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| 1 | Faculty | Faculty of Science and Engineering (FSE) |
| 2 | Department | CSE |
| 3 | Programme | B.Sc. in CSE |
| **4** | **Name of Course** | Artificial Intelligence |
| **5** | **Course Code** | CSE 403 |
| **6** | **Trimester** | Spring, 2022 |
| **7** | **Pre-requisites** | None |
| **8** | **Status** | Technical Elective CSE Course |
| **9** | **Credit Hours** | 3 |
| **10** | **Section** | DV/191DC,191DC,191DA,191DB,191DD,192EA,PC-191+192D |
| **11** | **Class Hours** | |  |  |  |  | | --- | --- | --- | --- | | **Section** | **Class Day** | **Class Hours** | **Venue** | | DV/191DC,  191DC | Tuesday | 11:30-01:00 PM | Zoom(Online) | | Thursday | 11:30-01:00 PM | Zoom(Online) | | 191DA | Tuesday | 11:30AM-1:00PM | Online | | Thursday | 11:30AM-1:00PM | Online | | 191DB | Tuesday | 10:00AM-11:30AM | Online | | Thursday | 10:00AM-11:30AM | Online | | 191DD | Tuesday | 11:30AM-1:00PM | Zoom(Online) | | Thursday | 11:30AM-1:00PM | Zoom(Online) | | 192EA | Wednesday | 6:00PM-7:15PM | Online | | Wednesday | 7:15PM-8:30PM | Online | | PC-191+192D | Monday | 12:00-1:30PM | Zoom(Online) | | Wednesday | 12:00-1:30PM | Zoom(Online) | |
| **12** | **Class Location** | Online |
| **13** | **Course website** | <https://classroom.google.com/u/0/c/NDU0OTAwNDM2OTE0(191DA)>  <https://classroom.google.com/u/0/c/NDU0OTAwNDM2ODI3>(191DB)  <https://classroom.google.com/u/0/c/NDYzOTAyNTU4NDU2> (191DC)  <https://classroom.google.com/u/5/c/NDYzNjQ1NzAwNTg3> (191DD)  <https://classroom.google.com/u/0/c/NDU0OTAwOTMyMjgz>(192EA)  <https://classroom.google.com/c/NDY0MjM3Njc0Nzcw?cjc=mmw7bd3> (PC-191+192D) |
| **14** | **Instructor** | Prof. Dr. Md Zahidul Islam (191 DA,191DB,192EA)  Dr. Faiz Al Faisal(PC-191+192D)  Jargis Ahmed (DV/191DC,191DC)  Md. Atik Ahamed(191DD) **[Course Coordinator]** |
| **15** | **Contact** | [zahid@cse.green.edu.bd](mailto:zahid@cse.green.edu.bd) (191 DA,191DB,192EA)  [faisal@cse.green.edu.bd](mailto:faisal@cse.green.edu.bd)(PC-191+192D)  [jargis@cse.green.edu.bd](mailto:jargis@cse.green.edu.bd) (DV/191DC,191DC)  [atikahamed@cse.green.edu.bd](mailto:atikahamed@cse.green.edu.bd)(191DD) |
| **16** | **Office** | NA (due to online classes) |
| **17** | **Counselling Hours** | |  |  |  |  | | --- | --- | --- | --- | | **Section** | **Day** | **Counselling Hours** | **Venue** | | DV/191DC,  191DC | Tuesday | 01:30-03:00 PM | Online | | Thursday | 01:30-03:00 PM | Online | | 191DA | Tuesday | 11:30AM-1:00PM | Online | | Thursday | 11:30AM-1:00PM | Online | | 191DB | Tuesday | 10:00AM-11:30AM | Online | | Thursday | 10:00AM-11:30AM | Online | | 191DD | Saturday | 4:30PM-6:00PM | Online | | Monday | 4:30PM-6:00PM | Online | | 192EA | Wednesday | 6:00PM-7:15PM | Online | | Wednesday | 7:15PM-8:30PM | Online | | 191+192D | Monday | 2:00-3:30PM | Online | | Wednesday | 2:00-3:30PM | Online | |
| **18** | **Text Book** | 1.    Russell, S. J., &Norvig, P. (2002). Artificial intelligence: a modern approach (International Edition).  2.    Frankish, K., & Ramsey, W. M. (Eds.). (2014). The Cambridge handbook of artificial intelligence. Cambridge University Press. |
| **19** | **Reference** | Artificial Intelligence, Elain Rich and Kevin Knight |
| **20** | **Equipment & Aids** | Bring your own materials *(calculator,pen, paper, etc.)* to participate effectively in classroom activities. |
