Syllabus

All Spring 2022 semester classes will begin remotely. We currently anticipate that courses with an in-person component will be able to start meeting in-person beginning on Monday, January 31, 2022.
Be prepared to pivot! A pivot back to online-only delivery is not currently anticipated. However, the state of the pandemic is still in constant flux, and this means there is a large degree of uncertainty about how the situation will evolve. Thus, we should be prepared to make a smooth change to online learning at any point in the semester, should this become necessary.

Late Submission, Make-up Policy, and Attendance may be impacted by the COVID-19 pandemic.

Do not attend your in-person class if you have **COVID-19**, if you are experiencing symptoms consistent with **COVID-19**, if you have been in close contact with others who have symptoms, if you need to care for an individual with **COVID-19**, or have other health concerns related to **COVID-19.**

- You should be aware of each of your course's attendance policies. In case of illness, **you should contact me immediately to discuss options for completing course work while ill**.
- **Notify me in advance** of the absence or inability to participate, if possible.
- **Participate in class activities online** and submit assignments electronically, to the extent possible.
- Reach out to me **if illness will require late submission** or other modifications to deadlines.
- If remaining in a class and fulfilling the necessary requirements becomes impossible due to illness, **contact me to discuss other options.**

As your instructor, I will trust your word when you say you are ill, and in turn, I expect that you will report the reason for your absences truthfully.

CSC 340 Artificial Intelligent **4.0 credits**

Instructor	Dr. Fatema Nafa
Email	fnafa@Salemstate.edu
Office Hours	Tuesdays &Wednesdays 9:00 –10:00,2:00 – 3:00 & **by appointment**
Lecture Time	**Wednesdays & Fridays: 2:40 – 4:20**
Place	**Harrington 112**
Final Exam: Friday May 06 2:00PM- 4:00PM	

Course Description:

This course studies the theory and application techniques which allow a computer to "behave intelligently". Various operational definitions of intelligence are discussed, along with the concept of "mechanized intelligence". The course includes case studies of expert systems which solve engineering design problems, diagnose disease, and learn from their environment via natural language and/or visual interaction with a user. The role of planning, goal formation, search analysis and evaluation, and

various forms of representation will be discussed extensively. Four lecture hours per week, plus programming work outside of class.

Prerequisites: **CSC 105 and CSC 260.**

Goals:

This course is intended to introduce the basic concepts of artificial intelligence. The student will employ hands-on case studies to internalize the techniques of AI. The course will develop an understanding of: CG01: the concepts of the fundamental branches of artificial intelligence;

CG02: the basic approaches to problem-solving using AI techniques;
CG03: knowledge representation and automated reasoning;
CG04: the concept of machine learning and its various technical issues.

Objectives:

Upon successful completion of this course the student will have

CO01: explained the rudimentary concepts of artificial intelligence techniques;
CO02: selected an artificial intelligence method of solution based on stated problem constraints;
CO03: mastered heuristic functions and search strategies such as uninformed search and informed search;
CO04: demonstrated knowledge of expert systems;
CO05: demonstrated knowledge of computer-based knowledge representation, reasoning, and planning;
CO06: demonstrated through projects and written assignments the ability to apply methods and techniques of machine learning (e.g. supervised learning, unsupervised learning, reinforcement learning, neural networks, genetic algorithms, and/or Bayesian Belief networks).

Student Outcome vs. Course Objectives matrix

SO	CO01	CO02	CO03	CO04	CO05	CO06
SO-1	✓	✓	✓	✓	✓	✓
SO-2		✓	✓		✓	✓
SO-3					✓	
SO-4						
SO-5					✓	
SO-6	✓	✓	✓	✓	✓	✓

Notes:

SO-1: Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.

SO-2: Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.

SO-3: Communicate effectively in a variety of professional contexts.

SO-4: Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.

SO-5: Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline. Apply computer science theory and software development fundamentals to produce computing-based solutions.

