Liverpool John Moores University

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Title:	Autonomous Systems and Machine Learning
Status:	Definitive
Code:	**6513ELEICB** (129103)
Version Start Date:	01-08-2021
Owning School/Faculty:	Engineering
Teaching School/Faculty:	International College of Business and Technology

Team	Leader
Qian Zhang	Y

Academic Level:	FHEQ6	**Credit Value:**	20	**Total Delivered Hours:**	46
Total Learning Hours:	200	**Private Study:**	154		

Delivery Options
Course typically offered: Semester 2

Component	Contact Hours
Lecture	11
Practical	33

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	AS2	Examination	50	2
Report	AS1	Practical and Design	50	

Aims

The aim of this module is to study the fundamentals of computational intelligence (CI) and their potential applications in robotics, and practise some CI-based techniques in the planning and control problems.

Learning Outcomes

After completing the module the student should be able to:

1	Analyse the techniques of computational intelligence (CI) and explain their strengths and weaknesses.
2	Use CI techniques to solve modern engineering and robotic problems.
3	Apply suitable autonomous system based solutions to modern automation problems
4	Design and implement machine learning systems

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

Examination	1	2	3	4
Practical and Design	3	4		

Outline Syllabus

Review of CI, Autonomous Systems, Mobile Robots, Robotic Arms.
Optimisation, Searching, Heuristic Algorithms, Swarm Intelligence, Generic Algorithms, Particle Swarm Optimisation.
Modelling, Data-driven, Artificial Neural Networks, Back Propagation, Deep Networks, Fuzzy Rule-based Systems, Interpretability, Black-box systems.
Artificial Intelligence, Machine Learning, Classification, Clustering, Big Data.
Planning Algorithms, Motion Planning, Path Planning, Decision Theory, Decision Tree.

Learning Activities

Lecture, demonstration and practical activities applying topics discussed.

Notes

In this module, students study the fundamentals of computational intelligence and their potential applications in robotics through both lectures and practical application.