| | | |
|---|---|---|
| | **YOGI VEMANA UNIVERSITY::KADAPA** | |

# Syllabus for Applications of Artificial Intelligence in consonance with Curriculum framework w.e.f. AY 2025-26

1. **Applicable to Botany, Zoology, Bio-Technology, Miro-Biology and other Life Sciences**
2. **Applicable to Commerce and Management**
3. **Applicable to History, Economics, Political Science, Linguistics, and any other Humanities**
4. **Applicable to Mathematics, Physics, Chemistry and any other Mathematical Sciences**
5. **Applicable to Computer Science, Data Science, Artificial Intelligence, Cognitive Systems, Data Analytics, Cloud Computing, Cyber Security and any other Computer Science Allied Streams**

## COURSE STRUCTURE

| Year | Semester | Course | Title of the Course | No. of Hrs /Week | No. of Credits |
|---|---|---|---|---|---|
| I | II | 1 | Applications of Artificial Intelligence | 3 | 4 |
| | | | Applications of Artificial Intelligence-Practical | 2 | 0 |

## 1. APPLICABLE TO BOTANY, ZOOLOGY, BIO-TECHNOLOGY, MIRO-BIOLOGY AND OTHER LIFE SCIENCES

### SEMESTER-II

### COURSE 1: APPLICATIONS OF ARTIFICIAL INTELLIGENCE

**Theory** **Credits: 4** **3 hrs/week**

---

**Course Objectives**

1. Provide a foundation in the AI ecosystem, including hardware, cloud, and edge platforms relevant to biological sciences.
2. Familiarize students with different types of datasets and public repositories used in AI research.
3. Develop skills in building AI data pipelines through collection, annotation, cleaning, and preprocessing.
4. Explore real-world applications of AI in agriculture, ecology, zoology, and environmental sciences.
5. Introduce AI-driven approaches in biotechnology and chemistry, such as genome sequencing, protein structure prediction, and drug discovery.

**Course Outcomes**

On successful completion of this course, students will be able to:

1. Explain the role of AI hardware, edge devices, and cloud platforms in enabling applications in biological sciences.
2. Differentiate data types and utilize public datasets relevant to AI in life sciences.
3. Design and implement a conceptual AI data pipeline for solving biological problems.
4. Apply AI techniques in case studies of agriculture, zoology, ecology, and environmental monitoring.
5. Analyze the impact of AI in biotechnology and chemistry, particularly in genome sequencing, protein prediction, and drug discovery.

**UNIT 1: Infrastructure and Platforms for AI**

**AI hardware basics:** CPU, GPU, TPU, NPU roles, RAM vs VRAM, storage types. AI platforms: Google AutoML, Teachable Machine, Orange, Weka, KNIME. Edge AI fundamentals: Latency, privacy, Sensors, models, actions. Edge AI applications: Smart cars, smart homes, Real examples.Unit recap and assessment

**UNIT 2: Foundations of Data for AI**

**Data importance:** Data role in AI, Big data influence. Core data concepts: Data, information, knowledge, Structured vs unstructured, Data modalities: Text, image, audio, video, time series, File formats. Data sources and ethics: Repositories (Kaggle, UCI, Hugging Face), Licensing, privacy. Unit recap and activity

**UNIT 3: AI Data Pipeline**

**Pipeline overview:** Ingestion, Storage, Processing. Data collection methods: APIs, sensors, logs, web scraping. Annotation and labeling: Types, Manual vs automated. Cleaning and preprocessing: Missing values, Normalization, Train-test split. Pipeline walkthrough

**Unit 4: AI in Biological Sciences**

**AI in Botany & Agriculture:** Plant disease detection via image recognition; Crop yield forecasting using climate and soil analytics; Precision agriculture: smart irrigation and fertilizer planning

**AI in Zoology, Ecology & Environmental Sciences:** Wildlife monitoring: species ID from camera trap data; Aquatic systems: fish recognition and water quality modeling; Livestock health and disease prediction; Environmental tracking: forest cover and pollution analysis

**Unit 5: AI in BioTechnology and Bio-Chemistry**

Application of AI in Genome sequencing & gene function prediction; Using AI in Protein structure modeling (e.g., AlphaFold); AI for Drug discovery: virtual compound screening; Application of AI in Microbial classification & metagenomic profiling; Chemical reaction and material property prediction

## 1. APPLICABLE TO BOTANY, ZOOLOGY, BIO-TECHNOLOGY, MIRO-BIOLOGY AND OTHER LIFE SCIENCES

### SEMESTER-II

### COURSE 1: APPLICATIONS OF ARTIFICIAL INTELLIGENCE

**Practical** **Credits: 0** **2 hrs/week**

---

**Suggested Lab Practicals (No Coding)**

**Lab 1 - Exploring Public Datasets (Orange Data Mining)**

- Visit a public repository (Kaggle, UCI, data.gov.in)
- Download a dataset (e.g., rainfall data, literacy rates, or traffic accident statistics)
- **Procedure**:
    1. Open Orange → Add *File* widget → Load a CSV (e.g., Titanic dataset).
    2. Connect to *Data Table* → View rows/columns.
    3. Connect to *Data Info* → Check attributes, data types.
    4. View in *Data Table* and *Distributions* widget.
- **Observation**: Note numeric, categorical, missing values.
- **Outcome:** Students understand structured data format in CSV.

**Lab 2 - Understanding Dataset Metadata and Formats**

- Take two datasets in different formats (CSV, JSON)
- View metadata (description, features, size, license)
- Compare domain-specific datasets (e.g., medical vs. finance)

**Lab 3 - Data Annotation Exercise**

- Use **MakeSense.ai** or **VGG Image Annotator (VIA)**
- Annotate 10 sample images (traffic signs, fruits, or medical scans)
- Export annotations in XML or YOLO format
- Discuss annotation errors and challenges

**Lab 4 - Data Cleaning and Visualization (Orange Data Mining)**

- **Aim**: To clean dirty data and visualize categorical and numeric attributes.
- **Procedure**:
    1. Load dataset.
    2. Connect *File → Edit Domain* (to change types) and *Impute* (to fill missing values).
    3. Compare cleaned vs. original in *Data Table*.
    4. *Distributions* widget.
    5. Check various features distribution.

  *(Optional: Create simple bar charts/line charts to visualize trends using Google Looker Studio)*
- **Observation**: Missing values filled with mean/median., Graphical representation of data.
- **Outcome:** Learn importance of data cleaning., Students learn importance of visualization in preprocessing.

**Lab 5: Train/Test Split in Orange**

- **Aim**: To split a dataset for AI training/testing.
- **Procedure**:
    1. Load Titanic dataset.
    2. Connect *File → Data Sampler* (70% train, 30% test).
    3. Connect outputs to *Data Table* widgets to view.
- **Observation**: Students see two different subsets.
- **Outcome:** Concept of model validation using split data.

**Lab 6: Plant Leaf Disease Detection**

- **Dataset:** Plant leaf disease datasets (PlantVillage, Kaggle).
- **Tool:** Google Teachable Machine / Plantix app.
- Activity: Upload leaf images to classify healthy vs diseased leaves.

**Lab 7: Crop Yield Prediction**

- **Dataset:** FAO crop yield datasets.
- **Tool:** Orange Data Mining (drag-and-drop AI workflows).
- Activity: Predict yield for different crops based on soil & climate features.

