BOSTON UNIVERSITY METROPOLITAN COLLEGE COMPUTER SCIENCE DEPARTMENT

MET CS 664 A1 ARTIFICIAL INTELLIGENCE

Course Overview

The course Artificial Intelligence (AI) treats in-depth methods for automated reasoning, automatic problem solvers and planners, knowledge representation mechanisms, game playing, machine learning, and statistical pattern recognition. The class is a recommended for students with a genuine curiosity about the ideas and techniques that enable computers to behave intelligently. Programming skills and a reasonable writing skills are expected; students will be asked to complete both programming assignments and writing assignments.

Course Format **Learn from Anywhere**
Offered Simultaneously On Campus and Remote

Time and location Wednesday 6:00 PM – 8:45 PM,
Room CAS 222

Prerequisite

MET CS 248 Discrete Mathematics and MET CS 341
or MET CS 342 Data Structures or instructor's consent

Learning Objectives

- Students will learn about the broader context of artificial intelligence.
- Students will learn core concepts in artificial intelligence, such as heuristic search, game playing, formal logic, knowledge representation, decision theory, machine learning, and natural language processing
- Students will apply this knowledge in programming assignments

Key Topics

- Artificial Intelligence in Context
- Intelligent Agents, Heuristic Search
- Game Playing.
- Logic and Knowledge Representation. Uncertainty.
- Machine Learning and Natural Language Processing.

Learning Outcomes:

Students who have completed this course should be able to apply core concepts in artificial intelligence,

1. heuristic search, game playing,
2. formal logic, knowledge representation,
3. decision theory,
4. machine learning, and natural language processing

in programming assignments

Assessment methods of all of the above: assignments, exams, term project

Required Textbook Stuart Russell, Peter Norvig, "Artificial Intelligence: Modern Approach," 3rd Ed, Pearson, 2010, ISBN-13: 978-0-13-604259-4.

Recommended book The following books are not required but suggested, if you want to learn more about certain subjects.

- Thinking, Fast and Slow, Daniel Kahneman, 2011
- Deep Learning and the Game of Go, Max Pumperla and Kevin Ferguson, 2019

Courseware

The lecture notes will be available in traditional digital-file formats (*.doc, *.ppt, and *.pdf) on the blackboard site related to our course CS664 A1 Artificial Intelligence (Sprg 2021) Blackboard Learn, URL: https://learn.bu.edu

Spring 2021 COVID-19 Policies

Classroom Rotations: Classrooms on campus have new capacities that follow guidelines issued by state and local health and government authorities related to COVID-19 and physical distancing. Before the beginning of the class, and throughout the semester, I will be reaching out to students who have indicated that they want to attend the classroom in-person. Our classroom hold 10 students, and therefore we will have two rotations of students that come to class on campus alternate weeks. You will be asked to attend remotely on the week that you have rotated out the classroom.

Compliance: All students returning to campus will be required, through a digital agreement, to commit to a set of Health Commitments and Expectations including face coverings, symptom attestation, testing, contact tracing, quarantine, and isolation. The agreement makes clear that compliance is a condition of being a member of our on-campus community.

You have a critical role to play in minimizing transmission of COVID-19 within the University community, so the University is requiring that you make your own health and safety commitments. Additionally, if you will be attending this class in person, you will be asked to show your Healthway badge on your mobile device to the instructor in the classroom prior to starting class, and wear your face mask over your mouth and nose at all times. If you do not comply with these rules you will be asked to leave the classroom. If you refuse to leave the class, the instructor will inform the class that they will not proceed with instruction until you leave the room. If you still refuse to leave the room, the instructor will dismiss the class and will contact the academic Dean's office for follow up.

Boston University is committed to offering the best learning environment for you, but to succeed, we need your help. We all must be responsible and respectful. If you do not want to follow these guidelines, you must participate in class remotely, so that you do not put your classmates or others at undue risk. We are counting on all members of our community to be courteous and collegial, whether they are with classmates and colleagues on campus, in the classroom, or engaging with us remotely, as we work together this fall semester.

