 7 (3 hours)	**MODULE-9: Basics of PHP** • Php comments, Php data types • Php operators, Php if else, Switch • Php for loop, while and do while loop • Php Break
WEEK – 8 (3 hours)	**MODULE-10: PHP Functions and Arrays** • Php functions • Examples of Functions • Php Array • Examples of Arrays
WEEK – 9 (3 hours)	**MODULE-11: PHP Form, include and State Management** • Get and Post, Php Include, Php Require • Php Cookie, Php Session • Php File Upload
WEEK – 10 (3 hours)	**MODULE-12: PHP MySql** • Mysql connect. Mysql Create Database • Mysql Create Table, Mysql Select • Mysql Insert, Mysql Update • Mysql Delete, Order By • Mysql Where
WEEK - 11	1. **CERTIFCATION EXAMINATION** 2. **CLOSING AND VALEDICTORY CEREMONY**

2.4.2COURSETITLE: Introduction to Python Programming (COURSECODE:AOC-DEP-IT-PYP)

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

2. COURSE OUTCOMES:

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 exception handling, different libraries and database connectivity
CO4	Use Python IDEs like IDLE, Spyder, and PyCharm to develop programs
CO5	Design solutions of real-world computational problems using Python programs

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

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

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

Criteria 1: 80% Attendance, and

Criteria 2: 70% or above marks in Certification Exam

7. WEEK-WISE COURSE OUTLINE:

WEEK	MODULE-WISE CONTENTS
WEEK	MODULE-WISE CONTENTS
WEEK – 1 (5 Hours)	**MODULE – 1: An Overview of Python** • What is Python? • Interpreted languages • Advantages and disadvantages • Downloading and installing • Which version of Python • Where to find documentation **MODULE – 2: The Python Environment** • Structure of a Python script • Using the interpreter interactively • Running standalone scripts under Unix and Windows
WEEK – 2 (5 hours)	**MODULE – 3: Getting Started** • Using variables • String types: normal, raw and Unicode • String operators and expressions • Math operators and expressions • Writing to the screen • Command line parameters • Reading from the keyboard **MODULE – 4: Flow Control** • About flow control • Indenting is significant • The if and elif statements • while loops • Using lists • Using the for statement • The range () function

WEEK – 3 (5 hours)	**MODULE – 5: Array Types** • list operations • list methods • Strings are special kinds of lists • tuples **MODULE – 6: Working with Files** • Text file I/O overview • Opening a text file • Reading text files • Raw (binary) data • Writing to a text file
WEEK – 4 (5 hours)	**MODULE-7: Dictionaries and Sets** • Dictionary overview • Creating dictionaries • Dictionary functions • Fetching keys or values • Testing for existence of elements • Deleting elements • Sets And Frozen Sets **MODULE-8: Functions** • Syntax of function definition • Formal parameters • Global versus local variables • Passing parameters and returning values
WEEK – 5 (5 hours)	**MODULE-9: Sorting** • The sorted() function • Alternate keys • Multiple keys • Lambda functions **MODULE-10: Errors and Exception Handling** • Dealing with syntax errors • Exceptions • Handling exceptions with try/except • Cleaning up with finally
WEEK – 6 (5 hours)	**MODULE-11: Modules and Packages** • What is a module? • The import statement • Function aliases • Packages **MODULE-12: Regular Expressions** • RE Objects • Pattern matching • Parsing data • Subexpressions • Complex substitutions • RE tips and tricks

WEEK-7 (5 Hours)	**MODULE-13: Highlights of the Standard Library** • Working with the operating system • Grabbing web pages • Sending email • math and random • Accessing dates and times with datetime • Working with compressed files **MODULE-14: An Introduction to Python Classes** • About o-o programming • Defining classes • Constructors • Instance methods • Instance data • Class methods and data • Destructors
WEEK - 8	1. **CERTIFCATION EXAMINATION** 2. **CLOSING AND VALEDICTORY CEREMONY**

2.6 DEPARTMENT OF MECHANICAL ENGINEERING

S. No.	Course ID	Course Name	No. of Modules	Course Duration	Course Facilitator
1	AOC-DEP-ME-SW	Solid Works	11	32 Hours	Mr. Ratnesh Sharma
2	AOC-DEP-ME-CAT	CATIA	11	32 Hours	Mr. Sanjay Kumawat
3	AOC-DEP-ME-SYS	ANSYS	11	32 Hours	Mr. Sanjay Kumawat

2.6.1COURSETITLE: Solid Works **(COURSECODE:**AOC-DEP-ME-SW**)**

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

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

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

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

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

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

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

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

S. No.	Course Outcomes
CO1	Describe the basic features of 3D modeling software.
CO2	Apply the fundamentals of solid modeling and construct 3D model.
CO3	Develop detailed drawings of machine parts using 3D Modeling Software
CO4	Understudies will exhibit an ability to confer satisfactorily and work as a partner ethically.

