

## COURSE OUTLINE

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<b>Course code:</b>	SCSJ 3553	<b>Academic Session/Semester:</b>	20202021/1
<b>Course name:</b>	Artificial Intelligence	<b>Pre/co requisite (course name and code, if applicable):</b>	Data Structure
<b>Credit hours:</b>	3		

<b>Course synopsis</b>	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.			
<b>Course coordinator</b>	Dr Aida Ali			
<b>Course lecturer(s)</b>	<b>Name</b>	<b>Office</b>	<b>Tel (07-55)</b>	<b>E-mail (@utm.my)</b>
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**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
CLO1	Explain the basic definition and concept of AI.	PLO1 (KW)	40	C3	Lecture, Active learning,	Q, M, F
CLO2	Identify the types of AI techniques and understand the role of search algorithms, knowledge representation, and machine learning methods	PLO3(PS)	30	C3, A2	Lecture, Active learning	A, M, F
CLO3	Formulate appropriate solutions for problems and design intelligent computer-based systems	PLO3 (PS)	20	C4, A3	Lecture, Active learning	A, P, R, F
CLO4	Develop team-working skills for implementing AI techniques in real-world problems.	PLO8 (AD)	10	C6, A5 AD3	Project	P, R

\*Taxonomies of Learning \*\*UTM's Graduate Attributes, where applicable for measurement of outcomes achievement

\*\*\*M – Mid-term Test; Q – Quiz; A – Assignment; P –Project; R –Report; F – Final Exam

**Details on Innovative T&L practices:**

<b>Prepared by:</b> Name: Dr. Afnizanfaizal Abdullah Signature:  Date: 23 August 2017	<b>Certified by:</b> Name: Assoc. Prof. Dr. Siti Zaiton Mohd Hashim Signature:  Date:
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No.	Type	Implementation
1.	Lecture	Conducting face-to-face learning session
2.	Active learning	Conducting in-class activities
3.	Project	Analysing real-world case studies, elucidating problem, and proposing solutions

#### Weekly Schedule:

Week 1 (18-22 Oct)	<b>Computer and Intelligence</b> <ul style="list-style-type: none"> <li>- Introduction to thinking, computer architecture, and intelligence.</li> <li>- What is artificial intelligence (AI)? Strong AI vs Weak AI</li> <li>- AI timeline and current trend</li> </ul>
Week 2-3 (25 - 5 Nov) Quiz1	<b>Knowledge Representation</b> <ul style="list-style-type: none"> <li>- What is knowledge representation? (frame-based, semantic graph etc)</li> <li>- Importance of representing knowledge</li> <li>- Syntax and semantics</li> <li>- Propositional logic</li> <li>- Predicate logic</li> <li>- Inference process</li> <li>- Proof procedure</li> </ul>
Week 4 (8 – 12Nov) Asg1 Project	<b>Structure for Problem Solving</b> <ul style="list-style-type: none"> <li>- Graph theory</li> <li>- Structures for state space</li> <li>- Search strategies: data- and goal-driven</li> <li>- Implementation and evaluation</li> </ul>
Week 5 (15-19 Nov) Quiz2	<b>Search Algorithms</b> <ul style="list-style-type: none"> <li>- Exhaustive search algorithms</li> <li>- Breadth-first search</li> <li>- Depth-first search</li> </ul>
Week 6-7 (22 Nov -3 Dec) Test1 18Oct	<b>Search Algorithms (Continued)</b> <ul style="list-style-type: none"> <li>- Heuristic search algorithm</li> <li>- Heuristic evaluation and best first search (including A* search)</li> <li>- Evaluation criteria (admissibility, monotonicity, and informedness)</li> </ul>
Week 8 (6-10 Dec)	<b>MID SEMESTER BREAK</b>
Week 9 (13-17 Dec) Asg2	<b>Problem Solving with Search</b> <ul style="list-style-type: none"> <li>- Game playing (minimax and alpha-beta)</li> <li>- Search engine, social media and bots</li> </ul>
Week 10 (20-24 Dec)	<b>Search Planning and Control</b> <ul style="list-style-type: none"> <li>- Recursion based search</li> <li>- Pattern based search</li> <li>- Implementation in image processing and pattern recognition</li> </ul>
Week 11-12 (27 Dec - 7 Jan)	<b>Advanced Artificial Intelligence</b> <ul style="list-style-type: none"> <li>- Agent and distributed-based search</li> <li>- Smart computing applications</li> </ul>
Week 13-14 (10-21 Jan) Asg3	<b>Machine Learning</b> <ul style="list-style-type: none"> <li>- Overview of machine learning</li> <li>- Supervised vs unsupervised learning</li> <li>- Classification, clustering, and reinforcement</li> <li>- Data Analytics</li> </ul>
Week 15 (24-28 Jan)	<b>Project Demo / Competition</b>

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<b>Week 16 - 18</b>	<b>REVISION WEEK AND FINAL EXAM</b>
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**Transferable skills (generic skills learned in course of study which can be useful and utilised in other settings):**

Team working  
Writing technical report

**Student learning time (SLT) details:**

Distribution of student Learning Time (SLT) Course content outline					Teaching and Learning Activities		TOTAL SLT
	Guided Learning (Face to Face)				Guided Learning Non-Face to Face	Independent Learning Non-Face to face	
<b>CLO</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>O</b>			
CLO 1	20h					18h	<b>38h</b>
CLO 2	5h		5h			16h	<b>26h</b>
CLO 3	5h		5h			10h	<b>20h</b>
CLO 4			2h			4h	<b>6h</b>
<b>Total SLT</b>	<b>30h</b>		<b>12h</b>			<b>48h</b>	<b>90h</b>

Continuous Assessment		PLO	Percentage	Total SLT
1	Quiz	KW	10	<b>1h</b>
2	Assignment	PS	15	<b>4h</b>
3	Mid-term Test	KW	15	<b>2h</b>
4	Project	AD	15	10h
5	Project teamwork	AD	5	10h
Final Assessment			Percentage	Total SLT
1	Final Examination	KW	40	<b>3h</b>
<b>Grand Total SLT</b>				<b>120h</b>

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

Software / Programming Language: Python, Prolog  
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)

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

1. Attendance is compulsory and will be taken in every lecture session. Student with less than 80% of total attendance is not allowed to sit for final exam.
2. Students are required to behave and follow the University's dressing regulation and etiquette all the time.
3. Exercises and tutorial will be given in class and some may be taken for assessment. Students who do not do the exercise will lose the coursework marks for the exercise.
4. Assignments must be submitted on the due dates. Some points will be deducted for late submissions. Assignments submitted three days after the due date will not be accepted.
5. Make up exam will not be given, except to students who are sick and submit medical certificate which is confirmed by UTM panel doctors. Make up exam can only be given within one week of the initial date of exam.

No.	Assessment	Total (%)	PL01	PLO3		PLO8	Total (%)
			CLO1	CLO2	CLO3	CLO4	
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			4	1	5.0
5	Assignment 3	5.0			4	1	5.0
6	Mid-Term Test	15.0	5	10			15.0
7	Final Exam	40.0	10	15	15		40.0
8	Project Teamwork	5.0				5	5.0
9	Project	15.0			15		10.0
Overall Total (%)		100.0	25.0	30.0	38.0	7.0	100.0
			25.0	68.0		7.0	

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