

Himachal Pradesh University

(NAAC Accredited “A” Grade University)

Summerhill, Shimla-171005,

Himachal Pradesh, India

Plan, Scheme, and Syllabus

to start a programme

Certificate Course

in

Artificial Intelligence

(Effective from Session 2026-2027)



Center for AI on Cyber Physical Systems

Himachal Pradesh University

(NAAC Accredited A" Grade University)

Summerhill, Shimla-171005,

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1. Introduction: The history of Artificial Intelligence traces back to the mid-20th century, when pioneers like Alan Turing began exploring the idea of machines that could think and learn. The term *Artificial Intelligence* was formally coined in 1956 during the Dartmouth Conference, marking the birth of AI as a scientific discipline. Early research focused on symbolic reasoning and problem-solving, leading to the development of simple programs that could play games or solve mathematical puzzles. The 1980s saw the rise of expert systems, while the 2000s brought significant advances in computational power and data availability, enabling breakthroughs in machine learning. In recent years, deep learning and neural networks have revolutionized AI, powering modern applications such as speech recognition, autonomous vehicles, and intelligent assistants. Today, AI continues to evolve rapidly, shaping the future of technology and transforming how we live and work.

2. Program Details:

- a) Program: Certificate course in Artificial Intelligence
- b) Duration & Seats: Six-month Program with 30 seats. (*Course will be start, if minimum 10 students will be admitted to the course)
- c) Eligibility: 10+2 in any stream with 50% aggregate marks in qualifying exam (45% for SC/ST/PWD)
- d) Mode of Admission: Direct Admission on merit bases
- e) Fee Structure: Rs. 10,000/-

3. Examinations:

As the certificate course is spanned over six months, the learning outcomes shall be assessed on the following components:

Sr. No.	Assessment Component
1.	Course End External Examinations (Theory)
2.	Internal Assessment (Theory)
3.	Python Programming Lab

4. Minimum Criteria to Award Certificate course:

The candidate will be awarded with the Certificate Course after securing 40% marks in all the Courses prescribed in the Scheme of Syllabus of Artificial Intelligence. **The total credit for the certificate course in Artificial Intelligence is seven (07).**

Certificate Course
In
Artificial Intelligence
Scheme
&
Syllabus

Credit Based System

Effective from

Academic Session 2026-2027

Scheme of Syllabus

Total credit of the certificate course: 07

Sr. No.	Broad Category	Category	Course Code	Course Title	L	P	H	C	Semester End Marks	
									ESE	IA
1.	PCC	Major	PCC-AIT-1	Introduction to Artificial Intelligence	3	0	3	3	50	25
2.	PCC	Major	PCC-AIT-2	Ethics and Governance in Artificial Intelligence	3	0	3	3	50	25
3.	PCC	Major	PCC-AIL	Python Programming Lab	0	1	2	1	30	20
Total							8	7	130	70
									Total = 200	

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Course Code	PCC-AIT-1	Credit 3	L-3, T-0, P-0
Name Of the Course	Introduction To Artificial Intelligence		
Lectures to be delivered	45 (1 Hrs. Each) (L=45, T=0 for each semester)		
Course End Examination	Max Marks: 50	Min Pass Marks: 40%	Max Time: 2 Hrs.
Internal Assessment: Class test/Assignments/quiz/seminar-20 marks, Attendance- 5 Marks			Max Marks: 25
Instructions: For Paper Setters: There will be 3 parts (A, B, C) and examiner shall set a total of six (6) questions from all the sections (A, B, C) in total. Part A will have 2 questions from section A of the syllabus of 10 marks each and the student shall have to attempt anyone. Part B will have 2 questions from section B of 10 marks shall have to attempt anyone. Part C will have 2 questions from section C of 10 marks shall have to attempt anyone Part D will have 7 questions from all the sections of the syllabus of 4 marks each and students have to attempt any 5 questions. For Candidates: Students will attempt eight (8) questions in total by selecting one questions from each section A, section B and section C and five questions from section D. Use of non-programmable calculators is allowed.			
Course Objective: To introduce the fundamental concepts of Artificial Intelligence and intelligent agents. To understand and apply different search strategies and problem-solving techniques.			
SECTIONS	COURSE CONTENT		
Section A	Fundamental Of Artificial Intelligence: Artificial Intelligence, How Does AI Work? Advantages and Disadvantages of Artificial Intelligence, History of Artificial Intelligence, Types of Artificial Intelligence, Weak AI, Strong AI, Reactive Machines, Theory of Mind, Self-Awareness, Is Artificial Intelligence Same as Augmented Intelligence and Cognitive Computing, Fundamental of Machine Learning, Types of Machine Learning, Applications of Machine Learning, Perspective, and Issues in Machine Learning. Overview of natural language processing.		
Section B	Trends in AI: Recent trends in AI, Expert System, Internet of Things, Artificial Intelligence of Things (AIoT). Robotics-an Application of AI, Drones Using AI, No Code AI, Low Code AI. Applications of AI: Application of AI in Healthcare, Application of AI in Finance, Application of AI in Retail, Application of AI in Agriculture, Application of AI in Education, Application of AI in Transportation, AI in Experimentation and Multi-disciplinary research.		
Section C	Case Studies in Artificial Intelligence: AI-Powered Healthcare Diagnostics, Autonomous Vehicles and Intelligent Navigation, Generative AI and Conversational Systems, AI-Enhanced Cybersecurity.		
Course Outcome: At the end of the course the students will be able to: - Describe the fundamentals and real-world applications of Artificial Intelligence. - Identify and analyze the structure and function of intelligent agents and their environments. - Apply techniques for data classification, clustering, and pattern recognition in real-world case studies.			
Reference Books: - Reema Thareja, Artificial Intelligence: Beyond Classical AI, Pearson Education, 2023. - Ajantha Devi Vairamani and Anand Nayyar, Prompt Engineering: Empowering Communication, 1st Edition, CRC Press, Taylor & Francis Group, 2024. (DOI: https://doi.org/10.1201/9781032692319). - Saptarsi Goswami, Amit Kumar Das and Amlan Chakrabarti, “AI for Everyone – A Beginner’s Handbook for Artificial Intelligence”, Pearson, 2024. - Susskind, R. (2025). How to think about AI: A guide for the perplexed. Oxford University Press			

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Course Code	PCC-AIT-2	Credit 3	L-3, T-0, P-0
Name Of the Course	Ethics and Governance in Artificial Intelligence		
Lectures to be delivered	45 (1 Hr. Each) (L=45, T=0 for each semester)		
Course End Examination	Max Marks: 50	Min Pass Marks: 40%	Max Time: 2 Hrs.
Internal Assessment: Class test/Assignments/Presentations/etc-20 marks, Attendance- 5 Marks			Max Marks: 25
Instructions: For Paper Setters: There will be 3 parts (A, B, C) and examiner shall set a total of six (6) questions from all the sections (A, B, C) in total. Part A will have 2 questions from section A of the syllabus of 10 marks each and the student shall have to attempt anyone. Part B will have 2 questions from section B of 10 marks shall have to attempt anyone. Part C will have 2 questions from section C of 10 marks shall have to attempt anyone Part D will have 7 questions from all the sections of the syllabus of 4 marks each and students have to attempt any 5 questions. For Candidates: Students will attempt eight (8) questions in total by selecting one questions from each section A, section B and section C and five questions from section D. Use of non-programmable calculators is allowed.			
Course Objective: To develop the ability to evaluate, design, and implement AI systems that are both ethically responsible and secure.			
SECTIONS	COURSE CONTENT		
Section A	Ethical Foundations of Artificial Intelligence: Overview of ethical theories and principles, Ethical considerations in AI development, understanding bias in AI algorithms, Importance of transparency in AI decision-making, Ethics of autonomous systems and decision-making, Ethical guidelines and frameworks for AI design, Ethical considerations in AI research and development.		
Section B	Societal Impacts and Ethical Decision-Making: Ethical implications of AI on employment, inequality, and social justice, AI and the future of work, International and national efforts for AI governance, Strategies for Addressing Societal Concerns, Ethical decision-making frameworks in AI, and practical exercises on ethical AI design and deployment.		
Section C	Privacy, Bias, and Fairness: Ethical and legal implications of data collection and usage in AI, Privacy-enhancing technologies, Fairness metrics, and evaluation methods, mitigating bias in AI systems, and Techniques for achieving transparency in AI models.		
Course Outcome: At the end of the course the students will be able to: • Explain the basic concepts of Artificial Intelligence and the importance of ethics in AI systems. • Describe the ethical challenges associated with autonomous and intelligent systems. • Apply simple ethical guidelines and responsible practices in the design and use of AI technologies. • Analyze the societal impacts of AI on employment, privacy, safety, and equality.			
Reference Books: 1. Müller, Vincent C. Ethics of Artificial Intelligence. The Routledge Social Science Handbook of AI (London: Routledge),2021. 2. Calo, Ryan, A. Michael Fromkin, and Ian Kerr. Robot Law. Edward Elgar Publishing, 2016. 3. O’Neil, Cathy. Weapons of Math Destruction, Crown, 2016. 4. Various academic papers and reports on AI ethics and law from reputable sources such as IEEE, ACM, ScienceDirect, and governmental organizations.			

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Course Code	PCC-AIL	Credit 1	L-0, T-0, P-2
Name Of the Course	Python Programming Lab		
Total Practical Sessions	45 (2 Hrs. Each)		
Course End Examination	Max Marks: 30	Min Pass Marks: 40%	Max Time: 2 Hrs.
Internal Assessment: Lab Work Assessment/Experiment Performance /Viva-15 marks, Attendance -10 marks			Max Marks: 20

List of Experiment

Course Objective: To introduce the fundamental concepts of Artificial Intelligence, Python programming, and machine learning, and to develop problem-solving skills through the implementation of AI algorithms, predictive models, and simple AI-based applications.

Sr. No.	Name of the Experiment
1.	Implementation of Python Basic Libraries (Math and NumPy) for AI Applications
2.	Creation, Loading, and Exploration of Datasets using Pandas
3.	Computation of Mean, Median, Mode, Variance, and Standard Deviation using Python.
4.	Data Visualization using Matplotlib for AI and Machine Learning Applications.
5.	Implementation of Breadth First Search (BFS) Algorithm.
6.	Implementation of Depth First Search (DFS) Algorithm.
7.	Implementation of a Simple Rule-Based Expert System
8.	Implementation of Simple Linear Regression and Graph Plotting.
9.	Development of a Simple AI-Based Application (Tic-Tac-Toe Game / Chatbot).
10.	Development of a Basic Image Classification Model using Machine Learning.

Course Outcome:

At the end of the course the students will be able to:

- Apply Python basic libraries such as NumPy and Math to perform numerical and mathematical computations required for Artificial Intelligence applications.
- Apply Python basic libraries such as NumPy and Math to perform numerical and mathematical computations required for Artificial Intelligence applications.
- Design and implement simple AI-based applications such as a Tic-Tac-Toe game, Chatbot, or Image Classification model using Python.

Reference Books:

1. Russell, S., & Norvig, P. (2021). Artificial Intelligence: A Modern Approach. Pearson Education.
2. McKinney, W. (2017). Python for Data Analysis. O'Reilly Media.
3. Müller, A. C., & Guido, S. (2016). Introduction to Machine Learning with Python. O'Reilly Media.
4. Géron, A. (2019). Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow. O'Reilly Media.