CBSE | DEPARTMENT OF SKILL EDUCATION

CURRICULUM FOR SESSION 2025-2026

ARTIFICIAL INTELLIGENCE (SUB. CODE - 843)

JOB ROLE: AI Assistant

CLASS – XII

OBJECTIVES OF THE COURSE:

Artificial Intelligence (AI) is a transformative field in computer science that focuses on creating intelligent systems capable of learning, adapting, and self-improving. These systems can process vast amounts of data with remarkable speed and accuracy, surpassing human capabilities in many domains. AI's impact extends across disciplines, offering innovative solutions to some of the world's most pressing challenges. From revolutionizing healthcare with advanced diagnostics and personalized treatments to enhancing agricultural practices and ensuring food security, AI has the power to reshape industries. It can improve access to quality education, and play a pivotal role in protecting and restoring our planet's ecosystems by cleaning our oceans, air, and water. The possibilities for leveraging AI to create a better future are boundless, provided we harness its potential responsibly and ethically.

LEARNING OUTCOMES:

By the end of this course, students will:

1. Develop an informed perspective on Artificial Intelligence (AI), enabling them to think critically about its implications for society and the world.
2. Understand the role of Python in AI development and its practical applications.
3. Harness the power of AI using no-code tools like Orange Data Mining to solve complex problems efficiently.
4. Comprehend the significance of Data Science Methodology in a Capstone Project to address real-world challenges.
5. Explore the fundamentals of computer vision and its applications in processing and analyzing digital images and videos, as well as its role in intelligent machines.
6. Delve into the diverse possibilities of Generative AI, including image generation, text synthesis, audio production, and video creation.
7. Understand the structure and components of neural networks, building a foundational knowledge of deep learning.
8. Appreciate the value of storytelling as a powerful tool to communicate ideas, insights, and solutions effectively in the context of AI.

SCHEME OF UNITS:

This course follows a structured sequence of instructional units designed to develop employability and vocational skills among students. These units are carefully crafted to integrate seamlessly with other educational subjects, fostering a holistic learning experience.

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ARTIFICIAL INTELLIGENCE (SUBJECT CODE - 843)

CLASS – XII (SESSION 2025-2026)

Total Marks: 100 (Theory-50 + Practical-50)

	UNITS	NO. OF HOURS		MAX MARKS
PART A	**EMPLOYABILITY SKILLS**			
	Unit 1: Communication Skills-IV	15		2
	Unit 2: Self-Management Skills-IV	10		2
	Unit 3: ICT Skills-IV	15		2
	Unit 4: Entrepreneurial Skills-IV	10		2
	Unit 5: Green Skills-IV	10		2
	TOTAL	**60**		**10**
PART B	**SUBJECT SPECIFIC SKILLS**	**Th.**	**Prac.**	
	Unit 1: Python Programming – II*	6	18	(*to be evaluated in practicals only)
	Unit 2: Data Science Methodology: An Analytic Approach to Capstone Project	8	12	8
	Unit 3: Making Machines See	6	12	6
	Unit 4: AI with Orange Data Mining Tool*	4	18	(*to be evaluated in practicals only)
	Unit 5: Introduction to Big Data and Data Analytics	7	12	6
	Unit 6: Understanding Neural Networks	8	12	8
	Unit 7: Generative AI	6	12	7
	Unit 8: Data Storytelling	5	4	5
	TOTAL	**50**	**100**	**40**
PART C	**PRACTICAL WORK / PROJECT WORK**			
	Capstone Project + Project Documentation (As per the process given in “Project Guidelines”, on page 2 of CBSE IBM Projects Cookbook) • Capstone Project =15 Marks • Project Documentation = 6 Marks • Video= 4 Marks			25
	Practical File			10
	Lab Test (Python and Orange Data Mining)			10
	Viva Voce (based on Capstone Project + Practical File)			5
	TOTAL			**50**
	GRAND TOTAL (THEORY + PRACTICAL)			**100**

(NOTE: *marked units/portion is to be evaluated in practicals only)

DETAILED CURRICULUM/TOPICS FOR CLASS XII

Part-A: EMPLOYABILITY SKILLS

S. No.	Units	Duration in Hours
1.	Unit 1: Communication Skills-IV	15
2.	Unit 2: Self-management Skills-IV	10
3.	Unit 3: Information and Communication Technology Skills-IV	15
4.	Unit 4: Entrepreneurial Skills-IV	10
5.	Unit 5: Green Skills-IV	10
	TOTAL	**60**

NOTE: The detailed curriculum/ topics to be covered under Part A: Employability Skills can be downloaded from the CBSE website.

