UNIVERSITY OF LEICESTER

Study Abroad

Modules in Informatics

2022/23 Academic Year

MODULE NAME: Software Engineering Project

MODULE CODE: CO2201

MODULE DESCRIPTION: Click to open.

CREDITS: 30

PERIOD: Academic Year

DEPARTMENT: Informatics

INTENDED LEARNING OUTCOMES:
At the end of this module, students should be able to:

- Apply project management techniques to plan a small project;

- Compare and evaluate software development lifecycle methodologies;

- Work collaboratively within a group to deliver a software project;

- Evaluate the outcomes of a project including social, legal and ethical considerations;

- Describe and apply frameworks used within Agile and plan-driven project management;

- Reflect on and articulate motivations, strengths and skills in relation to a future, work-related learning opportunity (e.g. placement, internship, employer-led project).

COORDINATOR: James Hoey

TEACHING AND LEARNING METHODS:
Lectures, supporting videos, group teaching, group supervisions. Industry consultation.

PRE-REQUISITES: -

TOTAL MODULE HOURS: 300

ASSESSMENT METHODS:
Coursework (100%).

GUIDED INDEPENDENT LEARNING: INDICATIVE ACTIVITIES:
Team meetings and study groups, guided reading and study of other information sources.

MODULE NAME: Computing Fundamentals

MODULE CODE: CO1101

MODULE DESCRIPTION: Click to open.

CREDITS: 15

PERIOD: Semester 1

DEPARTMENT: Informatics

INTENDED LEARNING OUTCOMES:
On completion of the module, successful students should be able to:

- Explain and discuss an overview of modern Computer Science and Software Engineering at honours level.

- Identify relevant IT sources of conceptual and technical information.

- Search information effectively and evaluate retrieved knowledge for an IT task.

- Organise, critically analyse and present information in the form of an IT literature survey, including appropriate grammar, quoting, and referencing.

- Reflect on and articulate motivations, strengths and experience of developing one or more transferable skills.

- Demonstrate basic skills of teamwork, including planning and time management.

- Operate tools from command line, including common CLI tasks regarding filesystem management.

- Apply web development techniques, using HTML, CSS, W3C standards and other technologies.

- Explain the basics of computer and internet security.

COORDINATOR: Uraz Turker

TEACHING AND LEARNING METHODS:
Lectures, Tutorials for coursework examples and feedback, Laboratory based Learning Support.

PRE-REQUISITES: -

TOTAL MODULE HOURS: 150

ASSESSMENT METHODS:
Coursework (100%).

GUIDED INDEPENDENT LEARNING: INDICATIVE ACTIVITIES:
Directed reading and videos, problem sets, writing module note-based summaries.

MODULE NAME: Programming Fundamentals

MODULE CODE: CO1102

MODULE DESCRIPTION: Click to open.

CREDITS: 15

PERIOD: Semester 1

DEPARTMENT: Informatics

INTENDED LEARNING OUTCOMES:
On completion of the module, successful students should be able to:

- Explain the fundamentals of imperative programming and write elementary programs;

- Analyse simple problems and write solution programs using variables, types, expressions and basic operators, conditional and looping control structures, functions and I/O and exceptions;

- Describe techniques for simple software design and development using very simple algorithms and data structures;

- Write simple programs involving text and file I/O, and data types such as strings, numbers, lists, tuples;

- Make use of editors and development environments;

- Describe fundamentals of OO programming and write simple OO programs using classes and objects.

COORDINATOR: Mohammad Reza Zare

TEACHING AND LEARNING METHODS:
Lectures, coursework, practical lab-based sessions, online resources (e.g. module webpage, electronic notes, Q+A forum, video tutorials).

PRE-REQUISITES: -

TOTAL MODULE HOURS: 150

ASSESSMENT METHODS:
Coursework (100%).

GUIDED INDEPENDENT LEARNING: INDICATIVE ACTIVITIES:
Directed reading and videos, problem sets, writing note-based summaries, use of web-based coding tutorials/videos.

MODULE NAME: Mathematics Fundamentals

MODULE CODE: CO1103

MODULE DESCRIPTION: Click to open.

CREDITS: 15

PERIOD: Semester 1

DEPARTMENT: Informatics

INTENDED LEARNING OUTCOMES:
On completion of the module, successful students should be able to:

- Translate basic logical propositions to and from English;

- Discuss basic logic and solve very simple problems;

- Describe the relevance of set theory and mathematical logic to Computer Science and Software Engineering;

- Explain basic set notation and solve simple problems concerning sets;

- Solve simple problems on set-theoretic functions, including problems concerning partiality and composition;

- Define relations and graphs, specify the matrix representation of a graph or a relation, and perform basic operations on matrices;

- Solve problems involving exponentials, logarithms, factorials, combinatorics, order notation;

- Recall and explain basic statistics for Computer Science and Software Engineering.

COORDINATOR: Tanya Vladimirova

TEACHING AND LEARNING METHODS:
Lectures, Tutorials for coursework examples and feedback.

PRE-REQUISITES: -

TOTAL MODULE HOURS: 150

ASSESSMENT METHODS:
Coursework (100%).

GUIDED INDEPENDENT LEARNING: INDICATIVE ACTIVITIES:
Directed reading and videos, problem sets, writing module note-based summaries.

MODULE NAME: Computer Architecture

MODULE CODE: CO1104

MODULE DESCRIPTION: Click to open.