**Lab 8: Species Recognization**

- **Dataset:** Camera trap image datasets (Snapshot Serengeti, LILA BC).
- **Tool:** iNaturalist / Wildbook AI platform.
- Activity: Upload wildlife images for species recognition & conservation mapping.

**Lab 9: Predict and visualize 3D protein structures:**

- **Dataset:** Genomic & protein sequence databases (NCBI, UniProt, AlphaFold DB).
- **Tool:** AlphaFold Protein Structure Viewer (online).
- Activity: Predict and visualize 3D protein structures.

**Lab 10: Analyze chemical similarity and predict drug-likeness.**

- **Dataset:** Drug compound datasets (ChEMBL).
- **Tool:** ChemMine Tools (web-based).
- Activity: Analyze chemical similarity and predict drug-likeness.

**Lab 11: Identify microbial species from sequencing datasets.**

- **Dataset:** Metagenomics datasets (MG-RAST).
- **Tool:** MG-RAST online platform.
- Activity: Identify microbial species from sequencing datasets.

***Note: The Tools suggested above are tentative. Teacher/Student is free to choose any other similar tool to execute the said lab experiments.***

**Books/References**


1. **Data Science for Beginners**, Andrew Park
   *(Introductory concepts of data types, collection, cleaning, and visualization without coding)*
2. **AI Basics for Non-Programmers**, Tom Taulli
   *(Clear explanations of AI data lifecycle and real-world use cases)*
3. **Data Preparation for Machine Learning**, Jason Brownlee
   *(Conceptual understanding of dataset quality, preprocessing, and pipelines)*
4. **Hands-On Data Science for Non-Programmers**, David Meerman Scott
   *(Spreadsheet-based data exploration and visualization)*
5. You Look Like a Thing and I Love You – Janelle Shane

6. **Artificial Intelligence in Life Sciences** – Elsevier.
7. **Artificial Intelligence in Agriculture** – CRC Press (B. Prasad).
8. **AI for Ecology and Conservation** – Springer.
9. **Bioinformatics and Drug Discovery using AI** – Academic Press.
10. Databases & Platforms: FAO, GBIF, PlantVillage, ChEMBL, UniProt, AlphaFold DB.

**Online Resources**

- **Kaggle Dataset Search**, https://www.kaggle.com/datasets
- **Google Dataset Search**, https://datasetsearch.research.google.com
- **UCI Machine Learning Repository**, https://archive.ics.uci.edu
- **Hugging Face Datasets**, https://huggingface.co/datasets
- **Open Government Data (India)**, https://data.gov.in

## 2. APPLICABLE TO COMMERCE AND MANAGEMENT

### SEMESTER-II

### COURSE 1: APPLICATIONS OF ARTIFICIAL INTELLIGENCE

**Theory** **Credits: 4** **3 hrs/week**

---

**Course Objectives:**

1. Provide a foundation in the AI ecosystem, including hardware, cloud, and edge platforms relevant to commerce and management.
2. Familiarize students with different types of datasets and public repositories used in AI research.
3. Develop skills in building AI data pipelines through collection, annotation, cleaning, and preprocessing.
4. Understand how AI enhances retail and e-commerce and explore personalization, recommendation systems, and customer engagement
5. Apply AI to streamline business processes and decision-making and explore AI in finance, HR, and supply chain management

**Course Outcomes:**

On successful completion of this course, students will be able to:

1. Explain the AI ecosystem (hardware, cloud, and edge devices) and its relevance to commerce and management.
2. Differentiate between structured and unstructured data, and utilize public datasets for business-oriented AI applications.
3. Design a conceptual AI data pipeline for solving real-world problems in commerce and management.
4. Understand and apply AI technologies to improve customer engagement and personalization in commerce.
5. Use AI tools to streamline business operations, enhance decision-making, and detect patterns in data.

**UNIT 1: Infrastructure and Platforms for AI**

**AI hardware basics:** CPU, GPU, TPU, NPU roles, RAM vs VRAM, storage types. AI platforms: Google AutoML, Teachable Machine, Orange, Weka, KNIME. Edge AI fundamentals: Latency, privacy, Sensors, models, actions. Edge AI applications: Smart cars, smart homes, Real examples.Unit recap and assessment

**UNIT 2: Foundations of Data for AI**

**Data importance:** Data role in AI, Big data influence. Core data concepts: Data, information, knowledge, Structured vs unstructured, Data modalities: Text, image, audio, video, time series, File formats. Data sources and ethics: Repositories (Kaggle, UCI, Hugging Face), Licensing, privacy. Unit recap and activity

**UNIT 3: AI Data Pipeline**

**Pipeline overview:** Ingestion, Storage, Processing. Data collection methods: APIs, sensors, logs, web scraping. Annotation and labeling: Types, Manual vs automated. Cleaning and preprocessing: Missing values, Normalization, Train-test split. Pipeline walkthrough

**Unit 4: AI in Commerce – Transforming the Consumer Experience**

Introduction to AI in Commerce, Recommendation Engines (Collaborative & Content-Based), Chatbots and Virtual Assistants, Sentiment Analysis and Review Mining, Inventory Optimization and Demand Forecasting, Ethical Issues related to use of AI in Commerce and Business: Bias, Privacy, and Transparency

**Unit 5: AI in Business Operations – Driving Efficiency and Insight**

AI in Business Intelligence and Predictive Analytics, Financial Applications: Fraud Detection, Risk Modelling, HR Applications: Resume Screening, Employee Analytics, Supply Chain Automation and Optimization, AI in Marketing: Customer Segmentation, Lead Scoring, Strategic Adoption of AI in Enterprises, Explainable AI in E-Commerce.

## 2. APPLICABLE TO COMMERCE AND MANAGEMENT

## SEMESTER-II

## COURSE 1: APPLICATIONS OF ARTIFICIAL INTELLIGENCE

**Practical** **Credits: 0** **2 hrs/week**

---

**Suggested Lab Practicals (No Coding)**

**Lab 1 - Exploring Public Datasets (Orange Data Mining)**

- Visit a public repository (Kaggle, UCI, data.gov.in)
- Download a dataset (e.g., rainfall data, literacy rates, or traffic accident statistics)
- **Procedure**:
    1. Open Orange → Add *File* widget → Load a CSV (e.g., Titanic dataset).
    2. Connect to *Data Table* → View rows/columns.
    3. Connect to *Data Info* → Check attributes, data types.
    4. View in *Data Table* and *Distributions* widget.
- **Observation**: Note numeric, categorical, missing values.
- **Outcome:** Students understand structured data format in CSV.

**Lab 2 - Understanding Dataset Metadata and Formats**

- Take two datasets in different formats (CSV, JSON)
- View metadata (description, features, size, license)
- Compare domain-specific datasets (e.g., medical vs. finance)

**Lab 3 - Data Annotation Exercise**

- Use **MakeSense.ai** or **VGG Image Annotator (VIA)**
- Annotate 10 sample images (traffic signs, fruits, or medical scans)
- Export annotations in XML or YOLO format
- Discuss annotation errors and challenges

**Lab 4 - Data Cleaning and Visualization (Orange Data Mining)**

- **Aim**: To clean dirty data and visualize categorical and numeric attributes.
- **Procedure**:
    1. Load dataset.
    2. Connect *File* → *Edit Domain* (to change types) and *Impute* (to fill missing values).
    3. Compare cleaned vs. original in *Data Table*.
    4. *Distributions* widget.
    5. Check various features distribution.

  *(Optional: Create simple bar charts/line charts to visualize trends using Google Looker Studio)*
- **Observation**: Missing values filled with mean/median., Graphical representation of data.
- **Outcome:** Learn importance of data cleaning., Students learn importance of visualization in preprocessing.

**Lab 5: Train/Test Split in Orange**

- **Aim**: To split dataset for AI training/testing.
- **Procedure**:
    1. Load Titanic dataset.
    2. Connect *File* → *Data Sampler* (70% train, 30% test).
    3. Connect outputs to *Data Table* widgets to view.
- **Observation**: Students see two different subsets.
- **Outcome:** Concept of model validation using split data.

**Lab 6: Introduction to AI in Commerce – Use Case Exploration**

**Prerequisite:** Discuss conceptually about Clustering

**Objective:** Understand how AI is applied in commerce through data visualization and clustering.

**Orange Workflow:** Use Orange Data Mining Tool

**Widgets Used**: File → Data Table → Scatter Plot → Hierarchical Clustering

**Dataset**: Retail customer data (e.g., purchase frequency, amount spent)

**Dataset Link**: Retail Sales Data

**Activities:**

· Load customer data and visualize spending patterns.

· Apply clustering to identify customer segments.

· Discuss how businesses can tailor services to each segment.

**Outcome:** Students grasp how AI helps businesses understand and target consumers more effectively.

**Lab 7: Recommendation Engine Simulation**

**Prerequisite:** Discuss conceptually about Clustering

**Objective:** Simulate collaborative filtering using similarity-based clustering.

**Orange Workflow:**

**Widgets Used**: File → Distance → Hierarchical Clustering → Data Table

**Dataset**: User-product ratings matrix

**Dataset Link**: Amazon Product Recommendation System

**Activities:**

- Calculate similarity between users.
- Group similar users and recommend products based on cluster behavior.
- Discuss differences between collaborative and content-based filtering.

**Outcome:** Students understand the logic behind recommendation systems and how they personalize user experience.

**Lab 8: Chatbot Intent Classification**

**Prerequisite:** Discuss conceptually about Linear Regression & Logistic Regression

**Objective:** Train a model to classify customer queries into intents.

**Orange Workflow:**

**Widgets Used**: File → Preprocess Text → Bag of Words → Logistic Regression → Test & Score

**Dataset**: Sample customer queries labeled with intents (e.g., "track order", "return item")

**Dataset Link**: Customer Intent Classification

**Activities:**

- Preprocess and vectorize text data.
- Train a classifier to predict query intent.

- Evaluate accuracy and discuss chatbot training.

**Outcome:** Students learn how AI understands and responds to customer queries.

**Lab 9: Sentiment Analysis of Reviews**

**Prerequisite:** Discuss conceptually about Naive Bayes

**Objective:** Classify customer reviews as positive or negative.

**Orange Workflow:**

**Widgets Used**: File → Preprocess Text → Bag of Words → Naive Bayes → Test & Score

**Dataset**: Product reviews with sentiment labels

**Dataset Link**: Amazon Product Reviews –Sentiment Analysis

**Activities:**

- Clean and tokenize review text.
- Train a sentiment classifier.
- Visualize word clouds for positive vs. negative reviews.

**Outcome:** Students analyze customer feedback and extract actionable insights.

**Lab 10: Demand Forecasting with Regression**

**Prerequisite:** Discuss conceptually about Linear Regression & Logistic Regression

**Objective:** Predict future sales using regression models.

**Orange Workflow:**

**Widgets Used**: File → Linear Regression → Scatter Plot → Test & Score

**Dataset**: Historical sales data (e.g., monthly sales, promotions)

**Dataset Link**: Comprehensive Retail Sales Data

**Activities:**

- Train a regression model to forecast sales.
- Visualize predictions vs. actuals.
- Discuss implications for inventory planning.

**Outcome:** Students understand how AI supports demand forecasting and inventory control.

**Lab 11: Bias Detection in AI Models**

**Prerequisite:** Discuss conceptually about Linear Regression, Logistic Regression & Confusion Matrix

**Objective:** Explore bias in predictive models and its impact.

**Orange Workflow:**

**Widgets Used**: File → Logistic Regression → Confusion Matrix → Distributions

**Dataset**: HR hiring data with gender or age attributes

**Dataset Link**: HR Data Analytics

**Activities:**

- Train a model to predict hiring decisions.
- Analyze performance across demographic groups.
- Discuss fairness, transparency, and ethical implications.

**Outcome:** Students critically assess bias and propose ethical safeguards.

**Lab 12: Predictive Analytics for Business Intelligence**

**Prerequisite:** Discuss conceptually about Random Forest

**Objective:** Use classification to predict customer churn.

**Orange Workflow:**

**Widgets Used**: File → Random Forest → Test & Score → ROC Analysis

**Dataset**: Telecom or subscription data with churn labels

**Dataset Link**: Telco Customer Churn –IBM Dataset

**Activities:**

- Train and evaluate a churn prediction model.
- Interpret ROC curves and accuracy.
- Discuss how businesses can act on predictions.

**Outcome:** Students apply predictive analytics to improve customer retention.

**Lab 13: AI in HR and Marketing – Resume Screening & Segmentation**

**Prerequisite:** Discuss conceptually about Clustering

**Objective:** Classify resumes and segment customers using clustering.

**Orange Workflow:**

**HR Task**: File → Preprocess Text → Bag of Words → Logistic Regression

**Marketing Task**: File → k-Means Clustering → Scatter Plot

**Resume Screening Dataset**: Employee Hiring Data

**Customer Segmentation Dataset**: Customer Segmentation Dataset

**Activities:**

- Screen resumes based on job fit.
- Segment customers by behavior or demographics.
- Discuss automation benefits and risks.

**Outcome:** Students explore how AI enhances HR and marketing efficiency.

***Note: The Tools suggested above are tentative. Teacher/Student is free to choose any other similar tool to execute the said lab experiments.***

**Books/References**


1. **Data Science for Beginners**, Andrew Park
   *(Introductory concepts of data types, collection, cleaning, and visualization without coding)*
2. **AI Basics for Non-Programmers**, Tom Taulli
   *(Clear explanations of AI data lifecycle and real-world use cases)*
3. **Data Preparation for Machine Learning**, Jason Brownlee
   *(Conceptual understanding of dataset quality, preprocessing, and pipelines)*
4. **Hands-On Data Science for Non-Programmers**, David Meerman Scott
   *(Spreadsheet-based data exploration and visualization)*
5. You Look Like a Thing and I Love You – Janelle Shane

## 3. APPLICABLE TO HISTORY, ECONOMICS, POLITICAL SCIENCE, LINGUISTICS, AND ANY OTHER HUMANITIES

### SEMESTER-II

### COURSE 1: APPLICATIONS OF ARTIFICIAL INTELLIGENCE

**Theory** **Credits: 4** **3 hrs/week**

---

**Course Objectives**

1. Provide a foundation in the AI ecosystem, including hardware, cloud, and edge platforms, in a non-technical way for Arts and Social Sciences students.
2. Familiarize students with data types, sources, and public repositories that fuel AI applications in society and humanities.
3. Explain the process of preparing and managing AI data pipelines through collection, annotation, and cleaning.
4. Explore real-world applications of AI in arts, culture, literature, linguistics, and languages.
5. Introduce applications of AI in social sciences such as economics, political science, psychology, history, and sociology, with an emphasis on ethics and responsible adoption.

**Course Outcomes**

On successful completion of this course, students will be able to:

1. Explain the AI ecosystem (hardware, cloud, edge devices) and its societal relevance.
2. Differentiate data types and identify public datasets relevant to social sciences, arts, and humanities.
3. Describe the steps of an AI data pipeline (collection, annotation, cleaning, preparation) in simple terms.
4. Illustrate the role of AI in arts, languages, and cultural heritage with practical, real-world examples.
5. Analyze applications of AI in social sciences (economics, politics, psychology, history, and society) and evaluate ethical concerns.

**UNIT 1: Infrastructure and Platforms for AI**

**AI hardware basics:** CPU, GPU, TPU, NPU roles, RAM vs VRAM, storage types. AI platforms: Google AutoML, Teachable Machine, Orange, Weka, KNIME. Edge AI fundamentals: Latency, privacy, Sensors, models, actions. Edge AI applications: Smart cars, smart homes, Real examples.Unit recap and assessment

**UNIT 2: Foundations of Data for AI**

**Data importance:** Data role in AI, Big data influence. Core data concepts: Data, information, knowledge, Structured vs unstructured, Data modalities: Text, image, audio, video, time series, File formats. Data sources and ethics: Repositories (Kaggle, UCI, Hugging Face), Licensing, privacy. Unit recap and activity

**UNIT 3: AI Data Pipeline**

**Pipeline overview:** Ingestion, Storage, Processing. Data collection methods: APIs, sensors, logs, web scraping. Annotation and labeling: Types, Manual vs automated. Cleaning and preprocessing: Missing values, Normalization, Train-test split. Pipeline walkthrough

**Unit 4: AI in Social Sciences and Society:**

**AI in Economics:** Predicting market trends, consumer behavior, and economic forecasting.
**AI in Political Science & Public Policy:** Social media analysis for political campaigns, Opinion mining & election trend prediction.
**AI in Psychology & Sociology:** Emotion recognition from facial expressions and text, AI chatbots in mental health counseling (conceptual).
**AI in History & Society:** Digital archives and historical document analysis,AI for preserving ancient languages and scripts, Social impact of AI on jobs, privacy, and democracy.

**Unit 5: AI in Arts, Languages, and Cultural Studies**

**AI in Literature & Languages:** Machine translation (Google Translate, DeepL), Sentiment analysis in literature and media reviews, AI-assisted creative writing (chatbots, story generators, poetry)

**AI in Arts & Culture:** AI in music composition & art generation (painting, film scripts), Digitization and preservation of cultural heritage using AI, Identifying fake art and forgeries

## 3. APPLICABLE TO HISTORY, ECONOMICS, POLITICAL SCIENCE, LINGUISTICS, AND ANY OTHER HUMANITIES

### SEMESTER-II

### COURSE 1: APPLICATIONS OF ARTIFICIAL INTELLIGENCE

**Practical** **Credits: 0** **2 hrs/week**

---

**Lab Experiments:**

**Lab 1: Explore Open Data (Economics / Sociology)**

- **Tool**: Our World in Data or World Bank Data Explorer (https://data360.worldbank.org/en/search)
- **Task**: Choose indicators (e.g., Literacy, GDP per capita, Poverty, Unemployment).
- **Procedure**:
    1. Open World Bank / Our World in Data.
    2. Select one country or compare multiple countries.
    3. Use the interactive charts to see historical trends.
- **Observation**: How does education level impact income or health?
- **Outcome:** Understand correlations between **socio-economic indicators**.

**Lab 2: Data Annotation (NER & Classification)**

- **Tool**: Prodigy Demo (https://demo.prodi.gy/) -free online demo, no install
- **Activity**:
    1. Try Named Entity Recognition (NER) demo.
    2. Highlight organizations, people, and places in sample text.
    3. Compare manual vs. automated annotation.
- **Outcome**: Students understand **manual vs. automated annotation** and why labeling is crucial.

**Lab 3: Automatic Text Classification for Sociology**

- **Tool:** Text2Data Sentiment Analysis Demo (https://text2data.com/Demo) *-free online demo*
- **Task:** Copy-paste 5 messages related to climate change, caste or gender.

- **Observation:** Tool classifies them as Positive, Neutral, or Negative.
- **Outcome:** Understand "annotation" and "classification labels."

**Lab 4: Word Clouds for Political Speeches (Languages / Political Science)**

- **Tool:** WordArt Cloud Generator (https://wordart.com/create) - Free Online
- **Procedure:**
    1. Copy a Prime Minister's speech or Economic Budget highlights.
    2. Paste into WordArt.
    3. Generate a word cloud → biggest words = most repeated.
- **Observation:** Main themes in political communication.
- **Outcome:** Learn how text visualization shows political/economic priorities.

**Lab 5: Bias in Job Advertisements (Sociology / Gender Studies)**

- **Tool:** Gender Decoder for Job Ads (https://gender-decoder.katmatfield.com/) -Free Online or Any other related tool
- **Procedure:**
    1. Copy text from 5 job advertisements.
    2. Paste into the gender bias detector.
    3. Note masculine vs feminine coded words.
- **Observation:** How language influences gendered hiring.
- **Outcome:** Awareness of AI in analyzing workplace bias.

**Lab 6: Language Detection & Translation (Languages / Linguistics)**

- **Tool**: Google Translate (https://translate.google.co.in/)
- **Task**: Enter text in regional/foreign languages.
- **Procedure**:
    1. Paste short paragraph in Telugu, Hindi, French, etc.
    2. Translate into English.
    3. Reverse-translate to see changes.
- **Observation**: Which meanings are lost in translation?
- **Outcome**: Students understand **AI's strengths/limits in translation**.

**Lab 7: Text Summarization of Articles (Languages / Literature)**

- **Tool**: SMMRY (https://smmry.com/) or Scholarcy Free Summarizer (https://www.scholarcy.com/article-summarizer)
- **Task**: Take a long article or essay.
- **Procedure**:
    1. Paste article into tool.
    2. Generate summary.
    3. Compare AI summary vs. student's manual summary.
- **Observation**: AI captures main ideas but may miss nuances.
- **Outcome**: Learn how **AI helps in academic reading & summarization**.

**Lab 8: Talk to a Free Chatbot**

- **Tool:** ChatGPT Free or Poe or any other related tool
- **Activity:** Students ask questions like:
    - "Tell me a Telugu proverb and its meaning."
    - "Explain World War II in 5 simple lines."
- **Outcome: Data delivery/output** stage - AI as a dialogue system.

**Lab 9: Story Generator (Creative Writing / Literature)**

- **Tool:** AI Dungeon (https://play.aidungeon.com/) -free play or DeepAI Text Generator (https://deepai.org/chat/text-generator)
- **Activity:** Give a starting line (e.g., "Once upon a time in Amaravati…") → AI continues story
- **Outcome:** How **training data influences creativity** in AI.

**Lab 10: AI Art Generator (Culture & Arts)**

- **Tool:** DeepAI Text-to-Image *(free) (https://deepai.org/machine-learning-model/text2img) or any other related tool*
- **Activity:** Ask students to generate:
    - "A painting of Bharat Mata in Picasso style."
    - "Hyderabad Charminar in futuristic design."
- **Outcome:** Data pipeline applied to **images**.

**Lab 11: AI Music Generation with Soundraw (Free Trial)**

**Tool:** Soundraw.io

**Steps:**

Open the website → Click **Create Music**.

Select **Mood** (happy, sad, chill, dramatic).

Select **Genre** (pop, jazz, cinematic, lo-fi, etc.).

The AI will generate a full instrumental track.

You can adjust instruments, tempo, and structure.

**Outcome:** Students understand how AI composes music automatically based on mood/genre → linking to **psychology, culture, and media studies**.

**Lab 12: Chatbot Roleplay (History / Social Science)**

- **Tool:** Character.AI *(free, no coding)- https://character.ai/*
- **Activity:** Talk to AI characters like "Einstein" or "Shakespeare" and ask them questions. You can try with other AI characters and experiment.
- **Learning:** How AI **mimics personalities** using training data.

***Note: The Tools suggested above are tentative. Teacher/Student is free to choose any other similar tool to execute the said lab experiments.***

**Books/References**


1. **Data Science for Beginners**, Andrew Park
   *(Introductory concepts of data types, collection, cleaning, and visualization without coding)*
2. **AI Basics for Non-Programmers**, Tom Taulli
   *(Clear explanations of AI data lifecycle and real-world use cases)*
3. **Data Preparation for Machine Learning**, Jason Brownlee
   *(Conceptual understanding of dataset quality, preprocessing, and pipelines)*
4. **Hands-On Data Science for Non-Programmers**, David Meerman Scott
   *(Spreadsheet-based data exploration and visualization)*
5. You Look Like a Thing and I Love You – Janelle Shane

## 4. APPLICABLE TO MATHEMATICS, PHYSICS, CHEMISTRY AND ANY OTHER MATHEMATICAL SCIENCES

### SEMESTER-II

### COURSE 1: APPLICATIONS OF ARTIFICIAL INTELLIGENCE

**Theory** **Credits: 4** **3 hrs/week**

---

**Course Objectives**

1. Provide a foundational understanding of AI platforms, data pipelines, and their importance in the physical sciences.
2. Introduce real-world datasets and public repositories relevant to physics, chemistry, mathematics, and earth sciences.
3. Explain how AI is applied to solve scientific problems, discover patterns, and support research in physical sciences in a simple, non-coding manner.
4. Highlight ethical concerns, data challenges, and the future of AI-driven discoveries in physical sciences.

**Course Outcomes**

On successful completion of this course, students will be able to:

1. Explain the AI ecosystem (hardware, cloud, and edge devices) in relation to physical sciences applications.
2. Identify scientific data types and public repositories relevant to physics, chemistry, mathematics, and earth sciences.
3. Describe the process of preparing and managing scientific data pipelines.
4. Illustrate the role of AI in solving real-world scientific challenges in physics, chemistry, mathematics, and earth sciences.
5. Analyze ethical, environmental, and societal impacts of AI-driven scientific applications.

**UNIT 1: Infrastructure and Platforms for AI**

**AI hardware basics:** CPU, GPU, TPU, NPU roles, RAM vs VRAM, storage types. AI platforms: Google AutoML, Teachable Machine, Orange, Weka, KNIME. Edge AI fundamentals: Latency, privacy, Sensors, models, actions. Edge AI applications: Smart cars, smart homes, Real examples.Unit recap and assessment

**UNIT 2: Foundations of Data for AI**

**Data importance:** Data role in AI, Big data influence. Core data concepts: Data, information, knowledge, Structured vs unstructured, Data modalities: Text, image, audio, video, time series, File formats. Data sources and ethics: Repositories (Kaggle, UCI, Hugging Face), Licensing, privacy. Unit recap and activity

**UNIT 3: AI Data Pipeline**

**Pipeline overview:** Ingestion, Storage, Processing. Data collection methods: APIs, sensors, logs, web scraping. Annotation and labeling: Types, Manual vs automated. Cleaning and preprocessing: Missing values, Normalization, Train-test split. Pipeline walkthrough

**Unit 4: AI in Physical Sciences (Physics & Chemistry Applications)**

**AI in Physics:** AI for analyzing astronomical images (identifying galaxies, stars, exoplanets), CERN Datasets for Particle Physics.

AI in material science: discovering new superconductors and quantum materials

AI in energy: predicting power grid loads, optimizing solar and wind energy systems

**AI in Chemistry:**

Protein structure prediction (AlphaFold).

AI in drug discovery - virtual screening of compounds.

AI in chemistry - reaction outcome & material property prediction**.**

**Unit 5: AI in Mathematics and Earth Sciences**

**AI in Mathematics:**

Pattern recognition in large datasets (fractals, chaos systems, number theory)

Automated theorem proving and symbolic mathematics

AI in optimization problems (transport, logistics, resource allocation)

(Explore the Wolfram Alpha Tool: https://www.wolframalpha.com/examples/mathematics)

**AI in Earth Sciences**

Climate modeling: AI predicting weather patterns, cyclones, and long-term climate change

Remote sensing: AI analyzing satellite images for deforestation, urbanization, and natural resource mapping

Earthquake and natural disaster prediction using sensor networks

AI in geology: identifying mineral deposits, oil, and groundwater reserves

**APPLICABLE TO MATHEMATICS, PHYSICS, CHEMISTRY AND ANY OTHER MATHEMATICAL SCIENCES**

**SEMESTER-II**

## COURSE 1: APPLICATIONS OF ARTIFICIAL INTELLIGENCE

**Practicxal** **Credits: 0** **2 hrs/week**

---

**Suggested Lab Practicals (No Coding)**

**Lab 1 - Exploring Public Datasets (Orange Data Mining)**

- Visit a public repository (Kaggle, UCI, data.gov.in)
- Download a dataset (e.g., rainfall data, literacy rates, or traffic accident statistics)
- **Procedure**:
    1. Open Orange → Add *File* widget → Load a CSV (e.g., Titanic dataset).
    2. Connect to *Data Table* → View rows/columns.
    3. Connect to *Data Info* → Check attributes, data types.
    4. View in *Data Table* and *Distributions* widget.
- **Observation**: Note numeric, categorical, missing values.
- **Outcome:** Students understand structured data format in CSV.

**Lab 2 - Exploring Scientific Datasets**

**Dataset:** Earth datasets, Physics Particle Dataset

**Tool:** Orange Data Mining.

**Activity:**

- Load a CSV (e.g., earthquake dataset: https://www.kaggle.com/datasets/warcoder/earthquake-dataset Physics particle dataset: https://www.kaggle.com/datasets/dsfelix/physics-particles )
- Use **Data Table + Distributions** to view features.
- Compare categorical vs numerical attributes.

**Outcome:** Students understand how scientific datasets are structured and visualized.

**Lab 3 - Understanding Dataset Metadata and Formats**

- Take two datasets in different formats (CSV, JSON)
- View metadata (description, features, size, license)
- Compare domain-specific datasets (e.g., medical vs. finance)

**Lab 4 - Data Annotation Exercise**

- Use **MakeSense.ai** or **VGG Image Annotator (VIA)**
- Annotate 10 sample images (traffic signs, fruits, or medical scans)
- Export annotations in XML or YOLO format
- Discuss annotation errors and challenges

**Lab 5 - Data Cleaning and Visualization (Orange Data Mining)**

- **Aim**: To clean dirty data and visualize categorical and numeric attributes.
- **Procedure**:
    1. Load dataset.
    2. Connect *File → Edit Domain* (to change types) and *Impute* (to fill missing values).
    3. Compare cleaned vs. original in *Data Table*.
    4. *Distributions* widget.
    5. Check various features distribution.

  *(Optional: Create simple bar charts/line charts to visualize trends using Google Looker Studio)*
- **Observation**: Missing values filled with mean/median., Graphical representation of data.
- **Outcome:** Learn importance of data cleaning., Students learn importance of visualization in preprocessing.

**Lab 6: Train/Test Split in Orange**

- **Aim**: To split dataset for AI training/testing.
- **Procedure**:
    1. Load Titanic dataset.
    2. Connect *File → Data Sampler* (70% train, 30% test).

3. Connect outputs to *Data Table* widgets to view.

- **Observation**: Students see two different subsets.
- **Outcome:** Concept of model validation using split data.

**Lab 7 – Material Science Data Exploration (Chemistry + Physics)**

**Dataset:** Materials Project Database (https://next-gen.materialsproject.org/ ) OR Kaggle chemistry datasets (https://www.kaggle.com/competitions?tagIds=7402-Chemistry) .

**Tool:** Orange Data Mining.

**Activity:**

Load material/compound dataset (e.g., band gap, conductivity).

Visualize trends (scatter plots, bar charts).

Identify correlations between features.

**Outcome:** Students see how AI identifies new material properties.

**Lab 8 – Earthquake Prediction Data Analysis (Earth Sciences) Dataset:**

USGS Earthquake Dataset (public):

https://www.kaggle.com/datasets/rupindersinghrana/usgs-earthquakes-2024

**Tool:** Orange Data Mining

**Activity:**

- Load earthquake data (time, magnitude, depth).
- Plot frequency over time & regions.
- Perform simple clustering (e.g., k-means in Orange).

**Outcome**: Understand how AI detects seismic patterns.

**Lab 9– Climate Data Visualization (Earth Sciences)**

**Dataset:** NASA GISS climate dataset (https://data.giss.nasa.gov/gistemp/) / FAO rainfall data (https://www.fao.org/aquastat/en/geospatial-information/climate-information) .

**Tool: Google Looker Studio (free dashboard tool).**

**Activity:**

- Import CSV of temperature/rainfall data.
- Build trend graphs and heat maps.

**Outcome: Learn visualization of climate patterns & anomalies.**

**Lab 10 – Chemical Compound Classification (Chemistry)**

**Prerequisite:** Discuss conceptually about Clustering

**Dataset:** PubChem / ChEMBL chemical datasets. (https://pubchem.ncbi.nlm.nih.gov/source/ChEMBL)

**Tool:** ChemMine Tools (free web-based). (https://chemminetools.ucr.edu/)

**Activity:**

- Input chemical structures or SMILES notations.
- Predict chemical similarity clusters.
- Analyze "drug-likeness" properties.

**Outcome:** Understanding AI in drug discovery & reaction prediction.

**Lab 11 – Symbolic Mathematics Solver (Mathematics)**

**Dataset:** Wolfram Alpha examples / OpenMath datasets.

**Tool:** MathPix (OCR) + Symbolab / WolframAlpha (free tier)- https://www.wolframalpha.com/

**Activity:**

- Input handwritten/scanned math problems using MathPix.
- Use Wolfram Alpha to see symbolic solving.
- Compare AI vs manual solution steps.

**Outcome:** Understand automated theorem proving and symbolic AI.

**Lab 11 – Explore the Mathematical AI tool**

**Tool:** WolframAlpha (free tier)- https://www.wolframalpha.com/

**Activity:**

- Solve specific math problems or find information on Mathematical subjects and topics.

**Outcome:** Understand deep computational power of AI tools in solving Math Problems.

**Lab 12 – Explore various Remote Sensing Datasets**

**Tool:** https://developers.google.com/earth-engine/datasets/

**Activity:**

- Explore any Three Satellite Sensor Datasets
- Identify the Significance and the Period of Availability
- Study various bands available in the data

**Outcome:** Understand various Remote Sensing Datasets.

***Note: The Tools suggested above are tentative. Teacher/Student is free to choose any other similar tool to execute the said lab experiments.***

**Books/References**


1. **Data Science for Beginners**, Andrew Park
   *(Introductory concepts of data types, collection, cleaning, and visualization without coding)*
2. **AI Basics for Non-Programmers**, Tom Taulli
   *(Clear explanations of AI data lifecycle and real-world use cases)*
3. **Data Preparation for Machine Learning**, Jason Brownlee
   *(Conceptual understanding of dataset quality, preprocessing, and pipelines)*
4. **Hands-On Data Science for Non-Programmers**, David Meerman Scott
   *(Spreadsheet-based data exploration and visualization)*
5. You Look Like a Thing and I Love You – Janelle Shane
6. AI in Astronomy:
   https://www.borntoengineer.com/how-is-artificial-intelligence-is-helping-us-learn-about-the-universe
   https://primo.ai/index.php/Astronomy
7. CERN datasets for Particle Physics: https://opendata.cern.ch/
8. AI in Material Science:
   https://deepmind.google/discover/blog/millions-of-new-materials-discovered-with-deep-learning/
   https://www.temasek.com.sg/content/dam/temasek-corporate/news-and-views/resources/reports/ai-meets-materials.pdf
9. AI in Energy: https://www.xenonstack.com/blog/ai-renewable-energy-production

https://www.sandtech.com/insight/how-ai-is-transforming-the-future-in-energy-management/

10. AI in Chemistry:
    https://chemintelligence.com/ai-for-chemistry
    https://deepmind.google/science/alphafold/
    https://aimagazine.com/articles/alphafold-2-the-ai-system-that-won-google-a-nobel-prize
    https://blog.google/technology/ai/google-deepmind-isomorphic-alphafold-3-ai-model/#life-molecules
11. AI in Drug Discovery:
    https://www.ddw-online.com/the-promise-of-ai-advancing-drug-discovery-with-ultra-large-library-processing-29063-202403/
    https://www.medchemexpress.com/ai-driven-drug-screening.html?srsltid=AfmBOoqhDeVNqW9S5vn1m4FZargNAKEFdOKaPvwsnOIzenQEEJoWkz8J
12. AI in Optimization Problems:
    https://throughput.world/blog/ai-in-transportation-and-logistics/
    https://codewave.com/insights/ai-transforming-transportation-logistics/
13. AI in Remote Sensing:
    https://www.satimagingcorp.com/applications/artificial-intelligence-ai/

5. **APPLICABLE TO COMPUTER SCIENCE, DATA SCIENCE, ARTIFICIAL INTELLIGENCE, COGNITIVE SYSTEMS, DATA ANALYTICS, CLOUD COMPUTING, CYBER SECURITY AND ANY OTHER COMPUTER SCIENCE ALLIED STREAMS**

**SEMESTER-II**

**COURSE 1: APPLICATIONS OF ARTIFICIAL INTELLIGENCE**

**Theory** **Credits: 4** **3 hrs/week**

---

**Course Objectives**

1. Provide a foundation in the AI ecosystem, including hardware, cloud, and edge platforms relevant to Computer science.
2. Familiarize students with different types of datasets and public repositories used in AI research.
3. Develop skills in building AI data pipelines through collection, annotation, cleaning, and preprocessing.
4. Expose students to no-code AI platforms, vibe coding, and workflow automation tools for rapid AI application development.
5. Introduce applications of AI in networking, cybersecurity, and digital forensics, highlighting both opportunities and challenges.

**Course Outcomes**

On successful completion of this course, students will be able to:

1. Explain the role of AI hardware, edge devices, and cloud platforms in enabling applications in Computer Science.
2. Differentiate data types and utilize public datasets relevant to AI.
3. Design and implement a conceptual AI data pipeline for solving problems.
4. Apply no-code/low-code AI platforms, vibe coding tools, and workflow automation for simple AI-powered applications.

5. Evaluate the role of AI in networking, cybersecurity, and digital forensics, and discuss its challenges and future scope.

**UNIT 1: Infrastructure and Platforms for AI**

**AI hardware basics:** CPU, GPU, TPU, NPU roles, RAM vs VRAM, storage types. AI platforms: Google AutoML, Teachable Machine, Orange, Weka, KNIME. Edge AI fundamentals: Latency, privacy, Sensors, models, actions. Edge AI applications: Smart cars, smart homes, Real examples.Unit recap and assessment

**UNIT 2: Foundations of Data for AI**

**Data importance:** Data role in AI, Big data influence. Core data concepts: Data, information, knowledge, Structured vs unstructured, Data modalities: Text, image, audio, video, time series, File formats. Data sources and ethics: Repositories (Kaggle, UCI, Hugging Face), Licensing, privacy. Unit recap and activity

**UNIT 3: AI Data Pipeline**

**Pipeline overview:** Ingestion, Storage, Processing. Data collection methods: APIs, sensors, logs, web scraping. Annotation and labeling: Types, Manual vs automated. Cleaning and preprocessing: Missing values, Normalization, Train-test split. Pipeline walkthrough

**Unit 4. AI-Powered No-Code Development: Vibe Coding and Workflow Automation**

**Vibe Coding:** Concept & Workflow: What is Vibe Coding and how it works; Comparison: Vibe Coding vs. traditional programming; Tools Overview: Google AI Studio, Firebase Studio, Replit, Cursor, Windsurf (for demonstration and practice only); Tool Selection: Choosing the right platform for your needs; Benefits & Challenges: Advantages and limitations of Vibe Coding; Paradigm Shift: From code-centric to prompt-driven development; Prompt Crafting: Structure and examples of effective app prompts.

**Workflow Automation using AI:** Fundamentals: What is workflow automation and its relevance in the AI era; Real-world Applications: Auto-email responses, Feedback summarization, Social media alerts & analytics; Toolset Overview: Zapier, Power Automate, n8n, Lindy and other similar tools (for demonstration and practice only); Choosing the Right Tool: Features, use cases, and integration potential.

**Unit 5. AI in Networks, Cybersecurity, and Forensics**

**AI in Networking:** Need of AI in Network Management, How AI works in Traffic Prediction & Intrusion Detection, Uses of AI in Optimization, Fault Management, and Routing

**AI in Cyber Security:** Need of AI in Cyber Security, How AI works in Cyber Security, Uses of AI in Cyber Security, Challenges and Considerations of AI in Cyber Security

**AI in Digital Forensics:** How AI enhance digital forensic investigations, Role of AI in cyber-forensic evidence acquisition and analysis, Overcoming challenges and limitations of AI in forensics, The future outlook for AI-powered forensic tools

**APPLICABLE TO COMPUTER SCIENCE, DATA SCIENCE, ARTIFICIAL INTELLIGENCE, COGNITIVE SYSTEMS, DATA ANALYTICS, CLOUD COMPUTING, CYBER SECURITY AND ANY OTHER COMPUTER SCIENCE ALLIED STREAMS**

**SEMESTER-II**

**COURSE 1: APPLICATIONS OF ARTIFICIAL INTELLIGENCE**

**Practical** **Credits: 0** **2 hrs/week**

---

**Suggested Lab Practicals (No Coding)**

**Lab 1 - Exploring Public Datasets (Orange Data Mining)**

- Visit a public repository (Kaggle, UCI, data.gov.in)
- Download a dataset (e.g., rainfall data, literacy rates, or traffic accident statistics)
- **Procedure**:
    1. Open Orange → Add *File* widget → Load a CSV (e.g., Titanic dataset).
    2. Connect to *Data Table* → View rows/columns.
    3. Connect to *Data Info* → Check attributes, data types.
    4. View in *Data Table* and *Distributions* widget.
- **Observation**: Note numeric, categorical, missing values.
- **Outcome:** Students understand structured data format in CSV.

**Lab 2 – Exploring Cybersecurity Datasets (Orange Data Mining)**

- Dataset: Kaggle Cybersecurity dataset. https://www.kaggle.com/datasets/teamincribo/cyber-security-attacks?select=cybersecurity_attacks.csv
- **Procedure**:
    1. Load dataset into Orange (File widget).
    2. View using **Data Table** and **Distributions** widgets.
    3. Identify numerical (packet size, duration) and categorical (protocol type, attack type) attributes.
- **Observation:** Note features that indicate “attack” vs. “normal traffic.”
- **Outcome:** Students understand the type of features used in intrusion detection.

**Lab 3 - Understanding Dataset Metadata and Formats**

- Take two datasets in different formats (CSV, JSON)
- View metadata (description, features, size, license)
- Compare domain-specific datasets (e.g., medical vs. finance)

**Lab 4 - Data Annotation Exercise**

- Use **MakeSense.ai** or **VGG Image Annotator (VIA)**
- Annotate 10 sample images (traffic signs, fruits, or medical scans)
- Export annotations in XML or YOLO format
- Discuss annotation errors and challenges

**Lab 5 - Data Cleaning and Visualization (Orange Data Mining)**

- **Aim**: To clean dirty data and visualize categorical and numeric attributes.
- **Procedure**:
    1. Load dataset.
    2. Connect *File → Edit Domain* (to change types) and *Impute* (to fill missing values).
    3. Compare cleaned vs. original in *Data Table*.
    4. *Distributions* widget.
    5. Check various features distribution.

  *(Optional: Create simple bar charts/line charts to visualize trends using Google Looker Studio)*
- **Observation**: Missing values filled with mean/median., Graphical representation of data.
- **Outcome:** Learn importance of data cleaning., Students learn importance of visualization in preprocessing.

**Lab 6: Train/Test Split in Orange**

- **Aim**: To split dataset for AI training/testing.
- **Procedure**:
    1. Load Titanic dataset.
    2. Connect *File → Data Sampler* (70% train, 30% test).

3. Connect outputs to *Data Table* widgets to view.

- **Observation**: Students see two different subsets.
- **Outcome:** Concept of model validation using split data.

**Lab 7 – Writing a Detailed Prompt for a Simple Game App (Generative AI)**

- **Objective**: Understand prompt engineering by designing a game idea.
- **Activity**:
    1. Open ChatGPT (or Gemini, Copilot).
    2. Write a detailed prompt like *"Create a simple text-based treasure hunt game with levels, scoring, and random challenges."*
    3. Ask the AI to refine game rules, scoring, and characters.
    4. Document how prompt detail changes the AI's response.
- **Outcome**: Students learn how detailed prompts shape AI outputs.

**Lab 8 – Create a Portfolio Website using Vibe Coding Tool**

- **Objective**: Learn how AI-assisted coding tools can automatically generate websites from simple instructions.
- **Activity**:
    1. Open **Vibe Coding Tool** (Windsurf/Cursor/Firebase Studio/Any other vibe coding tool).
    2. Give a natural language instruction:
       *"Create a personal portfolio website for a Computer Science student. It should have sections: About Me, Education, Skills, Projects, and Contact."*
    3. Experiment with different prompts to change **layout, theme, or color scheme** (e.g., *"Make it a modern dark theme with blue highlights."*).
    4. Preview the generated site and customize content.
- **Outcome**: Students experience how **AI converts prompts into functional websites** with minimal coding effort.

**Lab 9 – Develop an Interactive Education Quiz App using Vibe Coding Tool**

- **Objective**: Understand AI's role in creating **educational applications**.
- **Activity**:
    1. Open **Vibe Coding Tool**.
    2. Give prompt:
       *"Build an interactive quiz app for students with multiple-choice questions on AI basics. Include features: Start Quiz, Show Score, Retry."*
    3. Refine the app by asking AI to:
        - Add **timer** for each question.
        - Show **correct/incorrect answers** instantly.
        - Add a **Leaderboard** page.
    4. Test the app by playing the quiz.
- **Outcome**: Students see how **AI-generated apps** can support **e-learning and assessments**.

**Lab 10-Automating Feedback Summarization using n8n and AI**

**Objective:** Automatically summarize student feedback responses using AI and email the summary to the teacher.

**Steps:**

1. **Trigger Node:** Google Sheets (watch new row for feedback).
2. **AI Node:** Send text to OpenAI/Gemini API for summarization.
   (Get a free API from **OpenRouter (https://openrouter.ai/)** → Gives free trial credits + access to multiple models.)
3. **Action Node:** Gmail → email summarized feedback to teacher.
4. **Test:** Enter sample feedback in Google Sheet → receive AI summary via email.
5. **Discussion:** How AI reduced manual effort in reading every response.

**Outcome:** Students see how automation + AI can transform data into insights instantly.

**Lab 11 – Using AI Functions in Google Sheets**

**Objective**: Enable students to experience Google Sheets' built-in AI-powered features like summarizing, categorizing, sentiment analysis, and text generation through simple prompts within the spreadsheet environment.

**Tools & Setup**

**Enable** Google Sheets with Workspace Labs

https://workspace.google.com/labs-sign-up/u/1/

Follow the References and experiment with summarizing, categorizing, sentiment analysis, and text generation using =AI() function

https://support.google.com/docs/answer/15820999?visit_id=638919819014625788-1742465261&p=ai-function&rd=1

https://support.google.com/docs/answer/13447609?hl=en&sjid=9077695331310534831-NC

https://support.google.com/docs/answer/13635180?hl=en&ref_topic=13450085&sjid=9077695331310534831-NC

**Outcome:** Students will experience various AI functions within a spreadsheet-text generation, summarization, categorization, sentiment analysis.

**Lab 12- Deep Fake Image Detection**

**Objective**

Enable students to critically assess image authenticity using multiple free AI tools, understanding the strengths and limitations of each.

**Tools:**

**Deepfake-O-Meter:** https://zinc.cse.buffalo.edu/ubmdfl/deep-o-meter/landing_page

**Decopy AI Image Detector:** https://decopy.ai/ai-image-detector/

**Procedure**

1. **Collect Images**
    - 2 real images (e.g., faces from Unsplash or personal photos)
    - 2 AI-generated or manipulated images (e.g., from Midjourney, DALL·E, or Google AI studio)
2. **Run through DeepFake-o-Meter**
    - Visit the platform and upload an image.
    - Note the output: what algorithms flag or overall score for authenticity.
3. **Use Decopy AI Image Detector**
    - Upload the same images.
    - Check results indicating whether the image appears AI-generated.

**Observation:** How AI tools help in Digital Forensics.

***Note: The Tools suggested above are tentative. Teacher/Student is free to choose any other similar tool to execute the said lab experiments.***

**Books/References**


1. **Data Science for Beginners**, Andrew Park
   *(Introductory concepts of data types, collection, cleaning, and visualization without coding)*
2. **AI Basics for Non-Programmers**, Tom Taulli
   *(Clear explanations of AI data lifecycle and real-world use cases)*
3. **Data Preparation for Machine Learning**, Jason Brownlee
   *(Conceptual understanding of dataset quality, preprocessing, and pipelines)*
4. **Hands-On Data Science for Non-Programmers**, David Meerman Scott
   *(Spreadsheet-based data exploration and visualization)*
5. You Look Like a Thing and I Love You – Janelle Shane
6. Vibe coding: https://cloud.google.com/discover/what-is-vibe-coding
   https://www.ibm.com/think/topics/vibe-coding
   https://firebase.google.com/docs/studio/prompting
7. Workflow Automation: https://www.ibm.com/think/topics/workflow-automation
   https://www.ibm.com/think/topics/ai-workflow
   https://n8n.io/
8. AI in Cyber Security: https://www.geeksforgeeks.org/ethical-hacking/ai-in-cybersecurity/
9. AI in Networks:
   https://www.cisco.com/site/us/en/learn/topics/artificial-intelligence/what-is-ai-in-networking.html
10. AI in Digital Forensics:
    https://www.eccouncil.org/cybersecurity-exchange/cyber-talks/ai-and-ml-in-digital-forensics-the-future-of-forensic-investigations/

# Yogi Vemana University::Kadapa

## Common to all B.A., B.Com., B.Sc. Skill Enhancement Courses

**w.e.f. 2025-26 admitted batch**

Recommended Format of Question Paper for all Courses

*Time: 3 Hours* *Max. Marks : 70*

***Section-A***

Answer any FIVE of the following questions. **5X4=20**

1. From unit-I
2. From Unit-I
3. From Unit-II
4. From Unit-II
5. From Unit-III
6. From Unit-III
7. From Unit-IV
8. From Unit-IV
9. From Unit-V
10. From Unit-V

***Section-B***

Answer all the questions from below. **5X10=50**

11. From Unit-I

    or

12. From Unit-I
13. From Unit-II

    (or)

14. From Unit-II
15. From Unit-III

    (or)

16. From Unit-III
17. From Unit-IV

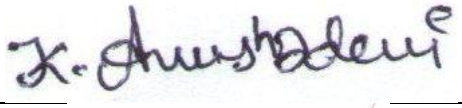
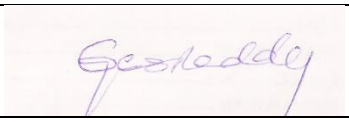
    (or)

18. From Unit-IV
19. From Unit-V

    (or)

20. From Unit-V

# Board of Studies for Computer Science and Allied Courses, Computer Applications

| | | |
|---|---|---|
| Chair Person | Sri.G.Dayanandam |  |
| Member | Smt.K.Anusha Devi |  |
| Member | Smt.N.Kiranmai |  |
| Member | Sk.Abjal Jeelani Basha |  |
| Member | Sri.Chandra Sekhar Reddy |  |
| University Nominee | Dr.M.Reddaiah |  |