

Course Title: **Artificial Intelligence in Education**

Course No.: ICT. Ed. 476

Level: B.Ed.

Semester: Seven

Nature of course: Theoretical + Practical

Credit Hour: 3 hours (2T+1P)

Teaching Hour: 80 hours (32+48)

1. Course Description

The goal of the course is to help students gain knowledge of Artificial intelligence that studies how to realize the intelligent human behaviors on a computer. AI is to make a computer that can learn, plan, and solve problems autonomously. AI include: problem solving, reasoning, planning, natural language understanding, computer vision, automatic programming, machine learning, and so on. It will introduce some basic search algorithms for problem solving; knowledge representation and reasoning; pattern recognition; fuzzy logic; and neural networks.

2. General Objectives

The general objectives of this course are as follows:

- To explain the fundamental theories, algorithms and representational structures underlying Artificial Intelligence.
- To apply the know representation techniques in AI system.
- Applied the recent trends of AI tools in education system.

3. Specific Objectives and Contents

Part I: Theory

Specific Objectives	Contents
<ul style="list-style-type: none">• Describe the concept, historical development and applications• Define Knowledge and its importance• Explain the role of learning agents in the AI system	Unit I: Introduction to AI (10) 1.1 Introduction to Artificial Intelligence 1.2 Brief history of AI, 1.3 Applications of Artificial Intelligence, 1.4 Definition and importance of Knowledge, 1.5 Learning Agent and it's performance measure 1.6 Problems Definition, Real life problems and well-defined problem
<ul style="list-style-type: none">• Describe the Uninformed or blinds search techniques and its implications• Explain the heuristic search techniques and its implication in AI system.	Unit II: Search Techniques (20) 2.1 Uninformed search techniques: depth first search, breadth first search, depth limit search, Iterative deepening search, 2.2 Heuristics search techniques: Greedy Best first search, A* search, Hill Climbing, Game playing, Adversarial search techniques-mini-max procedure, alpha beta pruning
<ul style="list-style-type: none">• Define knowledge representation techniques.• Apply the Propositional logic and First order predecited logic to knowledge reasoning and planning.	Unit III: Knowledge, Reasoning and Planning (20) 3.1 Formal logic-connectives: truth tables, syntax, semantics, tautology, validity, well-formed-formula, 3.1 Propositional Logic, Inference with PL: Resolution, Backward Chaining and Forward Chaining, 3.1 First Order Predicate Logic(FOPL), quantification, inference with FOPL: By converting into PL (Existential and universal

<ul style="list-style-type: none"> Explain and implementation of Rule based and statistical reasoning methods. 	instantiation), Directly with FOPL (unification and lifting, resolution Backward chaining, Forward Chaining), 3.1 Rule based deduction system, 3.1 Statistical Reasoning-Probability and Bayes' theorem and causal networks, reasoning in belief network
<ul style="list-style-type: none"> Describe the Structured knowledge representation procedures. 	Unit IV: Structured Knowledge Representation (10) 4.1 Representations and Mappings, 4.2 Approaches to Knowledge Representation, Issues in Knowledge Representation, 4.3 Semantic nets, frames, 4.4 conceptual dependencies and scripts
<ul style="list-style-type: none"> Describe Expert System and its application in education system. Explain the Neural Network and its application on education system Explain the application NLP and machine learning and application on education system 	Unit V: Application of AI system in education (20) 5.1 Expert Systems (Architecture, Expert system development process), 5.2 Application of Expert system in education 5.3 Neural Network (Mathematical model, get realization, Network structure) 5.4 Application of Neural Network in education 5.5 Natural Language Processing (Steps of NLP, parsing) 5.6 Application of NLP in education 5.7 Basic Concepts of Machine Learning and Visioning 5.8 Application of Machine Learning in education

4 Instructional Techniques

The instructional techniques for this course are divided into two groups. First group consists of general instructional techniques applicable to most of the units. The second group consists of specific instructional techniques applicable to particular units.

4.1 General Techniques

Reading materials will be provided to students in each unit. Lecture, Discussion, use of multi-media projector, brain storming are used in all units.

4.2 Specific Instructional Techniques

Demonstration is an essential instructional technique for all units in this course during teaching learning process. Specifically, demonstration with practical works will be specific instructional technique in this course. The details of suggested instructional techniques are presented below:

Laboratory Work:

There shall be 20 exercises in minimum, as decided by the faculty. The exercises shall encompass a broad spectrum of real-life and scientific problems, development of small program to the development of fairly complex subroutines, programs for practical

applications and problem solving situations. Laboratory assignments will be offered in groups of two to four for evaluation purpose. In general, the Laboratory Work must cover assignments and exercises from the following areas:

5. Evaluation :

Internal Assessment	External Practical Exam/Viva	Semester Examination	Total Marks
40 Points	20 Points	40 Points	100 Points

Note: Students must pass separately in internal assessment, external practical exam and semester examination.

5.1 Internal Evaluation (40 Points):

Internal evaluation will be conducted by subject teacher based on following criteria:

- | | |
|---|-----------|
| 1) Class Attendance | 5 points |
| 2) Learning activities and class performance | 5 points |
| 3) First assignment (written assignment) | 10 points |
| 4) Second assignment (Case Study/project work with presentation) | 10 points |
| 5) Terminal Examination | 10 Points |

Total	40 points
-------	-----------

5.2 Semester Examination (40 Points)

Examination Division, Dean office will conduct final examination at the end of semester.

- | | |
|--|-----------|
| 1) Objective question (Multiple choice 10 questions x 1mark) | 10 Points |
| 2) Subjective answer questions (6 questions x 5 marks) | 30 Points |

Total points	40
--------------	----

5.3 External Practical Exam/Viva (20 Points):

Examination Division, Dean Office will conduct final practical examination at the end of semester.

6. Recommended books and References materials (including relevant published articles in national and international journals)

Recommended Books References

Russell, S. J., Norvig, P., Davis, E., & Edwards, D. (2016). Artificial intelligence: a modern approach (Third edition, Global edition). Delhi: Pearson India.

Khemani, D. (2013). A first course in artificial intelligence. New Delhi: McGraw Hill Education (India).

E. Rich and Knight, Artificial Intelligence, McGraw Hill.

D. W. Patterson, Artificial Intelligence and Expert Systems, Prentice Hall.

P. H. Winston, Artificial Intelligence, Addison Wesley.

Ivan Bratko, PROLOG *Programming for Artificial Intelligence*