CREDITS: 15

PERIOD: Semester 1

DEPARTMENT: Informatics

INTENDED LEARNING OUTCOMES:
On completion of the module, successful students should be able to:

- Solve simple problems on: number systems (such as binary and hexary), elementary hardware and logic, and ALU correctness;

- Explain, and solve problems on: a high-level view of a datapath and control of a modern processor; running simple assembly programs;

- Explain, and solve problems on: fundamental hardware circuits - ALUs, multiplexors, and register files;

- Explain, and solve problems on: fundamental software - assembly and machine language and programs (ISAS), translations between the two.

- Solve problems on: detailed views of simple model processor hardware, running ISAs such as MIPS and ARM.

COORDINATOR: Roy Crole

TEACHING AND LEARNING METHODS:
Lectures, Tutorials for coursework examples and feedback.

PRE-REQUISITES: -

TOTAL MODULE HOURS: 150

ASSESSMENT METHODS:
Coursework (20%), Exam (80%).

GUIDED INDEPENDENT LEARNING: INDICATIVE ACTIVITIES:
Directed reading and videos, problem sets, writing module note-based summaries.

MODULE NAME: Operating Systems and Networking

MODULE CODE: CO2101

MODULE DESCRIPTION: Click to open.

CREDITS: 15

PERIOD: Semester 1

DEPARTMENT: Informatics

INTENDED LEARNING OUTCOMES:
On completion of the module, successful students should be able to:

- Describe the basic functioning of an operating system such as Linux;

- Explain the basics of processes and memory management, and analyse simple problems involving these concepts;

- Describe the basic functioning of a file system. Work out problems involving these topics;

- Analyse concurrent code and explain how it works;

- Describe the main protocols used to communicate over the internet, and answer simple questions about them.

- Explain the basics of networking protocols and APIs for communication between computers, and be able to work out simple questions on these topics.

COORDINATOR: Rajeev Raman

TEACHING AND LEARNING METHODS:
Lectures, notes, textbooks, laboratory work, coursework, model answers, handouts, online support (eg videos, Q+A forum, webpages etc).

PRE-REQUISITES: -

TOTAL MODULE HOURS: 150

ASSESSMENT METHODS:
Coursework (100%).

GUIDED INDEPENDENT LEARNING: INDICATIVE ACTIVITIES:
Directed reading and videos, problem sets, writing note-based summaries, worksheets.

MODULE NAME: Databases and Domain Modelling

MODULE CODE: CO2102

MODULE DESCRIPTION: Click to open.

CREDITS: 15

PERIOD: Semester 1

DEPARTMENT: Informatics

INTENDED LEARNING OUTCOMES:
On completion of the module, successful students should be able to:

- Utilize and design Relational Database Management Systems;

- Apply appropriate notation for modelling Database schemas using Entity Relational Diagrams;

- Normalize and Improve Database designs and performance, via Normalization;

- Utilize Data Definition Language (DDL) to create and manipulate simple Databases;

- Define and Utilize Data Manipulation Language (DML) to create and manipulate simple Databases;

- Understand Data Control Language (DCL) to create and manipulate simple Databases;

- Explain the principles of Database security;

- Construct data models from customer requirements.

COORDINATOR: Karim Mualla

TEACHING AND LEARNING METHODS:
Lectures, Tutorials for coursework examples and feedback, Laboratory based Learning Support.

PRE-REQUISITES: -

TOTAL MODULE HOURS: 150

ASSESSMENT METHODS:
Class tests

GUIDED INDEPENDENT LEARNING: INDICATIVE ACTIVITIES:
Directed reading and videos, problem sets, writing module note-based summaries. Use of web-based coding tutorials/videos.

MODULE NAME: Computational Intelligence and Software Engineering

MODULE CODE: CO3091

MODULE DESCRIPTION: Click to open.

CREDITS: 15

PERIOD: Semester 1

DEPARTMENT: Informatics

INTENDED LEARNING OUTCOMES:
On successful completion of the module, students should be able to:

- Recognise problems (and specially software engineering problems) that can be formulated as computational intelligence optimisation or machine learning problems;

- Formulate such problems as optimisation or machine learning problems;

- Demonstrate an understanding of the core techniques used in the computational intelligence approaches to solve such problems; communicate such core techniques to non-experts;

- Build models able to support practitioners in performing machine learning tasks; use optimisation algorithms to support practitioners in solving optimisation problems;

- Evaluate, analyse and critique computational intelligence approaches for software engineering.

COORDINATOR: Huiyu Zhou

TEACHING AND LEARNING METHODS:
Class sessions together with lecture slides; recommended book chapters, articles and research papers; web resources; worksheets.

PRE-REQUISITES: -

TOTAL MODULE HOURS: 150

ASSESSMENT METHODS:
Marked coursework and written examination.

GUIDED INDEPENDENT LEARNING: INDICATIVE ACTIVITIES:
Directed reading and videos, problem sets, writing module note-based summaries. Use of web-based coding tutorials/videos.

MODULE NAME: Software Measurement and Quality Assurance

MODULE CODE: CO3095

MODULE DESCRIPTION: Click to open.

CREDITS: 15

PERIOD: Semester 1

DEPARTMENT: Informatics

INTENDED LEARNING OUTCOMES:
On completion of the module, successful students will be able to:

- Describe how quality issues affect each aspect of the software development life-cycle;

- Relate quality to the current standards for process improvement;

- Demonstrate understanding of the theory of software metrics and make software measurements in practice;

- Critically evaluate, choose and apply appropriate strategies for software testing and validation.

- Design and implement test suites for different types and levels of testing using relevant tools and technologies.

- Explain and discuss advanced software testing topics, considering contextual aspects such as costs, effectiveness and tool-support.

COORDINATOR: José Miguel Rojas Siles

TEACHING AND LEARNING METHODS:
Class sessions together with lecture slides, recommended material (book chapters, articles, research papers, web resources), lab worksheets and solutions, web support, assessed coursework, help sessions for coursework, traditional written problem-based ex

PRE-REQUISITES: -

TOTAL MODULE HOURS: 150

ASSESSMENT METHODS:
Marked coursework.

GUIDED INDEPENDENT LEARNING: INDICATIVE ACTIVITIES:
Guided reading and videos, problem sets, writing module note-based summaries. Use of web-based coding tutorials/videos.

MODULE NAME: Computers, Society & Professionalism

MODULE CODE: CO3101

MODULE DESCRIPTION: Click to open.

CREDITS: 15

PERIOD: Semester 1

DEPARTMENT: Informatics

INTENDED LEARNING OUTCOMES:
On completion of the module, successful students will be able to:

- Describe the Information Society and Information Revolution. Explain the effect that computers and IT have had on employment in general and both individuals' jobs and corporate organisations; analyse and evaluate example scenarios.

- Describe the impact of the computer revolution on the conditions of work and life in contemporary society such as the usage of social networking sites. Discuss, in depth, topics such as equality and inclusivity in this context, and the impacts computers have on the economy and society.

- Describe human-computer interaction issues and their impacts on different IT-enhanced sectors such as healthcare, education, electronic commerce and environment;

- Discuss, explain and analyse social, legal and ethical issues in the realm of Informatics. Explain issues of access such as privacy and security, the inequality that can arise, and the impacts on society. Discuss issues surrounding information access rights. Solve problems related to these topics.

- Outline a history of digital computing and analyse events and consequences.

COORDINATOR: James Hoey

TEACHING AND LEARNING METHODS:
Lectures, web-based learning materials, supporting videos. Tutorials.

PRE-REQUISITES: -

TOTAL MODULE HOURS: 150

ASSESSMENT METHODS:
Coursework.

GUIDED INDEPENDENT LEARNING: INDICATIVE ACTIVITIES:
Directed reading and videos, problem sets, writing module note-based summaries.

MODULE NAME: Mobile and Web Applications

MODULE CODE: CO3102

MODULE DESCRIPTION: Click to open.

CREDITS: 15

PERIOD: Semester 1

DEPARTMENT: Informatics

INTENDED LEARNING OUTCOMES:
On completion of the module, successful students will be able to:

- Explain the architectural foundations for web technologies;

- Use data formats appropriately to create documents and handle data;

- Solve security and session handling issues and use supporting techniques;

- Explain the technologies behind web services and create a simple web service;

- Explain and analyse the architecture of mobile applications;

- Design and develop web/native apps using a chosen development framework;

- Work with software tools to develop, test and debug apps.

COORDINATOR: Yi Hong

TEACHING AND LEARNING METHODS:
Lectures, Tutorials for coursework examples and feedback, Laboratory based Learning Support.

PRE-REQUISITES: -

TOTAL MODULE HOURS: 150

ASSESSMENT METHODS:
Coursework and exam

GUIDED INDEPENDENT LEARNING: INDICATIVE ACTIVITIES:
Directed reading and videos, problem sets, writing module note-based summaries. Use of web-based coding tutorials/videos.

MODULE NAME: C++ Programming

MODULE CODE: CO3105

MODULE DESCRIPTION: Click to open.

CREDITS: 15

PERIOD: Semester 1

DEPARTMENT: Informatics

INTENDED LEARNING OUTCOMES:
On completion of the module, successful students should be able to:

- Demonstrate understanding of the syntax of C++, its design features, and the ideas of object orientation;

- Write C++ programs solve practical problems.

COORDINATOR: Stanley Fung

TEACHING AND LEARNING METHODS:
Class sessions with lecture slides and web resources; problem sets with feedback sessions; laboratory based learning support.

PRE-REQUISITES: -

TOTAL MODULE HOURS: 150

ASSESSMENT METHODS:
Coursework.

GUIDED INDEPENDENT LEARNING: INDICATIVE ACTIVITIES:
Guided reading and videos, web-based coding tutorials, problem sets.

MODULE NAME: Advanced C++ Programming

MODULE CODE: CO4105

MODULE DESCRIPTION: Click to open.

CREDITS: 15

PERIOD: Semester 1

DEPARTMENT: Informatics

INTENDED LEARNING OUTCOMES:
On completion of the module, successful students should be able to:

- Demonstrate understanding of the syntax of C++, its design features, and the ideas of object orientation

- Write C++ programs solve practical problems

COORDINATOR: Stanley Fung

TEACHING AND LEARNING METHODS:
Class sessions together with lecture slides; recommended book chapters, web resources; worksheets. Marked coursework. Marked coursework will be programming tasks. Students' programs will be automatically evaluated by a test suite.

PRE-REQUISITES: -

TOTAL MODULE HOURS: 150

ASSESSMENT METHODS:
Marked coursework.

GUIDED INDEPENDENT LEARNING: INDICATIVE ACTIVITIES:
Lecture recordings, recommmended book chapters and web resources.

MODULE NAME: Personal and Group Skills

MODULE CODE: CO4210

MODULE DESCRIPTION: Click to open.

CREDITS: 15

PERIOD: Semester 1

DEPARTMENT: Informatics

INTENDED LEARNING OUTCOMES:
On completion of the module, successful students should be able to:

- Locate, organise and marshal evidence, report on findings, analyse complex ideas and construct sophisticated critical arguments;

- Demonstrate knowledge of how and when to draw on the knowledge and expertise of others;

- Contribute and comment on ideas in syndicate groups;

- Reflect on and write up results;

- Plan and present research clearly and effectively using appropriate IT resources;

- Deliver oral presentations to professional standard;

- Respond to questioning;

- Write cogently and clearly.

COORDINATOR: Irek Ulidowski

TEACHING AND LEARNING METHODS:
Seminars by guest speakers, handouts and recommended texts, moderated group discussions, oral presentation, collective writing, workshops on transferrable skills.

PRE-REQUISITES: -

TOTAL MODULE HOURS: 150

ASSESSMENT METHODS:
Moderated group discussions, 4,000 word collective essay, 10 minute oral presentation. The coursework on this module cannot be re-sat.

GUIDED INDEPENDENT LEARNING: INDICATIVE ACTIVITIES:
Guided reading, workshop recordings, group discussions, literature search, essay writing, presentation preparation.

MODULE NAME: Advanced Web Technologies

MODULE CODE: CO4215

MODULE DESCRIPTION: Click to open.

CREDITS: 15

PERIOD: Semester 1

DEPARTMENT: Informatics

INTENDED LEARNING OUTCOMES:
On completion of the module, successful students should be able to:

- Define the fundamental ideas and standards underlying Web Service Technology;

- Define the fundamental principles for cloud applications;

- Discuss concepts at the frontier of industrial practice and emerging standards;

- Differentiate the major frameworks allowing to develop web services and cloud applications and assess their suitability for specific usage scenarios;

- Explain the link between the concepts of services and business processes and discuss and critique related standards;

- Develop business processes using the Workflow foundation;

- Develop and deploy web services and cloud applications using appropriate Microsoft technologies.

COORDINATOR: Stephan Reiff-Marganiec

TEACHING AND LEARNING METHODS:
Lectures, tutorials and practical sessions together with course notes, recommended reading, worksheets and some additional handouts.

PRE-REQUISITES: -

TOTAL MODULE HOURS: 150

ASSESSMENT METHODS:
Assessed coursework; traditional written exam

GUIDED INDEPENDENT LEARNING: INDICATIVE ACTIVITIES:

MODULE NAME: Agile Cloud Automation

MODULE CODE: CO4217

MODULE DESCRIPTION: Click to open.

CREDITS: 15

PERIOD: Semester 1

DEPARTMENT: Informatics

INTENDED LEARNING OUTCOMES:
On completion of the module, successful students should be able to:

- Demonstrate understanding of NoSQL principles and technology

- Discuss issues and solution approaches for questions of scalability and consistency

- Explain agile principles and practices for developing cloud systems

- Demonstrate a systematic understanding of the specification of low-code development platforms using model-driven software development

- Model domain-specific languages and build associated tooling for parsing their programs

- Apply model transformations for the effective design and implementation of low-code development platforms

COORDINATOR: Artur Boronat

TEACHING AND LEARNING METHODS:
Lectures, practical sessions, recommended reading, worksheets and some additional handouts.

PRE-REQUISITES: Desirable: UML, Java, Eclipse

TOTAL MODULE HOURS: 150

ASSESSMENT METHODS:
Assessed coursework; traditional written examination.

GUIDED INDEPENDENT LEARNING: INDICATIVE ACTIVITIES:
Lecture recordings, screencasts, guided reading lists, worksheets.

MODULE NAME: Internet and Cloud Computing

MODULE CODE: CO4219

MODULE DESCRIPTION: Click to open.

CREDITS: 15

PERIOD: Semester 1

DEPARTMENT: Informatics

INTENDED LEARNING OUTCOMES:
On completion of the module, successful students should be able to:

- Analyse distributed systems and provide a technical review of their strengths and weaknesses

- Produce system specifications taking into account scalability and performance

- Design and demonstrate distributed systems according to specifications

- Develop analytical skills in independently reviewing and improving the design of cloud systems

COORDINATOR: Ashiq Anjum

TEACHING AND LEARNING METHODS:
Lectures, tutorials and practical sessions together with course notes, recommended reading, worksheets and some additional handouts.

PRE-REQUISITES: Java programming knowledge.

TOTAL MODULE HOURS: 150

ASSESSMENT METHODS:
Assessed coursework; traditional written exam.

GUIDED INDEPENDENT LEARNING: INDICATIVE ACTIVITIES:
Lecture recordings, screencasts, guided reading lists.

MODULE NAME: Introduction to Object Oriented Programming

MODULE CODE: CO1105

MODULE DESCRIPTION: Click to open.

CREDITS: 15

PERIOD: Semester 2

DEPARTMENT: Informatics

INTENDED LEARNING OUTCOMES:
On completion of the module, successful students should be able to:

- Analyse the use of object-oriented design principles in standard design patterns;

- Explain object-oriented design principles using inheritance, abstraction, overriding and polymorphism;

- Demonstrate the use of exceptions for implementing fault recovery strategies;

- Represent object models using standard notation;

- Solve small scale computing problems that are suited to object-oriented development by designing solutions, coding them and deploying them using appropriate techniques.

COORDINATOR: Gilbert Laycock

TEACHING AND LEARNING METHODS:
Lectures, coursework, practical lab-based sessions, online resources (e.g. module webpage, electronic notes, Q+A forum, video tutorials).

