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# SUMMARY OF INFORMATION ON EACH COURSE

| | | | |
|---|---|---|---|
| 1. | Name of Course | Artificial Intelligence Fundamentals | |
| 2. | Course Code | TAI2151 | |
| 3. | Status of Course<br>[Applies to (cohort) ] | Specialisation Core for B.IT (Hons) Artificial Intelligence | |
| 4. | MQF Level/Stage<br>Note :<br>*Certificate – MQF Level 3*<br>*Diploma – MQF Level 4*<br>*Bachelor – MQF Level 6*<br>*Masters – MQF Level 7*<br>*Doctoral – MQF Level 8* | Bachelor – MQF Level 6 | |
| 5. | Version<br>(State the date of the Senate approval – history of previous and current approval date) | Date of previous version : None<br>Date of current version : June 2014 | |
| 6. | Pre-Requisite | TCP1121 Computer Programming | |
| 7. | Name(s) of academic/teaching staff | Cheah Wooi Ping<br>Tan Shing Chiang | |
| 8. | Semester and Year offered | Trimester 1, Year 2 | |
| 9. | Objective of the course in the programme :<br>This subject exposes students to the fundamental principles and methods used in developing artificial intelligence programs for state-space search, knowledge representation and reasoning, and machine learning. | | |
| 10. | Justification for including the course in the programme :<br>This subject provides fundamental knowledge and skills required by other advanced level topics in artificial intelligence. | | |
| 11. | Course Learning Outcomes : | Domain | Level |
| | LO1<br>Explain the basic concept of intelligent behaviour through the framework of intelligent agents. | Cognitive | 2 |
| | LO2<br>Demonstrate basic techniques of artificial intelligence in state-space search. | Cognitive | 3 |
| | LO3<br>Apply LISP and PROLOG languages to solve practical artificial intelligence related problems. | Cognitive | 3 |

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| | LO4<br>Analyse and compare different techniques in state-space search, knowledge representation and reasoning, and machine learning. | Cognitive | 4 |

12. Mapping of Learning Outcomes to Programme Outcomes :

| Learning Outcomes | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|---|---|---|---|---|---|---|---|---|---|
| LO1 | | | | | | | X | | |
| LO2 | | | | | | | X | | |
| LO3 | | | | | | | | X | |
| LO4 | | | | | | | X | | |
| Percentage | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 75.00 | 25.00 | |

13. Assessment Methods and Types :

| Method and Type | Description/Details | Percentage |
|---|---|---|
| Quiz | Written examination | 10% |
| Assignment | Written report, implemented programs, individual project | 20% |
| Test | Written examination | 20% |
| Final Examination | Written examination | 50% |

14. Mapping of assessment components to learning outcomes (LOs)

| Assessment Components | LO1 | LO2 | LO3 | LO4 |
|---|---|---|---|---|
| Quiz | 12.50 | | | |
| Assignment | | 22.22 | 100.00 | |
| Test | 25.00 | 22.22 | | 28.57 |
| Final Examination | 62.50 | 55.56 | | 71.43 |

15. Details of Course

| Topics | Mode of Delivery | |
|---|---|---|
| | Lecture | Lab |
| **1. LISP: Data & Control Structures, Input-Output, Functions and Higher-Order Functions**<br>Evaluation of arguments. Fundamental data types. Global and local variables. List structure and operations. Selections, iterations, and recursions. I/O streams and strings. File I/O. Functions: functional arguments, optional arguments, and keyword arguments. Higher-order functions and abstraction. | 0 | 4 |
| **2. LISP: Property Lists, Hash Tables, Arrays, Structures, and Classes**<br>Declaring/Defining, accessing, and using property lists, hash tables, arrays, and structures. CLOS: classes, inheritance, generic functions and methods. | 0 | 4 |

