COURSE OUTLINE

Department/ Faculty:	Software Engineering /Computing	**Page:**	1 of 5
Course code:	SECJ 3553	**Academic Session/Semester:**	20242025/1
Course name:	Artificial Intelligence	**Pre/co requisite (course name and code, if applicable):**	Data Structure
Credit hours:	3		

Course synopsis	This course offers students a new perspective on the study of Artificial Intelligence (AI) concepts. The essential topics and theory of AI are presented, but it also includes practical information on data input and reduction as well as data output (i.e. algorithm usage). In particular, this course emphasizes on theoretical and practical aspects of various search algorithms, knowledge representations, and machine learning methods. The course features practical implementations through assignments undertaken both individually and in groups.			
Course coordinator	Dr Shafaatunnur Hasan (shafaatunnur@utm.my) 05 (37/40),08(36/40)			
Course lecturer(s)	**Name**	**Section**	**Hp No**	**E-mail (@utm.my)**
	Dr. Sarina Sulaiman	01 (38/40)		
	P.M.Dr. Mohd Adham	02 (25/30)		
	Dr. NurEiliyah	03 (34/40)		
	Dr. Aida	04 (33/35)		
	P.M. Dr. Rohayanti Hassan	06 (35/35)		
	P.M. Dr. Siti Zaiton	07 (32/35)		
	Dr. Ruhaidah	09 (34/35) 12 (32/35)		
	Dr. Sim Hiew Moi	10 (35/35) 11 (30/35)		
	Dr. Fazliaty Edora	ALL		
Total Student	350 (14 Section)			

Mapping of the Course Learning Outcomes (CLO) to the Programme Learning Outcomes (PLO), Teaching & Learning (T&L) methods and Assessment methods:

No.	CLO	PLO (ICGPA CODE)	Weight (%)	*Taxonomies and **generic skills	T&L methods	***Assessment methods

Prepared by: Name: Dr. Shafaatunnur Hasan Signature: Date: 26 September 2024	**Certified by:** Name: Assoc. Prof. Dr. Radziah Mohamad Signature: Date:

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CLO1	Apply the fundamental and concept of AI using various types of AI solutions including search algorithms, knowledge representation and machine learning methods.	PLO1 (KW)	30	C3	Lecture, active learning, Inquiry-based teaching	Quiz 1 (5%), Quiz 2 (5%), M (10%), F (10%)
CLO2	Formulate the appropriate AI solutions using selected methods based on the problem given.	PLO3(PS)	60	C5	Group Discussion (GD) Think-Pair-Share (TPS), Project - case study	A1 (5%), A2 (5%), A3 (5%), M (5%), F (30%), P (10%)
CLO3	Apply the appropriate solutions in AI to solve real problems in the project.	PLO8 (AD)	10	AD3	Self & Peers reflection using MyPeer app/Google Form	PGS (10%)
*Taxonomies of Learning **UTM's Graduate Attributes, where applicable for measurement of outcomes achievement ***M – Mid-term Test; A1-A3 – Assignment; P –Project; R –Report; F – Final Exam, P –Project Generic Skills						

Details on Innovative T&L practices:

No.	Type	Implementation
1.	Active learning	Conducted through in-class activities
2.	Assignment and Project	Conducted based on given real world problem. The students must manage their projects by submitting specified deliverables based on the given problem. The same project is given for assignments and project. For assignments and project will be done in team.
3.	Peer Review TW	One peer review assessment at the end of the semester for the team members to assess their teammates for their adaptability quality.

Weekly Schedule:

Week 1 (6-10 Oct)	**1. Computer and Intelligence** Introduction to thinking, computer architecture, and intelligence, What is artificial intelligence (AI), AI timeline and current trend, Responsible AI, Key Workload AI, Artificial Intelligence in Microsoft Azure, Computational Intelligence, AI Applications, AI Applications and IR 4.0.
Week 2-3 (13 - 24 Oct)	**2. Knowledge Representation** What is knowledge representation, Importance of representing knowledge, Syntax and semantics, Propositional logic, Predicate logic, Inference process, Proof procedure. **Project & Assignment Briefing**

