

CBSE | DEPARTMENT OF SKILL EDUCATION

CURRICULUM FOR SESSION 2024-2025

ARTIFICIAL INTELLIGENCE (SUB. CODE 843)

CLASS XII

COURSE OVERVIEW:

AI is a discipline in computer science that focuses on developing intelligent machines, machines that can learn and then teach themselves. These machines, then, can process vast amounts of data than humans can, and several times faster. However, AI can go across all disciplines to change the world for the better– from creating new healthcare solutions, to designing hospitals of the future, improving farming and our food supply, helping refugees acclimatize to the new environments, improving educational resources and access, and even cleaning our oceans, air, and water supply. The potential for humans to improve the world through AI is endless, as long as we know how to use it.

OBJECTIVES OF THE COURSE:

In this course, the students will develop knowledge, skills and values to understand AI and its implications for our society and the world and to use AI to solve authentic problems, now and in the future. The students will engage with a host of multi-media online resources, as well as hands-on activities and sequence of learning experiences.

The following are the main objectives of the course:

1. Develop informed citizens with an understanding of AI and the skills to think critically and knowledgeably about the implications of AI for society and the world
2. Develop engaged citizens with a rigorous understanding of how AI can be harnessed to improve life and the world we live in
3. Stimulate interest and prepare students for further study to take up careers as AI scientists and developers to solve complex real world problems

SCHEME OF UNITS

This course is a planned sequence of instructions consisting of units meant for developing employability and vocational competencies of students opting for skill subject along with other education subjects. The unit-wise distribution of hours and marks for class XI & XII is as follows:

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ARTIFICIAL INTELLIGENCE (SUBJECT CODE - 843)

Class XII (Session 2024-2025)

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

	UNITS	NO. OF HOURS (Theory + Practical)	MAX. MARKS (Theory + Practical)
PART – A	Employability Skills		
	Unit 1: Communication Skills-IV	10	2
	Unit 2: Self-Management Skills-IV	10	2
	Unit 3: ICT Skills-IV	10	2
	Unit 4: Entrepreneurial Skills-IV	15	2
	Unit 5: Green Skills-IV	05	2
	Total	50	10
PART – B	Subject Specific Skills (THEORY)		
	Unit 1: Capstone Project	30	10
	Unit 2: Model Lifecycle	20	10
	Unit 3: Storytelling Through Data	30	20
	Total	80	40
PART – C	Student Capstone Project (PRACTICAL)		
	Student AI project Development & Presentation (Team work): Submission of Project Logbook and Video presentation	30	50
	Total	30	50
	GRAND TOTAL	160 Hours	100

DETAILED CURRICULUM/ TOPICS FOR CLASS XII

PART-A: EMPLOYABILITY SKILLS

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

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

Part-B – SUBJECT SPECIFIC SKILLS

Level 3: AI Innovate	<ul style="list-style-type: none">• Unit 1: Capstone Project• Unit 2: Model lifecycle (Knowledge)
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Level 3: AI Innovate	<ul style="list-style-type: none">• Unit 3: Storytelling through data (Critical and Creative thinking Skills)
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DETAILED CURRICULUM/ TOPICS

AI Innovate - (Level 3)		
Unit 1: Capstone Project	<ul style="list-style-type: none"> • Understanding the problem • Decomposing the problem through DT framework • Analytic Approach • Data Requirements • Data Collection • Modelling approach • How to validate model quality <ul style="list-style-type: none"> ➤ By test-train split ➤ Introduce concept of cross validation • Metrics of model quality by simple Maths and examples from small datasets – scaled up to capstone project (Apply) <ul style="list-style-type: none"> ➤ RMSE- Root Mean Squared Error ➤ MSE – Mean Squared Error ➤ MAPE – Mean Absolute Percent Error • Introduction to commonly used algorithms and the science behind them • Showcase through a compelling story 	10 hours to complete basic levels.
Unit 2: Model lifecycle (Knowledge)	<ul style="list-style-type: none"> • Different aspects of Model <ul style="list-style-type: none"> ➤ Train, test, validate, ➤ What are hyper parameters ➤ Commonly used platforms to build and run models (Introduction) ➤ Recommended tools ➤ Links to different platforms <ul style="list-style-type: none"> o Watson • Lifecycle of an AI model <ul style="list-style-type: none"> ➤ Build ➤ Deploy ➤ Retrain 	10 hours to complete basic levels.
Unit 3: Story- telling through data (Critical and Creative thinking Skills)	<ul style="list-style-type: none"> • The Need for Storytelling <ul style="list-style-type: none"> o Information processing and recalling stories o Why is storytelling important? o Structure that story! • How to create stories? <ul style="list-style-type: none"> o Begin with a pen-paper approach o Dig deeper to identify the sole purpose of your story o Use powerful headings o Design a Road-Map o Conclude with brevity • Ethics of storytelling • Types of Data and Suitable Charts <ul style="list-style-type: none"> o Text [Wordclouds] o Mixed [Facet Grids] o Numeric [Line Charts/ Bar Charts] o Stocks [Candlestick Charts] o Geographic [Maps] 	15 hours to complete basic levels.

AI Innovate - (Level 3)

	<ul style="list-style-type: none"> • Stories During the Steps of Predictive Modeling <ul style="list-style-type: none"> ○ Data Exploration ○ Feature Visualizing ○ Model Creation ○ Model Comparisons • Best Practices of Storytelling • Reference Material /Online Resources: <ul style="list-style-type: none"> ○ Analytics Vidhya (https://www.analyticsvidhya.com/blog/2020/05/art-storytelling-analytics-data-science/) ○ Udemy: (https://www.udemy.com/course/tell-a-story-with-data/) ○ Coursera: (https://www.coursera.org/learn/intro-business-analytics) ○ Coursera: (https://www.coursera.org/learn/communicate-with-impact) 	
Student ProjectWork (Practical)	Student capstone project development <ul style="list-style-type: none"> • Students to form teams and work on developing an AI based project • Resources like the AI Project Guide and AI Project LogBook to be used 	30 hours

LIST OF EQUIPMENT/ 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.

- Desktop Computer/ Laptop / Tablet
- Web cam (in case of desktop)
- Scanner
- Projector & Screen
- Printer
- Software: Microsoft Office Applications, Anaconda Navigator, Web Browser (preferably Google Chrome and/or Mozilla Firefox)
- Hub/switch
- Internet

CAREER OPPORTUNITIES:

- Data Scientist
- Data Architect
- ML Engineer
- Data Analyst
- Game Programmer
- Business Intelligence Developer
- Software Engineer – AI
- AI Research Scientist

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S. No.	ITEM NAME, DESCRIPTION & SPECIFICATION	QUANTITY
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 key board and built-in speakers, mic with WiFi / Internet connectivity.	15
2.	Printer – (Color/Black)	01
3.	Graphic Card: Integrated graphics	
4.	Online UPS 5 KVA	01
5.	16 Port Switches	01
6.	Air Conditioner 1.5 ton	02
7.	Telephone line (For Internet)	01
8.	Fire extinguisher	01
B	SOFTWARE	
1.	Operating System Linux and Windows	
2.	Anti-Virus Latest version	
3.	Productivity Suite, Example – Microsoft Office	
4.	Anaconda Navigator Distribution – Python IDE installed with software: NumPy, Pandas, Matplotlib, Seaborn, Scikit Learn)	
C	FURNITURE	
1.	Class room chairs and desks	25
2.	Computer Tables	15
3.	Straight back revolving & adjustable chairs (Computer Chairs)	15
4.	Printer Tables	01
5.	Trainers Table	01
6.	Trainers Chair	01
7.	Steel cupboards drawer type	02
8.	Cabinet with drawer	01
9.	Steel Almira - big size	01
10.	Steel Almira- small size	01

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 should have a minimum of 1 year of work experience in 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.	<ul style="list-style-type: none"> • 18-37 years (as on Jan. 01 (year)) • Age relaxation to be provided as per Govt. 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:

- 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 Level 2 or higher.

The National Quality Assurance Framework (NQAF) provides the benchmarks or quality criteria which 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 of relevant 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 procedure for selection of (Vocational) Teachers/Trainers is followed. The selection procedure should consist of the 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 before being deployed in the schools. The State should ensure that the existing trainers undergo in-service training of 5 days every year to make them aware of the relevant and new techniques/approaches in their sector and understand the latest 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.