4. MAPPING COURSE OUTCOMES WITH PO AND PSO

C	P	P	P	P	P	P	P	P	P	PO	PO	PO	PS	PS	PS

O	O1	O2	O3	O4	O5	O6	O7	O8	O9	10	11	12	O1	O2	O3
CO1	3	-	-	-	3	-	-	-	-	-	-	-	3	-	-
CO2	-	2	-	-	3	-	-	-	3	-	-	2	3	2	-
CO3	-	-	-	-	3	-	-	-	3	-	-	3	3	2	-
CO4	-	-	-	-	-	-	-	2	2	2	-	-	-	-	-

5. COURSE PRE-REQUISITES:

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

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

5. ENROLMENT CRITERIA: Interested Students of II Year (4ᵗʰSemester)
6. CERTIFICATION CRITERIA: Mandatory Fulfilment of Criteria 1 and 2
Criteria 1: 80% Attendance, and
Criteria 2: 70% or above marks in Certification Exam

7. WEEK-WISE COURSE OUTLINE:

WEEK	MODULE-WISE CONTENTS
WEEK – 1 (3 Hours)	**MODULE-1: SolidWorks Basics and the User Interface** Design Intent File References Opening Files The SolidWorks User Interface Using the Command Manager

WEEK – 2 (3 hours)	**MODULE-2: Introduction to Sketching** The Sketcher Workbench 2D Sketching Saving Files What are We Going to Sketch? Sketching Sketch Entities Basic Sketching Rules That Govern Sketches Design Intent Sketch Relations Dimensions Extrude Sketching Guidelines Tutorial and Exercise
WEEK – 3 (3 hours)	**MODULE-3: Basic Part Modeling** Other Sketching Tools in the Sketcher Workbench- Drawing Ellipses, Drawing Elongated Holes, Drawing Keyhole Profiles, Basic Modeling Terminology Choosing the Best Profile Choosing the Sketch Plane Details of the Part Boss Feature Sketching on a Planar Face Cut Feature View Selector Using the Hole Wizard Filleting Editing Tools Detailing Basics Drawing Views Center Marks Dimensioning Changing Parameters Tutorial and Exercise
WEEK – 4 (3 hours)	**MODULE-4: Symmetry, Draft & Patterning** **Symmetry and Draft** Constraining Sketches Boss Feature with Draft Symmetry in the Sketch Sketching Inside the Model View Options Using Model Edges in a Sketch Creating Trimmed Sketch Geometry Creating Views of Assemblies **Patterning** Why Use Patterns? Linear Pattern Circular Patterns Reference Geometry Planes Mirror Patterns Using Pattern Seed Only Sketch Driven Patterns Tutorial and Exercise

WEEK – 5 (3 hours)	**MODULE-5: Revolved Features & Shelling and Ribs** **Revolved Features** Revolved Features Building the Rim Building the Spoke Edit Material Mass Properties File Properties SolidWorks Simulation Xpress Using SolidWorks Simulation Xpress The Simulation Xpress Interface **Shelling and Ribs** Shelling and Ribs Analyzing and Adding Draft Other Options for Draft Shelling Ribs Full Round Fillets Thin Features Tutorial and Exercise
WEEK – 6 (3 hours)	**MODULE-6: Creating Dress-Up and Hole Features** **Editing: Repairs** Part Editing Editing Topics Sketch Issues Freezing Features Fillet Xpert Tutorial and Exercise
WEEK-7 (3 Hours)	**MODULE-7: Editing Features of a Model** Design Changes Part Editing Design Changes Information From a Model Rebuilding Tools Replace Sketch Entity Sketch Contours Tutorial and Exercise
WEEK-8 (3 Hours)	**MODULE-8: Working with the Drafting Workbench** **Using Drawings** More about Making Drawings Section View Model Views Broken View Detail Views Drawing Sheets and Sheet Formats Projected Views Annotations Tutorial and Exercise

WEEK-9 (3 Hours)	**MODULE-9: Assembly Modeling** Bottom-Up Assembly Modeling Creating a New Assembly Position of the First Component Feature Manager Design Tree and Symbols Adding Components Mating Components Using Part Congurations in assemblies Sub-assemblies Smart Mates Inserting Sub-assemblies Pack and Go Tutorial and Exercise
WEEK-10 (3 Hours)	**MODULE-10: Working with Assembly & Assembly Drawings** Using Assemblies Analyzing the Assemblies Checking for Clearances Changing the values of Dimensions Exploded Assemblies Exploded Assemblies Explode Line Sketch Bill of Materials Assembly Drawing Tutorial and Exercise
WEEK – 11 (2 Hours)	**CERTIFCATION EXAMINATION** **CLOSING AND VALEDICTORY CEREMONY**

2.6.2 COURSETITLE: CATIA (**COURSECODE:**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 Systems 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.

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.

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

S. No.	Course Outcomes
CO1	Understand sketcher profile toolbar, modification toolbar, constraining toolbar, iso constraining of sketches using sketcher module of 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 top down and bottom up approach. Generate assembly constraints, flexible assemblies, use of patterns in assembly

3. MAPPING COURSE OUTCOMES WITH PO AND PSO

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

4. 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.

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

7. WEEK-WISE COURSE OUTLINE:

WEEK	MODULE-WISE CONTENTS
WEEK – 1 (3 Hours)	**MODULE-1: Introduction to 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)**	1. **CERTIFCATION EXAMINATION** 2. **CLOSING AND VALEDICTORY CEREMONY**

2.6.3 COURSETITLE: ANSYS (**COURSE CODE:** AOC-DEP-ME-SYS)

1. COURSE DESCRIPTION:-A course on ANSYS (FEM) Lab is an integral part of Mechanical Engineering curriculum. Companies are gradually replacing testing verification, conceptualization and physical prototyping with simulation, as it reduces turnaround time and cost, while providing a detailed insight into design. Additional variants of products can easily be made by modifying the original CAD models, and their working can be tested under various circumstances using simulation. Predicting the performance of a component by simulating changes is something that can be done upfront and in real-time, which is where simulators are seen gaining importance.

ANSYS Mechanical Enterprise is the flagship mechanical engineering software solution that uses finite element analysis (FEA) for structural analysis using the ANSYS Mechanical interface. It

covers an enormous range of applications and comes complete with everything you need from geometry preparation to optimization and all the steps in between. We can use in Projects and further research work for the society needs.

ANSYS Workbench Mechanical Introductory course is suitable for new or occasional ANSYS Mechanical users, as well as for students or novices in structural engineering. This course teaches the basics of using ANSYS Mechanical to perform finite element analysis (FEA).

2. COURSE OUTCOMES:

S. No.	Course Outcomes
CO1	Discuss the basic features of an analysis package.
CO2	Demonstrate the deflection of beams subjected to point, uniformly distributed and varying loads
CO3	Use the modern tools to formulate and solve problems of bars, truss, beams, and plate to find stress with different loading conditions.
CO4	Applying basic principle to solve and demonstrate 1D and 2D heat transfer with conduction and convection boundary conditions.

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

4. COURSE PRE-REQUISITES:

- Knowledge of Sketching in Software like AutoCAD and Basics of FEM
- Knowledge of Subjects like, Mechanics of Solids, Heat Transfer and Vibration Engineering.
- As in previous semesters, Subjects like, Mechanics of Solids, Heat Transfer and Vibration Engineering as per the Curriculum. Basics of ANSYS has been taught in the previous semester.
- Fundamental knowledge of computers is required.
- Good Knowledge base in Design and Modeling.
- For structural analysis the concepts in subjects such as Theory of Machines and Strength of Materials should be clear.
- Good analytical skills in implementing the ideas practically can turn beginner into a true expert professional.

- For thermal analysis the concepts of Thermodynamics and fluid mechanics should be clear.