Part-B - SUBJECT SPECIFIC SKILLS

- Unit 1: Python Programming – II*
- Unit 2: Data Science Methodology: An Analytic Approach to Capstone Project
- Unit 3: Making Machines See
- Unit 4: AI with Orange Data Mining Tool*
- Unit 5: Introduction to Big Data and Data Analytics
- Unit 6: Understanding Neural Networks
- Unit 7: Generative AI
- Unit 8: Data Storytelling

(NOTE: *marked units/portion is to be evaluated in practicals only)

UNIT 1: PYTHON PROGRAMMING - II *(to be evaluated in practicals only)

SUB-UNIT	LEARNING OUTCOMES	ACTIVITY/PRACTICALS
• Recap of NumPy library • Recap of Pandas Library • Importing and Exporting Data between CSV Files and DataFrames • Handling missing value • Linear Regression algorithm (**For Advanced Learners)	• Apply the fundamental concepts of the NumPy and Pandas libraries to perform data manipulation and analysis tasks • Import and export data between CSV files and Pandas Data Frames, ensuring data integrity and consistency.	• Import and Export Data between CSV Files and DataFrames • Implement Linear Regression algorithm on Google Colab or any Python IDE. (**For Advanced Learners)

UNIT 2: DATA SCIENCE METHODOLOGY: AN ANALYTIC APPROACH TO CAPSTONE PROJECT

SUB-UNIT	LEARNING OUTCOMES	ACTIVITY/PRACTICALS
• Introduction to Data Science Methodology • Steps for Data Science Methodology • Model Validation Techniques • Model Performance-Evaluation Metrics	• Integrate Data Science Methodology steps into the Capstone Project. • Identify the best way to represent a solution to a problem. • Understand the importance of validating machine learning models • Use key evaluation metrics for various machine learning tasks	• Calculate MSE and RMSE values for the data given using MS Excel • Calculate Precision, Recall, F1 score, and Accuracy from the given confusion matrix • Python Code to Evaluate a Model (*to be evaluated in practicals only)

UNIT 3: MAKING MACHINES SEE

SUB-UNIT	LEARNING OUTCOMES	ACTIVITY/PRACTICALS
• How Machines See • Working of Computer Vision • Computer Vision Process • Applications of Computer Vision • Challenges of Computer Vision • The Future of Computer Vision • Working with OpenCV (**For Advanced Learners)	• Explain computer vision and its significance in visual data analysis. • Understand key stages of computer vision, including acquisition, preprocessing, feature extraction, and analysis. • Identify real-world applications in fields like healthcare, surveillance, and autonomous vehicles. • Analyze challenges such as ethics, privacy, and technical limitations. • Explore future advancements and transformative potential of computer vision. • Develop basic skills in using OpenCV and deploying machine learning models online.	• Binary Art - Recreating Images with 0s and 1s • Creating a Website Containing an ML Model • Working with OpenCV to load, display and resize images (**For Advanced Learners)

UNIT 4: AI WITH ORANGE DATA MINING TOOL (*to be evaluated in practicals only)

SUB-UNIT	LEARNING OUTCOMES	ACTIVITY/PRACTICALS
• What is Data Mining? • Introduction to Orange Data Mining Tool • Beneficiaries of Orange data mining • Getting started with Orange tool • Components of Orange • Default Widget Catalogue • Key domains of AI with ORANGE DATA MINING TOOL	• Develop proficiency in utilizing the Orange Data Mining tool, enabling them to navigate its interface, employ its features, and execute data analysis tasks effectively. • Demonstrate the ability to apply Orange in real-world scenarios across diverse domains of artificial intelligence, including data science, computer vision, and natural language processing (NLP), through hands-on projects and case studies.	• Load and visualize the Iris dataset using Scatter Plot and other widgets. • Use classification widgets • Evaluating the Classification Model with Orange • Computer Vision with Orange • Natural Language Processing with Orange

