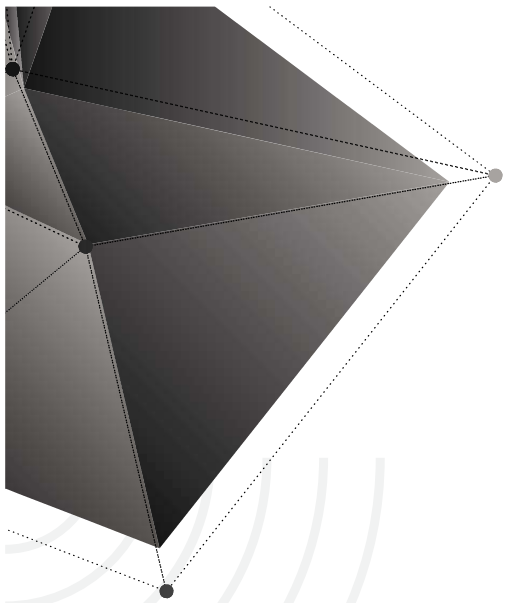
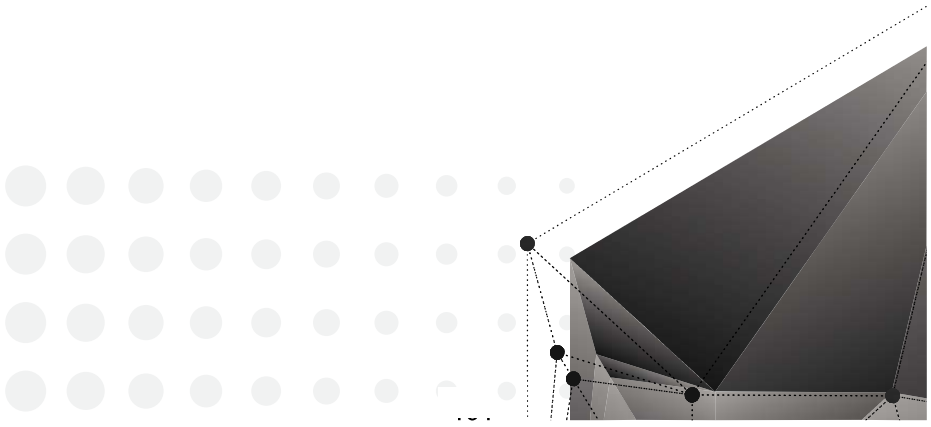


# FIFTH SEMESTER

# 'ARTIFICIAL INTELLIGENCE
# &
# MACHINE LEARNING'



# SCRIPTING LANGUAGE (PYTHON)

| | |
|---|---|
| **Course Code:** | 435001 |
| **Course Title** | Scripting Language (Python) |
| **No. of Credits** | 9 (TH:6,T:0,P:6) |

**COURSE OUTCOMES:** By the end of this course, students will be able to:

1. Demonstrate proficiency in Python programming language, including its syntax, data types, and control structures.
2. Develop scripts and programs using Python to solve real-world problems and automate tasks.
3. Utilize Python libraries and modules to enhance the functionality and efficiency of their scripts.
4. Apply object-oriented programming principles in Python to design and implement reusable code.
5. Manipulate and process data using Python's built-in data structures and libraries.
6. Implement error handling and exception management techniques to ensure robustness and reliability of their Python scripts.

## COURSE CONTENTS

**Unit - 1: Introduction, Variables and Data Types**

1.1 History

1.2 Features

1.3 Setting up path

1.4 Installation and Working with Python

1.5 Basic Syntax

1.6 Python variables, Data Types

1.7 Using string data type and string operations

1.8 Basic Operators

1.9 Understanding coding blocks

1.10 Defining list and list slicing

**Unit - 2: Control Structures**

2.1 Conditional blocks using if

2.2 Else and elif

2.3 For loops and iterations

2.4 while loops

2.5 Loop manipulation using continue, break and pass

2.6 Programming using conditional and loops block

**Unit - 3: Functions, Modules and Packages**

3.1 Organizing codes using functions

3.2 Organizing projects into modules

3.3 Importing own module as well as external modules

3.4 Understanding Packages

**Unit - 4: File I/O, Text Processing, Regular Expressions**

4.1 Understanding read, write functions

4.2 Programming using file operations

4.3 Pattern matching and searching

**Unit - 5 : Frameworks**

5.1 Overview of Django

5.2 Creating a simple Django Project

**PRACTICALS OUTCOMES:** By the end of this course the students will be able to:

1. Demonstrate proficiency in writing scripts using a scripting language.
2. Develop scripts to automate tasks and solve real-world problems.
3. Manipulate and process data using scripting language constructs and techniques.
4. Utilize built-in libraries and modules to enhance script functionality.
5. Implement error handling and exception management in scripting languages.
6. Create interactive scripts with graphical user interfaces or command-line interfaces.