SO-6: Apply computer science theory and software development fundamentals to produce computing-based solutions.

Keys to Success

- **Plan ahead!** Success in this course requires project management skills: identify milestones and deadlines and plan your work accordingly.

- **Coordinate the work schedule** for this class with the schedules for your other classes, work, and other activities. You are likely to have many deadlines toward the end of the semester, so it's important for you to keep up.
- **Give yourself plenty of time** to prepare for each class. You will find some of the readings challenging, I know, but get as much as you can from each one. If you are not prepared for class, you will not be able to fully participate in (and benefit from) each class meeting.
- **It is important for each class member to participate**. It's also more interesting and more fun for us all!
- If you have any questions or concerns about the class or your work for the class, please talk to me about them. I cannot help you if I don't know there is an issue, and it is always easier to deal with problems earlier rather than later.
-

Format and Procedures:

This course includes **lectures, homework**, **assigned readings**, **projects**, and **exams** (**Mid-term** and **Final**).

- **Class Participations:** Lectures will be given in the assigned lecture room twice a week. **Attendance and participation are required**. Lectures will be followed by an in-class lab exercise that assists in the learning process. The last 20 minutes of each lecture will be lab work with a score given based on attendance and successful completion of lab exercises. These "labs" will immediately apply material from the lecture and serve as an introduction to the other programming assignments.
- **Written Assignments:** At the end of every other week, we will either have a problem set or a programming assignment. Students must work individually on these assignments.

- **Readings:**
  - A reading list will be posted for each class period.
  - Readings will primarily consist of chapters from textbook, conference, and journal articles.
  - There will normally be two papers to read for each class period.
  - Students are required to read the papers before class and participate in discussion.

- **Projects:** paired or individual projects are required by the end of the semester. The time schedule and grading details for the projects will be provided through the classes via iterations.
- **Exams:** Exams are in-class exams (a mid-term of 90 minutes and a final of 120 minutes). There will be one midterm and one final (comprehensive) examination. The midterm will be held on **week 7 or 8** depending on the class progress, and the final will be held on **week 16**. **Please do not arrange any other activities on the posted exam dates.**

Zoom and Lecture Policies

The Salem State University Student Code of Conduct applies to online behavior as well as in-person or classroom behavior. You are expected to be professional and respectful when attending class on Zoom. **The following are class policies for our meetings with Zoom**.

Please read carefully, these policies are effective immediately and apply for the remainder of the semester. All students are expected to adhere to the policies.

- **LOG in** with your full first name and last name as listed on the class roster. Do not use a nickname or other pseudonym when you log in. (It makes it impossible to know who is in attendance. Using your full name, quickly sorts student into their groups when needed). Users who do not provide their full names will NOT be admitted to class. **Exceptions**
- Since enrolling in the class, some students have changed their names to better reflect their gender identity. If you currently use a different name than what is listed on the official roster, please send me a private Canvas message so I can note this on my roster. Then you can use your current name on Zoom!
- If you do not have access to a computer or smartphone with internet access, call into class from a phone line. This is not optimal; please try to **locate an internet-enabled device to use for class**.

- Stay focused. Please stay engaged in class activities. Close any apps on your device that are not relevant and turn off notifications.
- Need technical help? Contact the IT Help Desk at it-helpdesk@salemstate.edu or 978.542.2036. Or, create a ticket on the help desk portal: Salem State ITS Help Desk.

VIDEO

- **Turn on your video when possible**. It is helpful to be able to see each other, just as in an in person class. **Exceptions** If you have limited internet bandwidth or no webcam, it is ok to not use video. If you're unable to find an environment without a lot of visual distractions, it is also ok to turn off your video.
- Keep it clean. Don't share anything you wouldn't put up on the projector in class!

AUDIO

- Mute your microphone when you are not talking. This helps eliminate background noise.
- Use a headset when possible. If you own headphones with a microphone, please use them. This improves audio quality.
- Be in a quiet place when possible. Find a quiet, distraction-free spot to log in. Turn off any music, videos, etc. in the background.

CHAT

- **Stay on topic**. Use the chat window for questions and comments that are relevant to class. The chat window is not a place for socializing or posting comments that distract from the course activities. If you fill it up with random comments, I will be unable to sort through the information quickly to address students' real questions/concerns about the course.
- **No disrespect or hate speech**. Just like in our in-person class, respectful behavior is expected. Consider Zoom a professional environment, and act like you're at a job interview, even when you're typing in the chat.
- Student **attendance is MANDATORY**, and student participation is encouraged to facilitate the learning process. **Missing three classes is subjected to be reported**
- Students are expected to attend every class, and to arrive on time. Missing class **more than three times** without a legitimate excuse will be officially acknowledged in an email to you and your advisor. Regardless of the reasons for your absences, the first three will be considered "excused," and every absence thereafter **will not be excused**. Moreover, I will also **subtract 3 points** from your course grade for **each absence** after the third one. If you must miss class for a legitimate reason, please notify me in advance, if possible.
- Students are **responsible for all materials presented in class**, examinations, and other announcements. No excuses of any nature will be construed as relieving you from the responsibility for completion of the work assigned.
- The lecture is the student's responsibility if class is missed; it is in the student's best interests to get the notes from a fellow student. The instructor does not have slides or lecture notes to hand out.
- **No late submissions** will be accepted, and no extensions will be granted except for a family or medical emergency. We will be using the online **Canvas** assignment submission system. You can continue to resubmit your files as many times as you would like up until the deadline, so please feel free to **upload early and often**. If you submit an assignment even one minute past the deadline, then the assignment will be marked as late.
- The assignments will be posted on **Canvas** in the "**Assignments**" section. Each assignment will include instructions, a due date, and a link for electronic submission.
- Any form of dishonesty or cheating is not tolerated. While all students are encouraged to openly discuss and ask questions, the **final work to be submitted must be the student's own**.
- There will be a series of written assignments from the textbook and other sources: *question-answering and/or short essay-writing.* Reading will be a part of the written assignments. Please note that in addition to these (**written**) assignments there will be (**Database**) projects. There is a deadline to each assignment, and a penalty will be imposed for late submissions.

- **Make-ups** are only allowed under **extraordinary circumstances**. Students must provide a satisfactory reason (as determined by the instructor) along with **proper documentation**.
- I strongly encourage study groups, but I require that each student hand in his/her answers in his/her own words - if two answers are highly similar to each other, neither will receive credit.
- All assignments must be submitted at **Canvas**.
- No **submission will be accepted after the final examination**.

E-mail Policy

E-mail is the **preferred communication** medium. **Use "CS 263"** as the start of the subject/title for all e-mail communications.

Grading Procedures:

Students' final grades will be determined using the following grading weights:

Class Participations	**20%**
Written Assignments	**20%**
Project	**30%**
Midterm Examination	**15%**
Final Examination	**15%**

Grading Criteria:

SCORE	GRADE	SCORE	GRADE
93-100	**A**	73-76	**C**
90-92	**A-**	70-72	**C-**
87-89	**B+**	67-69	**D+**
83-86	**B**	63-66	**D**
80-82	**B-**	60-62	**D-**
77-79	**C+**	0-59	**F**

Tentative Schedule (Subject to Change as Per Instructor's Discretion)

Week	Date	Day	Topic for Lecture
1	01/19	Wed.	**Module 1:**
	01/21	Fri.	Course mechanic & Logistics, Introduction to AI
2	01/26	Wed.	**Module 2: Knowledge Representation**
	01/28	Fri	What is Knowledge Representation? Different Types of Knowledge Cycle of Knowledge Representation What is the relation between Knowledge & Intelligence? Techniques of Knowledge Representation Representation Requirements Approaches to Knowledge Representation with Example
3	02/02	Wed.	**Module 3**: **Knowledge, reasoning, and planning**
	02/04	Fri.	Logical Agents First Order Logic Inference In First Order Logic Classical Planning Planning And Acting In The Real World
4	03/02	Wed.	