Evaluation and Grading Policy

There will be two exams. If any grading criteria event will be missed it will be the responsibility of the student to arrange a mutually agreeable schedule for completion of work.

An assignment will be considered late, if you fail to hand in the assignment by the specified time and date, and you will be charged 10 pts.
Charge will be waived in case of circumstances are beyond your control.

You may resubmit your corrected assignment however you will be charged 5 pts per each submission. Charge will be waived in case of circumstances are beyond your control.

The grade is made up of your performance on your home works, project paper, midterm, final exams and participation.

Participation will be based on the percentage of in-class polling questions answered. Correctness of in-class polling responses will not be taken into account for participation grades.

Approximate weightings are as following:

Assignments	Percentage
Four Written Homework Assignments	48%
In Class Participation	4%
Midterm Exam	24%
Final Exam (or Project Paper)	24%

Letter Grade:

94 ≤ G:	A,	77 ≤ G < 80:	C+
90 ≤ G < 94:	A-	73 ≤ G < 77:	C
87 ≤ G < 90:	B+	70 ≤ G < 73:	C-
83 ≤ G < 87:	B	60<G<70:	D
80 ≤ G < 83:	B-	G<70 :	F

There will be no make-up exam for the final exam. If a student cannot take the final exam on the designated day, she/he will receive an incomplete grade.

Academic Honesty

The course is governed by the Academic Conduct Committee policies regarding plagiarism (any attempt to represent the work of another person as one's own). This includes copying (even with modifications) of a program or segment of code. You can discuss general ideas with other people, but the work you submit must be your own. Collaboration is not permitted. See link below

http://www.bu.edu/met/metropolitan_college_people/student/resources/conduct/c ode.html.

Instructor Information

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Office Hours: After each class meeting

Tentative Schedule

- The schedule is subject to change according to the actual progress of the class. Some topics may be skipped and some topics may be added.
- Students are encouraged to review book chapters assigned for each lecture before coming to class.

SESSION	TOPIC	Text book READING	Assignment with Learning Outcome Assessment *
1 (01/26)	Introduction. Artificial Intelligence – in the Public Imagination. Philosophy of Mind.	Ch. 1, 26	
2 (02/02)	Intelligent Agents. Basic Search	Ch. 2, 3	
3 (02/09)	Informed Search. Game Playing.	Ch. 3, 4, 5	**Homework #1 due CBK**
4 (02/16)	Constraints Satisfaction– Defining Constraint, Propagation, Backtracking, Local Search	Ch. 6	
5 (02/23)	Logical Agents – Knowledge Based Agents,	Ch. 7	
6 (03/02)	First Order Logic – Representation, Syntax & Semantics, Usage	Ch. 8	**Homework #2 due CBK, LO1**
(03/09)	**Spring Recess**		
7 (03/16)	**MID-TERM EXAM**		
8 (03/23)	Inference in First Order Logic – Propositional vs. FOL, Unification, Chaining, Resolution	Ch. 9	
9 (03/30)	Knowledge Representation	Ch. 12	**Homework #3 due CBK, LO2**
11 (04/06)	Planning. Probabilistic Reasoning Bayesian Networks	Ch. 11 Ch. 10, 13, 14	**Homework #5 due**
12 (04/13)	Statistical Learning. Neural Networks Reinforcement Learning.	Ch. 20,18.7, 21	**Homework #4 due CBK, LO3, LO4**

13 (04/27)	Natural Language processing		**Term Project Draft Due LO1,LO2,LO3,LO4**
14 (05/04)	Projects Presentations; Final Exam Preparation		
15 (05/11)	**FINAL EXAM**		

***Learning Outcome Assessments criteria abbreviations**

LO# Learning outcome number (see list of Learning Outcomes above)

CBK Common Body of Knowledge

Communication

- All official announcements will be made in the class.
- All assignments will be posted on the class web page.
- **Important:** The primary method of communication is through in-class announcements. So, if you miss a class you need to talk to a friend in the class or contact me to find out whether there was any important announcement.