PRE-REQUISITES: -

TOTAL MODULE HOURS: 150

ASSESSMENT METHODS:
Coursework (100%).

GUIDED INDEPENDENT LEARNING: INDICATIVE ACTIVITIES:
Directed reading, problem sets, writing module note-based summaries. Use of web-based coding tutorials/videos.

MODULE NAME: Requirements Engineering and Professional Practice

MODULE CODE: CO1106

MODULE DESCRIPTION: Click to open.

CREDITS: 15

PERIOD: Semester 2

DEPARTMENT: Informatics

INTENDED LEARNING OUTCOMES:
On completion of the module, successful students should be able to:

- Motivate the need of requirements engineering for successful software projects, describe the problems when requirements are omitted;

- Explain requirements change management process;

- Differentiate between different types of requirements;

- Demonstrate a knowledge of security and data protection issues in storage and usage of data;

- Critique the value of a number of requirements engineering techniques, such as stakeholder analysis, use cases, interviews, prototyping;

- Distinguish and choose between various modelling techniques for requirements documentation;

- Describe the role of professional bodies in the IT industry.

COORDINATOR: Matthias Heintz

TEACHING AND LEARNING METHODS:
Lectures, Tutorials for coursework examples and feedback, Laboratory based Learning Support, Group discussions.

PRE-REQUISITES: -

TOTAL MODULE HOURS: 150

ASSESSMENT METHODS:
Coursework (100%).

GUIDED INDEPENDENT LEARNING: INDICATIVE ACTIVITIES:
Directed reading and videos, problem sets, writing module note-based summaries.

MODULE NAME: Algorithms, Data Structures and Advanced Programming

MODULE CODE: CO1107

MODULE DESCRIPTION: Click to open.

CREDITS: 15

PERIOD: Semester 2

DEPARTMENT: Informatics

INTENDED LEARNING OUTCOMES:
On completion of the module, successful students should be able to:

- Show how to solve simple problems involving common datatypes such as arrays, strings, lists, stacks, queues, trees, graphs;

- Describe standard algorithms such as sorting, searching, hashing, and tree and graph traversal. Work out problems which involve these algorithms;

- Write programs that use recursive programming techniques;

- Answer questions on supplementary topics such as data storage and file I/O, sockets, and threads.

COORDINATOR: Mohammad Reza Zare

TEACHING AND LEARNING METHODS:
Lectures, coursework, practical lab-based sessions, online resources (e.g. module webpage, electronic notes, Q+A forum, video tutorials).

PRE-REQUISITES: -

TOTAL MODULE HOURS: 150

ASSESSMENT METHODS:
Coursework (100%).

GUIDED INDEPENDENT LEARNING: INDICATIVE ACTIVITIES:
Directed reading and videos, problem sets, writing note-based summaries.

MODULE NAME: Foundations of Computation

MODULE CODE: CO1108

MODULE DESCRIPTION: Click to open.

CREDITS: 15

PERIOD: Semester 2

DEPARTMENT: Informatics

INTENDED LEARNING OUTCOMES:
At the end of this module, students should be able to:

- Explain in broad terms the idea of foundations and theory in Computer Science;

- Discuss and classify grammars and formal languages; solve simple problems;

- Define and explain models of computation such as register and Turing machines, simple automata;

- Construct simple models to solve problems.

COORDINATOR: Irek Ulidowski

TEACHING AND LEARNING METHODS:
Lectures, Tutorials for coursework examples and feedback.

PRE-REQUISITES: -

TOTAL MODULE HOURS: 150

ASSESSMENT METHODS:
Coursework (40%) and final examination (60%).

GUIDED INDEPENDENT LEARNING: INDICATIVE ACTIVITIES:
Directed reading and videos, problem sets, writing module note-based summaries.

MODULE NAME: Business and Financial Computing

MODULE CODE: CO1109

MODULE DESCRIPTION: Click to open.

CREDITS: 15

PERIOD: Semester 2

DEPARTMENT: Informatics

INTENDED LEARNING OUTCOMES:
On completion of this module, successful students should be able to:

- Explain some of the fundamental concepts, terminology and processes of the business/financial domain;

- Explain the categories and functions of business and information systems and applcations and solve simple problems;

- Outline the functional and architectural properties of these systems;

- Explain the different roles and functions of IT professionals within organisations.

COORDINATOR:

TEACHING AND LEARNING METHODS:
Lectures, Tutorials for coursework examples and feedback.

PRE-REQUISITES: -

TOTAL MODULE HOURS: 150

ASSESSMENT METHODS:
Coursework and Examination.

GUIDED INDEPENDENT LEARNING: INDICATIVE ACTIVITIES:
Directed reading and videos, problem sets, writing module note-based summaries.

MODULE NAME: User Interface Design and Evaluation

MODULE CODE: CO2104

MODULE DESCRIPTION: Click to open.

CREDITS: 15

PERIOD: Semester 2

DEPARTMENT: Informatics

INTENDED LEARNING OUTCOMES:
On completion of the module, successful students should be able to:

- Design and develop interactive, responsive user interfaces;

- Demonstrate visualisation techniques for user interfaces;

- Assess accessibility in user interfaces;

- Demonstrate user interface design and prototyping following a user-centred design process;

- Discuss principles of human-computer interaction;

- Evaluate usability of user interfaces with direct/indirect heuristics;

- Discuss the role of ethics in empirical evaluation.

