10

TOUCHPAD

Artificial Intelligence

Teacher's Manual

Extended Support for Teachers

ORANGE
www.orangeeducation.in
www.thetouchpad.com

Teacher's Time Table

Periods / Days	0	I	II	III	IV	BREAK	V	VI	VII	VIII
Monday										
Tuesday										
Wednesday										
Thursday										
Friday										
Saturday										

Development Milestones in a Child

Development milestones are a set of functional skills or age-specific tasks that most children can do at a certain age. These milestones help the teacher to identify and understand how children differ in different age groups.

Age 5 - 8 Years	
Physical	• First permanent tooth erupts • Shows mature throwing and catching patterns • Writing is now smaller and more readable • Drawings are now more detailed, organised and have a sense of depth
Cognitive	• Attention continues to improve, becomes more selective and adaptable • Recall, scripted memory, and auto-biographical memory improves • Counts on and counts down, engaging in simple addition and subtraction • Thoughts are now more logical
Language	• Vocabulary reaches about 10,000 words • Vocabulary increases rapidly throughout middle childhood
Emotional/Social	• Ability to predict and interpret emotional reactions of others enhances • Relies more on language to express empathy • Self-conscious emotions of pride and guilt are governed by personal responsibility • Attends to facial and situational cues in interpreting another's feelings • Peer interaction is now more prosocial, and physical aggression declines

"If you cannot do great things, do small things in a great way."

Age 9 - 11 Years	
Physical	• Motor skills develop resulting enhanced reflexes
Cognitive	• Applies several memory strategies at once • Cognitive self-regulation is now improved
Language	• Ability to use complex grammatical constructions enhances • Conversational strategies are now more refined
Emotional/Social	• Self-esteem tends to rise • Peer groups emerge

Age 11 - 20 Years	
Physical	• If a girl, reaches peak of growth spurt • If a girl, motor performance gradually increases and then levels off • If a boy, reaches peak and then completes growth spurt • If a boy, motor performance increases dramatically
Cognitive	• Is now more self-conscious and self-focused • Becomes a better everyday planner and decision maker
Emotional/Social	• May show increased gender stereotyping of attitudes and behaviour • May have a conventional moral orientation

Managing the children's learning needs according to their developmental milestones is the key to a successful teaching-learning transaction in the classroom.

"Family is the most important thing in the world."

Teaching Pedagogies

Pedagogy is often described as the approach to teaching. It is the study of teaching methods including the aims of education and the ways in which such goals can be achieved.

Lesson Plans

A lesson plan is the instructor's road map which specifies what students needs to learn and how it can be done effectively during the class time. A lesson plan helps teachers in the classroom by providing a detailed outline to follow in each class.

A lesson plan addresses and integrates three key components:

- Learning objectives
- Learning activities
- Assessment to check the student's understanding

A lesson plan provides an outline of the teaching goals:

Before the class:

1. Identify the learning objectives.
2. Plan the lesson in an engaging and meaningful manner.
3. Plan to assess student's understanding.
4. Plan for a lesson closure.

↓

During the class:

Present the lesson plan.

↓

After the class:

Reflect on what worked well and why. If needed, revise the lesson plan.

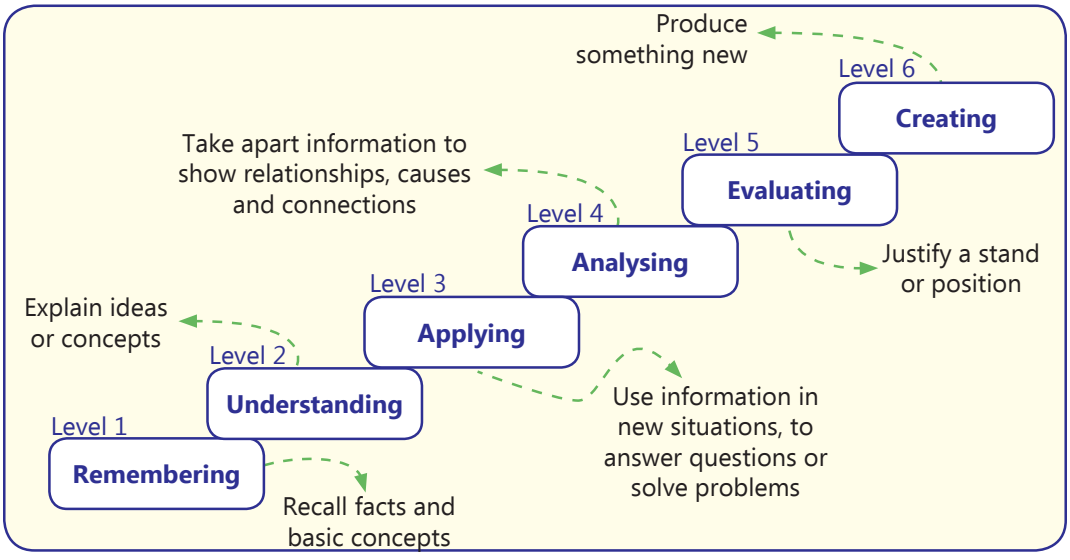
"Knowing yourself is the beginning of all wisdom."

Teaching Strategies

Numerous strategies have evolved over the years to facilitate the teaching-learning process in the classrooms.

Bloom's Taxonomy

Bloom's Taxonomy was created by **Dr Benjamin Bloom** and several of his colleagues, to promote higher forms of thinking in education instead of rote learning. There are three domains of learning: cognitive (mental), affective (emotional), and psychomotor (physical). However, when we refer to Bloom's Taxonomy we speak of the cognitive domain. Bloom's Taxonomy is a list of cognitive skills that is used by teachers to determine the level of thinking their students have achieved. As a teacher, one should attempt to move students up the taxonomy as they progress in their knowledge.



Teachers should focus on helping students remember information before expecting them to understand it, helping them understand it before expecting them to apply it to a new situation, and so on.

"If you have no confidence in self, you are twice defeated in the race of life."

Class 10

LESSON PLAN

Artificial Intelligence

Part-A: Employability Skills

1. Communication Skills-II

Teaching Objectives

Students will learn about

- Communication
- Communication Cycle
- Impact of Body Language
- Effective Communication
- 7Cs of Effective Communication
- Measures to Overcome Barriers in Effective Communication
- Basic Writing Skills
- Parts of Speech
- Learning Objectives of Effective Communication
- Different Methods of Communication
- Feedback
- Principles of Effective Communication
- Barriers in Effective Communication
- What is a Sentence?
- Use of Articles

Number of Hours
Theory
10

Teaching Plan

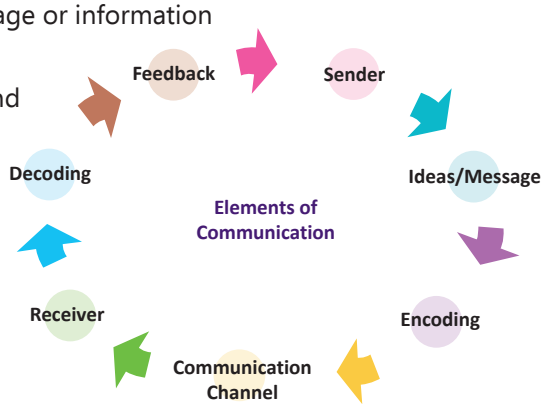
While teaching this chapter, tell the students that the word 'Communication' comes from the Latin word 'Communicare', means 'to share'.

Share the learning objectives of effective communication with the students:

- Development of interpersonal skills
- Sending, receiving and understanding the message or information
- To express effectively with maximum efficiency.

Explain the communication cycle to the students and the phases it involves:

- Sender
- Message
- Encoding
- Communication Channel
- Receiver



- Decoding
- Response/Feedback

Show the students the Methods and Types of Communication along with its advantages and disadvantages:

- Verbal Communication
- Non-Verbal Communication
- Visual Communication

Teach the students about the impact of Body Language and its Do's and Dont's.

Tell the students about the characteristics and importance of feedback and also teach types of feedback.

Teach them how to make an effective communication, its principles and 7Cs.

Define the types of barriers and measures to overcome barriers to the students in easy language for better understanding where:

Explain the following to the students with their proper purpose in detail:

- Sentence and its rules
- Phrase
- Parts of Sentence
- Parts of Speech
- Types of Sentences
- Articles and its uses

Ask the students to solve the task given on pages 29, 34 and 35 as **AI Task**.

Ask the students to read the **Brainy Fact** given on pages 22 and 31.

Extension

Ask the students some oral questions based on this chapter.

Q. What is Communication?

Q. What are the method of communication?

Q. Explain communication cycle.

Q. What is the importance of feedback?

Q. Explain the barriers in effective communication.

Q. Explain the 7Cs of communication.

Q. Define:

a. Sentence and its Kind
b. Phrase
c. Parts of Sentence
d. Parts of Speech
e. Articles
f. Definite Articles

Evaluation

Encourage the students to walk-through the chapter thoroughly.

After explaining the chapter, let the students do the exercises given on pages 39 to 47 in the main course book as **Exercise(Solved and Unsolved Questions) and Previous Years' Questions**.

Take the students to the computer lab and let them practice the activity given in **Lab Activity** section on page 47 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment Activity.

Ask the students to practice the activity in class given in **Class Activity** section given on Page 48 in the main course book. This will help the students to Communicate in a polite way and they will improve their writing skills and verbal skills.

Suggested Activity

Ask the students to go nearby market or shopping mall to observe how shopkeepers and salespersons are communicating.

2. Self Management Skills-II

Teaching Objectives

Students will learn about

- What is Stress?
- What is Stress Management?
- Steps to Manage Stress
- How can Students Manage Stress?
- How to Become Self-Reliant
- Stress Causing Agents
- Need of Stress Management
- Stress Management Techniques
- Working Independently
- Time Management and Its Importance

Number of Hours
Theory
10

Teaching Plan

While teaching this chapter, tell the students that self-management is the modus of applying and using one's self characteristics in a righteous and responsible way.

Introduce the students to Stress and also explain them how to manage stress & work independently.

Share the agents that causes stress with the students in details:

- Mental
- Physical
- Social
- Financial

Tell the students what measure are to be followed to reduce stress:

- Physical Exercise
- Time Management
- Yoga
- Meditation
- Enjoyment
- Vacation
- Nature Walks

Explain the following to the students in detail:

- What is stress management?
- Need of stress management
- Steps to manage stress
- Stress Management Techniques
- How can students manage stress?
- Work independently
- How to become self-reliant?