Week 4 (27 Oct - 31 Nov) Deepavali,30Oct	**3. Search Algorithms** Simplified Graph Theory (Structure for Problem Solving), Exhaustive search algorithms, Breadth-first search, Depth-first search
Week 5 (3-7 Nov)	**3. Search Algorithms (BFS & DFS)** Simplified Graph Theory (Structure for Problem Solving), Exhaustive search algorithms, Breadth-first search, Depth-first search **Quiz 1** **A1 Submission**
Week 6-7 (10 Nov -21 Nov)	**3. Search Algorithms (Heuristic Algorithm)** Heuristic search algorithm, Heuristic evaluation and best first search (including A* search), Evaluation criteria (admissibility, monotonicity, and informedness). **Mid Term Test (18 Nov 2024, Mon, 8pm - 10pm)DK,N24** **A2 Kick-off**
Week 8 (24-30 Nov)	**MID SEMESTER BREAK**
Week 9 (1-5 Dec)	**4. Problem Solving with Search (Minimax and Alpha-Beta Pruning)** Game playing (minimax and alpha-beta), Search engine, social media and bots. **A2 Submission, A3 Kick-off, Peer Review Part 1**
Week 10 (8-12 Dec)	**5. Search Planning and Control** Recursion based search, Pattern based search
Week 11-12 (15 Dec - 26 Dec) 25 Dec (wed) (Christmas)	**6. Advanced Artificial Intelligence** Agent and distributed-based search, Smart computing applications, Natural Language Processing Application, Computer Vision **Quiz 2** **A3 Submission, Project Kick-off**
Week 13-14 (29 Dec - 2 Jan)	**7. Machine Learning** Overview of machine learning, Supervised vs unsupervised learning, Classification, clustering, reinforcement, and regression.
Week 15 (5 - 9 Jan)	**Project Demo, Peer Review Part 2**
Week 16 - 18	**REVISION WEEK AND FINAL EXAM**

Transferable skills (generic skills learned in course of study which can be useful and utilised in other settings):

Adaptability AI Prototype development

Student learning time (SLT) details:

Distribution of student Learning Time (SLT) Course content		Teaching and Learning Activities	TOTAL SLT

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outline	Guided Learning (Face to Face)				Guided Learning Non-Face to Face	Independent Learning Non-Face to face	
CLO	**L**	**T**	**P**	**O**			
CLO 1	15h					3h	**18h**
CLO 2	29h		4h			60h	**93h**
CLO 3	1h		4h			4h	**9h**
Total SLT	**45h**		**8h**			**67h**	**120h**

Continuous Assessment		PLO	Percentage	Total SLT
1	Quiz	KW	10	**1h**
2	Assignment	PS	15	**36h**
3	Mid-term Test	KW	15	**2h**
4	Project	PS	10	23h
5	Project Generic Skill	AD	10	10h
Final Assessment			Percentage	Total SLT
1	Final Examination	KW	40	**3h**
Grand Total SLT				**120h**

Special requirement to deliver the course (e.g: software, nursery, computer lab, simulation room):

Software / Programming Language: Python (optional)
Hardware: Arduino (optional)

Learning resources:

Text book (if applicable)

Russel, S.J & Norvig, P., Artificial Intelligence: A Modern Approach, Pearson Education, 2016.

Luger, G.F & Stubblefield, W.A, Artificial Intelligence: Structures and Strategies for Complex Problem Solving, 6th Edition, Addison-Wesley, 2009.

Online

MOOC / E-learning: http://elearning.utm.my

Academic honesty and plagiarism:

Assignments are individual tasks and NOT group activities (UNLESS EXPLICITLY INDICATED AS GROUP ACTIVITIES) Copying of work (texts, lab results etc.) from other students/groups or from other sources is not allowed. Brief quotations are allowed and then only if indicated as such. Existing texts should be reformulated with your own words used to explain what you have read. It is not acceptable to retype existing texts and just acknowledge the source as a reference. Be warned: students who submit copied work will obtain a mark of **zero** for the assignment and exams and disciplinary steps may be taken by the Faculty. It is also unacceptable to do somebody else's work, to lend your work to them or to make your work available to them to copy.

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Other additional information (Course policy, any specific instruction etc.):

No.	Assessment	Total (%)	PL01	PLO3	PLO8	Total (%)
			CLO1	CLO2	CLO3	
1	Quiz 1	5.0	5			5.0
2	Quiz 2	5.0	5			5.0
3	Assignment 1	5.0		5		5.0
4	Assignment 2	5.0		5		5.0
5	Assignment 3	5.0		5		5.0
6	Mid-Term Test	15.0	10	5		15.0
7	Final Exam	40.0	10	30		40.0
8	Project Generic Skills	10.0			10	10.0
9	Project	10.0		10		10.0
Overall Total (%)		100.0	30.0	60.0	10.0	100.0

Disclaimer: