New College of the Humanities

Foundations of Artificial Intelligence Course Descriptor

Course Title	Foundations of Artificial Intelligence	Faculty	Philosophy
Course code	NCHCS766	Course Leader	TBA
Credit points	15	Teaching Period	Any
FHEQ level	Level 7	Date approved	September 2020
Compulsory/ Optional	Compulsory		
Pre-requisites	None		
Co-requisites	None		

COURSE SUMMARY

This course introduces the fundamental problems, theories, and algorithms of the artificial intelligence field at breadth. It focuses more on deep learning due to its impact on natural language understanding, robotics and computer vision.

COURSE AIMS

The aims of this course are:

- Understand the fundamental concepts of artificial intelligence (AI)
- Create working programs that solve problems, reason logically, and/or improve their own performance using techniques presented in the course

LEARNING OUTCOMES

On successful completion of the course, students will be able to:

KNOWLEDGE AND UNDERSTANDING

K1d Master practical methods, tools and techniques to solve a machine learning problem

K2d Understand fundamental and contextual concepts in the field of artificial intelligence such as decision-making and deep learning.

K3d Evaluate the technical, social and management issues of building and deploying a machine learning application.

SUBJECT SPECIFIC SKILLS

S1d Critically assess a machine learning problem, recognise the models and algorithms suitable for solving that problem and develop a solution.

S2d A sophisticated machine learning engineer, familiar with best practice and modern machine learning toolkits used in industry.

S3d Design and develop original software of varying levels of complexity that solves a practical AI problem.

TRANSFERABLE AND PROFESSIONAL SKILLS

T1d Critically review and analyse key developments in the field of AI, both in terms of algorithms and software libraries.

T2d Communicate with rigorous arguments how a machine learns to solve a particular AI problem to both technical and non-technical audiences.

T2d Consistently apply an excellent level of technical proficiency in written English, using an advanced application of scholarly terminology, that demonstrates the ability to deal with complex issues both systematically and with sophistication

T3d Lead or participate in teams to solve AI problems.

TEACHING AND LEARNING

Teaching and learning strategies for this course will include:

- 30 hours of full-cohort lectures
- 20 hours of lab-based tutorials
- 1 office hour per teaching week

There will be three 1-hour lectures per teaching week. Two 1-hour lab sessions will give students the opportunity to work on their assignments with the help of the course leader and teaching assistants.

Course information and supplementary materials are available on the College's Virtual Learning Environment (VLE).

Students will also attend the formal meeting, Collections, in which they will receive constructive and developmental feedback on their performance.

Students are required to attend and participate in all the formal and timetabled sessions for this course. Students are also expected to manage their directed learning and independent study in support of the course.

EMPLOYABILITY SKILLS

- Communication skills
- Mathematical skills
- Team-based project skills

ASSESSMENT

FORMATIVE

Students will be formatively assessed during the course by means of set assignments. These do not count towards the end of year results but will provide students with developmental feedback. Set assignments will also amplify problem-solving skills useful for the written examination and develop software components that form part of the students' projects.

SUMMATIVE

Assessment will be in two forms:

AE:	Assessment Activity	Weighting (%)	Online submission	Duration	Length
1	Project	40	Yes	N/A	Code and up to 2500-word documentation
2	Written examination	60	N/A	2 hours	N/A

The examination will consist of a number of questions from which the student will have the choice of answering a specified number. The project and the examination will be assessed in accordance with the assessment aims set out in the Programme Specification.

FEEDBACK

Students will receive formal feedback in a variety of ways: written (including via email correspondence); oral (within one-to-one tutorials or on an *ad hoc* basis) and indirectly through discussion during group tutorials.

Feedback is provided on summative assessment and is made available to the student either via email, the VLE or another appropriate method.

INDICATIVE READING

Note: Comprehensive and current reading lists for courses are produced annually in the Course Syllabus or other documentation provided to students; the indicative reading list provided below is used as part of the approval/modification process only.

BOOKS

Stuart J. Russell and Peter Norvig. 2009. Artificial Intelligence: A Modern Approach (3rd. ed.). Pearson Education

INDICATIVE TOPICS

Students will study the following topics:

- Artificial intelligence and machine learning
- Python programming language
- Graphical models: Bayesian networks and Hidden Markov models
- Search: uninformed and informed search, adversarial search, and constraint satisfaction

- Decision making under uncertainty: Markov Decision Processes and Reinforcement Learning
- Supervised, semi-supervised, and unsupervised deep learning

Title: NCHCS766 Foundations of Artificial Intelligence **Approved by: Academic Board** **Location: Academic Handbook/Programme specifications and Handbooks/ Postgraduate Programme Specifications/MSc Computer Science Programme Specification/Course Descriptors**					
Version number	Date approved	Date published	Owner	Proposed next review date	Modification (As per AQF4) & category number
2.0	January 2022	April 2022	Dr Alexandros Koliousis	April 2025	Category 3: Changes to Course Learning Outcomes
1.0	September 2020	September 2020	Dr Alexandros Koliousis	April 2025	