**List of Practicals:**

1. Practice basic coding syntax
2. Write and execute scripts based on data types
3. Write and execute Python scripts with conditionals and loops
4. Write and execute Scripts based on Functions and Modules
5. File Processing scripts
6. Write and execute Regular Expressions
7. Write and execute SQL Queries
8. Write and execute scripts using DBI
9. Develop a simple web application

This is a skill course. More student practice and try to find solution on their own, better it will be.

**Reference Books:**


1. Taming Python by Programming, Jeeva Jose, Khanna Publishing House
2. Starting Out with Python, Tony Gaddis, Pearson
3. Core Python Programming, Wesley J. Chun, Prentice Hall
4. Python Programming: Using Problem Solving Approach, Reema Thareja, Oxford University Press.
5. Introduction to Computation and Programming Using Python. John V. Guttag, MIT Press.
6. Beginning Python using Python 2.6 and Python 3, James Payne, Wrox publishing
7. Practical Programming: An Introduction to Computer Science using Python 3, Paul Gries, The Pragmatic Bookshelf.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# INTERNET OF THINGS

| | |
|---|---|
| **Course Code:** | 435002 |
| **Course Title** | Internet of Things |
| **No. of Credits** | 9 (TH:6,T:0,P:6) |

**COURSE OUTCOMES:** By the end of this course, students will be able to:

1. Understand the fundamental concepts and principles of the Internet of Things (IoT) and its applications.
2. Design and develop IoT architectures, considering scalability, security, and interoperability.
3. Implement IoT solutions using relevant hardware platforms, software frameworks, and programming languages.
4. Apply data collection and analytics techniques to extract insights from IoT systems.
5. Analyze and evaluate the challenges and ethical considerations related to privacy, security, and data governance in IoT deployments.
6. Explore emerging trends and applications of IoT, such as smart cities, industrial IoT, healthcare, and agriculture.

## COURSE CONTENTS

**Unit 1:**

1.1 Introduction to IoT

1.2 Sensing elements

1.3 Actuation methods

**Unit - 2 :**

2.1 Basics of IoT Networking

2.2 Communication Protocols

2.3 Sensor networks

**Unit - 3 :**

3.1 Introduction to Basic Arduino programming

3.2 Integration of Sensors/Actuators to Arduino

**Unit - 4 :**

4.1 Implementation of IoT with Raspberry Pi (Overview Only)

4.2 Data Handling Analytics

**Unit - 5 :**

5.1 Case Studies of IoT applications (any one example) in the filed of :

5.1.1 Agriculture

5.1.2 Healthcare

5.1.3 Activity Monitoring

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

1. Gain a comprehensive understanding of IoT concepts, devices, protocols & networking involved in IoT systems.
2. Develop hands-on skills in sensor integration with microcontrollers like Arduino and Raspberry Pi for data sensing and actuation.
3. Configure IoT devices for communication using protocols, facilitating seamless data exchange in IoT networks.
4. Create and manage IoT sensor networks to enable data transfer between multiple nodes in the network.
5. Acquire programming skills in Arduino, for data handling, analysis, and the development of comprehensive IoT systems.

**List of Practicals:**

1. Explore different IoT devices and their applications.
2. Set up various sensors (e.g., temperature, humidity) and actuators (e.g., LEDs, motors).
3. Configure network settings for IoT devices and establish communication.
4. Implement communication protocols for data exchange.
5. Create a sensor network using multiple IoT devices and transfer data between nodes.
6. Learn Arduino programming and write basic programs for sensor-actuator interaction.
7. Connect sensors and actuators to Arduino boards and develop a comprehensive IoT system.
8. Implement IoT case studies in Agriculture, Healthcare, and Activity Monitoring.

**References:**


1. "Internet of Things (A Hands-on Approach)" by Arshdeep Bahga and Vijay Madisetti.
2. "IoT Solutions in Microsoft's Azure IoT Suite" by Scott Klein and Paolo Patierno.
3. "Raspberry Pi IoT Projects: Prototyping Experiments for Makers" by John C. Shovic and Jeff Chang.
4. "IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things" by David Hanes and Gonzalo Salgueiro.
5. "Practical Internet of Things with MQTT and RabbitMQ" by Anand Vemuri.
6. https://nptel.ac.in/noc/individual_course.php?id=noc17-cs22
7. "The Internet of Things: Enabling Technologies, Platforms, and Use Cases", by Pethuru Raj and Anupama C. Raman (CRC Press)
8. Internet of Things by Dr. Jeeva Jose, Khanna Publishing House (Edition 2017)
9. Internet of Things: Architecture and Design Principles, Raj Kamal, McGraw Hill


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# 'Elective 1-1'
# MACHINE LEARNING

| | |
|---|---|
| **Course Code:** | 435003 |
| **Course Title** | Machine Learning |
| **No. of Credits** | 5 (TH:5,T:0,P:0) |

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

1. Develop a good understanding of fundamental principles of machine learning
2. Formulation of a Machine Learning problem
3. Develop a model using supervised/unsupervised machine learning algorithms for classification/ prediction/ clustering
4. Evaluate performance of various machine learning algorithms on various data sets of a domain.
5. Design and Concrete implementations of various machine learning algorithms to solve a given problem using languages such as Python.

## COURSE CONTENTS

**Introduction:**

Machine learning, Terminologies in machine learning, Types of machine learning.

**Discriminative Models:**

Overview of Basic Algorithm used in machine learning, Basic Concept of Regression, Prediction Model.

**Multi class classification :**

Basics Idea of Support Vector Machines- Large margin classifiers, Nonlinear SVM, kernel functions.

**SMO Algorithm :**

Model evaluation and improvement, Regularization.

**Computational Learning Theory :**

Introduction to Sample complexity, Classification of Learning Types.

**Machine Learning Models :**

Brief Introduction of Various Machine Learning Models- Gaussian, Generative. Concept of Maximum Likelihood Estimate.

**Unsupervised Learning Algorithms:**

Basic Introduction of Dimensionality Reduction Principal Component Analysis (PCA), Singular Value Decomposition (SVD).

**Text Book / References**


1. Tom Mitchell, “Machine Learning”, McGraw Hill, 1997
2. E. Alpaydin, “Introduction to Machine Learning”, PHI, 2005.
3. Andrew Ng, Machine learning yearning, https://www.deeplearning.ai/machine-learningyearning/
4. AurolienGeron, ”Hands-On Machine Learning with Scikit-Learn and TensorFlow, Shroff/O’Reilly”,2017
5. Andreas Muller and Sarah Guido, ”Introduction to Machine Learning with Python: A Guidefor Data Scientists”, Shroff/O’Reilly, 2016
6. Alejandro Barredo Arrieta, Natalia D´ıaz-Rodr´ıguez, Javier Del Ser, et.al.,” Explainable Artificial Intelligence (XAI): Concepts, taxonomies, opportunities and challenges toward responsible AI, Information Fusion”, Volume 58,2020, Pages 82-115, ISSN 1566-2535, https://doi.org/10.1016/j.inffus.2019.12.012.


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## 'Elective 1-2'
## FUNDAMENTALS OF CLOUD COMPUTING

| | |
|---|---|
| **Course Code:** | 435004 |
| **Course Title** | Fundamentals of Cloud Computing |
| **No. of Credits** | 5 (TH:5,T:0,P:0) |

**COURSE OUTCOMES :** At the end of the course student will be able to-

1. Understand the fundamental concepts, motivation, and importance of data mining.
2. Apply data preprocessing techniques, including data quality assessment, reduction, transformation, cleaning, and integration.
3. Design and implement data warehouses, utilizing data cube modeling and computation for online analytical processing (OLAP).
4. Analyze patterns, associations, and correlations in data, utilizing efficient mining methods and evaluating their applications.
5. Develop classification models using various techniques, such as decision tree induction, Bayesian methods, and rule-based classification.
6. Apply cluster analysis to identify structures in data, employing different clustering approaches and outlier detection techniques.

## COURSE CONTENTS

**1. Cloud Computing: An Overview**

1.1 Introduction to Cloud Computing, its key Characteristics.

1.2 Classification of Cloud Service Models, Basic Idea of various Cloud Support Services viz.- DSaaS, AaaS, DaaS, SecaaS, IAMaaS, MaaS.