	03/04	Fri.	**Module 4: Knowledge, reasoning, and planning**
5	03/09	Wed.	**Module 5: Uncertain knowledge and reasoning** Quantifying Uncertainty Probabilistic Reasoning Probabilistic Reasoning Over Time Making Simple Decisions Making Complex Decision
	03/11	Fri.	
6	**March 12-18**		**Spring Recess No Classes**
7	03/23	Wed.	**Module 7: Natural language processing**
	03/25	Fri.	
	03/30	Wed.	
8	04/01	Fri.	**Module 8: Solving problem by searching** classical approaches to search search spaces, search trees, goal trees uninformed search strategies informed search strategies heuristic functions two-player games constraint satisfaction
	04/06	Wed.	
9	04/08	Fri.	**Module 9: Learning** Learning From Examples Knowledge In Learning Learning Probabilistic Models Reinforcement Learning
	04/13	Wed.	
10	04/15	Fri.	**Module 10: Learning**
	04/20	Wed.	
11	04/22	Fri.	**Module 11: Communicating, perceiving, and acting** Natural Language Processing Natural Language For Communication Perception Robotics
	04/27	Wed.	
13	04/29	Fri.	**Module 12: Communicating, perceiving, and acting**
14	05/04	Wed.	**Module 13:** Last Day of classes
Final Exam: Friday May 06 2:00PM- 4:00PM			

Important Notes:

- "Students must comply with the **Covid-19** Health and Safety Protocols for the 2021-2022 Academic Year. This includes wearing masks in class and on campus in public spaces, practicing physical distancing where possible, including in-class, engaging in a daily symptom check, notifying Counseling and Health Services

at 978-542-6413 if they have any symptoms associated with COVID-19, and not coming to campus or to an in-person class if they have any of the symptoms related to COVID-19 until cleared by the Student Life Wellness Area. Students who have documented disabilities that may prevent them from complying with these policies are required to contact the Disability Services office."

- All students are expected to be familiar with the academic regulations, including those regarding Academic Integrity, for Salem State University as published in the college catalog. In addition, each student is responsible for completing all course requirements and for keeping up with all that goes on in the course (whether or not the student is present).
- In the event of a university declared a critical emergency, Salem State University reserves the right to alter this course plan. Students should refer to Salem State for further information and updates. The course attendance policy stays in effect until there is a university declared a critical emergency. In the event of an emergency, please refer to the alternative educational plans for this course located IN **CANVAS**. Students should review the plans and gather all required materials before an emergency is declared.

- Salem State University is committed to providing equal access to the educational experience for all students in compliance with Section 504 of The Rehabilitation Act and The Americans with Disabilities Act and to providing all reasonable academic accommodations, aids, and adjustments. Any student who has a documented disability requiring accommodation, aid, or adjustment should speak with the instructor immediately. Students with Disabilities who have not previously done so should provide documentation to and schedule an appointment with the Office for Students with Disabilities and obtain appropriate services

- In the event of a university declared critical emergency, Salem State University reserves the right to alter this course plan. Students should refer to salemstate.edu for further information and updates. The course attendance policy stays in effect until there is a university declared a critical emergency. In the event of an emergency, please refer to the alternative educational plans for this course located at Canvas (https://elearning.salemstate.edu/). Students should review the plans and gather all required materials before an emergency is declared.

Note:

Please remember that if, for any reason, you decide to drop this course, you **MUST** do so officially through the **Registrar's office**. The last day to withdraw from a course this semester is **January 24.**

Syllabus Change Policy

The syllabus is a guide. Circumstances and events, such as student progress, may make it necessary for the instructor to modify the syllabus during the semester. Any changes made to the syllabus will be announced in advance