5. ENROLMENT CRITERIA: Interested Students of III Year (6thSemester)
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 FEA (Finite Element Analsys)** • Introduction to Finite Element Analysis • Basic Mechanical terminology • Different Types of Numeric Methods & Applications • History of Finite Element Method • Today's Scenario & Future of FEA • Theoretical FEM Procedure to solve Engineering Problems • Types of Modules in ANSYS- Structural, Model & Thermal Analysis • Classification of materials • Demo of working on ANSYS Software
WEEK – 2 (3 hours)	**MODULE – 2: Getting Started** • Accessing ANSYS & Understanding GUI • Utility Menu • Working on a Project • Manipulating Model • Standard Toolbar • Command Input Window • Riser/ Hide Icon • Mouse handling • ANSYS Tool Bar • User Prompt Information & Current Settings • ANSYS Main Menu • Units & Work Plane • **ANSYS Workbench Database and File format** • Practice for the GUI Working
WEEK – 3 (3 hours)	**MODULE – 3: ANSYS Engineering Data Manager** • Introduction to ANSYS Engineering data Manager • Adding custom Material to ANSYS Engineering Data • Accessing Engineering Material Libraries present in ANSYS workbench • How to apply defined material to the project. • Practice session to define Material in ANSYS • Units in ANSYS Workbench • Changing the unit system
WEEK – 4 (3 hours)	**MODULE-4: Sketching and Part Modeling in Design Modeler** • Introduction to Modeling • Introduction to Design Modeler Window • Toolbars in Design Modeler

	• Sketching in Design Modeler • Coordinate system • Work Plane • Methods of Solid Modelling • 1D, 2D And 3D Modeling (2D & 3D Space) • Sketching Practice of, Plate, Plate with Hole.
WEEK – 5 **(3 hours)**	**MODULE-5: Sketching & Modelling Practice** • Sketching Practice of , Plate, Plate with Hole, Rectangular Bar, Circular Bar • Symmetric Modelling, Axis Symmetric Modelling
WEEK – 6 **(3 hours)**	**MODULE-6: Design Modular** • Modification in Model & Changes • Fundamentals of Mechanical Stress Simulation • Pre-processing • Meshing • Applying Material to the design
WEEK-7 **(3 Hours)**	**MODULE-7: Static Structural Module** • Analysis of Cantilever Beam with Point Load • Analysis of Simply Supported beam with UDL • Analysis of Simply Supported beam with Point Load
WEEK-8 **(3 Hours)**	**MODULE-8: Modal (Vibrational Analysis)** • Modal Analysis of Simply Supported Beam • Modal Analysis of Cantilever Beam
WEEK-9 **(3 Hours)**	**MODULE-9: Post Processing & Working** • Post-processing & Results • Fundamentals of Structural Nonlinearities • Nonlinear Structural Analysis
WEEK-10 **(3 Hours)**	**MODULE-10: Practice Session** • Analysis of Block with compressive & Tensile load • **Analysis of Plate with hole for tensile load** • **Analysis of Step Bar with Compressive Load**
WEEK – 11 **(2 Hours)**	1. **CERTIFCATION EXAMINATION** 2. **CLOSING AND VALEDICTORY CEREMONY**

2.7 DEPARTMENT OF FIRST YEAR

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

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

2.7.2COURSETITLE: Program on Logical Reasoning and Technical Skill Development **(COURSECODE:** AOC-DEP-FY-LRTS**)**

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

2. **Course Outcomes:**

- **CO 1:** students will be able to have knowledge about number system, quadratic equation, percentage, simple interest, compound interest, probability, permutation - combination and Vedic mathematics.

- **CO 2:** Students will be able to analyze the problems related to syllogism, patterns, puzzles and solve them.
- **CO 3:** Students will be able to develop their soft skills like communication skill (both speaking skill and writing skill). They will study about basic rules of English grammar to improve their communication.
- **CO 4: Students** will be able to improve their reasoning and logical thinking and also apply short cut tricks to solve the problems fast.
- **CO5:** Students will be able to interpret the data and evaluate the outcomes based on it.

3. MAPPING COURSE OUTCOMES WITH POs:

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

	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

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

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

Week 1 (Module 1)	Awareness about different Competitive Exams SWOT Analysis: Self Awareness,
Week 2 (Module 2)	Basic Calculation & Simplification: Addition & Subtraction, Divisible & Multiplication, Square & Cube root
Week 3 (Module 3)	Ice Breaking Session: Self- Introduction, Team Building and Group Dynamics, Vocabulary Building
Week 4 (Module 4)	Number System: Numbers, HCF & LCM, Cyclicity, Algebraic Formulae
Week 5 (Module 5)	Public Speaking, Word & Sentence Formation, Basic Usage of Grammar, Environmental Awareness
Week 6 (Module 6)	Ratio & Proportion: Types & Problems

Week 7 (Module 7)	Time Management & Goal Setting, Stress Management, Assertiveness
Week 8 (Module 8)	Creative & Analytical skills, Language Skills, Basic Usage of Grammar
Week 9 (Module 9)	Percentage & Partnership: Explanation & Conditions
Week 10 (Module 10)	Social & Business Etiquettes- Dealing in Social &Business Environment
Week 11 (Module 11)	Profit & Loss: Basic Formulae & Problems
Week 12 (Module 12)	Time & Work: Conditions, Pipes & Cisterns, Concept of Efficiency, Problems
Week 13 (Module 13)	Letter Writing, Business Comm. E-mail Etiquettes, Telephonic Etiquettes
Week 14 (Module 14)	Inter & Intra Personal Skills, Group Communication
Week 15 (Module 15)	Leadership Skills, Pro-activeness, News Paper Reading
Week 16 (Module 16)	Time, Speed & Distance: Units of Measurements, Cases or Conditions, Boat and Streams, Problems
Week 17 (Module 17)	Listening with Understanding, Memory Enhancement, Resume & CV Writing
Week 18 (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

2.7.3COURSETITLE: Skill Development Program in Project Oriented Training **(COURSECODE:**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 software 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	**Introduction of SMD component and Machine Tools** • Drilling operation • Soldering • Cutting tools • Filling

	• CRO • Breadboard	
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

	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
Day 10		

2.7.4 COURSETITLE: Skill Development Program in Advanced C **(COURSECODE:**AOC-DEP-FY-ACP**)**

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

2. COURSE OUTCOMES:

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

3. MAPPING COURSE OUTCOMES WITH PO AND PSO

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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
(COURSECODE: 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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	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: 80% Attendance, and

Criteria 2: 60% or above marks in Certification Exam

7. WEEK-WISE COURSE OUTLINE:

Days/Time		
Day 1	**Introduction to Image Processing** • Introduction to Image Processing • Application of Image Processing • Fundamental Image Processing Steps	**Image Processing Techniques** • Image Acquisition • Image Preprocessing • Image Enhancement • Image Restoration • Morphological Processing • Image Segmentation • Object Recognition • Image Data Compression
Day 2	**Introduction to Python** • Variable Declaration • Data Types	• Loops • Conditional Programming

	• Functions	
Day 3	**Package Description for ML and Data Science** • Numpy • Pandas • Matplotlib • Seaborn	**Python Practice** • Numpy • Scipy • Scikit-learn • Theano
Day 4	**"Data Analytics Techniques, Applications and Use Cases"** **(Guest Lecture by Dr. Jagannath Singh, Associate Professor, KIIT Deemed to be University, Bhubaneswar)**	**Data Extraction & Visualization** • Define Data Science • Role of a Data Scientist • Data Acquisition techniques • Different types of Data • Evaluate Input Data • Data Extraction • Hands-On: - Loading different types of dataset in Python
Day 5	**Introduction to Machine Learning** • Need of Machine Learning • Introduction to Machine Learning • Types of Machine Learning, such as supervised, unsupervised and reinforcement learning • Why Machine Learning with Python and applications of Machine Learning.	**Supervised Learning and Linear Regression** • Introduction to supervised learning • Types of supervised learning - regression and classification • Introduction to regression • Simple linear regression • Multiple linear regression, • Assumptions in linear regression, and math behind linear regression
Day 6	**Classification based Learning** • Introduction to classification • Linear regression vs logistic regression • Confusion matrix and accuracy • True positive rate v/s false positive rate	• Threshold evaluation with ROCR. • Hands-on Exercise – Logistic regression, Confusion matrix Implementation
Day 7	**SPL**	**Unsupervised Learning** • Types of unsupervised learning • Clustering and dimensionality reduction • Types of clustering • Introduction to k-means clustering
Day 8	**Introduction to Deep Learning**	**"Evaluation Parameters for Classifiers"**

	• 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.	**(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 **(COURSECODE:** 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 ReactJSclient-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	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	2	-		-	-	-	-	-	3	-	-	-

4. COURSE PRE-REQUISITES:

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

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

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

Criteria 1: 80% Attendance, and

Criteria 2: 60% or above marks in Certification Exam

7. WEEK-WISE COURSE OUTLINE:

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