Share the information about self-awareness to the students which are further divided into external and internal.

Tell the students about self-motivation and how to get motivated while using real life examples.

Explain the meaning of self-regulation to the students.

Tell the students about time management and its importance. Also, tell four steps for Effective Time Management.

Ask the students to solve the task given on pages 51, 55 and 56 as **Task**.

Extension

Ask the students some oral questions based on this chapter.

Q. What is self-management?

Q. What is stress?

Q. What measure can be taken to reduce stress?

Q. What is self-awareness?

Q. What is self-motivation?

Q. What is self-regulation?

Evaluation

Encourage the students to walk-through the chapter thoroughly.

After explaining the chapter, let the students do the exercises given on pages 59 to 64 in the main course book as **Exercise(Solved and Unsolved Questions) and Previous Years' Questions**.

Take the students to the computer lab and let them practice the activity given in **Lab Activity** section on page 64 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment Activity.

Ask the students to practice the activity in class given in **Class Activity** section given on page 65 in the main course book. This will help the students to understand the importance of all Self Management.

Suggested Activity

Ask the students to make their monthly time-table and set daily targets to prepare for the board examinations.

3. ICT Skills-II

Teaching Objectives

Students will learn about

- Computer System— Introduction
- Windows 10 Operating System
- What is a Folder?
- Computer Care and Maintenance
- Operating System
- What is a File?
- Creating and Managing Files and Folders
- Cleaning Computer Components

- ☞ Preparing Maintenance Schedule
- ☞ Increasing Computer Performance
- ☞ Protecting Computer against Viruses
- ☞ What are Temporary Files?
- ☞ Creating a Backup of Your Data
- ☞ Removing Spam Email from Your Computer
- ☞ Protecting Your Data

Number of Hours
Theory
10

Teaching Plan

Tell the students about that a computer system is a combination of hardware and software components that help in doing the required task.

Teach them about three types of software.

Tell the students that an operating system refers to the set of programs that provides an interface to use the resources of computer system effectively and efficiently.

Explain the important functions of operating systems and where it is commonly used to the students.

Teach the students that windows 10 is a Graphical user interface operating system developed by Microsoft in 2015. Also tell them about components of its Desktop.

Explain the following to the students in detail.

- What is a file?
- What is a folder?
- Creating and managing files and folders
- Computer care and maintenance
- Cleaning computer components
- Preparing maintenance schedule
- Creating a backup of your data
- Increasing computer performance
- Removing spam email from your computer
- Proctecting computer against viruses
- Protecting your data
- What are temporary files?

Ask the student to solve the exercise given on pages 71 and 81 as **Task**.

Ask the students to read the **Brainy Fact** given on pages 71, 72, 77 and 79.

Extension

Ask the students some oral questions based on this chapter.

Q. How does operating system act as a messenger between hardware and application program?

Q. Differentiate between CUI and GUI.

Q. What is Network OS?

Q. Write any four (4) functions of OS.

Q. What is a file?

Q. What is a file system?

Q. Give any four (4) points to be kept in mind while cleaning the computer.

Q. How we can create a backup of our data?

Evaluation

Encourage the students to walk-through the chapter thoroughly.

After explaining the chapter, let the students do the exercises given on pages 82 to 89 in the main course book as **Exercise (Solved and Unsolved Questions) and Previous Years' Questions**.

Take the students to the computer lab and let them practice the activity given in **Lab Activity** section on page 90 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment Activity.

Ask the students to practice the activity in class given in **Class Activity** section given on Page 90 in the main course book. This will help the students to know the working of computer.

Suggested Activity

Ask the students to create a word file on any of the following topics:

- Linux
- Disk Operating System
- Windows Operating System
- Mobile Operating System

4. Entrepreneurial Skills-II

Teaching Objectives

Students will learn about

- ☞ Entrepreneurship and Society
- ☞ Qualities of an Entrepreneur
- ☞ Role of an Entrepreneur
- ☞ Myths/Misconceptions about Entrepreneurship
- ☞ Entrepreneurship as a Career Option
- ☞ Work Done by an Entrepreneur
- ☞ Functions of an Entrepreneur
- ☞ Importance of Entrepreneurs

Number of Hours
Theory
15

Teaching Plan

While teaching this chapter, tell the students that entrepreneur is a person who makes his own business in an innovative manner and bears all the risk in the hope of gaining much profit and contributing to the economy of the country.

Tell them about entrepreneurship and society.

Teach them about the work done by an Entrepreneur.

Explain the qualities of entrepreneurs to the students.

- Hard Working
- Optimistic
- Independent
- Energetic
- Self-Confident
- Perseverant

Define the functions of an entrepreneur in detail with the students:

- Entrepreneurial Functions
- Promotional Functions
- Managerial Functions
- Commercial Functions

Show the role and importance of an entrepreneur to the students.

Explain the myths/misconceptions about entrepreneurship.

Define the entrepreneurship as a career option to students in detail.

Ask the students to solve the task given on page 97 and 100 as **Task**.

Ask the students to read the **Brainy Fact** given on page 97.

Extension

Ask the students some oral questions based on this chapter.

