

# MODULE HANDBOOK

2018 – 2019

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| **Module Title:** | IMAT2904 – Artificial Intelligence for Simulation |
| **Level:** | Level 5 |
| **Mode of Study:** | Full-Time |
| **Location of Delivery:** | Leicester Campus |
| **Programme Leader:** | Dr. Liang Hu |

**NOTE: This handbook is correct at the time of writing and may be subject to change. Throughout your studies, to ensure you have the most up to date information, you should always consult the online version of this handbook held on the Virtual Learning Environment/Blackboard. For up to date information on University academic and student regulations always consult the DMU website.**

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| **Section** | **Section No** |
| Welcome | [**1**](#_Welcome) |
| Module Overview | [**2**](#_Module_Overview) |
| Teaching Team | [**3**](#_Teaching_Team) |
| Module Learning Outcomes | [**4**](#_Module_Learning_Outcomes) |
| Main Topic Areas | [**5**](#_Main_Topic_Areas) |
| Learning Resources | [**6**](#_Learning_Resources) |
| Software | [**7**](#_Software) |
| Assessment | [**8**](#_Assessment) |
| Personal Tutor Scheme | [**9**](#_Personal_Tutor_Scheme) |
| Academic Offences | [**10**](#_Academic_Offences) |

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# Welcome

Welcome to the module IMAT2904 - Artificial Intelligence for Simulation. This is a Level 5, second year module. The core area in the module is artificial intelligence techniques to allow decision making and planning within such a physical simulation.

# Module Overview

Many applications of modern computing involve processes of assessment and decision making which used to be solely within the domain of human beings. Uses of Artificial Intelligence are widespread globally - from search engine algorithms on the internet to making decisions on credit worthiness to route finding in virtual worlds. This module covers in outline the major techniques of Artificial Intelligence and focuses on applications in computer games programming and simulation which use these techniques. The general methods of AI include knowledge based reasoning, graph based search algorithms, probabilistic reasoning, finite state machines, flocking and behavioural trees. Students will be required to explore the implications of their knowledge and use of these intelligent technologies with reference to ethical codes of relevant professional bodies and legal responsibilities.

# Teaching Team

The module is taught by 1 academic staff members from The Institute of Artificial Intelligence (IAI). Dr. Liang Hu presents the module for term 2 with regards to the artificial intelligence techniques to allow for decision making and planning.

**Module leader**: Dr. Liang Hu – Term 2

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# Module Learning Outcomes

The module has several learning outcomes and associated learning objectives:

1. Know the principal areas of Artificial Intelligence which relate to the global games programming industry.
2. Be able to implement a simple AI software system and demonstrate it successfully.

***How do we assess the extent to which you have achieved these outcomes?***

**LO3**: This is about your ability to understand a wide variety of modern AI approaches within modern video games. This is mainly assessed via the AI coursework component.

**LO4**: This is simply demonstrating that you can apply what you have learned to a practical problem involving AI. This is assessed in the coursework.

# Main Topic Areas

**Artificial Intelligence:**

Graphs and search: BFS, DFS, A\*, JPS. Forward and backwards chaining rule systems, finite state machines, behavioural trees, flocking behaviours and probabilistic reasoning.

# Learning Resources

Each week will have associated lecture notes posted on Blackboard. There will lab exercises and formative tests on Blackboard. Attending the labs and interacting with your peers and your lab tutor is crucially important.

*Buckland, M.(2005). Programming Game AI by Example. Wordware Publishing*

Useful web resources:

<http://www.gafferongames.com/> - More advanced coding modelling examples.

<http://www.aigamedev.com/> - Great general resource and up to date.

# Software

C++

# Assessment

* The module will be assessed by 100% Coursework, Group work including a report/presentation/software

**Late Submission of Coursework** **Policy:** Late submissions will be processed in accordance with current University regulations which state:

*“The time period during which a student may submit a piece of work late without authorisation and have the work capped at 40% if passed is* ***14 calendar days****. Work submitted unauthorised more than 14 calendar days after the original submission date will receive a mark of 0%. These regulations apply to a student’s first attempt at coursework. Work submitted late without authorisation which constitutes reassessment of a previously failed piece of coursework will always receive a mark of 0%.”*

# Personal Tutor Scheme

DMU provides all of its undergraduate students with a personal tutor who can be contacted regarding any general academic matter or personal concerns relating to life at DMU. The initial role of the tutor, along with the Student Advice Centre, is to help students make a smooth transition to university life.

**Each personal tutor will:**

1. Provide reliable and consistent advice and guidance.
2. Provide regular opportunities for feedback on general academic progress and action-planning for students in relation to their academic progress.
3. Meet with first year students within three weeks of the start of their studies and monitor their attendance so the faculty can encourage participation.
4. Be proactive in arranging meetings with students.
5. Support personal development planning by promoting reflective learning and ensuring students can review their own progress against action plans.
6. Make systematic use of information about students’ overall progress, including utilising attendance records and academic performance profiles.
7. Explain the options available regarding progression, as appropriate, including general advice on module choice.
8. Know when it is appropriate to refer the student to another individual or service for specialist support or guidance.
9. Advise students on the importance of career planning.
10. Operate the faculty system and keep records in accordance with published faculty protocols.
11. Advise the programme leader of any programme-related issues highlighted in tutorials, having regard for confidentiality in relation to individual tutees.

# Academic Offences

A number of rules and regulations apply to the activities of all DMU students including student discipline, payment of fees, examination regulations, extenuating circumstances, academic appeals, health and safety policy, and undergraduate and postgraduate scheme and regulations. An explanation of these rules can be found [here.](http://www.dmu.ac.uk/dmu-students/the-student-gateway/academic-support-office/student-regulations.aspx)

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