CBSE | DEPARTMENT OF SKILL EDUCATION

ARTIFICIAL INTELLIGENCE (SUBJECT CODE - 843)

Class XI (Session 2023-2024)

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

	UNITS	HOURS (Theory + Practical)	MAX. MARKS (Theory + Practical)
Part A	**Employability Skills**		
	Unit 1 : Communication Skills-III	10	2
	Unit 2 : Self-Management Skills-III	10	2
	Unit 3 : ICT Skills-III	10	2
	Unit 4 : Entrepreneurial Skills-III	15	2
	Unit 5 : Green Skills-III	05	2
	Total	**50**	**10**
Part B	**Subject Specific Skills**		
	To be assessed in Theory Exams		
	Unit 1: Introduction To AI	30	08
	Unit 2: AI Applications & Methodologies	30	10
	Unit 4: AI Values (Ethical Decision Making)	05	04
	Unit 5: Introduction To Storytelling	20	08
	Unit 8: Regression	30	10
	To be assessed through Practical only		
	Unit 3: Maths For AI	10	-
	Unit 6: Critical & Creative Thinking	05	-
	Unit 7: Data Analysis (Computational Thinking)	30	-
	Unit 9: Classification & Clustering	20	-
	Unit 10: AI Values (Bias Awareness)	30	-
	Total	**210**	**40**
Part C	**Practical Work**		
	Practical Examination		40
	Viva-Voce		
	Total		**40**
Part D	**Project Work/ Field Visit/ Project/ Ideation + presentation**		10
	Viva-Voce		
	Total		**10**
	GRAND TOTAL	**260**	**100**

DETAILED CURRICULUM/ TOPICS FOR CLASS XI

PART-A: EMPLOYABILITY SKILLS

S. No.	Units	Duration in Hours
1.	Unit 1: Communication Skills-III	10
2.	Unit 2: Self-management Skills-III	10
3.	Unit 3: Information and Communication Technology Skills-III	10
4.	Unit 4: Entrepreneurial Skills-III	15
5.	Unit 5: Green Skills-III	05
	TOTAL	**50**

NOTE: **Detailed Curriculum/ Topics to be covered under Part A: Employability Skills can be downloaded from CBSE website**.

Part-B – SUBJECT SPECIFIC SKILLS

Level I: AI Informed (AI Foundations)	• Unit1: Introduction to AI • Unit 2: AI Applications & Methodologies • *Unit 3: Math for AI* • Unit 4: AI Values (Ethical Decision Making) • Unit 5: Introduction to Storytelling

Level 2: AI Inquired (AI Apply)	• *Unit 6: Critical & Creative Thinking* • *Unit 7: Data Analysis (Computational Thinking)* • *Unit 8: Regression* • Unit 9: Classification & Clustering • *Unit 10: AI Values (Bias Awareness)*

DETAILED CURRICULUM/ TOPICS

LEVEL I: AI INFORMED (AI Foundations) -

UNIT	TOPICS	LEARNING OUTCOMES

Unit 1: Introduction
 	
(knowledge)
	Introduction-AI for everyone
	• What is AI?
	  ○ Kids can AI
	• History of AI
	• What is Machine Learning
	  ○ Difference between conventional programming and machine learning
	  ○ How is Machine learning related to AI?
	• What is data?
	  ○ Structured
	  ○ Unstructured
	  ○ Examples of unstructured data- text, images
	• Terminology and Related Concepts Intro to AI
	  ○ Machine learning
	  ○ Supervised learning (examples)
	  ○ Unsupervised learning (examples)
	  ○ Deep learning
	  ○ Reinforcement learning
	  ○ Machine Learning Techniques and Training
	  ○ Neural Networks
	• What machine learning can and cannot do
	• More examples of what machine learning can and cannot do
	• Jobs in AI
		Knowledge – Define AI andML
		
		Comprehension – What arethe AI products/ applications in society and how are they different from non-AI products/ applications?
		
		Evaluation – What kind ofjobs may appear in the future?

Unit 2: AI Applications and Methodologies
 	
(Introduction)
 	
(Knowledge)
	Present day AI and Applications
	• Key Fields of Application in AI
	  ○ Chatbots (Natural Language Processing, speech)
	  ○ Alexa, Siri and others
	  ○ Computer vision
	  ○ Weather Predictions
	  ○ Price forecast for commodities
	  ○ Self-driving cars
	• Characteristics and types of AI
	  ○ Data driven
	  ○ Autonomous systems
	  ○ Recommender systems
	  ○ Human like
		Knowledge – Where can AIbe applied (like in the field ofComputer vision, Speech, Text, etc.), What is deep learning?
		
		Comprehension – How AIwill impact our society
		
		Analysis – How should weget ready for the AI age (future)

UNIT	TOPICS	LEARNING OUTCOMES
	• Cognitive Computing (Perception, Learning, Reasoning) Cognitive computing • Recommended deep-dive in NLP, CV, etc.* • AI and Society coursera-ai-for-everyone • The Future with AI, and AI in Action (Introduction) • Non-technical explanation of deep learning coursera-ai-for-everyone	

Unit 3: Maths for AI
(Recap)
(Knowledge)
	• Introduction to matrices (Recap)
	• Introduction to set theory (Recap)
	  ○ Introduction to data table joins
	• Simple statistical concepts
	• Visual representation of data, bar graph, histogram, frequency bins, scatter plots, etc.
	• With co-ordinates and graphs introduction to dimensionality of data
	• Simple linear equation
	  ○ Least square method of regression
		Comprehension – Linear Algebra, Statistics, Basics of Graphs and Set theory
		
		Application – Application of Math in AI
		
		Synthesis – Representing data in term of mathematical formula

Unit 4: AI Values (Ethical decision making) (Values)	AI: Issues, Concerns and Ethical Considerations • Issues and Concerns around AI • AI and Ethical Concerns • AI and Bias • AI: Ethics, Bias, and Trust • Employment and AI	**Knowledge –** Ethics, Bias, Impacts of bias on society **Application –** Spot issue in data, Make arguments, Apply rules

Unit 5: Introduction to story telling
(Skills)
	• Storytelling: communication across the ages
	  ○ Learn why storytelling is so powerful and cross-cultural, and what this means for data storytelling
	• The Need for Storytelling
	• Story telling with data
	  ○ By the numbers: How to tell a great story with your data.
	• Conflict and Resolution
	  ○ Everyone wants to resolve conflict, and a good data storyteller is there to help!
	• Storytelling for audience
	  ○ Your data storytelling depends on the background knowledge of your audience.
	• Insights from storytelling
	  ○ Make the audience care about the data
	  ○ Keep the audience engaged
	  ○ Create from the end; present from the beginning
	  ○ Start with an anecdote, end with the data
	  ○ Build suspense, not surprise
		Skill – Imagination, mapping the plot into key events increasing memory retention.
		
		Application- Helping in creating blogs, videos, and other content.

LEVEL 2: AI INQUIRED (AI Apply)

UNIT	TOPICS	LEARNING OUTCOMES
Unit 6: Critical and Creative thinking (Skills)	• Design thinking framework ○ Right questioning (5W and 1H) ○ Identifying the problem to solve ○ Ideate	**Skill** – Understanding the problem and being able to express the same **Creativity** – To be able to develop/innovate from design a solution
Unit 7: Data Analysis (Computational thinking) (Skills)	• Types of structured data ○ Date and time ○ String ○ Categorical • Representation of data • Exploring Data Exploring data (Pattern recognition) ○ Cases, variables and levels of measurement ○ Data matrix and frequency table ○ Graphs and shapes of distributions ○ Mode, median and mean ○ Range, interquartile range and box plot ○ Variance and standard deviation ○ Z-scores ○ Example ○ Practice exercise	**Knowledge** – Types of structured data, statistical principals – frequency tables, mean, median, mode, range, etc. **Application** – Representing data in terms of graphs, statistical models **Synthesis** – To be able to represent a simple problem in terms of numbers
Unit 8: Regression (Knowledge)	• Correlation and Regression ○ Crosstabs and scatterplots ○ Pearson's r ○ Regression - Finding the line ○ Regression - Describing the line ○ Regression - How good is the line? ○ Correlation is not causation ○ Example contingency table ○ Example Pearson's r and regression Readings ○ Correlation ○ Regression ○ Caveats and examples ○ Practice exercise Correlation and Regression ○ Explain the importance of data from above examples ○ How prediction changes with changing data?	**Knowledge** – Correlations, Regression, and other related terms **Applications** – Being able to relate data with regression and correlation. Everyday applications of these mathematical concepts.

UNIT	TOPICS	LEARNING OUTCOMES
Unit 9: Classification& Clustering (Knowledge)	• What is a classification problem? • Examples - Simple binary classification • Introduction to binary classification with logistic regression • True positives, true negatives, false positives and false negatives o Where we should care more with examples o Example- false negative of a disease detection can have different implication than false positive, one will be more physical harm and other will be mental • **Practice exercise on simple Binary Classification model**	**Knowledge –** What is classification and its types, whatkind of problems may be placedunder the category of a classification problem **Applications –** Where to applyclassification principals **Analysis –** Impact of the application of incorrect algorithmson society
	• What is a clustering problem? • Why is it unsupervised? • Examples • **Practice exercise on simple Clustering model**	**Knowledge –** Clustering problemsand its application, why is it called clustering **Application –** Application of clustering problem using standardmodels
Unit 10: AI Values (Bias awareness) (Values)	• AI working for good • Principles for ethical AI • Types of bias (personal /cultural • /societal) • How bias influences AI based decisions • How data driven decisions can be debiased • **Hands on exercise to Detect theBias** (Intro to AI)	**Knowledge –** What is ethics, Impact of ethics on society, the impact of bias on AI functioning **Evaluation –** Biases in data, how to de-bias or neutralize the biaseddata **Application –** Finding bias inacquired dataset