TOUCHPAD

Artificial Intelligence (Ver. 3.0)

10

Teacher's Manual

Extended Support for Teachers

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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 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."

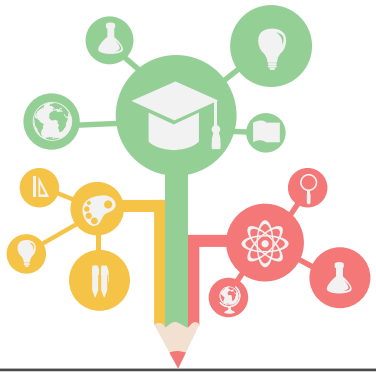
Age 9 - 11 Years	
Physical	• Motor skills develop resulting in enhanced reflexes
Cognitive	• Applies several memory strategies at once • Cognitive self-regulation is now improved
Language	• Ability to use complex grammatical constructions enhances • Conversational strategies are now more refined
Emotional/ 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 need 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.

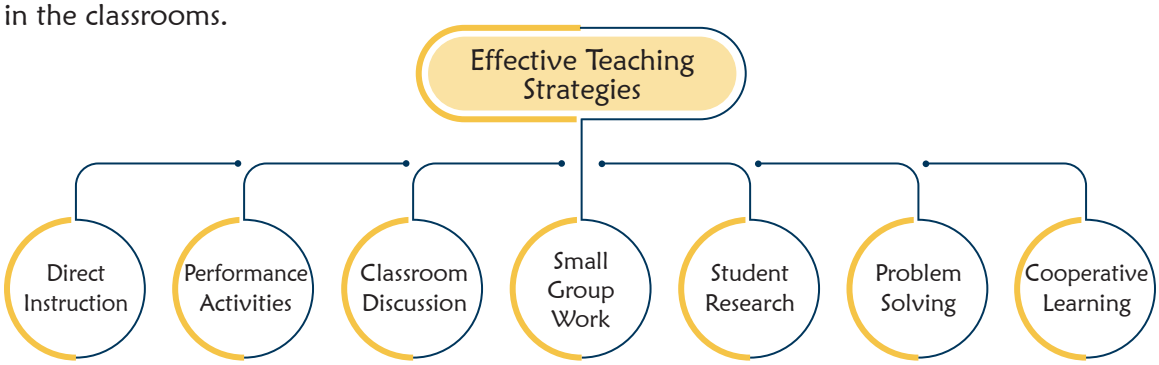
After the class

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

"Knowing yourself is the beginning of all wisdom."

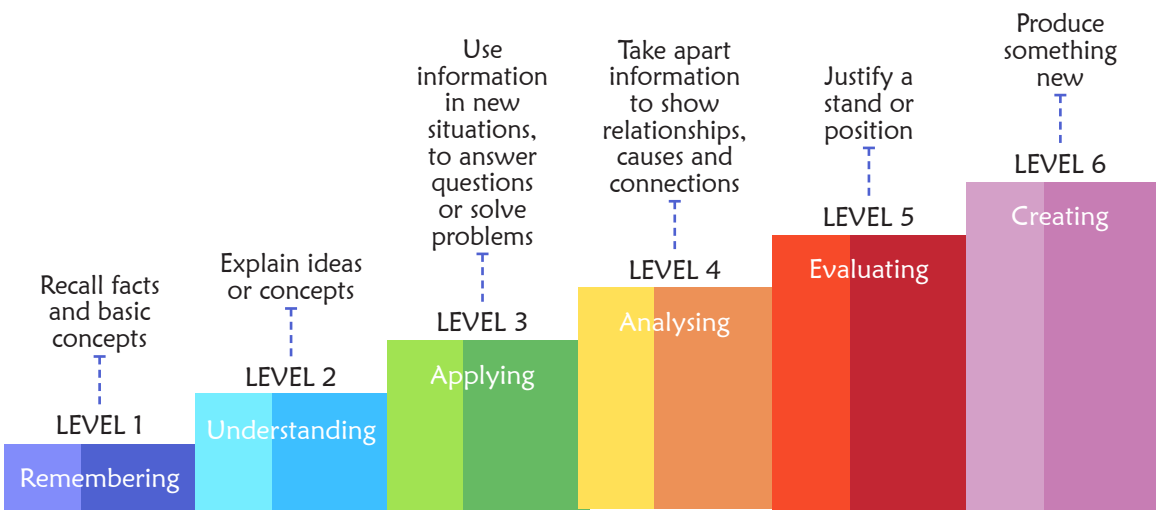
Teaching Strategies

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 to 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 1

LESSON PLAN

Part-A: Employability Skills

1 Communication Skills-II

Teaching Objectives

By the end of this unit, students will be able to:

- Define communication and explain its purpose and components.
- Understand and describe the Communication Cycle.
- Identify and differentiate between verbal, non-verbal, and visual methods of communication.
- Recognise the 7 Cs of Effective Communication and apply them.
- Understand and overcome barriers to communication.
- Develop basic writing skills, including sentence formation, paragraph writing, and correct use of grammar and punctuation.
- Apply body language techniques for better interpersonal interaction.
- Interpret and provide constructive feedback effectively.

Number of Periods	
Theory	Practical
5	3

Teaching Plan

Introduction (Engagement)

Warm-up Discussion:

- Ask students:
  - Why do we need to communicate?
  - What happens when there is miscommunication?
  - How do we communicate without words?

Quick Activity:

- Show a short clip (mute it) and ask students to guess the context based on body language and visuals alone.
- Use the responses to introduce the importance of **non-verbal and visual communication**.

Lesson Delivery (Explanation & Demonstration)

1. **Understanding Communication**

   Explanation:

   - Define communication and its types (verbal, non-verbal, visual).
   - Discuss the **importance of communication** in personal and professional life.

   Demonstration:

   - Real-life examples (teacher-student talk, email exchange, posters, traffic signals).

   Activity:

   - Group work: List down the ways they've communicated today (verbal/non-verbal/visual).

2. **The Communication Cycle**

   Explanation:

   - Introduce the **elements**: Sender, Message, Encoding, Channel, Receiver, Decoding, Feedback.
   - Use visual diagrams to explain the flow.

   Example:

   - Teacher explaining a science concept (Sender) → Students listening (Receiver) → Clarification (Feedback).

   Activity:

   - Role-play: Students enact each part of the communication cycle.

3. **Methods of Communication**

   Types Covered:

   - Verbal (oral and written), Non-verbal, and Visual

   Discussion:

   - Situational examples for each type.

   Activity:

   - Split class in teams. Each team is given a scenario to present it in one form of communication (poster, speech, body language skit, etc.).

4. **Verbal Communication and Interpersonal Skills**

   Explanation:

   - Oral vs Written
   - Interpersonal, Group, Public communication

   Activity:

   - Prepare a mini speech or dialogue between a student and teacher/parent/friend.
   - Peer review for clarity and body language.

5. **Non-Verbal and Visual Communication**

   Explanation:

   - Importance of facial expressions, posture, gestures, eye contact, paralanguage, appearance, personal space, haptics.

Demonstration:

- Act out good vs poor body language while communicating.

Activity:

- Charades: Communicate phrases only using gestures and facial expressions.

6. **Effective Communication: The 7 Cs**

Explanation:

- Clarity, Conciseness, Concreteness, Correctness, Coherence, Completeness, Courteousness

Activity:

- Improve a poorly written email or paragraph using the 7 Cs.

7. **Barriers to Communication**

Explanation:

- Physical, Linguistic, Interpersonal, Organisational, Cultural barriers.

Activity:

- Case study analysis: Identify barriers and suggest ways to overcome them.

8. **Feedback**

Explanation:

- Types: Positive, Negative, Specific, Non-specific, No feedback

Activity:

- Group game: "Chinese Whisper" followed by feedback discussion on message distortion.

9. **Basic Writing Skills**

Coverage:

- Sentence formation, types of sentences, active/passive voice, parts of speech, use of articles, punctuation, paragraph writing.

Activity:

- Complete fill-in-the-blanks and sentence correction exercises.
- Write a short paragraph based on a given theme.

Extension

Discussion Questions:

- What is the impact of body language in job interviews?
- Why are the 7 Cs important in business writing?
- How can we ensure that our feedback is effective?

Creative Task:

- Students will design a **poster** and a **speech script** on a school event (e.g., "Say No to Plastic").

Evaluation

- **Written Quiz:** Define communication, name and explain the 7 Cs, types of communication, identify barriers.

- **Practical Assessment:**
  - Role-play on feedback and body language.
  - Create a written paragraph following correct sentence structure and grammar rules.
- **Peer Review:** Students review each other's written communication and give feedback using the 7 Cs.

Suggested Activity

"Design Your School Campaign" Project:

- Students work in groups to design an awareness campaign (e.g., "Keep the Campus Clean").
- They will prepare:
  - Visual Communication (poster/flyer)
  - Verbal Communication (speech script)
  - Non-verbal Communication (gesture-based skit)
  - Use the Communication Cycle in planning

2 Self Management Skills-II

Teaching Objectives

By the end of this unit, students will be able to:

- Understand what stress is and identify its symptoms.
- Learn and apply effective stress management techniques.
- Develop and demonstrate working independently.
- Enhance emotional intelligence and self-awareness.
- Set SMART goals and apply time management techniques.
- Reflect on self-motivation and regulation as essential life skills.

Number of Periods	
Theory	Practical
3	2

Teaching Plan

1. Understanding Stress and Its Management

Key Points:

- Define stress and its types (Eustress and Distress).
- Discuss common signs of stress: headaches, restlessness, mood swings.
- Identify stress-causing agents: mental, physical, social, and financial.
- Introduce the ABC model of stress management (Adversity, Belief, Consequence).

Activity: Ask students to create a stress diary — write about one stressful situation, what caused it, how they reacted, and how they could have handled it better.

2. **Stress Management Techniques**

   Techniques to Discuss:

   - Time Management
   - Physical Exercise and Fresh Air
   - Meditation and Yoga
   - Healthy Diet and Good Sleep
   - Positivity and Nature Walks
   - Holidays with Friends and Family

   Group Activity: Divide students into teams. Assign each team a technique to present (e.g., a 2-minute skit or poster). Encourage the use of real-life student scenarios.

3. **Working Independently**

   Explain:

   - Importance of ownership and self-monitoring.
   - Advantages: increased focus, flexible working, better job satisfaction.

   Activity: Provide a small project or research topic to students individually. Encourage them to plan, execute, and submit without external help. Reflect on the experience.

4. **Self-Awareness & Emotional Intelligence**

   Topics Covered:

   - Knowing your strengths and weaknesses.
   - Differences between interests and abilities.
   - Understanding emotions and managing them.
   - Practising self-reflection and calm thinking.

   Interactive Task: Ask students to list their top 3 strengths and one weakness. Share anonymously, and the class will suggest ways to turn weaknesses into strengths.

5. **Self-Motivation and Self-Regulation**

   Concepts:

   - Intrinsic vs. Extrinsic Motivation.
   - Qualities of self-motivated individuals.
   - Self-regulation and behavioural control.
   - Staying loyal to personal goals.

   Case Study: Shristi's story – Analyse how self-motivation played a role in her discipline. Ask students to relate with someone they admire and how motivation drives them.

6. **SMART Goals and Time Management**

   Explain SMART Goals:

   - Specific, Measurable, Achievable, Realistic, Time-bound

   Demonstrate Time Management Techniques:

   - Organise, Prioritise, Control, Track

Activity: Have students write down one short-term SMART goal and a long-term SMART goal related to academics. Discuss strategies to stay on track.

Extension

Discussion Questions:

- Can stress ever be helpful? How?
- What motivates you to work hard?
- What are your distractions while managing time? How can you overcome them?
- How does being emotionally intelligent help you in school?

Creative Task: Create a "Self-Management Toolkit" — a mini-poster or folder with tips, goals, motivational quotes, and action plans.

Evaluation

- **Quiz** on key terms and concepts (e.g., types of stress, SMART goals, self-regulation).
- Scenario-based questions to analyse stress and motivation responses.
- **Reflection Journal**: Weekly reflection entries on how they managed stress and goals.
- **Role Play:** Enact situations that require independent work and emotional intelligence.

Suggested Activity

"My Self-Management Map":

- Each student creates a map or infographic that includes:
  - A personal stressor and how they manage it.
  - Their SMART goals.
  - A list of their strengths and motivational quotes.
  - A weekly time management plan.

3 ICT Skills-II

Teaching Objectives

By the end of this unit, students will be able to:

- Identify the basic components of a computer system.
- Distinguish between different types of software: system, application, and utility.
- Understand the functions and types of Operating Systems.
- Operate basic Windows 11 interface elements.
- Perform basic file and folder operations.
- Demonstrate proper shutdown, login, and logout procedures.
- Apply keyboard and mouse functions efficiently.

- Follow best practices for computer care, maintenance, and security.
- Understand the importance of backups, virus protection, and data privacy.

Number of Periods	
Theory	Practical
5	3

Teaching Plan

Introduction (Engagement)

Question-Based Discussion:

- What are the basic parts of a computer?
- How do you use your computer or smartphone in daily life?
- Why do we need software on a computer?
- Can you operate a computer without an operating system?

Demonstration: Use real or projected desktop view of Windows 11 to introduce the concept of GUI, desktop, icons, and taskbar.

Lesson Delivery (Explanation & Demonstration)

1. **Understanding the Computer System**

   Topics Covered:

   - What is ICT?
   - Hardware vs Software
   - Mobile devices as computer systems

   Activity: Show physical components (keyboard, mouse, monitor) and ask students to classify them as hardware or software.

2. **Types of Software**

   Topics Covered:

   - System Software
   - Application Software
   - Utility Software

   Activity: Present a scenario (e.g., using Word to write a letter) and ask students to identify what type of software is being used.

3. **Operating System**

   Topics Covered:

   - Role and importance of OS
   - Types of OS (Windows, Linux, Ubuntu, Mobile OS)
   - Features and functions of OS

   Visual Aid: Diagram showing interaction between hardware, OS, and user.

   Activity: Ask students to name the OS on their personal computers or phones and share their experiences.

4. **Windows 11 Basics**

   Topics Covered:

   - Desktop environment
   - Taskbar components (Start button, notification area)
   - Icons and their purpose

   Hands-On Task: Navigate a Windows 11 desktop, identify and explain function of taskbar, start menu, and icons.

5. **Starting and Shutting Down the Computer**

   Topics Covered:

   - Booting process
   - Login and logout procedures
   - Proper shutdown methods

   Activity: Demonstrate the startup and shutdown process on a live system or simulation.

6. **Keyboard and Mouse Operations**

   Topics Covered:

   - Keyboard keys and functions (Navigation, Function, Command keys)
   - Mouse functions (Click, Right-click, Double-click, Drag-and-drop, Hovering)

   Activity: Interactive matching game to pair keyboard keys with their functions.

7. **File and Folder Operations**

   Topics Covered:

   - What is a file and folder?
   - Creating, renaming, deleting, copying, moving files/folders

   Activity: Practical lab: Create a folder named "My Work", add a text file in it, rename it, copy to another folder.

8. **Computer Care and Maintenance**

   Topics Covered:

   - Cleaning hardware
   - Software updates and disk clean-up
   - Preparing a maintenance schedule

   Activity: Group project: Create a weekly maintenance checklist for a school lab.

9. **Computer Security and Privacy**

   Topics Covered:

   - Threats (virus, scam, theft)
   - Data protection measures

- Importance of antivirus and firewalls
- Temporary files and cleaning them

Activity: Case Study Discussion: "A virus deleted all files on my friend's computer. What could have prevented this?"

Extension

Discussion Questions:

- What would happen if we never shut down our computer properly?
- How does antivirus software help us?
- Why is it important to back up our data?

Creative Task: Students create a poster on "Tips to Keep Your Computer Safe and Clean".

Evaluation

Quiz: Short MCQs on types of software, parts of computer, Windows features.

Practical Test: Perform basic file operations and demonstrate use of mouse and keyboard functions.

Assignment: Prepare a short write-up on "How I Keep My Computer Safe and Organised".

Suggested Activity

ICT in Action: Students will act as "Computer Doctors" and conduct a diagnosis of a slow computer (role play). They will suggest actions like disk cleanup, file organisation, and scanning for viruses.

4 Entrepreneurial Skills-II

Teaching Objectives

By the end of this unit, students will be able to:

- Understand what entrepreneurship is and how it impacts society.
- Identify the differences between wage employment and self-employment.
- Describe the functions and roles of an entrepreneur.
- List the key qualities of successful entrepreneurs.
- Explain how entrepreneurs fulfil customer needs, wants, and demands.
- Assess the advantages and disadvantages of entrepreneurship.
- Understand myths related to entrepreneurship.
- Explore entrepreneurship as a career option.

Number of Periods	
Theory	Practical
4	2

Teaching Plan

Question-Based Discussion:

- Have you ever had an idea for a business?
- What do you think are the risks of starting your own business?
- Do you know any entrepreneurs in your family or neighbourhood?
- What makes someone a good entrepreneur?

Relatable Analogy:

Use the lemonade stand example:

- If you were to sell lemonade during summer, what would you need?
- This can lead to discussions on needs, investment, creativity, marketing, risk, etc.

Lesson Delivery (Explanation & Demonstration)

1. **Understanding Entrepreneurship and Society**

   Explanation:

   - Define entrepreneurship and distinguish it from wage employment.
   - Explore how entrepreneurs contribute to the economy and society.

   Activity: Case Study Comparison: Compare a salaried employee with a self-employed entrepreneur. List benefits and challenges of both.

2. **Customers' Needs, Wants, and Demands**

   Explanation:

   - Define and differentiate needs, wants, and demands.
   - Explain through Maya's snack bar example from the book.

   Activity: Group brainstorming: Imagine you want to start a small business. Identify what customer needs, wants, and demands your product or service would fulfil.

3. **Work Done by an Entrepreneur**

   Explanation:

   - Discuss the real work of entrepreneurs: innovation, operations, social contribution, job creation, economic development.

   Activity: Create a flowchart: "What Entrepreneurs Do" – from idea to social impact.

4. **Qualities of a Successful Entrepreneur**

   Explanation:

   - Discuss key qualities such as creativity, perseverance, patience, confidence, optimism, etc.

   Activity: "Match the Quality" Game: Match famous entrepreneurs with traits that helped them succeed (e.g., Elon Musk – innovation).

5. **Functions of an Entrepreneur**

   Explanation:

   - Explain decision-making, business management, income distribution, risk-taking, and innovation.

   Activity: Situational Role Play: Students act as entrepreneurs making critical decisions (e.g., product launch, hiring, pricing).

6. **Role of an Entrepreneur in Society**

   Explanation:

   - Roles include innovator, agent of change, risk bearer, capital builder, and job creator.

   Activity: Poster Creation: "Entrepreneur – A Builder of Society" with roles explained visually.

7. **Importance, Advantages, and Disadvantages of Entrepreneurship**

   Explanation:

   - Highlight the contribution to the economy and society.
   - Discuss the flexibility and freedom vs. risks and stress of entrepreneurship.

   Activity: Class Debate: "Entrepreneurship offers more freedom than a job" – divide class into teams.

8. **Myths and Misconceptions about Entrepreneurship**

   Explanation:

   - Debunk myths such as "entrepreneurs are born," "need big money," "only new ideas count," etc.

   Activity: Identify the myth: Given scenarios (e.g., Aman thought he needed lots of money), students identify the misconception.

9. **Entrepreneurship as a Career Option**

   Explanation:

   - Explain entrepreneurship as a life-long career process: Enter, Survive, Grow.
   - List different entrepreneurial career options.

   Activity:

   - Personal Reflection Worksheet:
   - Why do I want to be an entrepreneur?
   - What would my business be?
   - What would be the challenges?

Extension

Discussion Questions:

- What role do entrepreneurs play in solving societal problems?
- Can entrepreneurship be taught or is it an inborn skill?
- Should entrepreneurship be introduced at the school level?

Creative Task:

- Create a Business Card: Students design their own business card with their business name, product/service, and role.

Evaluation

- **Quiz:** Key terms (entrepreneurship, self-employment, qualities, functions).
- **Worksheet:** Match qualities and roles with the correct examples.
- **Project Work:** Design a mini-business plan based on a local need (e.g., tuition, food delivery, eco-products).
- **Group Presentation:** Pitch your business idea to the class.

Suggested Activity

"Start-Up Challenge" Group Task:

Students form teams and:

- Develop a business idea (product or service).
- Identify customer needs, define the product, and pitch it.
- Explain what qualities of an entrepreneur they used in planning.
- Present ideas through posters, skits, or PowerPoint presentations.

5 Green Skills-II

Teaching Objectives

By the end of this lesson, students will be able to:

- Understand the concept and significance of Sustainable Development.
- Identify the problems and challenges associated with sustainable development.
- Recognise the importance of Green Skills in achieving sustainable development goals.
- Understand the 17 Sustainable Development Goals (SDGs) and their relevance to global well-being.
- Appreciate the role of individuals and nations in achieving sustainability.

Number of Periods	
Theory	Practical
3	2

Teaching Plan

Introduction (Engagement)

Warm-Up Discussion:

- Ask students:
  - Why do we need to take care of our environment?
  - Have you ever reused or recycled anything at home or school? How did it help?

- What does "sustainability" mean to you?

Quote to Reflect:

"We do not inherit the Earth from our ancestors; we borrow it from our children." — Chief Seattle

Context Setting: Show a short video or infographic about current environmental challenges (e.g., pollution, deforestation, global warming).

Lesson Delivery (Explanation & Demonstration)

1. **Understanding Sustainable Development**

   Key Concepts:

   - Definition: Development that meets current needs without compromising future generations.
   - Importance:
     - Promotes responsible use of resources.
     - Ensures economic growth without environmental harm.
     - Encourages social equity and better living standards.

   Activity: Group brainstorming: "What would a sustainable future look like?"

2. **Problems Related to Sustainable Development**

   Discussion Areas:

   - **Food Scarcity**: Decreasing agricultural land and soil fertility.
   - **Water Shortage**: Pollution and overuse of freshwater resources.
   - **Fuel Depletion**: Overuse of forests and fossil fuels.

