



East West University
Department of Computer Science and Engineering
CSE365 – Artificial Intelligence
Course Outline for Summer 2017

Course Information

Course Code: CSE365
Course Title: Artificial Intelligence
Credit: 4 Credits

Lecture: Section 1: 01:30pm – 03:00pm (ST), Room: AB1-601, 111
Lab: Section 1: 04:50pm – 06:50pm (W), Room: 533

Lecture: Section 2: 03:10pm – 04:40pm (TR), Room: 726
Lab: Section 2: 10:10pm – 12:10pm (R), Room: 530

Lecture: Section 3: 03:10pm – 04:40pm (MW), Room: 110
Lab: Section 3: 04:50pm – 06:50pm (M), Room: 530

Instructor Information

Instructor: Amit Kumar Das
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Dhaka-1000 Bangladesh.*
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Course Website: <https://sites.google.com/site/amitkdasportfolio/teaching-materials/cse-365-artificial-intelligence>

Teaching Assistant: Swapnil Saha (Mobile: +8801940-740756)
Puloma Roy



Office Hours:

Day	10.10-11.40	11.50-01.20	01.30-03.00	03.10-04.40	04.50-06.20
Sunday				Office Hour	Office Hour
Monday			Office Hour		
Tuesday					Office Hour
Wednesday			Office Hour		
Thursday		Office Hour	Office Hour		Office Hour

Course Objectives

This course introduces students to basic concepts and methods of artificial intelligence from a computer science perspective. Emphasis of the course will be on the selection of data representation and algorithms useful in the design and implementation of intelligent systems. The course will contain an overview of one AI language and some discussion of important applications of artificial intelligence methodology.

Course Outcome (CO)

The objective of this course is to give students a solid understanding of the main abstractions and reasoning techniques used in AI. At the end of the course, students are able:

1. To **Explain** fundamental concepts of Artificial Intelligence
2. To **Understand** theories and algorithms of Artificial Intelligence
3. To **Analyze** Artificial Intelligent system
4. To **Design** Artificial Intelligent system for complex real life problems



Course Contents and Teaching Schedule:

Week	Topic	Textbook Chapters
1	<u>Introduction to Artificial Intelligence:</u> Definitions, Goals of AI, AI Approaches, AI Techniques, Branches of AI, Applications of AI.	1
2	<u>Intelligent agents</u> Definitions, Simple reflex agents, Model based reflex agents, Goal based agents, and Utility based agents, Learning agents.	2
3	<u>Problem solving through uninformed search</u> General problem solving, Search and control strategies , Exhaustive searches	3
4	<u>Problem solving through informed search.</u> Heuristic search techniques, Constraint satisfaction problems (CSPs), models	4
5	<u>AI and playing games</u> Overview, Mini-Max search procedure, Game playing with Mini-Max, Alpha-Beta pruning.	-
6	<u>Introduction to knowledge representation</u> Knowledge representation, KR using predicate logic, KR using rules	10
7	First-order logic and Prolog	7-9
8	<u>Planning</u> Representation of planning, Algorithms of planning, Application of planning, Complexity of planning, Real world planning,	11-12
9	<u>Machine learning</u> What is learning, Rote learning, Learning from example: Induction, Explanation Based Learning (EBL), Discovery, Clustering, Analogy, Neural net and genetic learning, Reinforcement learning.	18-19
10	<u>Robotics and Fundamentals of Genetic Algorithms</u> Introduction, Encoding, Operators of genetic algorithm, Basic genetic algorithm.	25
11	<u>Introduction to some advanced topics</u> Introduction, Knowledge acquisition, Knowledge base, Working memory, Inference engine, Expert system shells, Explanation, Application of expert systems.	22
12	Present and future of AI	27



Lab Contents and Teaching Schedule

Lab	Lab Experiment Title	Lab Equipment/ Software
1	Solving Problems (how robots/machine take decisions using instruction) using Blockly Games	Code Block or NetBeans
2	Solving Problems Using Uninformed Search algorithms (Breadth-First Search, Uniform-Cost Search)	As the above
3	Solving Problems Using Uninformed Search algorithms (Depth-First Search, Depth-Limited Search)	As the above
4	Solving Problems Using Informed Search algorithms (Heuristics, Greedy Search)	As the above
5	Solving Problems Using Informed Search algorithms (A* Tree Search, A* Graph Search)	As the above
6	Introduction to Prolog: Simple Facts and Queries in Prolog	As the above
7	Taking input, displaying output and basic arithmetic operations in prolog.	As the above
8	Conditional statements (if-else) and debugging procedure in prolog	As the above
9	Loops and recursion in prolog	As the above
10	One and Multi-dimensional array in prolog	As the above
11	Sorting and List in Prolog	As the above
12	Structure and file I/O in prolog	



Learning Outcomes:

- ***Knowledge and understanding***
 - Understand basic concepts of intelligent machine and their architecture.
 - Understand how artificial intelligence enables capabilities that are beyond conventional technology, for example, chess playing computer, self-driving cars etc.
 - Understand classical artificial intelligence techniques such as search algorithms, neural network, minimax algorithm etc.
- ***Cognitive skills (thinking and analysis)***
 - Be able to apply artificial intelligence techniques to problem solving.
 - Be able to understand various methods for representing and reasoning under uncertainty.
- ***Communication skills (personal and academic)***
 - Individual assignments after each lab work and group assignments including demonstration and presentation involve receiving clear instructions, designing and writing an effective report and making an effective presentation.
 - A term project (group work) where students will be assessed in terms of their effectiveness as an individual or leader in the team.
- ***Practical and subject specific skills (Transferable Skills)***
 - Be able to apply various methods for solving problems and building efficient intelligent machine.



Teaching Materials/ Equipment

Text Book:

- ❖ Artificial Intelligence: A Modern Approach, 3rded. S. Russell and P. Norvig, Prentice Hall.

Reference Materials:

1. Artificial Intelligence: Structures and Strategies for Complex Problem Solving, 6th ed. G. Luger, Addison Wesley, 2009
2. AI Algorithms, Data Structures, and Idioms in Prolog, Lisp and Java, G. Luger and W. Stubblefield, Addison Wesley, 2009
3. Artificial Intelligence: A Systems Approach. M. Tim Jones, Infinity Science Press, 2008

Teaching Materials: Lecture Notes*, Lab Exercises/Notes*, Reference Book, and Computer & Software.

Teaching-Learning Method: Lecture Notes*, PDF Documents, Lab Exercises*, Assignments.

*Lecture and Lab Notes that are required for the course will be delivered during class.

Software to compile Prolog programs:

IDE	Platform	Console programs
Cygwin	Windows	Compile console programs using Cygwin

Assessment Weightage (Evaluation and Grading Policy)

The relative contributions of exams, projects, quiz, and lab work are as follows[†]:

- ❖ Class Participation 5%
- ❖ Projects 10%
- ❖ Quiz (Average of best two) 10%
- ❖ Term I Exam 15%
- ❖ Term II Term Exam 15%
- ❖ Final Exam 20%
- ❖ Labs 25%

* Labs= Continuous evaluation in scheduled lab time + Final lab exam

*The above mark distribution can be change up to $\pm 5\%$ (for each field).



Student Learning Time (SLT)

Student Learning Time (SLT) can be divided into: Face to Face (36 hours), Guided Learning (24 hours), Independent Learning (93 hours) and Assessment (7 hours). The detailed breakdown is as follows:

No.	Teaching And Learning Activities	Student Learning Time (SlT)
1.	Lecture	36 hours (3 x 12 weeks)
2.	Lab	24 hours (2 x 12 weeks)
3.	Review lesson after lecture (includes preparation for final exams)	36 hours (36 hours x 1 hour study time)
4.	Student's preparation for lab	46 hours (23 hours x 2 hours preparation)
5	Carry out Assignment	9 hours (6 weeks x 1.5 hours)
6.	Carry out Class Tests and Quiz	1.5 hours
7.	Carry out Mid Term and Final Exams	4.5 hours
8.	Carry out Lab Tests and Quiz	3.0 hours
TOTAL SLT		160 hours
CREDIT = SLT/40		4.0

Details:

- ❖ Homework/Assignment: must be done in group not more than 3 (the same group as the lab works), **STRICTLY NO COPYING** from other groups.
- ❖ **Late assignments suffer a penalty rate of 20% per day, up to 5 days (weekends count towards the 5 days).** Assignments that are more than 5 days late are penalized by 100%.
- ❖ Submit the signed **Expectations of Originality form** with each homework assignment.
- ❖ **Failing Grade:** Plagiarism, absenteeism, lack of preparation, and lack of effort will result in a failing grade.



Grading System:

Marks (%)	Letter Grade	Grade Point	Marks (%)	Letter Grade	Grade Point
97-100	A+	4.00	73-76	C+	2.30
90-96	A	4.00	70-72	C	2.00
87-89	A-	3.70	67-69	C-	1.70
83-86	B+	3.30	63-66	D+	1.30
80-82	B	3.00	60-62	D	1.00
77-79	B-	2.70	Below 60	F	0.00

Exam Dates:

❖ Term I Exam (Section 1):

04th June 2017 (Sunday)

(Monday, 05 June, 2017 is earmarked for Mid Term I Exams for students who will have more than two exams on a single day as per the schedule above.)

❖ Term I Exam (Section 2):

06th June 2017 (Tuesday)

(Monday, 05 June, 2017 is earmarked for Mid Term I Exams for students who will have more than two exams on a single day as per the schedule above.)

❖ Term I Exam (Section 3):

07th June 2017 (Wednesday)

(Monday, 05 June, 2017 is earmarked for Mid Term I Exams for students who will have more than two exams on a single day as per the schedule above.)

❖ Term II Exam (Section 1)

09th July 2017 (Sunday)

(Monday, 10 July, 2017 is earmarked for Mid Term II Exams for students who will have more than two exams on a single day as per the schedule above.)

❖ Term II Exam (Section 2)

11th July 2017 (Tuesday)



(Monday, 10 July, 2017 is earmarked for Mid Term II Exams for students who will have more than two exams on a single day as per the schedule above.)

❖ **Term II Exam (Section 3)**

12th July 2017 (Wednesday)

(Monday, 10 July, 2017 is earmarked for Mid Term II Exams for students who will have more than two exams on a single day as per the schedule above.)

❖ **Final Exam (Section 1)**

13th August 2017 (Sunday)

(Saturday, 19 August, 2017 is earmarked for Final Exams for students who will have more than two exams on a single day as per the schedule above)

❖ **Final Exam (Section 2)**

20th August 2017 (Sunday)

(Saturday, 19 August, 2017 is earmarked for Final Exams for students who will have more than two exams on a single day as per the schedule above)

❖ **Final Exam (Section 3)**

16th August 2017 (Wednesday)

(Saturday, 19 August, 2017 is earmarked for Final Exams for students who will have more than two exams on a single day as per the schedule above)



Academic Code of Conduct

Academic Integrity

Any form of cheating, plagiarism, personating, and falsification of a document as well as any other form of dishonest behavior related to obtaining academic gain or the avoidance of evaluative exercises committed by a student is an academic offence under the Academic Code of Conduct and **may lead to severe penalties up to and including suspension and expulsion.**

Special Instructions

- ❖ Class Lectures and Lab works are believed to be the most effective and reliable source of knowledge for this course. Therefore, students are strongly encouraged to participate in all the classes attentively.
- ❖ Students will not be allowed to enter into the classroom after 20 minutes of the starting time. If you miss more than two consecutive classes you will lose 5% from the class participation marks. Moreover, **You MUST have at least 80% class attendance to sit for the final exam.** All mobile phones MUST be turned to silent.
- ❖ There is zero tolerance for cheating at EWU. Students caught with cheat sheets in their possession, whether used or not used, &/or copying from cheat sheets, writing on the palm of hand, back of calculators, chairs or nearby walls, etc. would be treated as cheating in the exam hall. The only penalty for cheating is expulsion from EWU. **For plagiarism, the grade will be automatically become zero for that exam/assignment.**
- ❖ There will be **NO make-up examinations for Quiz & Lab Exam in any case.** Make up exam can only be considered for the midterms in case of emergency, you MUST either inform me or the department secretary within 24 hours of the exam time. Failure to do so will mean that you are trying to take UNFAIR advantage and you will be automatically disqualified.