| **21** | **Course Rationale** | Artificial intelligence is an extremely broad field with applications to many disciplines and many subfields. This course gives a broad survey of artificial intelligence, as opposed to focusing on any particular subfield of AI. The course offered by the department of CSE, will cover methods from search, optimization, probabilistic reasoning, and learning, among other topics. Of course, these topics are closely related with each other. For example, the knowledge acquired through learning can be used both for problem solving and for reasoning. In fact, the skill for problem solving itself should be acquired through learning. Also, methods for problem solving are useful both for reasoning and planning. Further, both natural language understanding and computer vision can be solved using methods developed in the field of pattern recognition. |
| **22** | **Course Description** | Introduction to artificial intelligence, Foundation and history of artificial intelligence, Intelligent agents; Solving problem by searching; Adversarial searching; Logical agents; First-order logic; Knowledge representation; Probabilistic reasoning; Planning; Making decisions; Natural Language Processing; Perception; Robotics. |
| **23** | **Course Outcomes (CO)** | Upon successful completion of this course, students should be able to -  **CO1: Explain** the basic concepts of the Artificial Intelligence. [Cognitive]  **CO2: Analyse** real life problem of artificial intelligence to make AI based proper solution and techniques (uninformed, informed, heuristic, constraint satisfaction, genetic algorithms, machine learning). [Cognitive]  **CO3: Learn** the advanced and adaptive knowledge of artificial intelligence for evolving solution space accordingly. [Affective] |
| **24** | **Teaching Methods** | Maximum topics will be covered from the textbook. For the rest of the topics, reference books will be followed. Some class notes will be uploaded on the web. White board will be used for most of the time. For some cases, multimedia projector will be used for the convenience of the students. Students must participate in classroom discussions for case studies, problems solving and project developments. |
| **25** | **Topic Outline**  All topics and problems are from the main text if not specified otherwise. | |
|  | |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Lecture** | **Selected Topics** | **Article**  **(Text)** | **Suggested Problems. (Text)** | | |  | | | | | | (1) | Socialization and Introduction to the course | - | - | | |  | | | | | | (2) | What is Artificial Intelligence |  | 1.1-1.15 | | | The AI problems | 1.1 | | The Underlying Assumptions | 1.2 | | What is an AI Technique | 1.4 | |  |  |  |  | | | (3-4) | Intelligent Agents, Environments | 2.1 | 2.1-2.13 | | | The concept of rationally | 2.2 | | The nature of environments | 2.3 | | Structure of agents | 2.4 | |  | | | | | | (5-7) | Breadth First Search | 3.4 | 3.1-3.32 | | | Depth First Search | 3.4 | | Bi-directional Search | 3.4 | | Best First Search | 3.5 | |  |  |  |  |  | | (7-9) | Heuristic Functions and Their Effects on Searching Algorithms | 3.5-3.6 | 3.1-3.32 | | | Introduction to Genetic Algorithms | 4.1 | |  | | | | | | (11-12) | Knowledge Representation | 7.1-7.3 | 7.1-7.27 | | | Proposition logic | 7.4-7.7 | |  | | | | | | (13-14) | First order logic | 8.1-8.2 | 8.1-8.28 | | | Using First order Logic | 8.3-8.4 | |  | | | | | | (15-16) | Constraint Satisfaction Problems | 6.1 | 6.1-6.17 | | | Constraint Propagation | 6.2 | | Backtracking Search | 6.3 | | Local Search | 6.4 | |  | | | | | | (17-18) | Game Playing Overviews | 5.1 | 5.1-5.22 | | | The Minimax search procedure | 5.3 | | Adding Alpha-Beta Cut-offs | 5.3 | | Iterative Deepening | 3.4 | |  | | | | | | (19-20) | Planning Overview | 10.1-10.3 | 10.1-10.16 | | | An example domain-The blocks world | 10.1 | | Components of a planning system | 10.5-10.6 | |  | | | | | | (21-22) | Uncertainty- Probability Theory | 13.1-13.6 | 13.1-13.25  14.1-14.21 | | | Bayesian Networks | 14.1-14.6 | | Certainty Factors Methods | 15.1 | | Basics of Fuzzy Logic | 14.7 | | Non-monotonic reasoning systems | 12.6-12.7 |  | | |  | | | | | | (23-24) | Natural Language Processing Introduction | 22.1-22.4 | 23.1-23.19 | | | Syntactic Processing | 23.1-23.2 | | Semantic Analysis | 23.3 | | Discourse & Pragmatic Processing | 23.4-23.5 | |  | | | | | | |
