1. **Title of the module**

COMP3590 (CO359) – Programming for Artificial Intelligence

1. **Division or partner institution which will be responsible for management of the module**

Division of Computing, Engineering, Mathematical Sciences (CEMS)

1. **The level of the module (Level 4, Level 5, Level 6 or Level 7)**

Level 4

1. **The number of credits and the ECTS value which the module represents**

15 credits (7.5 ECTS)

1. **Which term(s) the module is to be taught in (or other teaching pattern)**

Autumn or Spring

1. **Prerequisite and co-requisite modules**

Pre-requisite (Year in Computing): COMP5830 (CO583) - An Introduction to Programming and Web Technologies

Pre-requisite (All other courses): COMP3200 (CO320) – Introduction to Object-Oriented Programming or WECON1000 - Kenometrics

1. **The course(s) of study to which the module contributes**

BSc Artificial Intelligence, including year in industry variant.

BSc Data Science, including year in industry variant.

BA/BSc courses ‘with Data Science’.

Year in Computing

1. **The intended subject specific learning outcomes.  
   On successfully completing the module students will be able to:**

8.1 Understand the basics of linear algebra, probability models, including normal and binomial distributions, sampling and inference and predictive techniques;

8.2 Understand measures of central tendency and dispersion to summarise data;

8.3 Read, understand and modify small programs for data manipulation;

8.4 Understand the principles of data visualisation;

8.5 Test visualisation solutions to real data and discuss the quality of visualisation solutions through consideration of clarity and informativeness;

8.6 Write programs to load, manipulate, visualise and store data;

8.7 Use effectively a range of AI-purposed libraries, such as scientific computing library, visualisation library, data manipulation and analysis library, and machine learning library.

1. **The intended generic learning outcomes.  
   On successfully completing the module students will be able to:**

9.1 Demonstrate comprehension of the trade-offs involved in design-choices.

9.2 Recognise and be guided by social, professional and ethical issues and guidelines and the general context in which they apply.

9.3 Deploy appropriate theory and practices in their use of methods and tools.

9.4 Manage their own learning and development, through self-directed study and working on continuous assessment.

1. **A synopsis of the curriculum**

Built on the foundation of object-oriented software development, this module provides an introduction software development for Artificial Intelligence (AI). In this module, students will gain an understanding of data analysis and statistics techniques, including summarising data, using measures of central tendency and dispersion, and effective graphical representations. Various probability models, including normal and binomial distributions, sampling and inference and predictive techniques are introduced.

Throughout the module, students will learn to embed data analysis and statistics concepts into a programming language which offers good support for AI (e.g., Python). Students will learn to use important AI-purposed libraries and tools, and apply these techniques to data loading, processing, manipulation and visualisation.

1. **Reading list (Indicative list, current at time of publication. Reading lists will be published annually)**

“Python Cookbook”, David Beazley, Brian K. Jones, 3rd Edition, O’Reilly, 2013.

“Artificial Intelligence with Python”, Prateek Joshi, Packt Publishing, 2017.

“Hands-on Machine Learning with Scikit-Learn and TensorFlow”, Aurélien Géron, O’Reilly, 2017.

1. **Learning and teaching methods**

Total contact hours: 42 (22h lectures + 20h classes)

Private study hours: 108

Total study hours: 150

1. **Assessment methods**
   1. This module will be assessed by 100% coursework.

40% four class exercises or tests (equally weighted, approximately 2 hours each)

60% two practical assignments (equally weighted, approximately 16 hours of work each)

* 1. **Reassessment Method**

Like for like

1. **Map of module learning outcomes (sections 8 & 9) to learning and teaching methods (section12) and methods of assessment (section 13)**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Module learning outcomes** | **8.1** | **8.2** | **8.3** | **8.4** | **8.5** | **8.6** | **8.7** | **9.1** | **9.2** | **9.3** | **9.4** |
| **Learning/ teaching method** |  |  |  |  |  |  |  |  |  |  |  |
| Lectures | x | x | x | x | x | x | x | x | x |  |  |
| Classes | x | x | x | x | x | x | x | x | x | x | x |
| Private study | x | x | x | x | x | x | x | x |  | x | x |
| **Assessment method** |  |  |  |  |  |  |  |  |  |  |  |
| Class exercises | x | x | x | x | x | x | x | x | x | x | x |
| Practical work 1 | x | x | x | x | x | x | x | x | x | x | x |
| Practical work 2 | x | x | x | x | x | x | x | x | x | x | x |

1. **Inclusive module design**

The Division recognises and has embedded the expectations of current equality legislation, by ensuring that the module is as accessible as possible by design. Additional alternative arrangements for students with Inclusive Learning Plans (ILPs)/declared disabilities will be made on an individual basis, in consultation with the relevant policies and support services.

The inclusive practices in the guidance (see Annex B Appendix A) have been considered in order to support all students in the following areas:

a) Accessible resources and curriculum

b) Learning, teaching and assessment methods

1. **Campus(es) or centre(s) where module will be delivered**

Canterbury

1. **Internationalisation**

The topics addressed by this module relate to a field which is of international importance, given the global role of computers in today’s technological innovation. The topics covered by this module are international in nature, being identical worldwide and independent of traditional spoken language.

**DIVISIONAL USE ONLY**

**Revision record – all revisions must be recorded in the grid and full details of the change retained in the appropriate committee records.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Date approved | Major/minor revision | Start date of delivery of revised version | Section revised | Impacts PLOs (Q6&7 cover sheet) |
| 11/10/2020 | Minor |  | 7, 16 | No |
| 19/11/2021 | Minor | September 2022 | 6, 7, 14 | No |
| 24/04/2023 | Minor | Sept 2023 | 6 | No |