University of Asia Pacific (UAP)
Department of Computer Science and Engineering (CSE)

Course Outline CSE 404

Program:	Computer Science and Engineering (CSE)
Course Title:	Artificial Intelligence and Expert Systems Lab
Course Code:	**CSE 404**
Semester:	**Fall-2020**
Level:	4th Year 1st Semester
Credit Hour:	1.5
Name & Designation of Teacher:	Dr. Nasima Begum (DNB), Assistant Professor Nadeem Ahmed (NAH), Assistant Professor
Office/Room:	7th Floor
Class Hours:	Sunday: 3:30 pm – 6:20 pm (Sec: A2) Tuesday: 3:30 pm – 6:20 pm (Sec: A1) Thursday: 3:30 pm – 6:20 pm (Sec: B1) Wednesday: 9:30 am – 12:20 pm (Sec: B2)
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Rationale: Artificial Intelligence and expert Systems Lab course is required for the student to be able to design and develop intelligent agents to solve real life problems. This is a required course in the CSE program.

Pre-requisite (if any)**:** None

Course Synopsis: This is an introductory course on artificial intelligence (AI) and deals mostly with the idea of **intelligent agents**. Its goal is to provide an overview of this field. Students will learn how to design intelligent agents with specific goals. We will cover topics including: knowledge, logic, agents, search, game playing, uncertainty, learning and artificial neural network (ANN).

Course Objectives: The objectives of this course are to:

1. Teach basic AI programming tools and how to apply them in solving problems.
2. Introduce the concept of different types of search strategy for problem solving.
3. Emphasize the design and implementation multi-agent problem to simulate the real world scenario.

Course Outcomes (CO) and their mapping with Program outcomes (PO) and Teaching-Learning Assessment methods:

CO No.	CO Statements: Upon successful completion of the course, students should be able to:	Corresponding POs (Appendix-1)	Bloom's taxonomy domain/level (Appendix-2)	Delivery methods and activities	Assessment Tools
CO1	**Solve** different problems (complex relationship structure with logical reasoning, forward backward chaining).	3	2/Manipulation	Live Lecture, Multimedia, Problem Solving	Lab Exam, Assignment, Report,
CO2	**Solve** different problems using heuristics and adversarial search algorithms.	3	2/Manipulation	Live Lecture, Multimedia, Problem Solving	Assignment, Report, Oral Exam
CO3	**Implement** different ML models to solve various real life problems.	4, 9, 10	2/Articulation	Live Lecture, Multimedia, Problem Solving,	Project, Report Presentation, Oral Exam
CO4	**Implement** different DL models to solve various real life problems.	4, 9, 10	2/Articulation	Live Lecture, Multimedia, Problem Solving,	Project, Report Presentation, Oral Exam

Weighting COs with Assessment Methods:

Assessment Type	% Weight	CO1	CO2	CO3	CO4
Assignmengt-1 followed by Viva and Report	20%		20		
Project followed by Presentation Viva and Report	30%				30
Project followed by Presentation, Viva and Report	30%			30	
Lab Exam	20%	20			
Total	100%	20	20	30	30

Course Content Outline and mapping with COs

Weeks	Topics / Content	Course Outcome	Delivery methods and activities	Reading Materials
1	Goal of AI Lab, Introduction to Prolog programming software	N/A	Lecture, multimedia, Required software installation	Handouts, Slides, Web contents
2	Solve different problems using Prolog programming	CO1	Lecture, multimedia, lab task	Handouts, Slides, Web contents
3	Prolog data object, list, operators and functions	CO1	Lecture, multimedia, Problem solving	Handouts, Slides, Web contents
4	Lab Exam	CO1	-	-
5-6	Overview of different searching strategies	CO2	Lecture, Multimedia	Slides, AIMA
7-8	First Assignment submission with viva and report (Problem, puzzle solving with search algorithm)	CO2	Demonstration, Presentation	Project, Presentation Slides, Report
8-9	Second Assignment submission with viva viva and report (Problem, puzzle solving with search algorithm)	CO2	Demonstration, Presentation	Project, presentation slides
10	Overview of different ML models	CO3	Lecture, multimedia, problem solving	Slides, AIMA
11	Overview of different ML models	CO3	Lecture, multimedia, problem solving	Slides, AIMA
12	Project submission on ML with viva and report	CO3	Demonstration, Presentation	Project, Presentation Slides, Report
13	Overview of different DL models	CO4	Lecture, multimedia, problem solving	Slides, AIMA
14	Project submission on DL with viva and report	CO4	Demonstration, Presentation	Project, Presentation Slides, Report

Minimum attendance: 70% class attendance is mandatory for a student in order to appear at the final examination.

Textbook: Artificial Intelligence: A Modern Approach By Stuart J. Russell and Peter Norvig (AIMA)

Required References:

Recommended References:

1. Clocksin, W.F. and Mellish, C.S., Programming in Prolog: Using the ISO Standard (5th edition), 2003.
2. Bratko, I., Prolog Programming for Artificial Intelligence (3rd edition), 2001.
3. Terling, L. and Shapiro, E., The Art of Prolog (Second edition), 1994.

Grading System: As per the approved grading scale of University of Asia Pacific (Appendix-3).

Special Instructions: Late attendance: Students who will enter the class after the attendance call will be marked as absent. **Assignment**: **Unfinished** work should be submitted as assignment. **Additional** assignments may be given as needed. Copied homework will be graded as zero. Late submission will result in a 50% deduction in score. **Student's responsibilities:** Students must come to the class prepared for the course material covered in the previous class (es). Students must submit their assignments on time.

Prepared by (Course Teacher)	**Checked by** (Chairman, PSAC committee)	**Approved by** (Head of the Department)
Dr. Nasima Begum Nadeem Ahmed		

Appendix-1:

Washington Accord Program Outcomes (PO) for engineering programs:

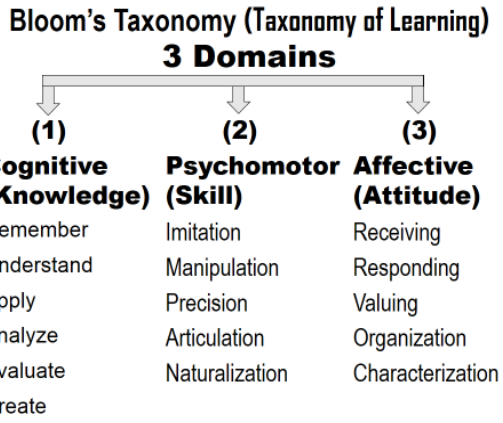
No.	PO	Differentiating Characteristic
1	Engineering Knowledge	Breadth and depth of education and type of knowledge, both theoretical and practical
2	Problem Analysis	Complexity of analysis
3	Design/ development of solutions	Breadth and uniqueness of engineering problems i.e. the extent to which problems are original and to which solutions have previously been identified or codified
4	Investigation	Breadth and depth of investigation and experimentation
5	Modern Tool Usage	Level of understanding of the appropriateness of the tool
6	The Engineer and Society	Level of knowledge and responsibility
7	Environment and Sustainability	Type of solutions.
8	Ethics	Understanding and level of practice
9	Individual and Team work	Role in and diversity of team
10	Communication	Level of communication according to type of activities performed
11	Project Management and Finance	Level of management required for differing types of activity

12	Lifelong learning	Preparation for and depth of Continuing learning.

Generic Skills (Detailed):

1. **Engineering Knowledge (T)** -Apply knowledge of mathematics, sciences, engineering fundamentals and manufacturing engineering to the solution of complex engineering problems;
2. **Problem Analysis (T)** – Identify, formulate, research relevant literature and analyze complex engineering problems, and reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences;
3. **Design/Development of Solutions (A)** –Design solutions, exhibiting innovativeness, for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, economical, ethical, environmental and sustainability issues.
4. **Investigation (D)** Conduct investigation into complex problems, displaying creativeness, using research-based knowledge, and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions;
5. **Modern Tool Usage (A & D)** -Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering activities, with an understanding of the limitations;
6. **The Engineer and Society (ESSE)** -Apply reasoning based on contextual knowledge to assess societal, health, safety, legal, cultural, contemporary issues, and the consequent responsibilities relevant to professional engineering practices.
7. **Environment and Sustainability (ESSE)** -Understand the impact of professional engineering solutions in societal, global, and environmental contexts and demonstrate knowledge of and need for sustainable development;
8. **Ethics (ESSE)** –Apply professional ethics with Islamic values and commit to responsibilities and norms of professional engineering code of practices.
9. **Communication (S)** -Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions;
10. **Individual and Team Work (S)** -Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.
11. **Life Long Learning (S)** -Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
12. **Project Management and Finance (S)** -Demonstrate knowledge and understanding of engineering management and financial principles and apply these to one's own work, as a member and/or leader in a team, to manage projects in multidisciplinary settings, and identify opportunities of entrepreneurship.

Appendix-2



Descriptions of Psychomotor Domain (Dave's Taxonomy 1975):

The **psychomotor domain** includes physical movement, coordination, and use of the motor-skill areas.

Level	Category	Meaning	Keywords
P1	Imitation	Copy action of another; observe and replicate.	Relate, Repeat, Choose, Copy, Follow, Show, Identify.
P2	Manipulation	Reproduce activity from instruction or memory	Copy, response, trace, Show, Start, Perform, Execute, Recreate.
P3	Precision	Execute skills reliably, independent of help.	Assemble, Implement, Organize, Calibrate, Demonstrate, Build, Perfect, Control, Complete, Measure.
P4	Articulation	Adapt and integrate expertise to satisfy a non-standard objective.	Modify, Master, Develop, Adapt, Formulate, Coordinate, Combine, Solve, Integrate.
P5	Naturalization	Automated, unconscious mastery of activity and related skills at strategic level.	Design, Rank, Manage, Compose, Develop, Specify, Construct, Invent.

Appendix-3

UAP Grading Policy:

Numeric Grade	Letter Grade	Grade Point
80% and above	A+	4.00
75% to less than 80%	A	3.75
70% to less than 75%	A-	3.50
65% to less than 70%	B+	3.25
60% to less than 65%	B	3.00
55% to less than 60%	B-	2.75
50% to less than 55%	C+	2.50
45% to less than 50%	C	2.25
40% to less than 45%	D	2.00
Less than 40%	F	0.00