1.3 Benefits, Limitations, and Concerns associated with Cloud Computing.

**2. Cloud : Services & Standards**

2.1 Classification of basic cloud service providers.

2.2 Brief Introduction of other services available over cloud- IBM Smart Cloud, EMC IT, Microsoft Windows Azure, Salesforce Service Cloud: Knowledge as a Service, Amazon Simple Queue Service (SQS)

2.3 Cloud, Standards and Management (Overview only)

**3. Cloud Reference Frameworks**

3.1 Introduction

3.2 Characteristic features of cloud reference frameworks, common standards for cloud reference framework, brief introduction of any cloud reference framework.

**4. Virtualization**

4.1 Basic concept of virtualization, its various types, advantages, limitations of virtualization.

**5. Cloud Networks & Security**

5.1 Introduction

5.2 Characteristics of Cloud Networks

5.3 Classification of Cloud Networks

5.4 Basic Architecture of Cloud Networks

5.5 Cloud Security: Introduction, Basic Characteristics, Issues and Challenges

**References :**


1. Encyclopedia of Cloud Computing by San Murugesan, Irena Bojanova, Wiley
2. Cloud Computing: A Practical Approach by Anthony T. Velte, Toby J. Velte, Robert Elsenpeter, The McGraw Hill
3. Cloud Computing For Dummies, 2nd Edition by Daniel Kirsch, Judith Hurwitz
4. https://www.tutorialspoint.com/cloud_computing/index.htm


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## ‘Elective 2-1’
## DATA SCIENCES : DATA WARE HOUSING AND DATA MINING

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|---|---|
| **Course Code:** | 435005 |
| **Course Title** | Data Sciences:Data Warehousing and Data Mining |
| **No. of Credits** | 5 (TH:5,T:0,P:0) |

**COURSE OUTCOMES:** By the end of this course, the student will be able to:

1. Understand the fundamental concepts, motivation, and importance of data mining.
2. Apply data preprocessing techniques, including data quality assessment, reduction, transformation, cleaning, and integration.
3. Design and implement data warehouses, utilizing data cube modeling and computation for online analytical processing.
4. Analyze patterns, associations, and correlations in data, utilizing efficient mining methods and evaluating their applications.
5. Develop classification models using various techniques, such as decision tree induction, Bayesian methods, and rule-based classification.
6. Apply cluster analysis to identify structures in data, employing different clustering approaches and outlier detection techniques.

## COURSE CONTENTS

1. **Introduction**

   Importance, Basic Definitions, Data Types, Data Mining Functionalities, Classification of Data Mining Systems, Major Issues in Data Mining, Concept of Data Visualization, Major Tasks in Data Preprocessing, Data Transformation, Data Cleaning and Data Integration

2. **Data Warehousing & On-line Analytical Processing (Overview Only)**

   Data Warehouse basic concepts, Data Warehouse Design and Usage, Data Warehouse Implementation.

3. **Patterns, Associations And Correlations**

   Mining Frequent Patterns, Basic Concepts of Association, Applications of frequent pattern and associations.

4. **Classification**

   Basic Concepts, Brief Introduction of various classification methods, Basic Idea of Techniques used to Improve Classification Accuracy,

5. **Cluster Analysis**

   Basic Concept of Cluster Analysis, Clustering Structures, Basic concept of web mining.

**Reference Books :**


1. Jiawei Han, MichelineKamber, Jian Pei, Data Mining: Concepts and Techniques, Elsevier
2. Margaret H Dunham, Data Mining Introductory and Advanced Topics, Pearson Education
3. AmiteshSinha, Data Warehousing, Thomson Learning, India.
4. Xingdong Wu, Vipin Kumar, the Top Ten Algorithms in Data Mining, CRC Press, UK.


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## 'Elective 2-2'
## MULTIMEDIA TECHNOLOGIES

| | |
|---|---|
| **Course Code:** | 435006 |
| **Course Title** | Multimedia Technologies |
| **No. of Credits** | 5 (TH:5,T:0,P:0) |

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

1. Understand the foundation and concepts of multimedia, including hardware, software, operating systems, and communication systems.
2. Apply compression techniques to reduce the file size of multimedia content while maintaining acceptable quality.
3. Utilize desktop publishing tools and software to create visually appealing multimedia content.
4. Create multimedia animations and special effects using 2D and 3D animation techniques.
5. Apply digital imaging techniques within the context of multimedia production to enhance visual elements.
6. Develop multimedia applications using programming languages and frameworks to create interactive and engaging multimedia experiences.

## COURSE CONTENTS

**Unit - 1 : Introduction to Multimedia**

Multimedia Foundation and Concepts: Multimedia Hardware, Multimedia Software, Multimedia operating systems , Multimedia communication system

**Unit - 2 : Basic Compression Techniques Video and Audio Data Compression Techniques –**

Lossy and Lossless. Example algorithms/standards: Huffman, RLE, JPEG, MPEG, MP3, MP4, LZMA, FLAC, ALAC, ITU G.722, H.261, H.265

**Unit - 3 : Content Development and Distribution (Basic Idea Only)**

Desktop publishing Software (Coral Draw, Photoshop, Page maker) Multimedia Animation & Special effects (2D/3D animation, Flash)

**Unit - 4 : Introduction to Digital Imaging**

Basics of Graphic Design and use of Digital technology, Definition of Digital images, Digital imaging in multimedia

**Unit - 5 :** Introduction to Multimedia Programming and Applications

**Note :-** The faculty is advised to give the basic idea of any one of the following softwares: Coral Draw, Photoshop, Page maker.

**Reference Books:**


1. An Introduction to Multimedia Authoring, A. Eliens
2. Fundamentals of Multimedia, Prentice Hall/Pearson, Ze-Nian Li & Mark S. Drew.
3. Multimedia and Animation, V.K. Jain, Khanna Publishing House, Edition 2018
4. Fundamentals of Multimedia, Ramesh Bangia, Khanna Book Publishing Co., N. Delhi (2007)


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## 'Open Elective 1-1 '
## SMART SYSTEMS

| | |
|---|---|
| **Course Code:** | 435007 |
| **Course Title** | Smart Systems |
| **No. of Credits** | 4 (TH:4,T:0,P:0) |

**COURSE OUTCOMES:** After completion of this course students are able to:

- Identify and understand the working of sensors.
- Understand the concept of interfacing different sensors with MCU.
- Explain control techniques and standard for data transfer over the internet.
- Select packaging technology.

## COURSE CONTENTS

### 1. Introduction to Sensor Devices

Basic idea of various sensor devices: Piezoresistive pressure sensor, Accelero-meter, Capacitive Sensors, Microphone, Resonant Sensor and Vibratory Gyroscope, Low-Power, Low Voltage Sensors, Nano Sensors.

### 2. Interfacing Sensor Information and MCU

Amplification and Signal Conditioning, Integrated Signal Conditioning, Digital conversion, Sensor Interface Techniques, Sensor Integration.

### 3. Control Techniques and Standards

Basic Sensor Control Techniques (Basic Idea Only),

Brief Introduction of Various Standards used for Sensor controlling.

### 4. Communication For Smart Sensors

Wireless Data Communications- RF Sensing, Telemetry, Automotive Protocols, Industrial Networks Home Automation, MCU Protocols.

### 5. Testing and Reliability Implications of Smart Sensors

Reliability Implications, Testing Smart Sensors- HVAC Sensor Chip

**Suggested Books:**


1. Artificial Intelligence by Elaine Rich, Kevin Knight and Shivashankar B Nair, Tata McGraw Hill.
2. Introduction to Artificial Intelligence and Expert Systems by Dan W. Patterson, Pearson Education.
3. Artificial Intelligence: A Modern Approach by S. Russell and P. Norvig, Prentice Hall.


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## 'Open Elective 1-2'
## RENEWABLE ENERGY TECHNOLOGIES

| | |
|---|---|
| **Course Code:** | 435008 |
| **Course Title** | Renewable Energy Technologies |
| **No. of Credits** | 4 (TH:4,T:0,P:0) |

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

1. Understand present and future energy scenario of the world.
2. Understand various methods of solar energy harvesting.
3. Identify various wind energy systems.
4. Evaluate appropriate methods for Bio energy generations from various Bio wastes.
5. Identify suitable energy sources for a location.

## COURSE CONTENTS

**Unit - I : Introduction :**

World Energy Use; Reserves of Energy Resources; Environmental Aspects of Energy Utilization; Renewable Energy Scenario in India and around the World; Potentials; Achievements/Applications; Economics of renewable energy systems.