COORDINATOR: Genovefa Kefalidou

TEACHING AND LEARNING METHODS:
LIVE Lectures, tutorials for coursework examples and feedback, Online workshops and seminars, Laboratory based Learning Support.

PRE-REQUISITES: -

TOTAL MODULE HOURS: 150

ASSESSMENT METHODS:
Coursework (100%).

GUIDED INDEPENDENT LEARNING: INDICATIVE ACTIVITIES:
Directed reading and videos, problem sets, writing module note-based summaries. Use of web-based coding tutorials/videos.

MODULE NAME: Data Analytics

MODULE CODE: CO2106

MODULE DESCRIPTION: Click to open.

CREDITS: 15

PERIOD: Semester 2

DEPARTMENT: Informatics

INTENDED LEARNING OUTCOMES:
On completion of the module, successful students should be able to:

- Collect, preprocess, and visualise data;

- Calculate basic probabilities and apply statistical tests to datasets;

- Analyse datasets to derive insights;

- Build-up a data-driven recommender system;

- Build-up and evaluate basic supervised learning models;

- Explain data ethics, privacy, and security.

COORDINATOR: Emmanuel Tadjouddine

TEACHING AND LEARNING METHODS:
Blended learning including online lectures, notes, guided laboratory work, tutorials, and model answers.

PRE-REQUISITES: -

TOTAL MODULE HOURS: 150

ASSESSMENT METHODS:
Coursework (100%).

GUIDED INDEPENDENT LEARNING: INDICATIVE ACTIVITIES:
Directed reading of resources (e.g. notes, books) and online videos, guided laboratory work, online support (e.g. videos, Q+A forum, webpages etc).

MODULE NAME: Foundations of Artificial Intelligence

MODULE CODE: CO2114

MODULE DESCRIPTION: Click to open.

CREDITS: 15

PERIOD: Semester 2

DEPARTMENT: Informatics

INTENDED LEARNING OUTCOMES:
On completion of the module, successful students should be able to:

- Translate an AI problem to a specification of the agent's task environment;

- Provide a precise problem formulation for a problem-solving agent;

- Explain and discuss different algorithms for uninformed search, and identify the most suitable approach for a given problem;

- Explain and discuss different algorithms for informed search, explain the effect of heuristics on performance, demonstrate familiarity with methods for constructing good heuristics;

- Formulate optimisation problems for AI agents, and be able to apply an array of out-of-the-box methods and tools for solving optimisation problems;

- Identify the appropriate type of environment for a given problem, and the corresponding methods for solving search problems within this environment;

- Implement and apply AI techniques to typical application domains such as video games and robotics.

COORDINATOR: Shuihua Wang

TEACHING AND LEARNING METHODS:
Lectures, lecture notes, recommended textbooks, supervised laboratories, hands-on experience programming robots, robot contest with. results from mini-project.

PRE-REQUISITES: -

TOTAL MODULE HOURS: 150

ASSESSMENT METHODS:
Coursework and Examination.

GUIDED INDEPENDENT LEARNING: INDICATIVE ACTIVITIES:
Directed reading, use of web-based tutorials.

MODULE NAME: Analysis and Design of Algorithms

MODULE CODE: CO3002

MODULE DESCRIPTION: Click to open.

CREDITS: 15

PERIOD: Semester 2

DEPARTMENT: Informatics

INTENDED LEARNING OUTCOMES:
On completion of the module, successful students should be able to:

- Analyse and evaluate the efficiency of algorithms in terms of asymptotic complexity;

- Demonstrate a number of standard algorithms for problems in fundamental areas in computer science and engineering such as sorting, searching, and problems involving graphs;

- Apply a number of standard algorithm design techniques to design efficient algorithms for new problems;

- Produce concise technical writing for describing the solutions and arguing for their correctness.

COORDINATOR: Stanley Fung

TEACHING AND LEARNING METHODS:
Class sessions together with lecture notes, lecture slides, recommended textbooks, worksheets, printed solutions, and web support.

PRE-REQUISITES: -

TOTAL MODULE HOURS: 150

ASSESSMENT METHODS:
Coursework (40%) and exam (60%).

GUIDED INDEPENDENT LEARNING: INDICATIVE ACTIVITIES:
Guided reading and videos, other web resources.

MODULE NAME: Distributed Systems and Applications

MODULE CODE: CO3090

MODULE DESCRIPTION: Click to open.

CREDITS: 15

PERIOD: Semester 2

DEPARTMENT: Informatics

INTENDED LEARNING OUTCOMES:
On completion of the module, successful students should be able to:

- Tackle distributed programming issues and analyse complex problems that require distribution of resources/computations;

- Analyse and choose among the middleware models described in the course;

- Demonstrate the ability to solve issues like multi-threading and transactional interactions in distributed application;

- Apply principles of component-based distributed programming (e.g., with respect to technologies like RMI, JavaEE, etc);

- Solve practical distributed computing problems using distributed computation frameworks such as Hadoop MapReduce.

COORDINATOR: Yi Hong

TEACHING AND LEARNING METHODS:
Class sessions, textbook, worksheets, additional hand-outs and web support. Marked coursework, traditional written examination

PRE-REQUISITES: -

TOTAL MODULE HOURS: 150

ASSESSMENT METHODS:
Marked coursework, traditional written examination.

GUIDED INDEPENDENT LEARNING: INDICATIVE ACTIVITIES:
Directed reading and videos, problem sets, writing module note-based summaries.

MODULE NAME: Big Data and Predictive Analytics

MODULE CODE: CO3093

MODULE DESCRIPTION: Click to open.

CREDITS: 15

PERIOD: Semester 2

DEPARTMENT: Informatics

INTENDED LEARNING OUTCOMES:
On successful completion of the module, students should be able to:

- Analyse possibly large amount of data;

- Develop and back-test a predictive model;

- Compare and contrast different types of predictive models;

- Evaluate a predictive mode;

- Use a Map-Reduce approach in processing data;

- Write a report on the data analysis carried out.

COORDINATOR: Emmanuel Tadjouddine

TEACHING AND LEARNING METHODS:
Blended learning including Lectures, Notes, Tutorials, Laboratory based Learning Support; Model answers for Lab/tutorials; all include online delivery.

PRE-REQUISITES: -

TOTAL MODULE HOURS: 150

ASSESSMENT METHODS:
Coursework.

GUIDED INDEPENDENT LEARNING: INDICATIVE ACTIVITIES:
Directed reading and videos, problem sets and sample solutions; learning support including online. Use of web-based coding tutorials/videos.

MODULE NAME: Foundations of Cybersecurity

MODULE CODE: CO3099

MODULE DESCRIPTION: Click to open.

CREDITS: 15

PERIOD: Semester 2

DEPARTMENT: Informatics

INTENDED LEARNING OUTCOMES:
On completion of the module, successful students will be able to:

- Describe the working principles of modern cryptosystems including public key cryptography;

- Design and implement secure network applications using standard cryptographic libraries;

- Describe the fundamental principles of security and be able to identify the needed design principle;

- Explain the importance of security requirements in system design;

- Explain the concepts of authentication and authorization, and discuss and compare commonly used methods for each of them;

- Identify common attack vectors, and implementation issues that can result in potential security problems;

- Be able to identify and prevent common client- and server-side attacks in web applications;

- Describe the concepts of privacy and anonymity, and be able to apply mechanisms for achieving database privacy;

- Demonstrate familiarity with secure communication protocols (such as, for example, TLS) and some attacks on them.

COORDINATOR: Stanley Fung

TEACHING AND LEARNING METHODS:
Class sessions together with lecture slides, recommended textbooks, problem sets with solutions and feedback, laboratory based learning support.

PRE-REQUISITES: -

TOTAL MODULE HOURS: 150

ASSESSMENT METHODS:
Marked coursework, traditional written examination.

GUIDED INDEPENDENT LEARNING: INDICATIVE ACTIVITIES:
Guided reading and videos, other web resources.

MODULE NAME: Technology and Innovation Management

MODULE CODE: CO3103

MODULE DESCRIPTION: Click to open.

CREDITS: 15

PERIOD: Semester 2

DEPARTMENT: Informatics

INTENDED LEARNING OUTCOMES:
At the end of this course you should be able to:

Clearly distinguish between the various models and facets of technology management.

Critically evaluate how various models of technology analysis can be used to assess competitiveness and inform managerial action.

Formulate and respond to differing technological scenarios at the firm level.

Make judgements about a particular technology strategy employed by an organisation and evaluate its effectiveness.

Define Networked Organisations and explore dissimilar innovative procedures and complex decision-making strategies to facilitate innovation.

Apply presentation and analytical skills to develop arguments and evidence to support your evaluation.

COORDINATOR: Karim Mualla

TEACHING AND LEARNING METHODS:
Lectures, Seminars for coursework examples and feedback.

PRE-REQUISITES: -

TOTAL MODULE HOURS: 150

ASSESSMENT METHODS:
Essay/Project.

GUIDED INDEPENDENT LEARNING: INDICATIVE ACTIVITIES:
Directed reading and videos, problem case-studies, writing module note-based summaries.

MODULE NAME: Functional Programming

MODULE CODE: CO3111

MODULE DESCRIPTION: Click to open.

CREDITS: 15

PERIOD: Semester 2

DEPARTMENT: Informatics

INTENDED LEARNING OUTCOMES:
On completion of the module, successful students should be able to:

- Demonstrate skilled use of basic functions and techniques to solve simple problems;

- Explain in detail definitions of numbers, lists, recursion, and patterns;

- Explain higher order functions and mechanisms for defining new datatypes;

- Explain advanced functional programming constructs;

- Solve simple and complex programming problems using functional programming;

- Demonstrate skilled use of functional programming in mainstream programming languages for developing web applications.

COORDINATOR: Roy Crole

TEACHING AND LEARNING METHODS:
Lectures, Tutorials for coursework examples and feedback, Laboratory based Learning Support

PRE-REQUISITES: -

TOTAL MODULE HOURS: 150

ASSESSMENT METHODS:
Coursework (40%), Exam (60%)

GUIDED INDEPENDENT LEARNING: INDICATIVE ACTIVITIES:
Directed reading and videos, problem sets, writing module note-based summaries. Use of web-based coding tutorials/videos.

MODULE NAME: Algorithms for Bioinformatics

MODULE CODE: CO4200

MODULE DESCRIPTION: Click to open.

CREDITS: 15

PERIOD: Semester 2

DEPARTMENT: Informatics

INTENDED LEARNING OUTCOMES:
On completion of the module, successful students should be able to:

- Describe a number of computational problems arising in bioinformatics;

- State and discuss algorithmic approaches to the solution of such problems;

- Discuss and apply probabilistic models underlying computational tasks in bioinformatics;

- Design and implement efficient algorithms;

- Apply modelling and algorithm design techniques to the solution of bioinformatics problems.

