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## Description of Course CSE 318

### PART A: General Information

- 1 **Course Title** : Artificial Intelligence Sessional
- 2 **Type of Course** : Sessional
- 3 **Offered to** : Department of CSE
- 4 **Pre-requisite Course(s)** : None

### PART B: Course Details

#### 1. **Course Content (As approved by the Academic Council)**

Sessional based on contents of the theory course CSE317 (Artificial Intelligence)

#### 2. **Course Objectives**

The students are expected to

- i. To teach the students how to design and implement programs to solve real-world AI and machine learning problems.
- ii. To teach the students how to evaluate the performance of machine learning techniques in real-world applications.

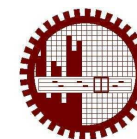
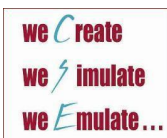
#### 3. **Knowledge required**

##### **Technical**

- Probability theory, linear algebra, multivariate calculus, good programming knowledge of C/C++/Java/Python

##### **Analytical**

- Problem solving and creating thinking



#### 4. Course Outcomes (COs)

CO No.	CO Statement After undergoing this course, students should be able to:	Corresponding PO(s)*	Domains and Taxonomy level(s)**	Delivery Method(s) and Activity(-ies)	Assessment Tool(s)
CO1	<b>Develop</b> programs for search algorithms (heuristic and adversarial) and constraint satisfaction problems.	PO1 and PO3	C6	Program design for real-world problem solving	Assignment, viva, final quiz
CO2	<b>Design and implement</b> techniques to solve real-world machine learning problems (supervised and unsupervised).	PO2 and PO3	C6, P7	Program design for real-world problem solving	Assignment, viva, final quiz
CO3	<b>Compare and evaluate</b> different machine learning algorithms in real-world problems.	PO1 and PO5	C5, A4	Program design for real-world problem solving	Assignment, viva, final quiz

#### \*Program Outcomes (POs)

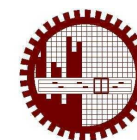
PO1: Engineering knowledge; PO2: Problem analysis; PO3: Design/development of solutions; PO4: Investigation; PO5: Modern tool usage; PO6: The engineer and society; PO7: Environment and sustainability; PO8: Ethics; PO9: Individual work and teamwork; PO10: Communication; PO11: Project management and finance; PO12: Life-long learning.

#### \*\*Domains

**C-Cognitive:** C1: Knowledge; C2: Comprehension; C3: Application; C4: Analysis; C5: Synthesis; C6: Evaluation

**A-Affective:** A1: Receiving; A2: Responding; A3: Valuing; A4: Organizing; A5: Characterizing

**P-Psychomotor:** P1: Perception; P2: Set; P3: Guided Response; P4: Mechanism; P5: Complex Overt Response; P6: Adaptation; P7: Organization



### 5. Mapping of Knowledge Profile, Complex Engineering Problem Solving and Complex Engineering Activities

COs	K1	K2	K3	K4	K5	K6	K7	K8	P1	P2	P3	P4	P5	P6	P7	A1	A2	A3	A4	A5
CO1		√	√	√	√	√			√	√	√				√	√				√
CO2		√	√	√	√	√		√	√	√	√				√	√	√	√		√
CO3		√	√	√	√	√		√	√	√	√					√			√	

#### K-Knowledge Profile:

**K1:** A systematic, theory-based understanding of the natural sciences applicable to the discipline; **K2:** Conceptually based mathematics, numerical analysis, statistics and the formal aspects of computer and information science to support analysis and modeling applicable to the discipline; **K3:** A systematic, theory-based formulation of engineering fundamentals required in the engineering discipline; **K4:** Engineering specialist knowledge that provides theoretical frameworks and bodies of knowledge for the accepted practice areas in the engineering discipline; much is at the forefront of the discipline; **K5:** Knowledge that supports engineering design in a practice area; **K6:** Knowledge of engineering practice (technology) in the practice areas in the engineering discipline; **K7:**Comprehension of the role of engineering in society and identified issues in engineering practice in the discipline: ethics and the engineer's professional responsibility to public safety; the impacts of engineering activity; economic, social, cultural, environmental and sustainability; **K8:** Engagement with selected knowledge in the research literature of the discipline

#### P-Range of Complex Engineering Problem Solving:

**P1:** Cannot be resolved without in-depth engineering knowledge at the level of one or more of K3, K4, K5, K6 or K8 which allows a fundamentals-based, first principles analytical approach; **P2:** Involve wide-ranging or conflicting technical, engineering and other issues; **P3:** Have no obvious solution and require abstract thinking, originality in analysis to formulate suitable models; **P4:** Involve infrequently encountered issues; **P5:** Are outside problems encompassed by standards and codes of practice for professional engineering; **P6:** Involve diverse groups of stakeholders with widely varying needs; **P7:** Are high level problems including many component parts or sub-problems



### A-Range of Complex Engineering Activities:

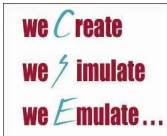
**A1:** Involve the use of diverse resources (and for this purpose resources include people, money, equipment, materials, information and technologies); **A2:** Require resolution of significant problems arising from interactions between wide-ranging or conflicting technical, engineering or other issues; **A3:** Involve creative use of engineering principles and research-based knowledge in novel ways; **A4:** Have significant consequences in a range of contexts, characterized by difficulty of prediction and mitigation; **A5:** Can extend beyond previous experiences by applying principles-based approaches

### 6. Lecture/Activity Plan

Week	Lecture Topics	Corresponding CO(s)
Weeks 1 & 2	Assignment on A* search	CO1
Weeks 3 & 4	Assignment on constraint satisfaction problem/ local search	CO1
Week 5-7	Assignment on adversarial search	CO1
Week 8 & 9	Assignment on supervised learning (decision tree algorithms)	CO2
Week 10 & 11	Assignment on HMM/MDP/Q-learning	CO2, CO3
Weeks 12 & 13		
Weeks 14	Final quiz	CO1 – CO3

### 7. Assessment Strategy

- Assignment: There will be four to six assignments. Some assignments may have sub-problems covering multiple topics.
- Viva: There will be a short viva examination on every assignment.
- Final quiz: A final quiz will be held at the end of the semester.



## 8. Distribution of Marks

Assignments:	50%
Viva:	20%
Final quiz:	30%
Total:	100%

## 9. Textbook/ Reference

Textbooks referred in the respective theory course CSE317 (Artificial Intelligence).