Q. Explain myths about entrepreneurship.

Q. Define entrepreneurship as a career option.

Q. When is entrepreneurship successful?

Q. How does entrepreneurship play an important role in the life cycle of society?

Q. List the qualities of an entrepreneur.

Q. What are the functions of an entrepreneur?

Evaluation

Encourage the students to walk-through the chapter thoroughly.

After explaining the chapter, let the students do the exercises given on pages 100 to 105 in the main course book as **Exercise(Solved and Unsolved Questions) and Previous Years' Questions**.

Take the students to the computer lab and let them practice the activity given in **Lab Activity** section on page 105 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment Activity.

Ask the students to practice the activity in class given in **Class Activity** section given on page 106 in the main course book. This will help the students to know about entrepreneurs and how to become an entrepreneur.

Suggested Activity

Ask the students to make a power point presentation on Successful Entrepreneurs of India.

5. Green Skills-II

Teaching Objectives

Students will learn about

- What is Sustainable Development?
- Importance of Sustainable Development
- Problems Related to Sustainable Development
- Challenges to Sustainable Development
- Sustainable Development Goals— Agenda 2030
- Sustainable Development Initiatives in India
- Our Role in Sustainable Development

Number of Hours
Theory
5

Teaching Plan

While teaching this chapter, tell the students that humans interact with the environment to get food, water, fuel and many other things. It is very important for the survival of all our lives.

Define sustainable development to the students and importance of sustainable development.

Explain the problems related to sustainable development to the students.

Explain the following challenges to sustainable development in detail:

Explain the meaning of Sustainable Development Goals – Agenda 2030 in detail:

- Goal 1
- Goal 2
- Goal 3
- Goal 4
- Goal 5
- Goal 6
- Goal 7
- Goal 8
- Goal 9
- Goal 10
- Goal 11
- Goal 12
- Goal 13
- Goal 14
- Goal 15
- Goal 16
- Goal 17

Tell the students that the Government of India has started many policies at the central level and state level in the direction of achieving SDGs. Some of these Sustainable Development Initiatives in India are:

- Swachh Bharat Mission
- Beti Bachao Beti Padhao
- Pradhan Mantri Awas Yojana

- Smart Cities
- Pradhan Mantri Jan Dhan Yojana
- Pradhan Mantri Ujjwala Yojana

Explain our role in sustainable development which are:

- Quality Education
- Affordable and Clean Energy
- Reduced Inequalities
- Responsible Consumers and Producers
- Protect Life on Land
- Clean Water and Sanitation
- Decent Work and Economic Growth
- Sustainable Cities and Communities
- Protect Life Below Water

Ask the student to solve the exercise given on page 111 as **Task**.

Ask the students to read the **Brainy Fact** given on page 109.

Extension

Ask the students some oral questions based on this chapter.

Q. Name any 10 sustainable development goals.

Q. Give another name for Sustainable goals.

Q. What is sustainable development?

Q. What is the importance of sustainable development?

Q. What are the problems related to sustainable development?

Evaluation

Encourage the students to walk-through the chapter thoroughly.

After explaining the chapter, let the students do the exercises given on pages 113 to 117 in the main course book as **Exercise (Solved and Unsolved Questions) and Previous Years' Questions**.

Take the students to the computer lab and let them practice the activity given in **Lab Activity** section on page 118 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment Activity.

Ask the students to practice the activity in class given in **Class Activity** section given on Page 118 in the main course book. This will help the students to know about the importance of Sustainable Development.

Suggested Activity

Ask the students to make poster on any one of the Sustainable Development Goals.

Class 10

LESSON PLAN

Artificial Intelligence

Part B-Subject Specific Skills

1. Introduction to AI

Teaching Objectives

Students will learn about

- What is Intelligence?
- Decision Making
- How do Machines become Intelligent?
- What is not AI?
- Domains of AI
- Types of Intelligence
- What is Artificial Intelligence?
- Applications of AI Around Us
- AI and Related Terminologies
- AI Ethics

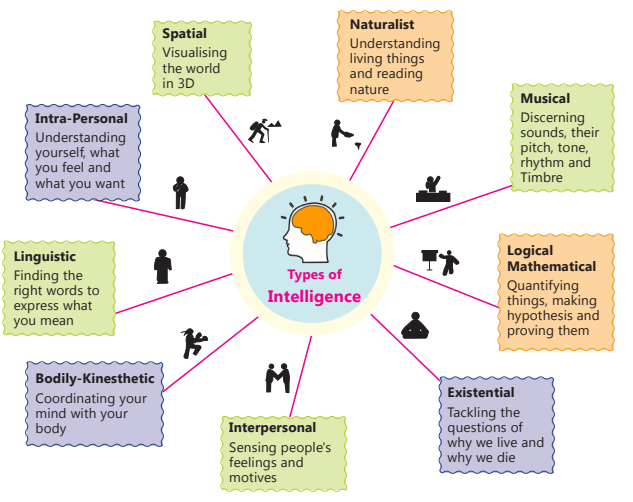
Number of Hours	
Theory	Practical
8	10

Teaching Plan

While teaching this chapter tell the students that Intelligence is how good you are in languages or science or music or art. You cannot be naturally skilled at the same things that include your school subjects, music, sports etc.