UNIT 5: INTRODUCTION TO BIG DATA AND DATA ANALYTICS

SUB-UNIT	LEARNING OUTCOMES	ACTIVITY/PRACTICALS
• Introduction to Big Data • Types of Big Data • Advantages and Disadvantages of Big Data • Characteristics of Big Data • Big Data Analytics • Working on Big Data Analytics • Mining Data Streams • Future of Big Data Analytics	• Understanding Big Data, its types, advantages and disadvantages. • Recognize the characteristics of Big Data. • Explain the concept of Big Data Analytics and its significance. • Analyze the future trends in the field of Big Data Analytics. • Understanding the term Mining Data Streams.	*Performing Big Data analytics with Orange Data mining tool. (*to be evaluated in practicals only)

UNIT 6: UNDERSTANDING NEURAL NETWORKS

SUB-UNIT	LEARNING OUTCOMES	ACTIVITY/PRACTICALS
• Parts of a Neural Network • Components of a Neural Network • Working of a Neural Network • Types of Neural Networks • Future of Neural Networks and Societal Impact	• Explain the basic structure and components of a neural network. • Identify different types of neural networks and their respective applications. • Understand machine learning and neural networks through hands-on projects, interactive tools, and Python programming.	• Explore Machine Learning for Kids to create a neural network for identifying animals and birds. • Build a TensorFlow model to convert Celsius to Fahrenheit (*to be evaluated in practicals only) • Use Python Keras to create and train a neural network predicting Fahrenheit from Celsius. (**For Advanced Learners) • Classification problem using TensorFlow playground

UNIT 7: GENERATIVE AI

SUB-UNIT	LEARNING OUTCOMES	ACTIVITY/PRACTICALS
• Introduction to Generative AI • Working of Generative AI • Generative and Discriminative models • Applications of Generative AI • LLM- Large Language Model • Future of Generative AI • Ethical and Social Implications of Generative AI	• How Generative AI works. • Differentiate between Generative AI and Discriminative AI and identify their use cases. • Explore ethical, social, and legal concerns. • Gain hands-on experience using AI tools to generate creative and analytical outputs, such as images, texts, and videos. • Use the Gemini API to design and deploy a functional chatbot.	• Signing up for Canva Activity. • Animaker's AI Video Generation tool. • Use Google Gemini to craft prompts and generate text outputs. • Explore ChatGPT for conversational text generation and creative tasks. • Write Python code to initialize the Gemini API and create a chat bot. (**For Advanced Learners)

UNIT 8: DATA STORYTELLING

SUB-UNIT	LEARNING OUTCOMES	ACTIVITY/PRACTICALS
• Introduction to Storytelling • Elements of a Story • Introduction to Data Storytelling • Why is Data Storytelling Powerful? • Essential Elements of Data Storytelling • Narrative Structure of a Data Story (Freytag's Pyramid) • Types of Data and Visualizations for Different Data • Steps to Create a Story Through Data • Ethics in Data Storytelling	• Understand the benefits of storytelling. • Appreciate the role of data storytelling in data analysis, data science, and AI. • Learn to combine data, visuals, and narrative to present complex information effectively. • Gain skills to draw meaningful insights from data stories.	• Create an effective data story using given data.

****Note- All portions under Advanced Learners are not to be evaluated in Theory or Practical Examinations.**

(NOTE: *marked units/portion is to be evaluated in practicals only)

PART – C:

1. Practical File:

The following are to be included in the Practical File

1. Minimum 6 programs of Python.
2. Minimum 3 programs using Orange Data Mining tool.
3. Minimum 1 problem to create a Data Story using all steps of Data Storytelling.

Optional Programs- for practical File

- Demonstration of train-test split in Linear Regression using Python.
- Chatbot using Google Gemini API.
- Orange Data Mining for Data Analytics.
- Classification problem using TensorFlow playground.
- Regression problem using TensorFlow playground.

(snapshots to be attached)

Sample programs for reference

I. Python

1. Write Python code to create a Pandas DataFrame using any sequence data type.
a) Display the DataFrame.
b) Display first 5 records.
c) Display last 10 records.
d) Display the number of missing values in the dataset.

2. Download dataset in the form of CSV from any public open-source website.
   a) Read CSV File and convert it into Pandas DataFrame.
   b) Perform statistical functions on the dataset to check the data, checking missing values, filling missing data etc.
3. Python Code to Evaluate a Model.

II. Orange Data Mining

1. Perform step wise procedure of Data Visualization using the Orange Data Mining Tool.
2. Perform Classification with Orange Data Mining.
3. Evaluate the Classification Model with Orange.
4. Perform Image analytics using the Orange data mining tool.
5.Write down steps to visualize word frequencies with Word Cloud using the Orange Data Mining tool.

Note: Snapshots of all the steps and outputs to be taken and pasted in the practical file.

III. Data Storytelling (Sample)

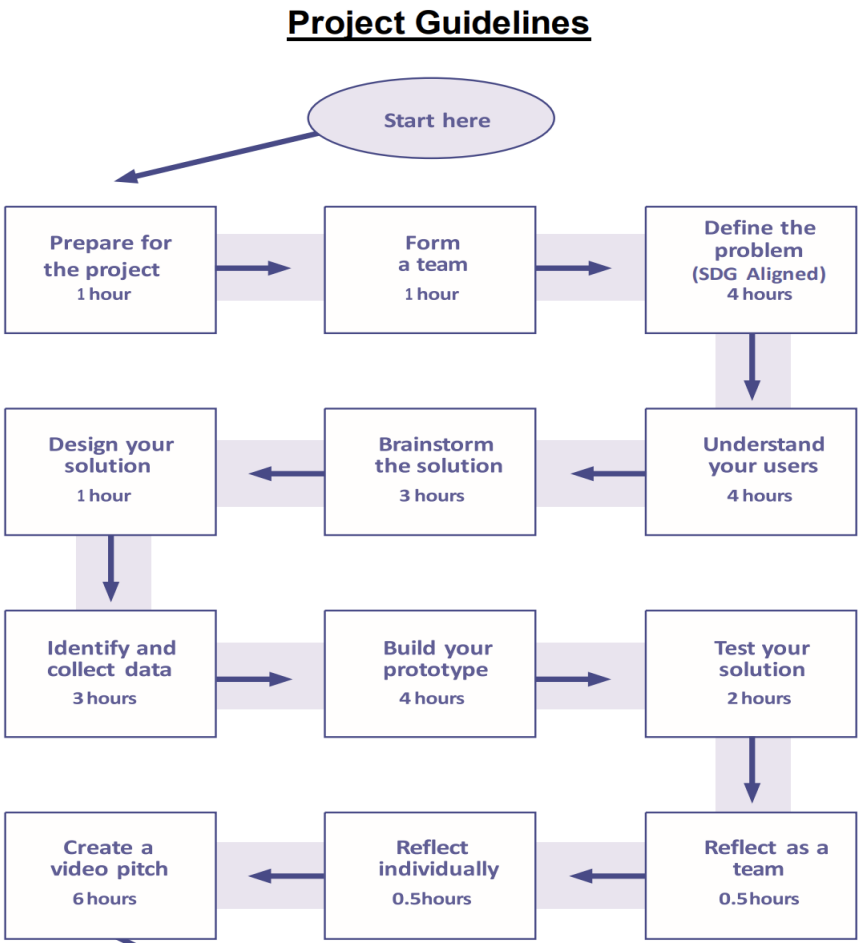
Using available data on student enrollment, attendance, and dropout rates, create a compelling data story that explores the impact of the Mid-Day Meal Scheme (MDMS) since its launch in 1995. Uncover trends, patterns, and correlations in the data to tell a story about how the implementation of the MDMS may have influenced dropout rates in the state over the years. Consider incorporating visualizations, charts, and graphs to effectively communicate your findings. Additionally, analyze any external factors or events that might have played a role in shaping these trends. Your goal is to provide a comprehensive narrative that highlights the relationship between the MDMS and student dropout rates in the state.