**Unit - II : Solar energy :**

Solar Radiation; Measurements of Solar Radiation; Flat Plate and Concentrating Collectors; Solar direct Thermal Applications; Solar thermal Power Generation Fundamentals of Solar Photo Voltaic Conversion; Solar Cells; Solar PV Power Generation; Solar PV Applications.

**Unit - III : Wind Energy :**

Wind Data and Energy Estimation; Types of Wind Energy Systems; Performance; Site Selection; Details of Wind Turbine Generator; Safety and Environmental Aspects.

**Unit - IV : Bio-Energy :**

Biomass direct combustion; Biomass gasifiers; Biogas plants; Digesters; Ethanol production; Bio diesel; Cogeneration; Biomass Applications.

**Unit - V : Other Renewable Energy Sources (Brief Idea Only):**

Tidal energy; Wave Energy; Open and Closed OTEC Cycles; Small Hydro-Geothermal Energy; Hydrogen and Storage; Fuel Cell Systems; Hybrid Systems.

**Reference Books :**


1. O.P. Gupta, Energy Technology, Khanna Publishing House, Delhi (ed. 2018)
2. Renewable Energy Sources, Twidell, J.W. & Weir, A., EFN Spon Ltd., UK, 2006.
3. Solar Energy, Sukhatme. S.P., Tata McGraw Hill Publishing Company Ltd., New Delhi, 1997.
4. Renewable Energy, Power for a Sustainable Future, Godfrey Boyle, Oxford University Press, U.K., 1996.
5. Fundamental of Renewable Energy Sources, GN Tiwari and MK Ghoshal, Narosa, New Delhi, 2007.
6. Renewable Energy and Environment-A Policy Analysis for India, NH Ravindranath, UK Rao, B. Natarajan, P. Monga, Tata McGraw Hill.
7. Energy and The Environment, RA Ristinen and J J Kraushaar, Second Edition, John Willey & Sons, New York, 2006.
8. Renewable Energy Resources, JW Twidell and AD Weir, ELBS, 2006.


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# MACHINE LEARNING IN PYTHON LAB

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|---|---|
| **Course Code:** | 435009 |
| **Course Title** | Machine Learning in Python Lab |
| **No. of Credits** | 2 (TH:0,T:0,P:4) |

**COURSE OUTCOMES:** Upon completion of the course, students will be able to:

1. Develop proficiency in fundamental programming concepts such as variables, strings, numbers, lists, tuples, and functions, and apply them to solve computational problems.
2. Acquire the skills to implement conditional statements (if statements) and iterative loops (while loops) in programming.
3. Gain knowledge and practical experience in working with essential data structures in Python, including dictionaries, and effectively manipulate and extract information from them.
4. Understand the principles of object-oriented programming (OOP) and demonstrate the ability to design and implement classes, encapsulating data and behavior within objects.
5. Gain familiarity with popular data analysis and machine learning libraries.
6. Develop practical skills in implementing various machine learning algorithms for data analysis and prediction tasks.

**LIST OF PRACTICALS:**

1. Write a Python program to perform basic input and output operations.
2. Implement a program that involves variables, strings, and numbers to solve computational problems.
3. Develop a program that demonstrates the usage of lists and tuples for data manipulation.
4. Create a program that includes user-defined functions to perform specific tasks.
5. Write a program that utilizes if statements for decision-making processes.
6. Implement a program that involves while loops and handles user input for iterative execution.
7. Develop a program that showcases the usage of dictionaries for efficient data storage and retrieval.
8. Create a program that demonstrates the principles of object-oriented programming by designing and implementing classes.
9. Demonstrate various data pre-processing techniques, such as handling missing data, encoding categorical variables, and scaling features, for a given dataset.
10. Implement dimensionality reduction using the Principle Component Analysis (PCA) method on a given dataset.
11. Write a Python program to visualize data using various techniques and libraries.