Define the types of intelligence:

- Intrapersonal Intelligence
- Spatial Intelligence
- Naturalist Intelligence
- Musical Intelligence
- Logical-Mathematical Intelligence
- Existential Intelligence
- Interpersonal Intelligence
- Bodily-kinesthetic Intelligence
- Linguistic Intelligence



Tell the students that decision making is the process of comparing our different alternatives and coming to a conclusion on what exactly you want to do. It is a process of selection which is more satisfactory than other options.

Explain the students that Artificial Intelligence is the science and engineering of making intelligent machines. It is a technique of getting machines to work and behave like humans.

Tell the students that machines become intelligent with the algorithms that are fed into them by developers. They are trained with information that makes them intelligent to achieve the desired output.

Share the applications of AI around us which are:

- Google Search
- Digital Assistants
- Google Maps
- Preferred Recommendations
- Ridesharing Apps
- AI based Games
- Healthcare
- Chatbots

Tell the students about what is not AI and give them proper examples in detail.

Tell the students more about AI and related terminologies.

Explain the domains of AI which are:

- Data Science
- Computer Vision
- Natural Language Processing

Define the AI Ethics to the students which are:

- Data Privacy
- Unemployment
- AI Bias
- AI Access
- AI for Kids

Ask the student to solve the exercise given on pages 123, 124, 133, 134, 135, 136, 137 as **AI Task**.

Ask the students to read the **Brainy Fact** given on pages 131, 133 and 135.

Make sure to ask the students to scan and watch the video given on page 137. Encourage the students to use the internet and search about chatbots.

Extension

Ask the students some oral questions based on this chapter.

Q. What is intelligence?

Q. Define the following:

a. Intrapersonal Intelligence
b. Spatial Intelligence
c. Naturalist Intelligence
d. Musical Intelligence
e. Logical-Mathematical Intelligence
f. Existential Intelligence
g. Interpersonal Intelligence
h. Bodily-kinesthetic Intelligence
i. Linguistic Intelligence

Q. What is decision making?

Q. What is Artificial Intelligence?

Q. How do machines become intelligent?

Q. Define the following application of AI:

a. Google Search b. Digital Assistants c. Google Maps

d. Preferred Recommendations e. Ridesharing Apps

f. AI based Games g. Healthcare h. Chatbots

Q. Define the following:

a. Data Science b. Computer Vision c. NLP

Q. Define the following:

a. Data Privacy b. Unemployment c. AI Bias

d. AI Access e. AI for Kids

Evaluation

Encourage the students to walk-through the chapter thoroughly.

After explaining the chapter, let the students do the exercises given on pages 138 to 146 in the main course book as **Exercise (Solved and Unsolved Questions) and Previous Years' Questions**. Tell them to solve the critical and computational skill developing exercises as **AI in Life** and **AI Deep Thinking** given on page 144 and 145. Ask the students to think and answer the exercise as **AI Ready 1** given on page 147.

Take the students to the computer lab and let them practice the activity given in **AI Lab** section on page 145 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment Activity.

Suggested Activity

Ask the students to give a presentation on the topics below:

- Domains of AI
- Applications of AI
- AI Ethics
- AI and its types

2. AI Project Cycle

Teaching Objectives

Students will learn about

- ☞ Introducing AI Project Cycle
- ☞ Stages of AI Project Cycle
- ☞ Neutral Network

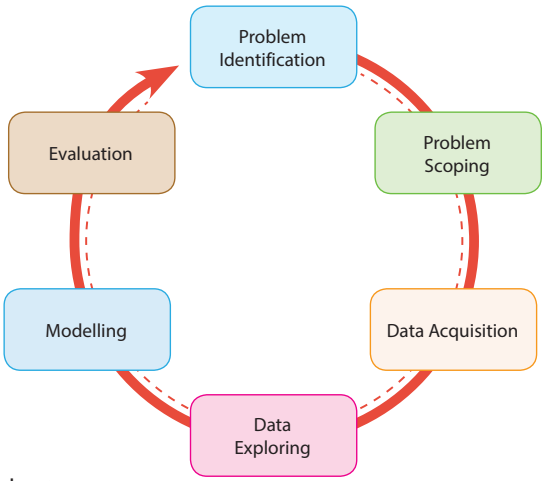
Number of Hours	
Theory	Practical
8	10

Teaching Plan

Before Tell the students that project cycle is the steps taken to complete a task from the beginning to its end. AI project cycle provides us with a framework of planning, organising, executing and implementing an AI project to achieve a target.

Define the stages of AI project cycle. There are mainly five stages of developing an AI Project:

1. Problem Scoping
2. Data Acquisition
3. Data Exploration
4. Modelling
5. Evaluation



Define the different ways to visualise data to the students.

Share the meaning of Neural Networks and why do we use them to the students along with the working of it.

Ask the student to solve the exercise given on page 162 as **AI Reboot**.

Ask the students to solve the task given on page 148 as **AI Task**.

Make sure to ask the students to scan and watch the video given on page 161. Encourage the students to use the internet and search about the uses of data visualisation techniques.

Extension

Ask the students some oral questions based on this chapter.

