UNIVERSITY OF SARGODHA

DEPARTMENT OF

COURSE OUTLINE Spring 2020

**Course Title**: Artificial Intelligence

**Course Code**: CS-3811

**Credit Hours**:3

**Prerequisites**: CMP-2111(Discrete Structures)

Instructor: Nisar Ahmad

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 COURSE SCHEDULE

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| Week  | Topics and Readings  |
| 1. | Introduction: What is AI, Foundations of AI, History of AI. Intelligent Agents: Agents and Environments, The Nature of Environments, The Structure of Agents [TB: Ch. 1, 2] |
| 2. | Problem Solving by Searching: Problem Solving Agents, Searching for Solutions, Uninformed Search Strategies. |
| 3. | Breadth-First Search, Depth-First Search, Depth-limited Search, Iterative Deepening, Depth-first Search, Comparison of Uninformed Search Strategies. [TB: Ch. 3 |
| 4. | Informed Search and Exploration: Informed (Heuristic) Search Strategies: Greedy Bestfirst Search, A\* Search, Heuristic Functions, Local Search Algorithms and OptimizationProblems. [TB: Ch. 4] |
| 5. | Constraint Satisfaction Problems: Backtracking Search for CSPs, Local Search for CSPs. Adversarial Search: Games, Minimax Algorithm, Alpha-Beta Pruning. [TB: Ch.5, 6]  |
| 6. | Reasoning and Knowledge Representation: Introductions to Reasoning and Knowledge Representation, Propositional Logic, First Order Logic: Syntax and Semantics of FirstOrder Logic, Knowledge Engineering in First-Order Logic, [TB: Ch. 7, 8] |
| 7. | Inference in First-Order Logic: Inference rules for quantifiers, A first-order inference rule, Unification, Forward Chaining, Backward Chaining, A backward chainingalgorithm, Logic programming, The resolution inference rule [TB: Ch. 9] |
| 8. | Introduction to Prolog Programming |
| 9. | Reasoning Systems for Categories, Semantic Nets and Description logics, Reasoning with Default Information: Open and closed worlds, Negation as failure and stable modelsemantic. Truth Maintenance Systems [TB: Ch. 10] |
| 10. | Reasoning with Uncertainty & Probabilistic Reasoning : Acting Under Uncertainty, Bayes' Rule and Its Use, [TB: Ch 13] |
| 11. | Representing Knowledge in an Uncertain Domain, The Semantics of Bayesian Networks. [TB: Ch. 14] |
| 12. | Learning from Observations: Forms of Learning , Inductive Learning,, Learning Decision Trees [TB: Ch. 18] |
| 13. | . Knowledge in Learning, Explanation-Based Learning, Inductive Logic Programming.[TB: 19] |
| 14. | Statistical Learning, Neural Networks [TB: Ch. 20] |
| 15. |  |
| 16. |  |

**Reference Material:**

Artificial Intelligence: A Systems Approach by M. Tim Jones, Jones and Bartlett
Publishers, Inc; 1stEdition (December 26, 2008). ISBN-10: 0763773379
• Artificial Intelligence in the 21st Century by Stephen Lucci , Danny Kopec, Mercury
Learning and Information (May 18, 2012). ISBN-10: 1936420236

Labs

Lab work should be carried out to develop students‘Computer Skills, Operating Systems and Utility Software Skills, E-Mail Skills, Word Processing Skills, Spreadsheet Skills, Electronic Presentation Skills, Web Surfing Skills.

ASSESSMENT CRITERIA

Sessional: 20 [QUIZES +ASSIGNMENTS]

Mid term: 30

Final exam:50

RULES AND REGULATIONS

* **Class Attendance and Absenteeism**

Students are required to attend all classes and lab meetings. Regular attendance in their class/laboratory sessions will be very helpful to maintain a satisfactory progress throughout their course. Attendance will be strictly enforced and evaluated according to the Student Attendance Control Criteria announced by the DOCSIT and UoS. Any student who exceeds the maximum allowable absence limit during the course will not be allowed to sit in the exams. The maximum allowed limit for this course is 25% which include both excused and unexcused absences.

* **Policy on Late Lab. / Project Report and Written Work =============**

Assignments are due at the beginning of the class on the date indicated in the course schedule or on the assignment.  If the due date is extended, you will be informed of this through notice board. Assignments will not be accepted after the classroom discussion occurs. Such discussion would provide an unfair advantage to those who are preparing/submitting the assignment after the fact. At the instructor's option, late assignments may be evaluated to provide feedback, but WILL NOT BE GRADED. Late assignments will receive a grade of zero.

* **Academic Integrity**

Cheating in any form will not be tolerated and could lead to severe consequences. Academic work submitted by the students in the form of homework, assignment, or a project must be the result of their own effort.

* **Make-Up Exam Policy**

A student who has missed an exam will be allowed to sit in a make-up exam only if he or she provides a medical report from a government hospital/clinic.

* **General Behavior**

Students must maintain a good behavior both in and outside their classes. They are required to keep their mobile phones switched off while attending their class/laboratory sessions or writing their exams. Any student who engages in a behavior that disrupts the learning environment may face disciplinary action under the UoS code. Students must also maintain a smoke free environment in all college facilities.