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| | **3. PROLOG: Declarative Programming**<br>Basic statements, data objects, and different types of queries. Prolog database. Recursive data structures and programming techniques. | 0 | 4 |
| | **4. PROLOG: Procedural Programming**<br>Backtracking. Controlling backtracking with the “cut”. Negation as failure. Common uses and problems with the “not”.<br>Input and output: reading and writing terms, characters, sentences, and files. Built-in predicates for testing the type of terms, constructing and decomposing terms, etc. Various kinds of equality. | 0 | 4 |
| | **5. Introduction and Intelligent Agents**<br>History and definition of Artificial Intelligence; IQ-Test Program; Philosophical Foundations; Consciousness; Intelligence Agents. | 4 | 0 |
| | **6. Problem Solving and Searching**<br>Solving Problems by Searching; State-Space Search; Heuristic Search; Game Playing; Alpha-Beta Pruning. | 10 | 6 |
| | **7. Knowledge Representation and Reasoning**<br>Knowledge Representation; Conceptual Graphs; Reasoning in Uncertainty Situation; Probabilistic Reasoning Systems; Decision Making. | 8 | 2 |
| | **8. Machine Learning**<br>Learning from Observations; Reinforcement learning; Knowledge in Learning; Decision Tree Learning; Information Theory. | 4 | 2 |
| | **Total** | **26** | **26** |

| | Total Student Learning Time (SLT) | Face to Face / Guided Learning | Independent Learning |
|---|---|---|---|
| | Lecture | 26 | 26 |
| | Tutorials | 0 | 0 |
| | Laboratory/Practical | 26 | 13 |
| | Presentation | 0 | 0 |
| | Assignment | - | 10 |
| | Mid Term Test | 2 | 6 |
| | Final Exam | 2 | 20 |
| | Quiz | 2 times | 2 |
| | Sub Total | 56 | 77 |
| | **Total SLT** | **133** | |
| 16. | Credit Value | **3** | |
| 17. | Reading Materials : | | |

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# SUMMARY OF INFORMATION ON EACH COURSE

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| Textbooks |
| 1. Stuart Russell, Peter Norvig (2010). Artificial Intelligence: A Modern Approach (3rd ed.). Pearson. |
| |
| Reference Material (including 'Statutes' for Law) |
| 1. Danny Kopec, Shweta Shetty, Christopher Pileggi (2014). Artificial Intelligence Problems and Their Solutions (1st ed.). Mercury Learning & Information. |
| 2. Kevin Warwick (2011). Artificial Intelligence: The Basics. Routledge. |
| 3. David L. Poole, Alan K. Mackworth, (2010). Artificial Intelligence: Foundations of Computational Agents. Cambridge University Press. |
| 4. George Luger (2008). Artificial Intelligence: Structures and Strategies for Complex Problem Solving (6th ed.). Addison-Wesley. |
| 5. M. Tim Jones (2008). Artificial Intelligence: A Systems Approach (2008). Jones and Bartlett Publishers. |
| 6. Ivan Bratko (2011). Prolog Programming for Artificial Intelligence (4th ed.). Pearson. |
| 7. David S. Touretzky (2013). Common LISP: A Gentle Introduction to Symbolic Computation (Revised Edition). Dover Publications. |
| 8. Paul Graham (2001). ANSI Common LISP (2nd ed.). Prentice Hall. |

Appendix (to be compiled when submitting the complete syllabus for the programme) :

1. Mission and Vision of the University and Faculty
2. Programme Objectives or Programme Educational Objectives
3. Programme Outcomes (POs)
4. Mapping of POs to the 8 MQF domain
5. Summary of the Bloom's Taxonomy's Domain Coverage in all the Los in the format below :

| Subject | Learning Outcomes (please state the learning 0utcomes) | Bloom's Taxonomy Domain | | |
|---|---|---|---|---|
| | | Affective | Cognitive | Psychomotor |
| ABC1234 | Learning Outcome 1 | | | |
| | Learning Outcome 2 | | | |
| | Learning Outcome 3 | | | |
| | Learning Outcome 4 | | | |
| DEF5678 | Learning Outcome 1 | | | |
| | Learning Outcome 2 | | | |
| | Learning Outcome 3 | | | |
| | Learning Outcome 4 | | | |

6. Summary of LO to PO measurement
7. Measurement and Tabulation of result for LO achievement
8. Measurement Tabulation of result for PO achievement

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