2. Capstone Project:

Capstone Project Guidelines:

- In a group, minimum 3 and maximum 5 students are allowed.
- Their projects should be aligned with any of the SDGs.
- Students will complete their Capstone Project in Class XII and complete the project documentation.
- Video of the Capstone Project should be exactly of 3 minutes duration.
- The video will have the following components:
    a. Problem statement
    b. To which SDG the project is aligned to
    c. AI concept/domains/algorithms used
    d. Working of the project
    e. Conclusion
    f. Acknowledgement to the teacher

Please refer to the Project guidelines of [CBSE-IBM AI PROJECT COOKBOOK (Page -2)]



Note for Educators: Python or No code/low code platforms like Orange Data Mining tool can be chosen by the students for developing their Capstone Projects.

LIST OF EQUIPMENTS/ MATERIALS:

The list given below is suggestive and an exhaustive list should be compiled by the teacher(s) teaching the subject. Only basic tools, equipment and accessories should be procured by the Institution so that the routine tasks can be performed by the students regularly for practice and acquiring adequate practical experience.

S. NO.	ITEM NAME, DESCRIPTION & SPECIFICATION
A	**HARDWARE**
1	Computer with latest configuration or minimum core I5 Processor or equivalent with minimum 8 GB RAM, 512 GB SSD, 17" LED Monitor, NIC Card, 3 button Mouse, Camera, 105 keys keyboard, speakers, mic, WiFi / Internet connectivity, Webcam, UPS, Dual Band Wireless Connectivity Min 100 Mbps and integrated graphic cards
2	Fire extinguisher
B	**SOFTWARE SPECIFICATIONS**
1	Any Operating System with antivirus activated
2	Python IDLE
3	Anaconda Navigator Distribution – Python IDE installed with software: NumPy, Pandas, Matplotlib, Scikit Learn)
4	Productivity Suite: Any (Google+ Suite recommended)
5	Orange Data Mining Tool

Additional Recommendations:

- Ensure regular updates and maintenance for all installed software to benefit from bug fixes, security patches, and new features.
- Provide licenses for commercial software, such as MS Office, as per the school's requirements and budget.
- Encourage teachers and students to stay updated with the latest versions of the software and tools and provide resources for learning and support.
- Consider implementing version control systems (e.g., Git) to facilitate collaborative coding and project management.

TEACHER'S/ TRAINER'S QUALIFICATIONS:

Qualification and other requirements for appointment of teachers/trainers for teaching this subject, on contractual basis should be decided by the State/ UT. The suggestive qualifications and minimum competencies for the teacher should be as follows:

Qualification	Minimum Competencies	Age Limit
Diploma in Computer Science/ Information Technology **OR** Bachelor Degree in Computer Application/ Science/ Information Technology (BCA, B.Sc. Computer Science/ Information Technology) **OR** Graduate with PGDCA OR DOEACCA Level Certificate. The suggested qualification is the minimum criteria. However higher qualifications will also be acceptable.	The candidate shouldhave a minimum of 1 year of work experiencein the same job role. • S/he should be able to communicate in English and local language. S/he should have knowledge of equipment, tools, material, Safety, Health & Hygiene.	• 18-37 years (as onJan. 01 (year)) • Age relaxation to be provided as perGovt. rules

Teachers/Trainers form the backbone of Skill (Vocational) Education being imparted as an integral part of Rashtriya Madhyamik Shiksha Abhiyan (RMSA). They are directly involved in teaching of Skill (vocational) subjects and also serve as a link between the industry and the schools for arranging industry visits, On-the-Job Training (OJT) and placement.

These guidelines have been prepared with an aim to help and guide the States in engaging quality Teachers/Trainers in the schools. Various parameters that need to be looked into while engaging the Vocational Teachers/Trainers are mode and procedure of selection of Teachers/ Trainers, Educational Qualifications, Industry Experience, and Certification/ Accreditation.

The State may engage Teachers/Trainers in schools approved under the component of scheme of Vocationalisation of Secondary and Higher Secondary Education under RMSA in following ways:

(i) Directly as per the prescribed qualifications and industry experience suggested by the PSS Central Institute of Vocational Education (PSSCIVE), NCERT or the respective Sector Skill Council (SSC).

OR

(ii) Through accredited Vocational Training Providers accredited under the National Quality Assurance Framework (NQAF*) approved by the National Skill Qualification Committee on 21.07.2016. If the State is engaging Vocational Teachers/Trainers through the Vocational Training Provider (VTP), it should ensure that VTP should have been accredited at NQAF Level2 or higher.

The National Quality Assurance Framework (NQAF) provides the benchmarks or quality criteriawhich the different organizations involved in education and training must meet in order to be accredited by competent bodies to provide government- funded education and training/skills activities. This is applicable to all organizations offering NSQF-compliant qualifications.

The educational qualifications required for being a Teacher/Trainer for a particular job role are clearly mentioned in the curriculum for the particular NSQF compliant job role. The State should ensure that teachers/ trainers deployed in the schools have relevant technical competencies for the NSQF qualification being delivered. Teachers/Trainers preferably should be certified by the concerned Sector Skill Council for the particular Qualification Pack/Job role which he will be teaching. Copies ofrelevant certificates and/or record of experience of the teacher/trainer in the industry should be kept as record.

To ensure the quality of the Teachers/Trainers, the State should ensure that a standardized procedurefor selection of (Vocational) Teachers/Trainers is followed. The selection procedure should consist ofthe following:

(i) Written test for the technical/domain specific knowledge related to the sector;
(ii) Interview for assessing the knowledge, interests and aptitude of trainer through a panel of experts from the field and state representatives; and
(iii) Practical test/mock test in classroom/workshop/laboratory.

In case of appointment through VTPs, the selection may be done based on the above procedure by a committee having representatives of both the State Government and the VTP. The State should ensure that the Teachers/ Trainers who are recruited should undergo induction training of 20 days for understanding the scheme, NSQF framework and Vocational Pedagogy beforebeing deployed in the schools. The State should ensure that the existing trainers undergo in-service training of 5 days every year tomake them aware of the relevant and new techniques/approaches in their sector and understand thelatest trends and policy reforms in vocational education. The Head Master/Principal of the school where the scheme is being implemented should facilitate and ensure that the (Vocational) Teachers/Trainers:

- Prepare session plans and deliver sessions which have a clear and relevant purpose and which engage the students;
- Deliver education and training activities to students, based on the curriculum to achieve the learning outcomes;
- Make effective use of learning aids and ICT tools during the classroom sessions;
- Engage students in learning activities, which include a mix of different methodologies, such as project-based work, team work, practical and simulation-based learning experiences;
- Work with the institution's management to organise skill demonstrations, site visits, on job trainings, and presentations for students in cooperation with industry, enterprises and other workplaces;
- Identify the weaknesses of students and assist them in up-gradation of competency;
- Cater to different learning styles and level of ability of students;
- Assess the learning needs and abilities, when working with students with different abilities
- Identify any additional support the student may need and help to make special arrangements for that support;
- Provide placement assistance

Assessment and evaluation of (Vocational) Teachers/Trainers is very critical for making them aware of their performance and for suggesting corrective actions. The States/UTs should ensure that the performance of the (Vocational) Teachers/Trainers is appraised annually. Performance based appraisal in relation to certain pre-established criteria and objectives should be done periodically to ensure the quality of the (Vocational) Teachers/Trainers.

Following parameters may be considered during the appraisal process:

- Participation in guidance and counseling activities conducted at Institutional, District and State level;
- Adoption of innovative teaching and training methods;
- Improvement in result of vocational students of Class X or Class XII;
- Continuous up-gradation of knowledge and skills related to the vocational pedagogy, communication skills and vocational subject;
- Membership of professional society at District, State, Regional, National and International level;
- Development of teaching-learning materials in the subject area;
- Efforts made in developing linkages with the Industry/Establishments;
- Efforts made towards involving the local community in Vocational Education
- Publication of papers in National and International Journals;
- Organization of activities for promotion of vocational subjects;
- Involvement in placement of students/student support services.