1. **Title of the module**

COMP3370 (CO337) Computers and the Cloud

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 (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**

None

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

BSc Computer Science, including all variants, both with and without Year in Industry.

BSc Business Information Technology, BSc Computing, both with and without Year in Industry.

BSc Artificial Intelligence, BSc Data Science, BSc Software Engineering, both with and without Year in Industry.

1. **The intended subject specific learning outcomes.  
   On successfully completing the module students will be able to:**
   1. Describe the architecture of a modern distributed computing application.
   2. Describe trade-offs involved in developing an application based in the cloud versus on one’s own hardware: economic trade-offs, security trade-offs, sustainability trade-offs, and ethical trade-offs.
   3. Install and configure an existing cloud-based application.
   4. Describe the existing cloud infrastructure, for organising computations and for storing data.
   5. For a given problem, select the appropriate classical distributed algorithm to solve it.
   6. Explain how operating systems support the cloud infrastructure (for example, by providing network services, and by providing virtualization services).
2. **The intended generic learning outcomes.  
   On successfully completing the module students will be able to:**
   1. Communicate their understanding of technical problems and their solutions.
   2. Make effective use of IT facilities.
   3. Manage their time and resources effectively.
3. **A synopsis of the curriculum**

This module equips students with an understanding of how modern cloud-based applications work. Topics covered may include:

* *A high-level view of cloud computing:* the economies of scale, security issues, ethical concerns, the typical high-level architecture of a cloud-based application, types of available services (e.g., parallelization, data storage).
* *Cloud infrastructure:* command line interface; containers and virtual machines; parallelization (e.g., MapReduce, distributed graph processing); data storage (e.g., distributed file systems, distributed databases, distributed shared in-memory data structures).
* *Cloud concepts:* high-level races, transactions and sequential equivalence; classical distributed algorithms (e.g., election, global snapshot, consensus, distributed mutual exclusion); scheduling, fault-tolerance and reliability in the context of a particular parallelization technology (e.g., MapReduce).
* *Operating system support:* network services (e.g., TCP/IP, routing, reliable communication), virtualization services (e.g., virtual memory, containers).

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

* Armbrust et al., *A view of Cloud Computing*, CACM, 2010
* Leskovec et al, *Mining of Massive Datasets*, 2014, Chapter 2

Further reading material will be recommended by individual lecturers.

1. **Learning and teaching methods**

22 contact hours

128 private study hours

Total hours: 150

1. **Assessment methods**
   1. Main assessment methods

The module is assessed 50% coursework and 50% examination:

40% two practical assignments (equally weighted, approximately 20 hours of work each)

10% two online quizzes, focused on theory (equally weighted, approximately 5 hours of work each)

50% two-hour examination

13.2 Reassessment methods

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 outcome** | 8.1 | 8.2 | 8.3 | 8.4 | 8.5 | 8.6 | 9.1 | 9.2 | 9.3 |
| **Learning/ teaching method** |  |  |  |  |  |  |  |  |  |
| **Private Study** | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** |
| Lectures | **X** | **X** | **X** | **X** | **X** | **X** | **X** |  |  |
| **Assessment method** |  |  |  |  |  |  |  |  |  |
| Practical assignments |  |  | **X** |  | **X** | **X** | **X** | **X** | **X** |
| Theory quizzes | **X** | **X** |  | **X** | **X** | **X** | **X** |  | **X** |
| Examination | **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.**

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| --- | --- | --- | --- | --- |
| Date approved | Major/minor revision | Start date of delivery of revised version | Section revised | Impacts PLOs (Q6&7 cover sheet) |
| 10/11/2020 | Minor |  | 7 | No |
|  |  |  |  |  |