| **26** | **Assessment and Marks Distribution:** | Students will be assessed on the basis of their overall performance in all the exams, quizzes, and class participation. Final numeric reward will be the compilation of (tentative):   * Class Tests (15%) * Assignment (5%) * Presentation (5%) * Class Attendance (5%) * Mid-Term Test (30%) * Final Exam (40%) |
| **27** | **Assessment Methods of COs** | Assessment methods of COs are given below:   |  |  |  |  | | --- | --- | --- | --- | | COs | **CO1** | **CO2** | **CO3** | | **CT1, CT2, CT3** | 15% |  |  | | **MT** | 20% | 10% |  | | **FE** | 20% | 20% |  | | **Presentation, Attendance and Assignment** |  |  | 15% | | **Total** | 55% | 30% | 15% | |
| **28** | **Mapping of COs with POs** | Mapping of COs with program outcomes (POs) are given below:   |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **Program Outcomes (POs)** | | | | | | | | | | | | | | **COs** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | | **CO1** | **√** |  |  |  |  |  |  |  |  |  |  |  | | **CO2** |  | **√** |  |  |  |  |  |  |  |  |  |  | | **CO3** |  |  |  |  |  |  |  |  |  |  |  | **√** | |
| **29** | **Grading Policy** | The following chart will be followed for grading. This has been customized from the guideline provided by the School of Engineering and Computer Science.   |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **A+** | **A** | **A-** | **B+** | **B** | **B-** | **C+** | **C** | **D** | **F** | | **80 and above** | **75-<80** | **70-<75** | **65-<70** | **60-<65** | **55-<60** | **50-<55** | **45-<50** | **40-<45** | **<40** | |
| **30** | **Additional Course Policies** | |  |  | | --- | --- | | Assignments | There will be four assignments. Average marks of the assignments will be counted. No late homework will be accepted.  Two or more copied assignments will carry zero mark in all assignments. Solutions to assignment problems will be provided through web and on hand. | | Class Test | There will be at least three CTs, best of two will be counted. A CT can be taken with an announcement in prior or without any announcement. | | Exams | Mid-term and final exam will be closed book, closed notes. Mobile is strictly prohibited in exam hall. Please bring your own watch and synchronize time during exam hours. | | Test Policy: | If you are absent from a test, and you have not spoken to the teacher personally beforehand, your grade for the test will be zero. No make-up for class test will be taken because it has alternative(three out of four).No make-up for mid will be entertained without presence and recommendation of guardian and written permission of the department. Make-up test of mid will be much harder than the regular test. | |
| **31** | **Additional Information** | 1. Academic Calendar Fall 2022: http://www.green.edu.bd/academics/academic-calendar. 2. Academic Information and Policies: http://www.green.edu.bd/academics/academic-rules-a-regulations. 3. Grading and Performance Evaluation: http://www.green.edu.bd/academics/academic-rules-a-regulations. 4. Proctorial Rules: http://www.green.edu.bd/administrator/proctors-office. |