   Activity:

   - Think-Pair-Share: Identify one problem and suggest a green solution (e.g., solar energy instead of wood fuel).

3. **Challenges to Sustainable Development**

   Major Challenges:

   - Lack of awareness and education.
   - Climate change and biodiversity loss.
   - Profit-first mindset of industries.
   - Lack of global cooperation.

   Case Discussion:

   - Why is it difficult for countries to cooperate on environmental issues?

4. **Introduction to Green Skills**

   Definition:

   - Skills that support environmental sustainability and promote a green economy.

   Example:

   - Using renewable energy, waste management, tree planting, etc.

Government Initiative:

- Green Skills Development Programme (GSDP) launched in 2017.

Activity: Poster Making: "A Green Skill I Can Learn to Help the Planet"

5. **Sustainable Development Goals (SDGs)**

Overview:

- 17 goals adopted by the UN in 2015 to be achieved by 2030.
- Cover issues like poverty, education, clean energy, climate action, and more.

Focus on Key Goals:

- No Poverty
- Good Health & Well-being
- Gender Equality
- Life Below Water & Life on Land
- Zero Hunger
- Quality Education
- Climate Action

Activity: SDG Relay: Each group presents one goal and explains how it can be achieved.

Extension

Discussion Questions:

- What can you do at home to support sustainable development?
- Can technology help us live greener lives? How?

Creative Task:

Create a "Green Diary" for a week. Record your eco-friendly actions each day (e.g., saving electricity, using cloth bags).

Evaluation

Quiz:

- MCQs from the textbook (e.g., number of SDGs, definition of sustainable development).

Short Answer Questions:

1. What are the three major problems in sustainable development?
2. List any two Green Skills.
3. Why is sustainable development important?

Practical Assessment:

- Presentations on SDGs.
- Peer review of Green Diaries or posters.

Suggested Activity

"Sustainability in Action" – Group Project:

- Choose a local problem (like waste, water use, tree cover).
- Plan and present a sustainable solution using green practices.

CLASS 1

LESSON PLAN

Part B-Subject Specific Skills

1 Revisiting AI Project Cycle & Ethical Frameworks for AI

Teaching Objectives

By the end of this lesson, students will be able to:

- Understand the **AI Project Cycle** and its six stages.
- Explain the **importance of ethical considerations in AI**.
- Explore different **AI domains** and their real-world applications.
- Analyse the **ethical concerns and frameworks** associated with AI.
- Apply problem-solving methodologies using the **4W Problem Canvas**.

Number of Periods	
Theory	Practical
3	2

Teaching Plan

Introduction (Engagement)

1. **Question-Based Discussion:** Start the lesson by asking students:
   - What do you think AI is used for in everyday life?
   - Can AI make ethical decisions like humans?
   - Why do we need a structured process to build AI projects?
2. **Relatable Analogy:** Use the **cake-baking example** from the unit to introduce the concept of a structured cycle in AI projects.

Lesson Delivery (Explanation & Demonstration)

1. **AI Project Cycle – Understanding the Steps**
   - Introduce the **AI Project Cycle** and explain its six stages:
     1. **Problem Scoping** – Understanding the problem using the **4Ws framework (Who, What, Where, Why)**.
     2. **Data Acquisition** – Collecting structured, unstructured, and semi-structured data.
     3. **Data Exploration** – Analysing patterns using statistical and visual tools.
     4. **Modelling** – Developing AI models through training algorithms.
     5. **Evaluation** – Testing the AI model to ensure reliability and accuracy.
     6. **Deployment** – Implementing the AI solution in real-world applications.

- **Activity:**
  - Provide students with a case study: **AI-powered waste sorting system in a school**.
  - Ask students to **apply the AI Project Cycle** to develop a solution.

2. **Ethical Concerns in AI**
   - Discuss major challenges in AI:
     - **Job displacement** due to automation.
     - **Privacy risks** in AI-driven apps.
     - **Bias in AI systems** due to incorrect training data.
     - **Autonomous weapons and misuse of AI technology**.
     - **Environmental impact of AI-powered data processing**.
   - **Activity:**
     - **Debate:** "Should AI be allowed to replace human decision-making in law enforcement?"
3. **Ethical Frameworks for AI**
   - Explain the **two types of ethical frameworks**:
     - **Sector-based Ethical Frameworks** (industry-specific guidelines).
     - **Value-based Ethical Frameworks**:
       - **Rights-based ethics** (respect for human rights).
       - **Utility-based ethics** (maximising benefits for all).
       - **Virtue-based ethics** (morality in AI decisions).
   - **Case Study:**
     - **AI in Healthcare:** Analyse the ethical dilemma of AI predicting mental health risks.
     - **Discussion:** How can AI avoid biases in healthcare data?
4. **Exploring AI Domains**
   - Explain the **three key AI domains** with examples:
     1. **Statistical Data** – Used in recommendation systems (e.g., Netflix, Amazon).
     2. **Computer Vision** – Facial recognition, self-driving cars.
     3. **Natural Language Processing (NLP)** – Chatbots, translation tools.
   - **Handstivity:**
     - Use **Google Lens or Quick Draw AI game** to showcase real-life applications of **Computer Vision**.
     - Use **ChatGPT or Semantris NLP game** to demonstrate **Natural Language Processing**.

Extension (Further Exploration)

- **Discussion Questions:**
  - What are some real-life AI applications where ethical concerns exist?
  - How can AI systems be designed to avoid biases?
  - What are the long-term effects of AI on employment?

- **Creative Task:**
  - Ask students to prepare a **presentation** on AI-related ethical issues in different industries.

Evaluation (Assessments & Review)

- Conduct a **quiz** on key concepts (Problem Scoping, AI Cycle, Ethics in AI).
- Assign students to complete the **4W Problem Canvas** for a real-world AI issue.
- Practical lab session: Experiment with AI applications like **Google AutoDraw, Chatbots, or AI-based image recognition tools**.

Suggested Activity

- **AI in Action:**
  - Students will work in teams to **design an AI project** addressing an issue (e.g., traffic management, environmental monitoring).
  - They will present their ideas using the **AI Project Cycle framework**.

2 Advanced Concepts of Modelling in AI

Teaching Objectives

By the end of this lesson, students will be able to:

- **Revisit AI, Machine Learning (ML), and Deep Learning (DL)**.
- Understand **common terminologies used with data** (features, labels, training & testing datasets).
- Explain the **modelling process in AI** and its applications.
- Understand the concept of **Neural Networks and how AI makes decisions**.
- Differentiate between **Supervised, Unsupervised, and Reinforcement Learning**.

Number of Periods	
Theory	Practical
3	2

Teaching Plan

Introduction (Engagement & Recap)

1. **Discussion Questions:** Start with engaging questions to activate prior knowledge:
   - How do you think AI makes decisions?
   - What is the difference between **Machine Learning and Deep Learning**?
   - Can AI learn without human instructions?
2. **Real-Life Scenario:**
   - Use the example of **Netflix's recommendation system** to introduce **Machine Learning concepts**.
   - Show how **AI learns from past data** (like user preferences) to make better recommendations.

Lesson Delivery (Explanation & Demonstration)

1. **Revisiting AI, ML, and DL**
   - **Artificial Intelligence (AI)**: Machines mimicking human intelligence for problem-solving and decision-making.
   - **Machine Learning (ML)**: AI's subset that enables machines to learn from data without explicit programming.
   - **Deep Learning (DL)**: A further subset of ML that uses **Artificial Neural Networks (ANNs)** to process large datasets.

   Activity:
   - Show students a **real-world AI application** (e.g., **Google Assistant, ChatGPT, or image recognition tools**).
   - Discuss how these tools **use AI, ML, and DL** for different tasks.
2. **Understanding AI Modelling**
   - **What is AI Modelling?**
     - Developing algorithms that can **train, learn, and make intelligent decisions**.
     - Two primary types: **Rule-Based & Learning-Based Models**.
   - **Common AI Modelling Terms:**
     - **Features:** The attributes/data input into an AI model.
     - **Labels:** The predefined categories for supervised learning.
     - **Training Dataset:** Data used to train an AI model.
     - **Testing Dataset:** Data used to test the AI model's accuracy.

   Activity:
   - Ask students to classify **images of animals** based on size and weight, mimicking AI model classification.
3. **Supervised, Unsupervised & Reinforcement Learning**
   - **Supervised Learning:** AI learns from labelled data (e.g., **spam detection in emails**).
   - **Unsupervised Learning:** AI identifies patterns in unlabelled data (e.g., **customer segmentation in marketing**).
   - **Reinforcement Learning:** AI **learns by trial and error** and receives rewards for correct actions (e.g., **self-driving cars, chess AI**).

   Activity:
   - Show a **Supervised vs. Unsupervised learning** demo using a **classification tool like Google Quick Draw**.
   - Conduct a **mini-quiz** where students match learning types with real-world AI applications.
4. **Neural Networks & AI Decision Making**
   - **What is a Neural Network?**
     - A system that **mimics the human brain** using interconnected layers of nodes.

- Uses **input layers, hidden layers, and output layers** to process data.

- **How AI Makes Decisions:**
  - AI uses **Perceptrons** (basic units of neural networks) to weigh different factors before making a decision.
  - Example: **Self-driving cars deciding when to stop, accelerate, or turn.**

Activity:

- Play a **Human Neural Network Game** where students act as different nodes in a neural network to process information and generate an output.
- Watch a **video demonstration of a Neural Network in action**.

Extension (Further Exploration)

- **Discussion Questions:**
  - How does AI impact different industries (healthcare, finance, entertainment)?
  - What are the ethical concerns related to AI making decisions?
  - How do companies prevent AI biases in data-driven decision-making?
- **Creative Task:**
  - Ask students to create a **mind map** of AI applications in different domains.
  - Research how **Amazon, Google, or Flipkart** use **AI-driven recommendation systems**.

Evaluation (Assessments & Review)

- Conduct a **quick quiz** on key AI concepts.
- Assign a **short-answer test** on the **difference between ML, DL, and Neural Networks**.
- Practical Lab Session: Let students explore **an AI-based image classifier** or **chatbot tool**.

Suggested Activity

- **AI in Action:**
  - Students work in groups to **design a simple AI model** (paper-based) to **predict students' favourite school activities** based on given data.
  - Present findings to the class, explaining **how AI modelling works**.

3 Evaluating Models in AI

Teaching Objectives

By the end of this lesson, students will be able to:

- Understand the **importance of model evaluation** in AI.
- Learn **evaluation techniques** such as **Train-Test Split, Overfitting, and Underfitting**.
- Explore key **evaluation metrics** like **Accuracy, Precision, Recall, and F1 Score**.

- Understand the **Confusion Matrix** and its components.
- Analyse **ethical concerns** related to model evaluation.

Number of Periods	
Theory	Practical
3	2

Teaching Plan

Introduction (Engagement & Recap)

1. **Discussion Questions:**
   - Why do you think AI models need evaluation?
   - How can we measure whether an AI model is making good predictions?
   - What challenges do companies face in ensuring AI models work correctly?
2. **Real-Life Scenario:**
   - Explain how **Netflix's recommendation system** improves over time using **model evaluation**.
   - Show how **self-driving cars refine their AI models** based on real-world data.

Lesson Delivery (Explanation & Demonstration)

1 **Importance of Model Evaluation**

- **Why evaluate AI models?**
  - Ensures the model works correctly and optimally.
  - Helps refine the model to improve performance.
  - Prevents **bias and fairness issues** in decision-making.
- **Activity:**
  - Compare AI model evaluation to **human learning** (e.g., taking a test to measure understanding).
  - Discuss why **AI models need continuous evaluation and improvement**.

2. **Train-Test Split & Model Evaluation Techniques**

- **Train-Test Split:**
  - The dataset is divided into **Training (70-80%)** and **Testing (20-30%)** subsets.
  - The model is trained on one part and tested on another to measure performance.
- **Overfitting vs. Underfitting:**
  - **Overfitting:** The model memorises training data but performs poorly on new data.
  - **Underfitting:** The model is too simple and fails to learn from data.
  - **Perfect Fit:** Balances complexity and generalisation.

Activity:

- Show **graphs** demonstrating **overfitting, underfitting, and perfect fit**.
- Ask students to **identify real-world examples** of these issues (e.g., exam cramming vs. conceptual learning).

3. **Understanding the Confusion Matrix**
   - **What is a Confusion Matrix?**
     - A **2×2 matrix** used to measure AI model performance in classification tasks.
     - Compares **actual vs. predicted values**.
   - **Components of Confusion Matrix:**
     - **True Positive (TP):** Correctly predicted positive cases.
     - **False Positive (FP):** Incorrectly predicted positive cases.
     - **False Negative (FN):** Incorrectly predicted negative cases.
     - **True Negative (TN):** Correctly predicted negative cases.

   Activity:
   - **Hands-on Exercise:** Create a confusion matrix for a **loan approval AI model**.
   - **Example:** Predicting whether a loan will be approved based on given data.
4. **Evaluation Metrics – Accuracy, Precision, Recall, F1 Score**
   - **Accuracy:** Measures overall correct predictions.
   - **Precision:** Measures the correctness of positive predictions.
   - **Recall:** Measures how well the model identifies positive cases.
   - **F1 Score:** Balances **Precision & Recall** for a reliable evaluation.

   Activity:
   - Use a **real-world scenario** (e.g., **AI detecting fraudulent transactions**) to show why Precision or Recall is more important in different cases.
   - Ask students to **calculate Accuracy, Precision, and Recall** using sample data.

Extension (Further Exploration)

- **Discussion Questions:**
  - Why is overfitting bad for AI models?
  - In which cases would **Recall** be more important than **Precision**?
  - How do AI models improve over time through evaluation?
- **Creative Task:**
  - Research and present how **Google, Amazon, or Netflix** use AI model evaluation in their services.

Evaluation (Assessments & Review)

- Conduct a **quick quiz** on AI model evaluation concepts.
- Assign a **short-answer test** on **Train-Test Split & Confusion Matrix components**.
- Practical Lab Session: Let students create and evaluate an AI model using a **basic AI classifier**.

Suggested Activity

- **AI in Action:**
  - Students **design a basic AI model for predicting student exam performance**.
  - Use **Accuracy, Precision, and Recall** to evaluate how well their model performs.

4 Data Science and No-Code AI

Teaching Objectives

By the end of this lesson, students will be able to:

- Understand the **importance of model evaluation** in AI.
- Learn **evaluation techniques** such as **Train-Test Split, Overfitting, and Underfitting**.
- Explore key **evaluation metrics** like **Accuracy, Precision, Recall, and F1 Score**.
- Understand the **Confusion Matrix** and its components.
- Analyse **ethical concerns** related to model evaluation.

Number of Periods	
Theory	Practical
2	3

Teaching Plan

Pre-Lesson Activity:

- Ask students to define **Artificial Intelligence** and **Data Science** in their own words.
- Discuss examples of AI applications they encounter daily.

Lesson Introduction:

1. Explain that Data Science is the backbone of AI, allowing machines to process and analyse large datasets.
2. Introduce the concept of **Low/No-Code AI**, explaining how it allows non-programmers to build AI models.

Concept Exploration:

- **What is Data Science?**
  - Discuss the interdisciplinary nature of Data Science (Statistics, Machine Learning, etc.).
  - Provide real-world examples (e.g., e-commerce recommendations, targeted advertising).
- **Statistical Data Analysis in AI**
  - Define **Descriptive Statistics** (Mean, Median, Mode, Distribution).
  - Discuss the importance of **Sampling** and **Probability** in AI models.
- **Introduction to No-Code AI Tools**
  - Explain **Google AutoML, Azure Machine Learning, Teachable Machine, and Lobe AI**.
  - Show how No-Code AI tools allow business users to implement AI without coding.

- **Hands-on Session: Orange Data Mining**
  - Demonstrate how to install and use Orange Data Mining for basic statistical analysis.
  - Walk through the AI Project Cycle (Problem Scoping, Data Acquisition, Data Exploration, Modelling, Evaluation, Deployment).

Class Discussion:

- Ask students how Data Science can be applied in their everyday life.
- Discuss ethical concerns regarding data collection and AI decision-making.

Extension Activity

- Conduct a **Personality Prediction Quiz** using online tools and analyse the results.
- Assign students to create a short report comparing Custom Coding, Low-Code, and No-Code AI approaches.

Oral Questions:

1. What is the role of Data Science in AI?
2. How does targeted advertising use AI?
3. What are some statistical concepts used in Data Science?
4. How does Orange Data Mining help in AI projects?

Evaluation

- Students will complete exercises in the course book on **pages [Specify Pages]**.
- Conduct a **Quick Quiz** on key concepts covered.
- Practical assessment in the lab using Orange Data Mining.

Suggested Activity

- Create a **mind map** summarising the AI Project Cycle.
- Implement a small dataset analysis using **MS Excel or Orange Data Mining** and present findings.

5.1 Computer Vision

Teaching Objectives

By the end of this lesson, students will be able to:

- Understand the **concept of Computer Vision** and its role in AI.
- Explain how **machines see and interpret images**.
- Differentiate between **Computer Vision and Image Processing**.
- Explore **Computer Vision tasks** such as **object detection and image classification**.
- Identify **real-world applications of Computer Vision** in industries like **healthcare, retail, and autonomous vehicles**.
- Understand the **role of pixels, grayscale, and RGB images** in digital image processing.

Number of Periods	
Theory	Practical
3	2

Teaching Plan

Introduction (Engagement & Recap)

1. **Discussion Questions:**
   - Can machines see and interpret images like humans?
   - How do self-driving cars recognise road signs and pedestrians?
   - What makes face filters in apps like Snapchat and Instagram work?
2. **Real-Life Scenario:**
   - Show examples of **Google Lens, Face ID, or self-driving cars** to introduce the **power of Computer Vision**.
   - Play the **Emoji Scavenger Hunt** game to demonstrate how machines process images.

Lesson Delivery (Explanation & Demonstration)

1. **Introduction to Computer Vision**
   - **What is Computer Vision?**
     - AI enables machines to see, observe, and interpret images.
     - Uses **machine learning and neural networks** to analyse images.
   - **How does Computer Vision work?**
     - Acquiring visual data (images/videos).
     - Processing and analysing data using **feature extraction techniques**.
     - Making predictions (e.g., face recognition, object detection).

   Activity:
   - Show an AI tool like **Google Reverse Image Search** to demonstrate how AI processes images.
2. **How Machines See Images**
   - **Basics of Images & Pixels:**
     - Digital images are made up of **tiny dots called pixels**.
     - More pixels = higher quality image (e.g., **4K vs. 1080p resolution**).
   - **RGB vs. Grayscale Images:**
     - **RGB images** use three colours: Red, Green, and Blue.
     - **Grayscale images** store brightness levels from 0 (black) to 255 (white).
   - **Resolution and Image Storage:**
     - Higher resolution = more storage required.

   Activity:
   - Use an **online RGB colour mixer tool** to experiment with different colour intensities.
   - Ask students to **zoom into an image** to see how it's made of tiny pixels.

3. **Computer Vision vs. Image Processing**

Computer Vision	Image Processing
Enables machines to **understand and interpret** images.	Focuses on **enhancing or manipulating** images.
Example: **Face recognition, object detection**.	Example: **Brightness correction, noise reduction**.
Works at a **higher level** of abstraction.	Works at a **lower level** with pixel data.

Activity:

- Show an **AI face recognition demo** vs. **basic image editing tools** (like brightness/contrast adjustments).

4. **Computer Vision Tasks**
   - **Classification:** Identifying what is in an image (e.g., cat vs. dog).
   - **Object Detection:** Identifying and locating objects (e.g., detecting multiple people in an image).
   - **Instance Segmentation:** Identifying individual objects and distinguishing them from the background.

   Activity:
   - Use **Google Quick Draw** to show how AI classifies hand-drawn images.
   - Demonstrate an **image recognition app** like **Google Lens**.
5. **Applications of Computer Vision**
   - **Facial Recognition:** Used in security systems and attendance tracking.
   - **Retail Analytics:** AI tracks customer movement to optimise store layouts.
   - **Self-Driving Cars:** Uses cameras to detect objects, road signs, and pedestrians.
   - **Medical Imaging:** Helps doctors analyse X-rays and MRIs for accurate diagnosis.
   - **Google Translate (OCR):** Translates text in images using Optical Character Recognition (OCR).

   Activity:
   - Ask students to research and present **one real-world application** of Computer Vision.

Extension (Further Exploration)

- **Discussion Questions:**
  - How does Computer Vision impact privacy and security?
  - Can AI be biased when analysing images?
  - How does Google Translate use Computer Vision for live translations?
- **Creative Task:**
  - Research how **Amazon Go (checkout-free stores)** use Computer Vision for payments.
  - Explore how **AI detects fake news through image analysis**.

Evaluation (Assessments & Review)

- Conduct a **quick quiz** on Computer Vision concepts.
- Assign a **short-answer test** on **the difference between Image Processing and Computer Vision**.
- Practical Lab Session: Use an **AI-based image classifier** to experiment with object detection.

Suggested Activity

- **AI in Action:**
  - Students work in teams to **design a Computer Vision project** (e.g., AI that detects student emotions in online classes).
  - Present findings on how AI interprets visual data.

5.2 Computer Vision and No-Code AI Tools

Teaching Objectives

Students will learn about:

- The role of Computer Vision in Artificial Intelligence
- How AI interprets and understands visual data
- Convolution and its significance in image processing
- Introduction to No-Code AI tools such as **Lobe, Teachable Machine, and Orange Data Mining**
- Hands-on experience in building and deploying AI models without coding
- Convolutional Neural Networks (CNNs) and their applications

Number of Periods	
Theory	Practical
2	3

Teaching Plan

Pre-Lesson Activity:

- Ask students to identify AI applications that use Computer Vision (e.g., facial recognition, self-driving cars, medical imaging).
- Show examples of how AI detects objects in images and videos.

Lesson Introduction:

1. Explain **Computer Vision** as an AI discipline that enables machines to interpret visual data.
2. Discuss how convolution helps AI identify patterns in images and videos.
3. Introduce **No-Code AI tools** and their growing significance in AI development.

Concept Exploration:

- **What is Computer Vision?**
  - Explain how AI models extract features from images.

- Discuss real-world applications like **healthcare, autonomous driving, and security systems**.

- **Understanding Convolution in Image Processing**
  - Explain how convolutional filters detect edges, textures, and objects.
  - Demonstrate using an online convolution tool to visualise image filtering.
- **No-Code AI Tools for Computer Vision**
  - **Lobe AI**: Image classification using a drag-and-drop interface.
  - **Teachable Machine**: AI model training using images, audio, and poses.
  - **Orange Data Mining**: Visual programming for AI and data analysis.
- **Hands-on Session: Image Classification with No-Code AI**
  - Step-by-step guidance on using **Teachable Machine** for image classification.
  - Practical demo of **Lobe AI** to build a real-time image recognition model.
  - Exploring **Orange Data Mining** for dataset analysis.

Class Discussion:

- Ethical concerns of Computer Vision (bias, privacy, and security issues).
- The impact of AI-powered image recognition on industries.

Extension Activity

- Build a **Smart Sorter AI Model** using **Teachable Machine**.
- Conduct an experiment comparing **Custom Coding vs No-Code AI tools**.
- Explore the concept of **Coral Bleaching Detection with AI** (case study with **Orange Data Mining**).

Oral Questions:

1. How does Computer Vision enable AI to interpret images?
2. What is convolution, and why is it essential for image processing?
3. How do No-Code AI tools simplify AI development?
4. What are the applications of CNNs in real life?

Evaluation

- Students will complete exercises in the course book on **pages [Specify Pages]**.
- Conduct a **Quick Quiz** on key concepts covered.
- Practical assessment on building an AI image classifier using **Lobe or Teachable Machine**.

Suggested Activity

- Implement a real-time image classification project using **Teachable Machine**.
- Analyse a dataset using **Orange Data Mining** and present findings.

6.1 Natural Language Processing (NLP)

Teaching Objectives

Students will learn about:

- The fundamentals of **Natural Language Processing (NLP)**
- The difference between **Natural Language and Computer Language**
- **Stages of NLP** and how machines process human language
- **Chatbots and their functionalities**
- **Applications of NLP** in real-world scenarios
- **Text processing techniques** such as **Tokenization, Stemming, and Lemmatization**
- **Techniques of NLP**, including **Bag of Words, TF-IDF, and NLTK**

Number of Periods	
Theory	Practical
2	3

Teaching Plan

Pre-Lesson Activity:

- Ask students to list different languages they speak and discuss how language varies in structure and meaning.
- Show real-world applications of NLP, such as **Google Translate, Voice Assistants, and Sentiment Analysis**.

Lesson Introduction:

1. Explain **Natural Language Processing (NLP)** as a subfield of AI that enables machines to understand and process human language.
2. Discuss the importance of **syntax, semantics, and context** in NLP.

Concept Exploration:

- **What is Natural Language?**
  - Discuss how human languages develop naturally and compare them to programming languages.
- **Rules That Govern Different Languages**
  - Explain **Syntax, Lexicon, and Semantics**.
  - Demonstrate how changing word order affects meaning.
- **Understanding NLP and its Stages**
  - **Lexical Analysis**: Identifying words and breaking them into tokens.
  - **Syntactic Analysis**: Checking grammar and sentence structure.
  - **Semantic Analysis**: Understanding the meaning of words in context.

- **Discourse Integration**: Interpreting relationships between sentences.
- **Pragmatic Analysis**: Understanding real-world implications.

- **Chatbots and Their Role in AI**
  - **Types of Chatbots:** Script-based bots vs. AI-powered bots.
  - **Examples:** Siri, Google Assistant, Alexa, Customer Service Bots.
  - Hands-on activity: Interacting with a chatbot.
- **Applications of NLP**
  - **Text Classification:** How spam filters work in Gmail.
  - **Sentiment Analysis:** Understanding consumer emotions from reviews.
  - **Automatic Text Summarisation:** How news articles generate summaries.
  - **Keyword Extraction:** Identifying important words from a text.
  - **Language Translation:** Google Translate and real-time translation tools.
- **Hands-on Session: Text Processing Techniques**
  - **Tokenization:** Breaking sentences into words.
  - **Removing Stopwords and Special Characters.**
  - **Stemming and Lemmatization:** Understanding root words.
  - **Bag of Words and TF-IDF:** Converting text into numerical data for AI models.
  - **Introduction to NLTK (Natural Language Toolkit) in Python.**

Class Discussion:

- Ethical concerns in NLP (bias in language models, privacy concerns in voice assistants).
- The impact of NLP on industries such as **healthcare, customer service, and education**.

Extension Activity

- Students will **train a simple chatbot** using an online chatbot builder.
- Conduct a **Sentiment Analysis** on customer reviews using an NLP tool.
- Explore how **language translation models** work by experimenting with Google Translate.

Oral Questions:

1. What is NLP, and why is it important?
2. How does a chatbot understand and respond to human queries?
3. What are the different stages of NLP?
4. How do AI assistants like Siri and Alexa use NLP?
5. What is the difference between Stemming and Lemmatization?

Evaluation

- Students will complete exercises in the course book on **pages [Specify Pages]**.
- Conduct a **Quick Quiz** on key NLP concepts.
- Hands-on practical test: **Text processing using Python or No-Code AI tools**.

Suggested Activity

- Create a **mind map** summarising the stages of NLP.
- Implement a **keyword extraction project** using a text dataset.
- Write a **comparison report** on human language vs. computer language.

6.2 Natural Language Processing (Practical)

Teaching Objectives

By the end of this lesson, students will be able to:

- Understand **No-Code NLP tools** and their applications.
- Perform **Sentiment Analysis** using NLP.
- Explore **NLP in customer feedback analysis**.
- Use **Orange Data Mining Tool** for NLP tasks.
- Learn how NLP is applied in real-world scenarios, such as **IMDB movie reviews and Twitter sentiment analysis**.

Number of Periods	
Theory	Practical
2	3

Teaching Plan

Introduction (Engagement & Recap)

1. **Discussion Questions:**
   - How does AI understand human language?
   - Can machines detect emotions in customer feedback or social media posts?
   - What are some real-world applications of NLP (e.g., Google Translate, Siri, Chatbots)?
2. **Real-Life Scenario:**
   - Show examples of **Chatbots (like ChatGPT), sentiment analysis in product reviews, or language translation apps**.
   - Discuss how **companies use NLP** to analyse customer feedback and improve services.

Lesson Delivery (Explanation & Demonstration)

1. **Introduction to No-Code NLP Tools**
   - **What is NLP?**
     - NLP allows computers to process and analyse human language.
     - Used in **voice assistants, spam filters, chatbots, and text analysis**.
   - **No-Code NLP Tools:**
     - **Orange Data Mining**: Drag-and-drop tool for sentiment analysis and text mining.
     - **MonkeyLearn**: Simple NLP platform for text classification.
     - **MeaningCloud**: No-code tool for extracting insights from text.

Activity:

- Show how **MonkeyLearn or MeaningCloud** can perform **text sentiment analysis** without coding.

2. **NLP in Customer Feedback Analysis**
   - **Why analyse customer feedback?**
     - Helps businesses understand customer concerns.
     - Identifies trends and improves services.
   - **Steps in Customer Feedback Analysis:**
     1. **Data Collection:** Gather customer reviews, survey results, and emails.
     2. **Preprocessing:** Remove special characters, convert text to lowercase, and tokenize words.
     3. **Sentiment Analysis:** Use NLP tools to classify feedback as **positive, negative, or neutral**.
     4. **Topic Modelling:** Identify frequently mentioned topics (e.g., "delivery issues" or "product quality").
     5. **Outcome:** Companies use these insights to **improve customer service and reduce complaints**.

   Activity:

   - **Group Task:** Students simulate a **customer feedback system** by manually labelling sentences as **positive, negative, or neutral**.

3. **Sentiment Analysis and Its Importance**
   - **What is Sentiment Analysis?**
     - A technique to determine the **emotional tone** behind text data.
     - Helps businesses gauge **public opinion, brand reputation, and product reviews**.
   - **Methods of Sentiment Analysis:**
     - **Lexicon-Based:** Uses predefined lists of positive/negative words.
     - **Machine Learning-Based:** Uses AI models to learn patterns in text.
     - **Hybrid Approach:** Combines lexicon and machine learning for better accuracy.

   Activity:

   - **Video Session:** Watch a video on **"What is Sentiment Analysis?"** and discuss how sarcasm affects AI-based sentiment analysis.

4. **NLP with Orange Data Mining Tool**
   - **What is Orange Data Mining?**
     - A **drag-and-drop tool** for performing NLP tasks.
     - Allows **sentiment analysis, text classification, and topic modelling**.
   - **Performing Sentiment Analysis Using Orange:**
     1. **Import Dataset** (e.g., IMDB movie reviews, Twitter data).
     2. **Preprocess Text** (clean text, remove noise).

3. **Apply Sentiment Analysis** to classify reviews as positive, negative, or neutral.
4. **Visualise Results** using graphs and tables.

Activity:

- **Hands-on Lab:** Use **Orange Data Mining Tool** to classify IMDB reviews into **positive or negative**.

Extension (Further Exploration)

- **Discussion Questions:**
  - How do businesses use Sentiment Analysis in marketing?
  - What challenges does AI face in detecting sarcasm?
  - Can NLP be used to detect fake news?
- **Creative Task:**
  - Research how **Amazon, Netflix, or YouTube** use NLP for recommendations.
  - Analyse **Twitter data** to detect public sentiment on a trending topic.

Evaluation (Assessments & Review)

- Conduct a **quick quiz** on NLP concepts.
- Assign a **short-answer test** on **Sentiment Analysis techniques**.
- Practical Lab Session: **Use NLP tools to perform real-world sentiment analysis on customer reviews**.

Suggested Activity

- **AI in Action:**
  - Students work in teams to **design an NLP model** for analysing **social media posts or movie reviews**.
  - Present findings on **how AI processes language and detects emotions**.

7 Advanced Python (Practical)

Teaching Objectives

By the end of this lesson, students will be able to:

- Understand **Anaconda** and its role in AI and data science.
- Learn how to work with **Jupyter Notebook** for Python programming.
- Explore the **Virtual Environment** in Python and its importance.
- Understand and use **Python libraries** such as **NumPy, Pandas, Matplotlib, SciPy, NLTK, and OpenCV**.
- Apply Python for **data analysis, visualization, and AI applications**.

Number of Periods	
Theory	Practical
2	3

Teaching Plan

Introduction (Engagement & Recap)

1. **Discussion Questions:**
   - Why do data scientists and AI developers use Python?
   - What are the benefits of using Anaconda for Python programming?
   - How does Jupyter Notebook help in AI development?
2. **Real-Life Scenario:**
   - Show how **Netflix uses Python for data analysis**.
   - Explain how **Google uses Jupyter Notebook for AI research**.

Lesson Delivery (Explanation & Demonstration)

1. **Introduction to Anaconda & Jupyter Notebook**
   - **What is Anaconda?**
     - A free, open-source Python distribution used in **AI, Machine Learning, and Data Science**.
     - Comes with pre-installed libraries like **NumPy, Pandas, Matplotlib, and SciPy**.
   - **What is Jupyter Notebook?**
     - A web-based tool for **writing, running, and visualizing Python code**.
     - Allows the integration of **live code, text, and visualizations** in one document.
   - **Installation & Setup of Anaconda**
     - Download Anaconda from **www.anaconda.com**.
     - Install and launch **Jupyter Notebook** using Anaconda Navigator or the command prompt.

   Activity:
   - **Hands-on Exercise:** Open **Jupyter Notebook** and run a simple Python script.
2. **Virtual Environment in Python**
   - **What is a Virtual Environment?**
     - An isolated Python setup that **allows different projects to have their own libraries**.
   - **Creating a Virtual Environment**
     - Command: conda create -n myenv python=3.12.7
     - Activating it: conda activate myenv
   - **Why is it important?**
     - Helps **manage dependencies** for different projects without conflicts.

   Activity:
   - **Lab Task:** Create and activate a virtual environment in Anaconda.

3. **Essential Python Libraries for AI & Data Science**
   - **NumPy (Numerical Python)**
     - Used for **handling large datasets and performing mathematical operations**.
     - Supports **multi-dimensional arrays** for fast computations.
   - **Pandas (Panel Data)**
     - Used for **data manipulation and analysis**.
     - Helps in handling **structured datasets like CSV, Excel, and SQL tables**.
   - **Matplotlib & Seaborn**
     - Libraries for **data visualization** using **graphs, charts, and plots**.
   - **SciPy (Scientific Python)**
     - Used for **scientific computing, optimization, and machine learning algorithms**.
   - **NLTK (Natural Language Toolkit)**
     - Used for **text processing and NLP (Natural Language Processing)**.
   - **OpenCV (Open-Source Computer Vision Library)**
     - Used for **image processing and computer vision applications**.

   Activity:
   - **Practical Exercise:**
     - Load a dataset using **Pandas**.
     - Perform numerical operations using **NumPy**.
     - Visualize data with **Matplotlib**.
4. **Python for AI & Data Science**
   - **Why Python for AI?**
     - **Easy to learn & implement**.
     - **Extensive libraries** for data science, machine learning, and deep learning.
     - **Strong community support** for AI developers.
   - **Real-World AI Applications:**
     - **Google Assistant:** Uses Python for speech recognition.
     - **Tesla Autopilot:** Uses Python for self-driving car algorithms.
     - **Netflix Recommendations:** Uses AI models built in Python.

   Activity:
   - **Case Study:** Research how companies like **Google, Tesla, or Netflix** use Python for AI.

Extension (Further Exploration)

- **Discussion Questions:**
  - What are the advantages of using Jupyter Notebook over traditional IDEs?
  - Why is a Virtual Environment necessary for AI projects?

- How does Python compare to other programming languages in AI?

- **Creative Task:**
  - Research how **Anaconda, NumPy, and Pandas** help in data science projects.
  - Create a **Python project** using **data analysis & visualization** techniques.

Evaluation (Assessments & Review)

- Conduct a **quiz** on Python's role in AI.
- Assign a **short-answer test** on **Python libraries for data science**.
- **Practical Lab Session:**
  - Install Anaconda & Jupyter Notebook.
  - Create a **Virtual Environment** and install required packages.
  - Load and analyse a dataset using **Pandas & Matplotlib**.

Suggested Activity

- **AI in Action:**
  - Students work in teams to **develop a small AI project** using Python.
  - Examples:
    - **Predict student performance using Pandas & NumPy**.
    - **Analyse movie reviews using Sentiment Analysis with NLTK**.
    - **Create a simple image filter using OpenCV**.