**Text Book / References**


1. Tom Mitchell, “Machine Learning”, McGraw Hill, 1997
2. E. Alpaydin, “Introduction to Machine Learning”, PHI, 2005.
3. Andrew Ng, Machine learning yearning, https://www.deeplearning.ai/machine-learningyearning/
4. AurolienGeron, ”Hands-On Machine Learning with Scikit-Learn and TensorFlow, Shroff/O’Reilly”,2017
5. Andreas Muller and Sarah Guido, ”Introduction top Machine Learning with Python: A Guidefor Data Scientists”, Shroff/O’Reilly, 2016
6. Alejandro Barredo Arrieta, Natalia D´ıaz-Rodr´ıguez, Javier Del Ser, et.al.,” Explainable Artificial Intelligence (XAI): Concepts, taxonomies, opportunities and challenges toward responsible AI, Information Fusion”, Volume 58,2020, Pages 82-115, ISSN 1566-2535, https://doi.org/10.1016/j.inffus.2019.12.012.


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# SUMMER INTERNSHIP-II

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|---|---|
| **Course Code:** | AS501 |
| **Course Title** | Summer Internship - II |
| **No. of Credits** | 3 (TH:0,T:0,P:0) |

Summer Internship provides an invaluable opportunity for students pursuing their Diploma in Engineering to gain real-world experience and exposure to various industrial production units and commercial activities related to their field of study. This program aims to bridge the gap between theoretical knowledge and practical application, equipping students with the necessary skills and expertise to thrive in the branch related industry.

At the end of the **Fourth semester,** students will undertake a minimum **6-week** Summer Internship, scheduled during the semester break following the Fourth Semester examinations. The respective Heads of Departments (HoDs) and experienced faculty members will guide and assist students in securing suitable training opportunities that align with their specialization. Each student will have a personalized training schedule developed in collaboration with the training providers, ensuring a comprehensive and enriching learning experience.

Before starting their training, students will receive a comprehensive briefing about the organizational setup, product range, manufacturing processes, and significant machinery and materials used in the training organization. This preliminary understanding will enhance their engagement and productivity during the internship.

To ensure a fruitful learning experience, faculty members will supervise students during their training in the industry or field organization. Each teacher will mentor a small group of 4-5 students, providing personalized attention and guidance. Students will be encouraged to maintain daily reports in their diaries, which will assist them in composing their final training report and presentation.

The evaluation process for the Summer Internship will include both internal and external assessments, as per the study and evaluation scheme of the **Fifth Semester.** During the viva-voce/presentation examination, students' understanding of materials, industrial processes, practices in the industry, and problem-solving abilities will be assessed. The evaluation will also focus on their application of knowledge and skills in real-life situations.

**The components of evaluation will comprise:**

**(a) Punctuality and regularity: 15%**

**(b) Initiative in learning new things: 15%**

**(c ) Relationship with peers and colleagues: 10%**

**(d) Summer Internship report: 25%**

**(e) Viva-Voce: 35%**

We believe that this Summer Internship program will be a transformative experience for our students, empowering them to excel in their future careers and make meaningful contributions to the Engineering industry. The collaborative efforts of our experienced faculty members and industry partners will ensure that students gain valuable insights and practical skills during this immersive learning journey.

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# MAJOR PROJECT-I

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|---|---|
| **Course Code:** | AS502 |
| **Course Title** | Major Project - I |
| **No. of Credits** | 1 (TH:0,T:0,P:2) |

The evaluation of Major Project-I will be conducted to assess students' understanding, application, and presentation of their chosen project topic. The following evaluation criteria will be used to measure their performance:

1. **Project Identification (10%):**
   - Clarity and relevance of the chosen project topic.
   - Demonstration of understanding of the industry or community needs addressed by the project.
   - Adequate justification for selecting the particular project topic.

2. **Project Proposal (10%):**
   - Comprehensive description of project objectives and scope.
   - Logical and well-structured methodology for project execution.
   - Feasibility of the proposed project, considering available resources.

3. **Literature Review (10%):**
   - Thoroughness of the research conducted in relevant academic and professional sources.
   - Critical analysis of existing literature, identifying gaps and potential contributions of the project.

4. **Feasibility Study (10%):**
    - Evaluation of the project's practicality and viability.
    - Assessment of potential risks and proposed mitigation strategies.

5. **Project Planning (20%):**
    - Detailed project plan, including timeline, milestones, and resource allocation.
    - Realistic budgeting and cost management strategies.

6. **Proposal Presentation (30%):**
    - Clarity and effectiveness of communication during the presentation.
    - Ability to address questions and defend the project proposal confidently.
    - Professionalism and engagement with the panel and audience.

7. **Overall Impression (10%):**
    - Demonstrated commitment and effort throughout the project.
    - Creativity and innovation in problem-solving.
    - Adherence to project management principles and best practices.

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