Q. What is a project cycle?

Q. Define the following stages of AI project cycle:

1. Problem Scoping
2. Data Acquisition
3. Data Exploration
4. Modelling
5. Evaluation
6. Bullet graphs
7. Histogram
8. Scatter plot
9. Tree diagram and flow chart
10. Supervised and unsupervised learning

Q. What do you mean by neural networks?

Evaluation

Encourage the students to walk-through the chapter thoroughly.

After explaining the chapter, let the students do the exercises given on pages 162 to 172 in the main course book as **Exercise (Solved and Unsolved Questions) and Previous Years' Questions**. Tell them to solve the critical and computational skill developing exercises as **AI in Life** and **AI Deep Thinking** given on page 169. Ask the students to think and answer the exercise as **AI Ready 2** given on page 173.

Take the students to the computer lab and let them practice the activity given in **AI Lab** section on Page 169 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment Activity.

Suggested Activity

Ask the students to draw the stages of AI Project Cycle in an A-3 size sheet.

3. Advance Python

Teaching Objectives

Students will learn about

- Introduction to Anaconda
- What is a Virtual Environment?
- Introduction to Python
- Applications of Python
- Understanding Jupyter Notebook
- Working with Jupyter Notebook
- Why Python for Artificial Intelligence
- Recap of Python Basics

Number of Hours	
Theory	Practical
10	30

Teaching Plan

Start the chapter by giving an introduction of Anaconda to the students by stating the brief history of it.

Tell the students that Anaconda Prompt is an Command Line Interface (CLI) used for Python programming.

Show the detailed and labelled steps to the students for installing Anaconda for Windows.

Make sure that students understand Jupyter Notebook and to work on it properly. Also, share the steps to install Jupyter with the students.

Explain the meaning of Virtual environment to the students along with the detailed steps on how to create a virtual environment.

Share the information with the students about working with Jupyter Notebook and how to install the same easily in Windows. Make sure to share the detailed steps with the students for better understanding.

Tell the students about the interface of Jupyter Notebook and explain the role of tools available in this interface:

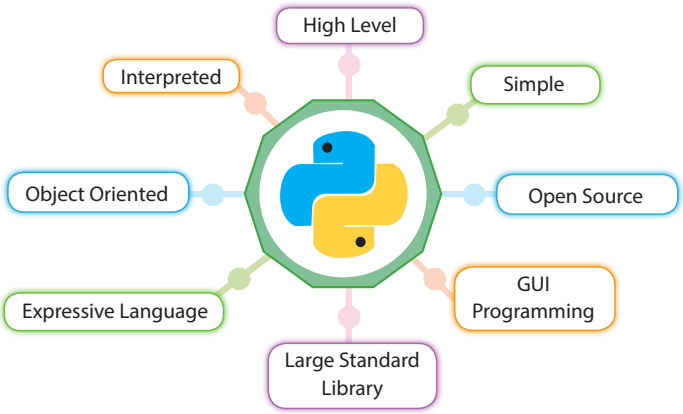
- Save
- Add
- Cut
- Copy
- Paste
- Shift
- Run
- Stop

Define the menus and tabs present in the interface windows which are:

- File Menu
- Edit Menu
- View Menu
- Insert Menu
- Cell Menu
- Kernel Menu
- Widgets Menu
- Help Menu

Introduce Python to the students in brief along with a little history.

Explain to the students that why Python used for Artificial Intelligence in detail and share all the points that are required to fulfil the answer of this query.



Share the variety of applications of Python with the students in detail with their purpose.

Do a recap of basics of python for the students taught in Class 9 and explain the following:

- Python Character Set
- Statement in Python (Simple, Multiline, and Multiple)
- Comments (Single line and Multi line)
- Keywords
- Identifiers
- Variables
- Data Types (Numbers, None, Sequence, Boolean, Sets, Maps, and Dictionary)
- Operators (Arithmetic, Comparison or Relational, Logical, Assignment, Augmented Assignment)
- Operator Precedence
- Type Conversion (Implicit and Explicit)
- Print( ) Function
- Input( ) Function
- Conditional Statements
- Looping Statements (for loop and while loop)

Ask the student to solve the exercise given on page 203 as **AI Reboot**.

Ask the students to solve the task given on page 195 as **AI Task**.

Ask the students to read the **Brainy Fact** given on pages 193 and 201.

Extension

Ask the students some oral questions based on this chapter.

Q. What is Anaconda?

Q. What is Jupyter Notebook?

Q. Why Python is used for AI?

Q. Define the following:

a. File Menu
b. Edit Menu
c. View Menu
d. Insert Menu
e. Cell Menu
f. Kernel Menu
g. Widgets Menu
h. Help Menu
i. Datatypes
j. Operators
k. Identifiers
l. Keyboard

Evaluation

Encourage the students to walk-through the chapter thoroughly.

After explaining the chapter, let the students do the exercises given on pages 203 to 210 in the main course book as **Exercise (Solved and Unsolved Questions)**.

Take the students to the computer lab and let them practice the activity given in **AI Lab** section on page 210 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment Activity.

Suggested Activity

Ask the students to collect more information about the following packages we used in Python.

4. Data Science

Teaching Objectives

Students will learn about

- What is Data Science?
- Revisiting AI Project Cycle
- Python for Data Science
- Statistical Learning with Python
- Personality Prediction
- Understanding K-Nearest Neighbour Model (K-NN)
- Applications of Data Science
- Data Collection
- Data Access in Python
- Data Visualisation in Python

Number of Hours	
Theory	Practical
5	5

Teaching Plan

Share with the students that Data Science is the process of using the skills of programming, mathematics and statistics together to find meaningful information from the given data. It is a technology that does the analysis of data to create impactful solutions from the given data or to predict outcomes for a problem statement.

Define the applications of Data Science to the students which are:

- Internet Search
- Digital Advertisement
- Website Recommendations

- Image Recognition
- Fraud and Risk Detection
- Virtual Reality
- Speech Recognition
- Medicine
- Airline Route Planning
- Gaming

Tell the students about revisiting AI project cycle and tell them about all the stages:

The following is the 4Ws canvas for the above problem.

Define the following to the students with suitable examples and detail:

- Data Collection
- Data Access in Python
- Statistical Learning with Python
- Personality Prediction
- Understanding K-Nearest Neighbour Model (K-NN)
- Python for Data Science
- Pandas
- Data Visualisation in Python

Ask the student to solve the exercise given on page 240 as **AI Reboot**.

Ask the students to solve the task given on pages 225, 236 and 237 as **AI Task**.

Ask the students to read the **Brainy Fact** given on page 235.

Extension

Ask the students some oral questions based on this chapter.

Q. What is Data Science?

Q. Define the following application:

- Internet Search
- Image Recognition
- Fraud and Risk Detection
- Virtual Reality
- Digital Advertisement
- Speech Recognition
- Medicine
- Website Recommendations
- Airline Route Planning
- Gaming

Q. Explain the following:

- Data Collection
- Pandas
- Personality Prediction
- Python for Data Science
- Statistical Learning with Python
- Understanding K-Nearest Neighbour Model (K-NN)
- Data Access in Python
- Data Visualisation in Python

Evaluation

Encourage the students to walk-through the chapter and ask them to play the game given on page 212 on their own under the name **AI Game** after learning about the rules and basics.

After explaining the chapter, Let the students do the exercises given on pages 241 to 245 in the main course book as **Exercise (Solved and Unsolved Questions)**. Tell them to solve the critical and computational skill developing exercises as **AI in Life** and **AI Deep Thinking** given on page 246. Ask the students to think and answer the exercise as **AI Ready 3** given on page 247.

Take the students to the computer lab and let them practice the activity given in **AI Lab** section on page 246 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment Activity.

Suggested Activity

Ask the students to create a power point presentation about the key concepts and features of Scikit-learn library package.

5. Computer Vision

Teaching Objectives

Students will learn about

- ☞ Computer Vision-Definition
- ☞ Applications of Computer Vision
- ☞ Difference Between Computer Vision and Human Vision
- ☞ Tasks in Computer Vision Applications
- ☞ What are Pixels?
- ☞ Basics of Images
- ☞ How do Computers see Images?
- ☞ Image Features
- ☞ Introducing OpenCV
- ☞ Image Processing Operations
- ☞ Understanding Convolution Operator
- ☞ What is Neural Network?
- ☞ What is Convolutional Neural Network (CNN)?

Number of Hours	
Theory	Practical
10	20

Teaching Plan

Before starting the chapter, tell the students that Computer Vision means giving the ability to the computer to see the world just like humans.

Explain that It is a domain of Artificial Intelligence that enables computers to see, observe and understand digital images or data, process them by acquiring, screening, analysing, identifying and extracting information using the machine learning and neural network algorithms.

Define the following applications of Computer Vision to the students:

- Image Classification and Object Detection
- Agriculture
- Autonomous Cars
- Banking
- Retail Business
- Warehouse Automation
- Damage Analysis
- Medical Field

Explain the difference between Computer Vision and Human Vision in detail with suitable examples to the students.

Teach the tasks in CV Applications to the students in details with proper examples.

Explain the following with examples:

- Pixels
- How does computer see Images?
- Basics of Images
- Image Features

- Introducing OpenCV
- Image Processing Operation
- Understanding Convolution Operator

Tell the students what is Neural Network and Convolutional Neural Network (CNN) in detail.

Ask the students to solve the task given on pages 257, 258 and 265 as **AI Task**.

Ask the students to read the **Brainy Fact** given on pages 254, 259, 268 and 270.

Make sure to ask the students to scan and watch the video given on page 270.

Encourage the students to use the internet and learn more about how computer vision used in self driving cars.

Extension

Ask the students some oral questions based on this chapter.

Q. What is Computer Vision?

Q. Define the following applications of CV:

- Image Classification and Object Detection
- Banking
- Autonomous Cars
- Warehouse Automation
- Medical Field
- Agriculture
- Retail Business
- Damage Analysis

Q. Explain the following:

- Pixels
- Image Features
- Image Processing Operation
- Basics of Images
- Convolution layer
- Understanding Convolution Operator

Q. Differentiate between Computer Vision and Human Vision.

Q. How does computer see Images?

Q. What is CNN?

Evaluation

Encourage the students to walk-through the chapter and ask them to play the game given on page 249 on their own under the name **AI Game** after learning about the rules and basics.

After explaining the chapter, let the students do the exercises given on pages 271 to 276 in the main course book as **Exercise (Solved and Unsolved Questions)**. Tell them to solve the critical and computational skill developing exercises as **AI in Life** and **AI Deep Thinking** given on page 276. Ask the students to think and answer the exercise as **AI Ready 4** given on page 278.

Take the students to the computer lab and let them practice the activity given in **AI Lab** section on Page 277 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment Activity.

Suggested Activity

Ask the students to use Google lens and scan the backside of a medicine pack and write the uses, side effects on an A-4 size sheet.

6. Natural Language Processing

Teaching Objectives

Students will learn about

- What is NLP?
- Applications of Natural Language Processing
- Revisiting AI Project Cycle
- Different Types of Chatbots
- Data Processing
- Process involved in NLP
- What are Chatbots?
- Human Language Vs Computer Language
- Techniques of Natural Language Processing

Number of Hours	
Theory	Practical
3	8

Teaching Plan

Before starting the chapter, tell the students that communication through text or speech is a very common method of interaction in humans. Now computers are enabled using a new technology called Natural Language Processing to understand, learn, process and manipulate human languages.

Tell the students that Natural Language Processing or NLP is the subset of Artificial Intelligence that deals with how computers through a program will perform tasks like speech recognition, translation, large amounts of Natural language data analysis and extraction.

Define the process involved in NLP to the students:

- Lexical Analysis
- Syntactic Analysis
- Semantic Analysis
- Discourse Integration
- Pragmatic Analysis

Define the applications of NLP to the students with proper examples:

- Automatic Text Summarization
- Sentiment and Emotion Analysis
- Text Classification
- Virtual Assistants
- Chatbots

Explain the students about AI project cycle to understand that how we can develop a project using NLP.

Tell the students about chatbots and define the types of chatbots which are Script-bot and Smart-bot.

Define the difference between human language Vs computer language along with the details.

Define the following to the students:

- Data Processing
- Techniques of NLP
- Term Frequency and Inverse document Frequency
- NLTK

Ask the students to read the **Brainy Fact** given on pages 286 and 287.

Extension

Ask the students some oral questions based on this chapter.

Q. What is NLP?

Q. Define the following:

- Lexical Analysis
- Semantic Analysis
- Pragmatic Analysis
- Syntactic Analysis
- Discourse Integration

Q. Define the following applications of NLP:

- Automatic Text Summarization
- Text Classification
- Chatbots
- Sentiment and Emotion Analysis
- Virtual Assistants

Q. What are chatbots?

Q. What are Script-bot?

Q. What are Smart-bot?

Q. Define the following:

- Data Processing
- Term Frequency and Inverse document Frequency
- NLTK
- Techniques of NLP

Evaluation

Encourage the students to walk-through the chapter and ask them to play the game given on page 279 and 280 on their own under the name **AI Game** after learning about the rules and basics.

After explaining the chapter, let the students do the exercises given on pages 299 to 308 in the main course book as **Exercise (Solved and Unsolved Questions) and Previous Years' Questions**. Tell them to solve the critical and computational skill developing exercises as **AI in Life** and **AI Deep Thinking** given on page 307. Ask the students to think and answer the exercise as **AI Ready 5** given on page 309.

Take the students to the computer lab and let them practice the activity given in **AI Lab** section on page 307 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment Activity.

Suggested Activity

Ask the students to create the dictionary and document vector of the topic "Python is easy to learn".

7. Evaluation

Teaching Objectives

Students will learn about

- ☞ Understanding Evaluation
- ☞ Reasons for Inefficiency of AI Model
- ☞ Confusion Matrix
- ☞ Evaluation Matrix for AI Model
- ☞ Importance of Evaluation
- ☞ Terminologies of Model Evaluation
- ☞ Terminologies of Confusion Matrix

Number of Hours	
Theory	Practical
2	5

Teaching Plan

Tell the students about evaluation and make them understand how it works.

Share the importance of evaluation with the students along with examples.

Tell the students the reasons for inefficiency of AI Model:

- Lack of Training Data
- Inefficient coding / Wrong Algorithms
- Not Easy
- Unauthenticated Data / Wrong Data
- Not Tested
- Less Accuracy

Define the terminologies of model evaluation to the students with proper examples and case studies.

Tell the students about the Confusion Matrix along with the terminologies of it.

Explain the evaluation matrix for AI model to the students.

Ask the students to solve the task given on pages 315 and 316 as **AI Task**.

Make sure to ask the students to scan and watch the video given on page 319. Encourage the students to use the internet and make a PowerPoint presentation on the topic "Evaluation Matrix for AI Model".

Extension

Ask the students some oral questions based on this chapter.

Q. What is evaluation?

Q. Explain the importance of evaluation.

Q. Define the following:

- Recall
- Accuracy
- F1 score
- Precision

Q. What is confusion matrix?

Evaluation

Make sure to ask the students to scan and watch the video given on page 319.

Encourage the students to use the internet and learn more about model evaluation from the video.

After explaining the chapter, let the students do the exercises given on pages 319 to 328 in the main

course book as **Exercise (Solved and Unsolved Questions)**.

Take the students to the computer lab and let them practice the activity given in **AI Lab** section on page 328 in the main course book. This will enhance the ability of the students and serve as a Subject Enrichment Activity.

Suggested Activity

Ask the students to make a case study on the topic "Confusion Matrix".