COORDINATOR: Rajeev Raman

TEACHING AND LEARNING METHODS:
Class sessions together with course notes, recommended textbooks, worksheets, and some additional hand-outs and web support.

PRE-REQUISITES: -

TOTAL MODULE HOURS: 150

ASSESSMENT METHODS:
Marked problem-based worksheets and programming assignments, traditional written problem-based examination.

GUIDED INDEPENDENT LEARNING: INDICATIVE ACTIVITIES:
Lecture recordings, screencasts, guided reading lists.

MODULE NAME: Algorithms for Bioinformatics

MODULE CODE: CO4200

MODULE DESCRIPTION: Click to open.

CREDITS: 15

PERIOD: Semester 2

DEPARTMENT: Informatics

INTENDED LEARNING OUTCOMES:
On completion of the module, successful students should be able to:

- Describe a number of computational problems arising in bioinformatics;

- State and discuss algorithmic approaches to the solution of such problems;

- Discuss and apply probabilistic models underlying computational tasks in bioinformatics;

- Design and implement efficient algorithms;

- Apply modelling and algorithm design techniques to the solution of bioinformatics problems.

COORDINATOR: Thomas Erlebach

TEACHING AND LEARNING METHODS:
Class sessions together with course notes, recommended textbooks, worksheets, and some additional hand-outs and web support.

PRE-REQUISITES: -

TOTAL MODULE HOURS: 150

ASSESSMENT METHODS:
Marked problem-based worksheets and programming assignments, traditional written problem-based examination.

GUIDED INDEPENDENT LEARNING: INDICATIVE ACTIVITIES:
Lecture recordings, screencasts, guided reading lists.

MODULE NAME: Generative Development

MODULE CODE: CO4207

MODULE DESCRIPTION: Click to open.

CREDITS: 15

PERIOD: Semester 2

DEPARTMENT: Informatics

INTENDED LEARNING OUTCOMES:
On completion of the module, successful students should be able to:

- Demonstrate knowledge of the main approaches for model-based software development;

- Critically evaluate the role of modelling and code generation in software development;

- use modelling languages for designing views of software systems;

- Check the consistency of the models of an application;

- Use techniques for generative software development;

- Explain concepts of software product line development and apply them.

COORDINATOR: James Hoey

TEACHING AND LEARNING METHODS:
Lectures, problem classes, laboratory sessions, recommended textbooks, worksheets, programming exercises, web support.

PRE-REQUISITES: Desirable: UML, Java, Eclipse

TOTAL MODULE HOURS: 150

ASSESSMENT METHODS:
Individual and group coursework assignments, in-class tests. Re-assessment via traditional written examination.

GUIDED INDEPENDENT LEARNING: INDICATIVE ACTIVITIES:
Lecture recordings, screencasts, guided reading lists.

MODULE NAME: Personal and Group Skills

MODULE CODE: CO4210

MODULE DESCRIPTION: Click to open.

CREDITS: 15

PERIOD: Semester 2

DEPARTMENT: Informatics

INTENDED LEARNING OUTCOMES:
On completion of the module, successful students should be able to:

- Locate, organise and marshal evidence, report on findings, analyse complex ideas and construct sophisticated critical arguments;

- Demonstrate knowledge of how and when to draw on the knowledge and expertise of others;

- Contribute and comment on ideas in syndicate groups;

- Reflect on and write up results;

- Plan and present research clearly and effectively using appropriate IT resources;

- Deliver oral presentations to professional standard;

- Respond to questioning;

- Write cogently and clearly.

COORDINATOR: Irek Ulidowski

TEACHING AND LEARNING METHODS:
Seminars by guest speakers, handouts and recommended texts, moderated group discussions, oral presentation, collective writing, workshops on transferrable skills.

PRE-REQUISITES: -

TOTAL MODULE HOURS: 150

ASSESSMENT METHODS:
Moderated group discussions, 4,000 word collective essay, 10 minute oral presentation. The coursework on this module cannot be re-sat.

GUIDED INDEPENDENT LEARNING: INDICATIVE ACTIVITIES:
Guided reading, workshop recordings, group discussions, literature search, essay writing, presentation preparation.

MODULE NAME: Service-Oriented Architectures

MODULE CODE: CO4214

MODULE DESCRIPTION: Click to open.

CREDITS: 15

PERIOD: Semester 2

DEPARTMENT: Informatics

INTENDED LEARNING OUTCOMES:
On completion of the module, successful students should be able to:

- Demonstrate familiarity with the conceptual and technological foundations of Service-Oriented Architectures (SOA), i.e. the motivation, basic mechanisms, and open problems of SOA;

- Be able to design service-oriented systems and express these designs in appropriate modelling notations based on object-oriented and component-based concepts;

- Understand the relationship between high-level models and their implementation-level languages and technologies such as XML, WSDL and SOAP as well as JSON and REST;

- Be able to exercise this relationship by mappings in both directions in simple examples;

- Understand the use of model-based testing of services; be able to generate test cases and assess test results based on models.

COORDINATOR: Reiko Heckel

TEACHING AND LEARNING METHODS:
Lectures, surgeries and lab classes; lecture and surgery recordings; course notes, lab and surgery assignments; recommended textbooks and online materials.

PRE-REQUISITES: Desirable: UML, XML, Java.

TOTAL MODULE HOURS: 150

ASSESSMENT METHODS:
Marked coursework based on theoretical and lab-based problem solving task, class or lab tests, written examination.

GUIDED INDEPENDENT LEARNING: INDICATIVE ACTIVITIES: