BIRKBECK COLLEGE
UNIVERSITY OF LONDON

BSc (Hons) Information Systems & Management
(2015/16)

OPTIONS HANDBOOK
**GENERAL INFORMATION**

This handbook is a guide to the options available to students in the 3rd and 4th years of the BSc Information Systems and Management (four years part time programme) or in the 2nd and 3rd years of the BSc ISM (three years full time programme). A total of 360 credits are required. A module taught in 1 term has a value of 15 credits. A module taught over two terms has a value of 30 credits. The final year project has a value of 30 credits.

It is necessary to obtain at least 120 credits at level 6.

Level 5 ITApps modules can be included as options, subject to availability and provided the prerequisites are satisfied. See [http://www.dcs.bbk.ac.uk/itapps/](http://www.dcs.bbk.ac.uk/itapps/) for further information. If any ITApps modules are of interest, then please contact the BSc ISM programme director.

When you have decided on your options, you are required to complete the options form on page 32 of this handbook and return it to the Programme Administrator by the 21st September. If, after submitting your form you wish to change one or more options, then please email the Programme Administrator at: bscadmin@dcs.bbk.ac.uk indicating your new choices.

Although the Department endeavours to provide the modules as stated, there may be last minute changes.

Please note that the suggested texts in the module descriptions may differ from the books recommended for purchase. In the first lecture of each module students will be informed about the books recommended for purchase.

<table>
<thead>
<tr>
<th>Optional modules</th>
<th>Credits</th>
<th>Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Computer Science and Information Systems Modules:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advanced Web Authoring</td>
<td>15</td>
<td>3</td>
</tr>
<tr>
<td>Cloud Computing Concepts</td>
<td>15</td>
<td>3</td>
</tr>
<tr>
<td>Computer Networking</td>
<td>15</td>
<td>4</td>
</tr>
<tr>
<td>Computer Organization and Systems Software</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>Concepts of Intelligent Technologies</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>Data Structures and Algorithms</td>
<td>15</td>
<td>6</td>
</tr>
<tr>
<td>Database Management</td>
<td>15</td>
<td>7</td>
</tr>
<tr>
<td>Enterprise Computing</td>
<td>15</td>
<td>8</td>
</tr>
<tr>
<td>Interactive Systems Design</td>
<td>15</td>
<td>8</td>
</tr>
<tr>
<td>Introduction to Data Analytics Using R</td>
<td>15</td>
<td>9</td>
</tr>
<tr>
<td>Introduction to Search Engine and Web Navigation</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>Introduction to the Semantic Web</td>
<td>15</td>
<td>11</td>
</tr>
<tr>
<td>Practical Software Engineering</td>
<td>15</td>
<td>12</td>
</tr>
<tr>
<td>Programming Language Paradigms</td>
<td>15</td>
<td>13</td>
</tr>
<tr>
<td>Software and Programming II</td>
<td>15</td>
<td>14</td>
</tr>
<tr>
<td>Software and Programming III</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Wireless and Mobile Computing</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td><strong>Management Modules:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commercial Law for Business</td>
<td>15</td>
<td>16</td>
</tr>
<tr>
<td>Employment Relations and HRM</td>
<td>15</td>
<td>17</td>
</tr>
<tr>
<td>Financial Management</td>
<td>30</td>
<td>17</td>
</tr>
<tr>
<td>International Business</td>
<td>15</td>
<td>18</td>
</tr>
<tr>
<td>Macroeconomics for Business</td>
<td>15</td>
<td>19</td>
</tr>
<tr>
<td>Management of Innovation</td>
<td>15</td>
<td>19</td>
</tr>
<tr>
<td>Marketing Strategy</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td>Operations Management</td>
<td>15</td>
<td>21</td>
</tr>
<tr>
<td>Research Methods in Management</td>
<td>15</td>
<td>22</td>
</tr>
<tr>
<td><strong>Organisational Psychology Module:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organizational Behaviour</td>
<td>15</td>
<td>23</td>
</tr>
</tbody>
</table>
Advanced Web Authoring
Level 5
15 credits
BUCI051H5

Prerequisites
Introduction to Web Authoring or equivalent.
Good knowledge of authoring with HTML and some knowledge of CSS.
Good knowledge of web design: colour theory, font management, page layout.

Aims
To develop expertise in creating and publishing professional quality websites using industry-standard web authoring tools.
To build on the HTML5 and CSS3 skills developed in Introduction to Web Authoring.

Content
- Authoring Tool Basics: Creating websites using range of techniques to ensure that websites can be maintained and conform to standards.
- Libraries, stylesheets, templates.
- Accessibility: Optimising site accessibility, building accessible tables and forms in XHTML.
- Management tools for publishing websites.
- Tools: Validation, accessibility and browser compatibility testing.

Cloud Computing Concepts
Level 6
15 credits
BUCI028H6
Lecturer: Dell Zhang
Prerequisites: Software and Programming 2 or equivalent prior experience of programming in Java.

Outline: Students in this module will learn to understand the emerging area of cloud computing and how it relates to traditional models of computing, and gain competence in MapReduce as a programming model for distributed processing of big data.

Aims: This module aims to introduce back-end cloud computing techniques for processing "big data" (terabytes/petabytes) and developing scalable systems (with up to millions of users). We focus mostly on MapReduce, which is presently the most accessible and practical means of computing for "Web-scale" problems, but will discuss other techniques as well.

Syllabus
- Introduction to Cloud Computing
- Cloud Computing Technologies and Types
- Big Data
- MapReduce and Hadoop
- Running Hadoop in the Cloud (Practical Lab Class)
- Developing MapReduce Programs
- Data Management in the Cloud
- Information Retrieval in the Cloud
- Link Analysis in the Cloud
- Beyond MapReduce
- Selected Case Studies

Coursework: One essay of 2,000-3,000 words.
Assessment: Coursework (20%). Examination (80%).

Recommended Reading
- Extensive use is made of other relevant book chapters and research papers that are distributed or provided online.

Computer Networking
Level 5
15 credits
BUCI036H5
Lecturer: Andrea Calì

Outline: The module covers several fundamental aspects of modern computer networks, especially the Internet and its protocols. Foundations are given for networking at all layers, from the physical layer to applications, and the course topics are presented together with their real-world applications.

Aims: The module aims at providing the student the tools for understanding and building network applications, by analysing Internet protocols, the interaction among them, and their applications. There is an emphasis on real-world applications, so as to provide the basic tools to understand and design network hardware and software.

On successful completion of this module the student will be able to:
- Deal with the fundamental network protocols and interfaces at every layer of a communication system, from the physical layer to the application layer.
- Understand and address basic security issues in computer networks.
- Address basic design and performance issues in computer networks.
- Write simple Java networking code with sockets

Syllabus
- Computer Networks and their applications
- The physical layer
- The data link layer, LAN and WAN
- The network layer and IP
- The transport layer and TCP
- The application layer, DNS, email, and FTP
- Network security and cryptography
- Java Networking basics

Assessment: A two-hour written examination (90%) and programming coursework (10%).

Recommended Reading

Optional Reading
Computer Organisation and Systems Software
Level 5
15 credits
BUCI055H5
Lecturer: Szabolcs Mikulas
Prerequisites: passing the Introduction to Computer Systems module

Outline: During the module the students will become familiar with the main parts of the computer, their functions and interconnections. They will also learn the main functions of the operating system and how it interacts with the hardware.

Aims: The main aim of the module is to understand the basics of computer architecture and organisation, and the role and mechanisms of operating systems.

Syllabus:
- Basics of Computer Architecture
- Memory Hierarchy
- Instruction Sets
- Pipelining
- Processes and Threads
- Scheduling and Resource Allocation
- Concurrency
- Input/Output
- File Systems

Coursework: computational and algorithmic exercises
Assessment: written examination (90%) and coursework (10%)
Recommended Reading:

Concepts of Intelligent Technologies
Level 6
15 credits
BUCI034H6
Lecturer: George Magoulas

Prerequisites: No formal pre-requisite or co-requisite module but knowledge of mathematical concepts such as those presented in the website (http://www.gcseguide.co.uk/mathsgcseguide.htm) is essential.

Outline. The module covers computational algorithms for intelligent information management, decision making and complex problem solving. It provides an introduction to technologies such as knowledge-based systems, artificial neural networks, fuzzy logic, evolutionary computation, hybrid systems showing how such technologies work to support the development of modern intelligent applications.

Syllabus
- Knowledge-based Systems
- Rule-based Expert systems
- Fuzzy Systems
- Uncertainty Management
- Neural Computing
- Genetic and Evolutionary Computing
- Hybrid Approaches

Aims. The module aims to cover fundamental technologies of intelligent systems, illustrate what technologies are useful for and how systems that employ these technologies are designed and built.
On successful completion of this module, the student will be able to:

- Discuss essential facts, concepts, principles, and theories of intelligent systems.
- Discuss fundamental issues relating to the design and implementation of systems that employ intelligent technologies or components.
- Apply theoretical understanding of intelligent computing paradigms to solve data modelling, information processing and decision making problems using intelligent systems.
- Recognise legal, social, ethical & professional issues and risk involved in the application and use of intelligent technologies.
- Recognise andanalyse specifications appropriate to specific problems and plan strategies for their solution.
- Describe the process involved in the effective deployment of intelligent technologies.
- Evaluate intelligent technologies in terms of general quality attributes and possible trade-offs presented within the given problem.

**Assessment:** A two-hour written examination (100%).

**Recommended Reading**
M. Negnevitsky, Artificial Intelligence: a Guide to Intelligent Systems, 2nd edition, Addison Wesley. Students will also be directed to online educational resources on the subject.

---

**Data Structures and Algorithms**

*Level 5*

*15 credits*

*BUC1030H5*

**Lecturer:** Igor Razgon

**Prerequisites:** Introduction to Programming or Software and Programming 1.

**Aims**

At this stage of your studies you know to write programs for simple computational tasks. Now it is time to learn how to write *efficient* programs, that is those that complete the task as fast as possible and do not consume much memory. Writing such a program means:

- Organising the data operated by the program into structures (classes in terms of Java) that allow quick data extraction and do not occupy too much memory.
- Designing an algorithm that queries the above structures only regarding the data needed for the given computational task.

The ability to write efficient programs is fundamental for a qualified software developer. The module Data Structures and Algorithms will give you a gentle introduction into the beautiful art of writing efficient programs. It will equip you with the skills and intuitions that will be much needed in your future career in software development.

Teaching and learning methods include lectures and reading materials describing techniques for analysing algorithms and applications of data structures. Students will have an opportunity to examine practical problem solving for this area.

**Syllabus**

- Introduction to Data Structures and Algorithms;
- Runtime of algorithms, big O notation;
- Data structures: arrays, lists, queues, stacks, and sets;
- Trees: binary trees;
- Recursion - Traversing binary trees;
- Binary search trees.
- Algorithms for sorting and searching;
- Elementary graph algorithms.

**Assessment:**

two hour written examination (80%) and coursework (20%).
**Reading list:** the material we cover in the module appears in any reasonable book on Data Structures and Algorithms. Choose any book covering the topics of the syllabus. Some books stick to a particular programming language, our working language will be Java. Please note that books are often written to fit a large audience of readers from undergraduate students to advanced graduates and professional researchers. Therefore your book would probably contain much more material that we will study in this module and some material will be very advanced. Please do not be scared away by this fact: our coverage of material will be elementary with intuition coming before mathematical precision.

**Database Management**

Level 6  
15 credits  
COIY028H6  
**Lecturer:** Peter Wood

**Prerequisites:** ISC, ISM, ITP and ICS

**Aims.** To familiarise the student with the main concepts underlying Database Management, and in particular with the Relational Database model which is the dominant database system used within corporate IT departments. The course has three main strands: (1) Fundamental concepts introduced using the Entity-Relationship model, (2) Querying a relational database, and (3) Relational database design.

**Syllabus**

- Entity Relationship Diagrams
- Relational Model
- Querying a Relational Database
- Creating Relational Schemas
- Modifying a Relational Database
- Integrity Constraints in the Relational Model
- Relational Database Design
- Normal Forms
- Normalisation Algorithms
- Object Relational and NoSQL Databases
- Databases and the Web

**Assessment:** 2-hour written examination and practical coursework, weighting 80% and 20% respectively.

**Reading list**


Enterprise Computing
Level 6
15 credits
COIY044H6

Prerequisites
Years 1 and 2 of Information Systems & Management (or Foundation Degree or equivalent). Some experience of web applications will also be useful. It is not essential, but it helps, to have taken the module Software and Programming II.

Description
The concept of Enterprise Middleware, a layer of software which lies between application-specific software and operating system(s) in a server environment, is introduced. In its more advanced forms, middleware provides a complete virtual environment for applications, eliminating the need for these applications to access the operating system directly. The need for this layer has been found in commercial server-based applications over several decades, for three main reasons:

• to simplify development of enterprise applications and enable application portability
• to enable the construction of robust, highly scalable, and secure distributed applications
• to enable applications to achieve the qualities of service (cost per transaction, availability, response time, peak transaction rate, etc) demanded by real world applications

Typical examples of advanced middleware systems are Transaction Processing monitors, which are widely used to support large scale commercial server-based applications, and server-based software products conforming to the JEE or .NET specifications. It is estimated that 80% of all large scale server-based systems use some form of middleware. These technologies are now providing the basis for implementing applications using Service Oriented Architectures. The module is fairly demanding, since it aims to give students a working knowledge of important topics in the industry today.

Aims
After completing this course, students should:

• be familiar with large scale server-based applications and the middleware products used to support them, with specific examples of them and their detailed capabilities, and the business context in which they are deployed
• understand the issues involved in designing and building these systems, including architecture, transactions, performance, scalability, security, and specific middleware technologies including remote procedure call, reliable messaging, transaction management and web services
• understand the Qualities of Services required of large scale applications and the design approaches needed to meet these requirements
• understand the behaviour of systems in high load situations, the techniques used to measure them and to ensure satisfactory performance be aware of the management disciplines required to support the operation of large scale commercial systems

Assessment
One two-hour examination (80%)
In-class test - open book (10%)
Lab coursework (10%)

Interactive Systems Design
Level 6
15 credits
BUCI053H6
Lecturer: George Magoulas

Prerequisites: Knowledge of the module Information Systems Concepts (COIY016H4).

Outline. Modern software systems are interactive and personalised and operate in a large variety of contexts. Systems and digital artefacts vary enormously in size and complexity and utilise a range of technologies. There is no ‘one size fits all’ approach that can deal with this variety. The Interactive systems design module offers an introduction to the practical issues of creating interactive systems
and products from a human-centred perspective. It covers methodologies, techniques, and technologies involved in the design of high quality interactive systems, products and services, and techniques for reflecting on a design throughout the development of the interactive system. The focus is on the design and evaluation of interactive system rather than on the programming.

**Syllabus**
The module covers theory, methods, and techniques used for the design of interactive systems. Indicative topics are listed below:

- Essentials of designing interactive systems: key concepts and how these are applied to different types of systems.
  - The process of human-centred design
  - Usability
- Techniques for designing interactive systems: understanding the requirements, prototyping and evaluating design ideas.
  - Methods for understanding users
  - Design methods
  - Evaluation methods
  - Task analysis
- Contexts for designing interactive systems: case studies of interaction design in contexts that are dominating the subject today.
  - Web-based interactive systems
  - Agents and avatars
  - Mobile computing

**Aims.** The module aims to present a coherent introduction to the practical issues of creating interactive systems and products from a human-centred perspective. It covers fundamental concepts of interactive systems design, essential processes, and techniques for the design, development, and evaluation of interactive systems in different contexts.

On successful completion of this module, the student will be able to:

- Discuss essential facts, concepts, principles, and theories of interactive systems design.
- Discuss fundamental issues relating to the design and implementation of interactive systems
- Describe processes, methodologies and techniques involved in the design, implementation and effective deployment of interactive systems
- Recognise social, ethical & professional issues and risk involved in the design of interactive systems.
- Recognise specifications and guidelines to design interactive systems for a particular context.
- Apply theoretical understanding of design methodologies to interactive systems.
- Evaluate interactive systems in terms of general quality attributes and possible trade-offs within a particular context.

**Assessment:** A two-hour written examination (100%).

**Recommended Reading**
Students will also be directed to online educational resources on the subject.

**Introduction to Data Analytics Using R**
Level 6
Credits 15
BUCI045H6
**Lecturer:** Tingting Han
**Prerequisites:** none

This module covers the principle concepts and techniques of data analytics and how to apply them to large-scale data sets. Students develop the core skills and expertise needed by data scientists, including the use of techniques such as linear regression, classification and clustering. The module will show you how to use the popular and powerful data analysis language and environment R to solve practical problems based on use cases extracted from real domains. Topics include: linear
regression; classification using logistic regression, decision trees, and SVM; clustering; ensemble methods; validation; and more advanced topics.

**On successful completion of this module a student will be expected to:**

- Recognise the state of the practice in big data analytics in the industry.
- Demonstrate a satisfactory knowledge of linear regression, classification and clustering.
- Understand ensemble methods and use them to data in a big scale.
- Use the open-source tool R for performing the above tasks and apply the methods in real application scenarios consisting of big and complex data.
- Outline the advanced techniques used in big data systems (e.g., scalable machine learning methods) and applications (e.g. the stream data).
- Be able to validate and evaluate the data analysis results.

**Content**

- Introduction to big data analytics: big data overview, data pre-processing, concepts of supervised and unsupervised learning.
- Basic statistics: mean, median, standard deviation, variance, correlation, covariance.
- Linear regression: simple linear regression, introduction to multiple linear regression.
- Classification: logistic regression, decision trees, SVM.
- Ensemble methods: bagging, random forests.
- Evaluation and validation: cross-validation, assessing the statistical significance of data mining results.
- Real life applications as case studies.
- Tools: R.

**Textbooks:**
A suitable textbook covering data mining and R will be used, such as:

An Introduction to Statistical Learning: With Applications in R: Gareth James, Daniela Witten, Trevor Hastie and Robert Tibshirani.

---

**Introduction to Search Engines and Web Navigation**

**Level 6**
**Credits 15**
**BUCI047H6**

**Lecturer:** Mark Levene

**Prerequisites:** Software and Programming 1 or equivalent

This module covers the principle concepts underlying Search Engine and Navigation technologies within the context of the World-Wide-Web (WWW). It focuses on the technologies that help us understand:

- The structure of the Web; Web metrics.
- Finding information on the Web; Searching and navigating for information on the Web, and
- How people use the Web; Web data mining.

**The main aims** of the module are to familiarise the student with the main technologies that underpin Search Engine and Navigation technologies within the context of the WWW, and how these are influencing the development of the WWW. An important aim of the course is to enable the student to experiment, through the coursework, with various technologies and to understand the convergence of these technologies within the WWW.

**On successful completion of the module the student is expected to:**

- Understand the main technologies that underpin Search and Navigation in the context of the WWW.
- Be familiar with Search and Navigation technologies that manifest themselves within tools that are widely used within organisations.
- Have the ability to identify the appropriate Search and Navigation technologies needed to solve problems relating to IT and commercial Internet strategies.
• Have the ability to understand and tackle problems relating to IT, especially regarding the deployment of new Web technologies that affect work patterns within organizations.

The syllabus contains the following items:

• How the WWW operates - some history and terminology.
• The structure of the web.
• Link analysis.
• Searching the web.
• Navigating the web.
• Web usage mining.
• Recommender Systems and Collaborative Filtering.
• Web 2.0 and Collective Intelligence.

Recommended Textbook:

More detail can be found on the module web page at: http://www.dcs.bbk.ac.uk/~mark/webtech.html

Introduction to the Semantic Web
Level 6
15 Credits
BUCI048H6
Lecturer: Michael Zakharyaschev

Prerequisites: None

Aims
This module is a gentle introduction to the theory and practice of the Semantic Web, an extension of the current Web that provides an easier way to find, share, reuse and combine information. It is based on machine-readable information and builds on XML technology's capability to define customised tagging schemes, RDF's (Resource Description Framework) flexible approach to representing data, the OWL (Web Ontology Language) schema language and SPARQL query language. The Semantic Web provides common formats for the interchange of data (whereas on the Web there is only an interchange of documents). It also provides a common language for recording how data relates to real world objects, allowing a person or a machine to start off in one database, and then move through an unending set of databases which are connected not by wires but by being about the same thing. Important applications of the Semantic Web technologies include Healthcare (SNOMED CT), Supply Chain Management (Biogen Idec), Media Management (BBC), Data Integration in the Oil & Gas industry (Chevron, Statoil), Web Search and E-commerce.

Syllabus
• The layered approach to the Semantic Web. XML, the tree model of XML documents, XML Schema. Querying XML documents, XPath.
• SPARQL Query Language and Terse RDF Triple Language Turtle.
• Requirements for ontology languages. From RDFS to OWL. OWL ontologies.
• Ontology engineering. OWL ontologies in life sciences and industry.
• Protege ontology editor and framework for building intelligent systems. Reasoning with OWL.
• Introduction to Description Logic and formal semantics.
• Ontology-based data access with Ontop.

Assessment
By 2-hour written examination and by practical coursework. The written examination will have a weighting of 80% and the coursework a weighting of 20% of the final mark.
Recommended Reading


---

Practical Software Engineering
Level 6
15 credits
BUCI049H6
Lecturer: Oded Lachish

Prerequisite: Software and Programming I

Aims
The aim of this module is to provide a general understanding of Software Engineering; the typical phases of the software lifecycle with particular reference to practical specification, design and testing techniques. These techniques form important concepts that can be studied in more detail in other modules. It prepares students for the various software development projects undertaken throughout their studies.

Outline
This module will introduce the concepts of Software Engineering as a discipline and will provide an overview of the whole software development process. A selection of fundamental topics in Software Engineering will be covered in depth:

- Software development methodologies and the software lifecycle, focusing on agile models, extreme programming, DEVOPS, etc.
- Formal requirements and specification, focussing on how to turn an informal design brief into a formal specification
- Software testing, evaluation and debugging, including practical use of modern debugging toolkits.
- Software evolution and maintenance, including version control and collaborative development system.

Syllabus

- Introduction
- Overview of the software processes
- Agile software development
- Requirements engineering
- System modelling and architectural design
- Design and implementation
- Software build systems
- Software testing and evolution
- Case studies
- Student presentations

Coursework: Team project (selected from a set of topics on Software Engineering (25%)

Assessment: Two hour unseen examination
Programming Language Paradigms
Level 6
15 credits
BUCI032H6
Lecturers: Keith Mannock

Prerequisites: Software and Programming 2

Outline. To create a basic understanding of different programming paradigms and how they can be used in developing software. To provide the opportunity to further develop problem solving skills by studying advanced programming languages and new programming paradigms.

Aims. To enable students to understand the key differences between the various programming paradigms and the applicability of these paradigms to different programming problems. To enable students to deal with the changing requirements of the current day (and future) programmer where "polyglot" programming (the ability to mix and match languages and technologies appropriately) is fast becoming the norm.

Syllabus
- Definition of syntax and semantics;
- Variable scoping and binding - lexical/static and dynamic;
- Normal and applicative order evaluation, parameter passing mechanisms
- Storage allocation: run-time stack, heap storage and garbage collection
- Language support for abstract data types - arrays, maps, lists, etc.;
- Data abstraction and libraries, collections, iterators;
- Recursion, including tail recursion optimisation;
- Continuations, threads, tasks, actors, co-routines, etc.
- The imperative (procedural and object-oriented) language paradigm;
- The functional and logic language paradigms: lambda expressions, environments, predicates, etc.;
- Process oriented languages.
- Domain Specific Languages: scientific computation, symbolic computation, web and Internet computing.

Assessment
By two hour written examination (worth 80%) and practical coursework (worth 20%).

Recommended Reading
Indicative list:


Prerequisites: Software and Programming I. Alternative qualifications, e.g., extensive industrial experience, need to be agreed with the module leader prior to taking the module.

Outline
This module is a continuation of the studies presented in Software and Programming I focussing on and introducing the use of object-oriented methods for problem solving. Object-oriented programming languages require a different approach to software design from the traditional functional decomposition approach of procedural languages. Object-oriented systems are described in terms of independent objects, and their inter-relationships. Such systems can provide considerable potential for re-usability, extensibility, and robustness, assisting in the process of programming-in-the-large.

Syllabus
- Review of basic Java programming and the materials covered in Software and Programming I
- Passing objects and call-by-reference. Scope and the reference this. The qualifier final and class constants.
- Arrays, the enhanced for loop, common array algorithms, using arrays with methods, two-dimensional arrays and array lists
- Input and Output
- Test Driven Development
- Exceptions and exception handling - exception handling with try and catch. Program correctness: throwing an exception. Runtime exceptions and the throws clause. User defined exception classes.
- Object-Oriented Design - discovering classes, relationships between classes, cohesion and coupling, side effects, abstract classes, packages

Assessment
By two hour written examination (75%) and practical coursework (25%).

Recommended Reading
Java for Everyone: Compatible with Java 5, 6, and 7, 2nd Edition by Cay Horstmann 2012 published by John Wiley is the module text.
Software and Programming III

Level 6
15 credits
**Lecturer:** Keith Mannock

**Prerequisite:** Software and Programming II

**Aims**
The main aim of the module is to provide students with the necessary skills for developing software using the object-oriented and functional programming paradigms through appropriate programming languages (e.g., Java 8 and Scala).

**Outline**
The module provides students with the necessary skills for developing software using the object-oriented and functional programming paradigms, with Java 8 and/or Scala. This ranges from learning object-oriented concepts, designing object-oriented software using a proven methodology and tools, to learning how to program in an object-oriented and functional style. The module provides detailed examination of Software Design Patterns, and the emerging functional features of current day object-oriented programming languages.

**Syllabus**
- The object model and how it is realised in various object-oriented languages (e.g., Java, Scala, Ruby, C++, ...)
- Further development of the ideas of inheritance and polymorphism
- Language features: inner classes, closures, higher-order functions, meta-objects, etc.
- An introduction to Test Driven Design (TDD) and Behavioural Driven Design (BDD)
- The use of an Integrated Development Environment (IDE) for software development: e.g., editing, debugging, compilation, etc.
- Modularity, versioning, packaging, and managing the build process
- Design Patterns and Anti-Patterns and their application to software design
- The SOLID (Single responsibility, Open-closed, Liskov substitution, Interface segregation and Dependency inversion) approach to object oriented programming and design
- Code refactoring and analysis
- Concurrency and agents/actors

**Coursework:** Practical programming assignments(s) (25%)

**Assessment:** Three hours unseen online or written examination (75%)

Wireless and Mobile Computing

Level 6
15 credits
**BUCI046H6**

**Lecturer:** George Roussos

**Prerequisites:** Software and Programming 1, Software and Programming 2 and Computer Networking. Information Security is recommended but is not essential.

**Aims**
Students taking this module will:
- study the novel aspects of mobile, ubiquitous and pervasive computing systems
- study the principles, research problems and applications of the Internet of Things
- acquire a range of design skills for software development in Android
- acquire systems development experience with mobile and ubiquitous computing technologies
- develop self-study skills so that they can keep up with the rapidly changing technologies, tools and techniques in the area
Syllabus
- Wireless and mobile networks
- Routing and mobility aspects of IP networks
- Smartphone components
- Radio Frequency Identification (RFID) and the IoT
- Processing sensor streams
- Location sensing technologies
- Privacy in mobile location sensing systems
- Programming with Android

Assessment
By 2-hour written examination and by practical project. The written examination will have a weighting of 80% and the project a weighting of 20% of the final mark.

Recommended Reading

Commercial Law for Business
MOMN018H5
Convenor: Dr Marion Frenz
Lecturers: Ms Jacqueline Bartley
Pre-requisites: None
Assessment: A 3-hour written examination (65%) and 1500-word coursework (35%).
Module credits: 15 credits at Level 5.

The module gives students an overview of the law relevant to business organisations. The syllabus is divided into 3 main areas of study: the English legal system; contract law; and company law.

The topics covered include an introduction to the structure of the courts, sources of law, European community law, formation of contracts, and sale of goods legislation and formation of companies together with director’s duties.

The module delivery is through lectures, seminars and group discussion. Students are expected to undertake a coursework assignment amounting to 35% of their final mark.

Aims
The aims of this module are to:
- To appreciate the law of contract and the sale of goods, which are fundamental to business.
- To understand the legal consequences of a company having a separate artificial legal personality.

Learning objectives
At the end of this module students will:
- Be familiar with the law making process both in this jurisdiction and the European Community, and the relationship between them.
- Understand the basic elements of English law of contract.
- Understand the status of different terms and that the law will imply terms into many contracts.
- Understand what amounts to a misrepresentation and appreciate the variety of causes of action and respective remedies.
• Recognise the distinction between a partnership and a company, the various types of companies and understand the exceptions to the rule that a company has a separate legal personality.

Recommended reading

Employment Relations and Human Resources Management
MOMN068H5
Convener: Dr Rebecca Gumbrell-McCormick
Lecturers: Dr Rebecca Gumbrell-McCormick, Roger Fagg, John Kelly
Pre-requisites: Management Studies 1 and Management Studies 2
Assessment: 2500-word coursework (35%) and exam (65%).
Credits: 15 credits.

This is a central module on the BA degree programmes in Management. It introduces some of the key concepts, critical debates and issues in the field of Employment Relations and Human Resource Management (ER and HRM) and focuses on such current topical issues as changes to the labour market, equality and inequality, and the role of trade unions, employers and the state.

Aims:
• To introduce key concepts and approaches in the study of the employment relationship.
• To describe and analyse contemporary developments in ER and HRM in the UK and other selected industrialized countries.
• To develop an understanding of some of the current developments in ER and HRM.

Learning objectives
At the end of this module students will have an understanding of:
• The key models of employment relations systems.
• The changing nature of work.
• Regulation of the employment relationship.
• The role of the state in contemporary labour markets.
• The origins, forms, and current practice of HRM.
• The management of work performance and work rewards.
• The forms of worker representation.
• The key issues in employment relations and current employment legislation.

Recommended reading

Financial Management
BUMN052S6
Convener and lecturer: Dr. Christine Guo
Pre-requisites: Financial Accounting, Quantitative Methods, Microeconomics for Business and Macroeconomics for Business
Assessment: A 3-hour written examination (75%) and 1 mid-term test (25%).
Module credits: 30 credits at Level 6.

This module is very quantitatively and mathematically rigorous. You will tackle complicated questions that involve basic statistics. It is strongly advised that you undertake the pre-requisites.

Aims
• Introduce students to the international world of capital markets and explores the theory of financial management.
• Gain an understanding of the financial system, which includes the stock, bond and derivative markets and the financial instruments.
• Deepen students’ knowledge of project evaluation for capital budgeting and be expected to value projects using discounted cash flow analysis.
• Introduce market efficiency.

The syllabus also includes portfolio theory, capital asset pricing models, capital structure theory and empirical evidence, dividend policy and merger and acquisition.

Learning objectives
At the end of this module students will be able to:
• Understand how different financial markets function.
• Estimate the valuation of financial instruments (including stocks, bonds, options and futures).
• Understand the term structure of interest rates.
• Make capital budgeting decisions under both certainty and uncertainty.
• Appreciate the application of the Capital Assets Pricing Model in practice.
• Deploy a working knowledge of the capital structure theory and dividend policy of a firm.
• Understand the theory of mergers and acquisitions.

Recommended reading

International Business
MOMN064H6
Convenor: Dr Paz Estrella Tolentino
Lecturer: Dr Paz Estrella Tolentino
Pre-requisites: Microeconomics for Business, Macroeconomics for Business
Assessment: A two-hour written examination (65%) and 2500-word coursework and presentation (35%).
Credit value: 15 credits at Level 6.

This advanced undergraduate module takes an academic approach to teaching and learning selected topics in international business.

Aims
• To develop an advanced understanding of selected topics concerning multinational companies in particular and international companies more generally.
• To analyse the various modes of international business as strategic means to attain the objectives of the international firm: international trade, international production and various forms of cross border collaborative arrangements.

Learning objectives
At the end of this module students will:
• Understand how globalisation is both a cause and effect of current economic issues.
• Appreciate the key role of multinational companies as international business institutions.
• Know the geographical scope of multinational companies.
• Comprehend the evolution of the international firm in a historical context.
• Be able to analyse how the different modes of international business can accomplish the objectives of international companies.

Recommended reading
For background reading:
Or any international business textbook.
Research published in academic journals is an integral part of teaching and learning in this module.
Macroeconomics for Business
MOMN033H5
Convenor: Dr. Luca Andriani and Dr. Federica Rossi
Lecturers: Dr. Luca Andriani
Pre-requisites: None
Assessment: One mid-term exam (30%) and a 2-hour written examination (70%)
Credit value: 15 credits at Level 5.

This module analyses the most useful and relevant topics in macroeconomics for business decision making. The module covers the basic concepts of managerial economics under the macroeconomic perspectives: business cycle, balance of payment and national account identity, exchange rate and purchasing power parity, monetary policy, fiscal policy and credit market under asymmetric information.

Aims
- At a specific level, to train undergraduate students in management programmes to understand the macroeconomic view in which business are operating.
- At a more general level, to strengthen the analytical and critical thinking skills of undergraduate students in management programmes.

Learning objectives
At the end of this module students will:
- Appreciate the practical utility of modern macroeconomic tools to identify and implement appropriate business strategies in a given situation.
- Be able to apply economic theory to specific macroeconomic scenarios.
- Develop widely transferable analytical and critical thinking skills.

Recommended reading
The lecture notes and seminar exercises represent the main study material of this module.
A textbook will be advised before the start of the module. A couple of good textbooks to browse in advance (available from the library) are:
Keith Pilbeam (2006), International Finance, Palgrave Macmillan. Please read the first 2 chapters (any edition is fine).

Management of Innovation
MOMN060H6
Convenor: Dr Marion Frenz
Lecturers: Professor Daniele Archibugi, Dr Marion Frenz, Professor Helen Lawton Smith
Pre-requisites: Management Studies 1 and Management Studies 2
Assessment: 2500-word essay (80%) and online multiple-choice tests (20%). Students are further expected to contribute to class discussions.
Credit value: 15 credits at Level 6.

Management of Innovation provides an introduction to key concepts and theories in innovation studies. We examine how firms manage innovation processes, explore different knowledge sources for innovation and look at technology and innovation strategies. A range of different methods used by firms to protect their innovations from imitation is evaluated. Students also learn about wider framework conditions that have a bearing on business innovation, including availability of finance for innovation, public policies and agencies promoting innovation.

Aims
- Develop an appreciation of the role of different types of innovations and their diffusion in the performances of firms, regions and economies. We consider the impact of ground breaking technological breakthroughs, but also incremental improvements in goods, services and processes.
- Analyse the key determinants driving business innovation, including internal sources - for example R&D personnel - and learning through collaborations with other businesses with the aim to develop new products, processes and services.
Learning objectives
On successful completion of the module, students will understand:
• Different types of innovations.
• Key factors influencing firms’ innovation performance.
• A range of theories explaining the rate and type of innovations.
• The relevance of, and rationale for, intellectual property rights, standards and innovation policy.
• The impact of different types of innovations on the firm, economy and society as a whole.

Recommended reading
Main text:

Further Reading

Marketing Strategy
MOMN044H6
Prerequisite: Marketing Principles and Practices
Convenor: Dr Peter Trim
Lecturer: Dr Peter Trim
Assessment: A 2-hour written examination (65%) and 1 essay of 2500 words (35%).
Credit value: 15 credits.

This module explores the central issues in international marketing management, and examines in depth a number of topics introduced in Marketing Principles and Practices. Topics covered include: the strategic marketing approach; the link between organizational cultural value systems and national cultural value systems; competitor analysis; market entry strategies; negotiating business deals; and international marketing operations.

Aims
• Explore the central issues in marketing management and strategy.
• Examine in depth a number of topics explored in Marketing Principles and Practices.
• Provide students with an understanding and appreciation of marketing strategy formulation and implementation.

Learning objectives
• The objectives of this module are to understand the complexities associated with marketing strategy formulation with respect to:
  • Marketing management processes.
  • Undertaking competitor analysis in relation to developing marketing strategies.
  • Designing and implementing marketing information systems.
  • The necessity to evaluate communications programmes.
  • How to implement marketing management policy in an international business context.

Recommended reading
Operations Management
MOMN019H5
Convenor: Professor John Kelly
Lecturers: TBC
Credits: 15 credits at Level 5.
Pre-requisites: Management Studies 1 and Management Studies 2

Assessment: A 2-hour written examination (65%) and coursework (35%). The coursework is an essay of 2500 words that requires you to analyse a set of organisations through application of the principles of operations management.

This module presents a managerial perspective on operations management, examining the strategic context of its contribution to the overall success of an organisation. It covers a range of key management decisions, taking a comparative approach to manufacturing and service organisations. Topics include strategic role of operations management, product and process design, supply chain management, capacity planning and control, inventory management, project management, quality control and continuous improvement techniques, risk management, and corporate social responsibility.

Aims
- To introduce the main objectives of operations management and the specialist techniques that follow from them.
- To develop a critical understanding of the relevance of operations management models and criteria for decision-making.
- To develop a strategic perspective on the impact of operations decisions within organisations.

Learning objectives
At the end of this module students will:
- Describe the principal tools, concepts and techniques covered in each lecture topic and explain why they are necessary.
- Discriminate between and evaluate different approaches to operational efficiency.
- Discuss relevant applications of operations practice in service and manufacturing contexts.

Recommended reading
Main Text
The following textbooks provide some alternative reading:

Relevant Journals
Production and Operations Management; Journal of Operations Management; and Management Science are the leading academic journals.
Research Methods in Management  
MOMN035H6  
**Convenor:** Dr Marion Frenz  
**Lecturers:** Dr Marion Frenz  
**Pre-requisites:** Management Studies 1 and 2, Quantitative Methods  
**Assessment:** Research proposal 80% and multiple-choice test 20%. The word limit of the coursework is 2,500 words.  
**Credit Value:** 15 points

Research Methods in Management provides students with the necessary skills to design, and complete, their own research projects. The module also helps you to evaluate the quality of published research in the area of business and management. We discuss how to design research questions and how to write a critical literature review. We further explore how the steps in research design are influenced by your research question and by different research traditions. The most common research strategies in management studies are survey and case study strategies, and these are covered in greater depth in the course. We discuss different data collection methods – observations, interviews and questionnaires – and analysis techniques. The module also explains ethical issues that arise when research involves the participation of individuals.

**Aims**
- the required skills to design and write their own research project;
- the foundations of business and management research; and
- an understanding of a number of techniques that can be used to undertake data collection and data analysis.

**Learning objectives**
At the end of this module students will be able to:
- formulate and test the feasibility of research questions;
- write a critically review of the literature;
- collect primary and secondary information;
- apply a range of qualitative and quantitative analyses techniques;
- take into account research ethics.

**Assessment**
The submission of a research proposal, the mark of which constitutes 80% of marks awarded for the module, and the completion of online multiple-choice tests, the marks of which constitute 20% of marks awarded for the module. Students are further expected to present their research proposal in class. The word limit of your research proposal is 2,500 words.

**Recommended reading**

**Key Reading**

**Further Reading**
Organizational Behaviour

Level 5
15 credits
MOMN047H5

Convenor: Gintare Visockaiate
Lecturers: Gintare Visockaiate
Pre-requisites: None

Content

The module introduces a broad sample of the main areas for research and practice in Organizational Behaviour (OB). It helps students understand how individual employees and groups respond to act in organization and how organizations manage their environments. Topics like employee work motivation, personality and work performance, leadership and conflict, organizational culture and change will be introduced to show how individual, group, and organizational characteristics work together to stimulates individual performance and organizational effectiveness.

Aims

• To develop an appreciation of ways in which individuals and modern forms of work organizations might interact.

• To consider some of the complex ways in which behaviour might impact individual and organizational outcomes or performance.

• To develop a critical perspective on the field of OB.

Learning objectives

By the end of the course, students should have developed an understanding of:

• How the ‘individual’, the ‘group’, the ‘organization’ and their interactions are characterised in Organizational Behaviour;

• The complexity involved in impacting and measuring outcomes and performance at individual, group, and organizational level;

• Different approaches to organizational structure and the possible influence of structure on individuals

• Be able to applying influential theories to explain employee workplace behaviour;

• Take a critical view to look at management practice.

Assessment: 2 hour unseen exam

Recommended reading

Calculus 2: Multivariable and Differential Equations  
Level 5  
30 credits  
BUEM001S5

**Aims.** This module aims to develop the ideas and techniques of calculus introduced in *Calculus 1: Single Variable* to functions of more than one variable. It also covers exact and numerical solutions of ordinary differential equations, as well as modelling problems using differential equations.

**Teaching and Assessment.** Teaching for this module will take place throughout the year, with eight evenings in each of the Autumn and Spring Terms and two evenings of revision and consolidation in the Summer Term. Of the final course mark, 80% is based on a three-hour exam in June and the other 20% is from assessed coursework. Coursework will consist of short, problem-based assignments. You will have around three weeks to complete each one. The examination in the Summer Term has two sections. Section A (worth 40%) consists of compulsory short questions. Section B (also worth 40%) contains several longer questions of which you must answer two.

**Syllabus**

*Partial Differentiation*
Limits, formal definition of the derivative, partial differentiation, tangent planes, directional derivatives, stationary points, Lagrange multipliers, the chain rule, Taylor polynomial approximation of a function.

*Integration*
Double integrals, splitting the integral, changing the order of integration, polar coordinates, line integrals, Green’s Theorem.

*Hyperbolic and Special Functions*
Hyperbolic functions, sinh, cosh and tanh, gamma functions, beta functions, properties of hyperbolic and special functions, application of hyperbolic and special functions to evaluate certain integrals.

*Ordinary Differential Equations*
First order differential equations, variable separable, exact differential equations, integrating factors, homogeneous differential equations, some special families of first order differential equations, second order differential equations, homogeneous and non-homogeneous differential equations with constant coefficients, some special families of second order differential equations numerical methods for finding approximate solutions of a differential equation.

*Mathematical Models*
Applications of Calculus including simple harmonic motion, damped and forced oscillations, population models, epidemiology, finance and economics.

**Learning Outcomes**
On successful completion of this module a student will be expected to be able to:
Knowledge and understanding of, and the ability to use, mathematical and/or statistical techniques. In particular:
- Techniques of calculus of more than one variable;
- Methods of solution of ordinary differential equations.
- Knowledge and understanding of a range of results in mathematics.
- Appreciation of the need for proof in mathematics, and the ability to follow and construct mathematical arguments. In particular:
- Knowledge of the theory underpinning the techniques of calculus;
- Ability to produce proofs of some results in calculus.
- Awareness of the use of mathematics and/or statistics to model problems in the natural and social sciences, and the ability to formulate such problems using appropriate notation. In particular:
- Modelling oscillating systems;
- Modelling problems in biology;
• Modelling problems in finance and economics.
• Knowledge and understanding of the processes and limitations of mathematical approximation and computational mathematics. In particular:
  • Approximating functions using Taylor series;
  • Finding numerical solutions to differential equations;
  • Estimating the error in numerical solutions to differential equations.
• Knowledge and understanding of a range of modelling techniques, their conditions and limitations, and the need to validate and revise models. In particular:
  • Modelling problems using differential equations.
  • A deeper knowledge of some particular areas of mathematics.
• Ability to use a modern mathematical and/or statistical computer package with a programming facility, together with knowledge of other suitable packages.

Intellectual
• Ability to comprehend conceptual and abstract material.
• Develop a logical and systematic approach to problem solving.

Practical
• Ability to use a range of software packages including word processing and spreadsheets.
• Problem-solving skills, including the ability to assess problems logically and to approach them analytically.
• Highly developed quantitative skills.
• Ability to transfer knowledge and expertise from one context to another.

Personal and Social
• Ability to learn independently using a variety of media.
• Ability to work independently with patience and persistence.
• Time-management and organizational skills.
• General IT skills, including word processing and spreadsheets.
• Good communication skills, including the ability to write coherently.
• Ability to complete a sustained and substantial task.
• Ability to complete work in a limited time period.

Recommended books
(provisional list)
Adams, RA Calculus of several variables, Addison-Wesley
Adams, RA, Calculus: A complete course, Addison-Wesley
Goldsmith C and Nelson D, Extensions of Calculus, Cambridge

Department of Geography, Environment and Development Studies
Geography Administrator: 020 3073 8000

Principles of Geographical Information Systems
Level 6
30 credits
GGPH036S6

Eligibility: available to students who have completed years 1 and 2 of the following programmes: BSc Geography; BSc Environmental Management; BSc Environmental Science; BSc Social Sciences; BSc Economic and Social Policy; BA History and Archaeology; BA Archaeology; BSc Information Systems and Management.

Format: Friday evening lectures (6-9pm) with practical sessions in IT Labs.

Assessment: a test on the functions and uses of ArcGIS as well as the theory of GIS at the end of first term (35%) and a practical project to be completed by the end of the second term (65%).
This module aims to introduce the basic principles and applications of geographic information systems (GIS). GIS are defined in this course as 'systems for handling spatially referenced data and their use in geographical applications'. A key aim is to explore how geographic reality is modelled in a GIS and what kinds of data are already defined, collected and available.

Principles covered include those underlying the capturing, editing, structuring, restructuring, manipulation, searching, analysing and integrating of spatial data along with the presentation and understanding of spatial data for decision support.

The module also aims to introduce the features of typical software systems used through practical work and present case studies of its application in environmental, archaeology, human geography, and socio-economic fields.

This module will use the specialist GIS software package ArcGIS.

Students enrolled in this module are entitled to a free educational copy of ArcGIS software, which expires after 1 year, to install in their personal computers (compatible with PCs only). Students are also given the opportunity to undertake ArcGIS self-paced practical exercises from a home computer.

**Miscellaneous Information**

**Summer term teaching**
Final year students may have their graduation delayed if they choose summer term modules.

**Final year project**
The final year project, which is compulsory but not timetabled, has a value of 30 credits. There are four types of project: 1) Management; 2) Information Systems Research; 3) Information Systems Development; 4) Computing. Students who choose a type 1 or type 2 project must also take the module Research Methods in Management prior to the project. Students who choose a type 3 or a type 4 project are not required to take Research Methods in Management, but they may find it useful to do so. Please note that the RMM coursework includes the preparation of a proposal for a type 1 project. A second proposal would have to be prepared outside RMM for a Type 2, type 3 or a type 4 project, whichever is chosen.

**ITApps**
With one exception, level 5 ITApps modules are not shown below. They can be included as options subject to availability and provided the prerequisites are satisfied. If any ITApps modules are of interest, then contact the BSc in ISM programme director. Detailed information about ITApps modules can be found at http://www.dcs.bbk.ac.uk/itapps/

**Lecture Rooms**
Information about rooms can be found in MyBirkbeck. You are advised to check before each lecture because room bookings can change at short notice.

**Credits**
It is necessary to obtain at least 360 credits of which at least 120 credits must be at level 6. The total value of the modules taken in a single year should not normally exceed 90 credits for the four year part time programme or 120 credits for the three year full time programme. In this timetable, modules which are taught in a single term have a value of 15 credits. Modules which require teaching over two terms have a value of 30 credits.
Time table of compulsory modules for years 3 and 4 of the 4 year programme

**Year 3, Autumn Term, compulsory module**

<table>
<thead>
<tr>
<th>Day</th>
<th>Module</th>
<th>Lecturers</th>
<th>Prerequisites</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mon</td>
<td>Information Security</td>
<td>David Weston</td>
<td>None</td>
<td>6</td>
</tr>
<tr>
<td>Tues</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thu</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fri</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Year 3, Spring Term, compulsory module**

<table>
<thead>
<tr>
<th>Day</th>
<th>Module</th>
<th>Lecturers</th>
<th>Prerequisites</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mon</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tues</td>
<td>Microeconomics for Business</td>
<td>Federica Rossi</td>
<td>None</td>
<td>5</td>
</tr>
<tr>
<td>Wed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thu</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fri</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Year 3, Summer Term, compulsory module**

<table>
<thead>
<tr>
<th>Day</th>
<th>Module</th>
<th>Lecturers</th>
<th>Prerequisites</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mon</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tues</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thu</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fri</td>
<td>Research Methods in Management (compulsory for a type 1 or type 2 project)</td>
<td>Marion Frenz</td>
<td>QM, ME1, ME2</td>
<td>6</td>
</tr>
</tbody>
</table>

**Year 4, Autumn Term, compulsory modules**

<table>
<thead>
<tr>
<th>Day</th>
<th>Module</th>
<th>Lecturers</th>
<th>Prerequisites</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mon</td>
<td>Strategic Management</td>
<td>Ian Harrison, Mariangela Siciliano</td>
<td>MS1, MS2</td>
<td>6</td>
</tr>
<tr>
<td>Tues</td>
<td>Social and Organisational Issues in Computing</td>
<td>Brian Gannon</td>
<td>None</td>
<td>6</td>
</tr>
<tr>
<td>Wed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thu</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fri</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Year 4, Spring Term, compulsory modules**

<table>
<thead>
<tr>
<th>Day</th>
<th>Module</th>
<th>Lecturers</th>
<th>Prerequisites</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mon</td>
<td>Strategic Information Systems</td>
<td>Dave Wilson</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Tues</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thu</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fri</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Time table of compulsory modules for years 2 and 3 of the 3 year programme

### Year 2, Autumn Term, compulsory modules

<table>
<thead>
<tr>
<th>Day</th>
<th>Module</th>
<th>Lecturers</th>
<th>Prerequisites</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mon</td>
<td>Information Security</td>
<td>David Weston</td>
<td>None</td>
<td>6</td>
</tr>
<tr>
<td>Tues</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wed</td>
<td>Marketing Principles and Practices</td>
<td>Olivier Sibai</td>
<td>MS1, MS2</td>
<td>5</td>
</tr>
<tr>
<td>Thu</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fri</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Year 2, Spring Term, compulsory modules

<table>
<thead>
<tr>
<th>Day</th>
<th>Module</th>
<th>Lecturers</th>
<th>Prerequisites</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mon</td>
<td>Financial Accounting</td>
<td>Libon Fung, Barry McCarthy</td>
<td>None</td>
<td>5</td>
</tr>
<tr>
<td>Tues</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wed</td>
<td>Software and Programming 1</td>
<td>Roman Kontchakov</td>
<td>A mark of at least 30% for ITP or equivalent</td>
<td>5</td>
</tr>
<tr>
<td>Thu</td>
<td>Information Systems Management</td>
<td>Andrea Cali</td>
<td>ISC</td>
<td>5</td>
</tr>
<tr>
<td>Fri</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Year 2, Summer Term, compulsory modules

<table>
<thead>
<tr>
<th>Day</th>
<th>Module</th>
<th>Lecturers</th>
<th>Prerequisites</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mon</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tues</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thu</td>
<td>Management Accounting</td>
<td>Libon Fung</td>
<td>None</td>
<td>5</td>
</tr>
<tr>
<td>Fri</td>
<td>Research Methods in Management (compulsory for a type 1 or type 2 project)</td>
<td>Marion Frenz</td>
<td>QM, ME1, ME2</td>
<td>6</td>
</tr>
</tbody>
</table>

### Year 3, Autumn Term, compulsory modules

<table>
<thead>
<tr>
<th>Day</th>
<th>Module</th>
<th>Lecturers</th>
<th>Prerequisites</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mon</td>
<td>Strategic Management</td>
<td>Ian Harrison, Mariangela Siciliano</td>
<td>MS1, MS2</td>
<td>6</td>
</tr>
<tr>
<td>Tues</td>
<td>Social and Organisational Issues in Computing</td>
<td>Brian Gannon</td>
<td>None</td>
<td>6</td>
</tr>
<tr>
<td>Wed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thu</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fri</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Year 3, Spring Term, compulsory module

<table>
<thead>
<tr>
<th>Day</th>
<th>Module</th>
<th>Lecturers</th>
<th>Prerequisites</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mon</td>
<td>Strategic Information Systems</td>
<td>Dave Wilson</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Tues</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thu</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fri</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Time table of optional modules for the 3 year and 4 year programmes

#### Autumn Term, optional modules

<table>
<thead>
<tr>
<th>Day</th>
<th>Module</th>
<th>Lecturers</th>
<th>Prerequisites</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mon</td>
<td>Data Structures and Algorithms</td>
<td>Igor Razgon</td>
<td>QM plus ITP or SP1</td>
<td>5</td>
</tr>
<tr>
<td>“</td>
<td>Introduction to the Semantic Web (evening lectures in 2015/16, daytime lectures in 2016/17)</td>
<td>Michael Zakharyaschev</td>
<td>None</td>
<td>6</td>
</tr>
<tr>
<td>Tues</td>
<td>Software and Programming 2</td>
<td>Carsten Fuhs</td>
<td>SP1</td>
<td>6</td>
</tr>
<tr>
<td>“</td>
<td>Introduction to Data Analysis Using R</td>
<td>Tingting Han</td>
<td>None</td>
<td>6</td>
</tr>
<tr>
<td>“</td>
<td>Financial Management (The second half of this 30 credit module runs in the spring term)</td>
<td>Qian Guo</td>
<td>QM, Microecon, Macroecon, FA, MA</td>
<td>6</td>
</tr>
<tr>
<td>Wed</td>
<td>Marketing Strategy</td>
<td>Peter Trim</td>
<td>MPP</td>
<td>6</td>
</tr>
<tr>
<td>“</td>
<td>Programming Language Paradigms</td>
<td>Keith Mannock</td>
<td>SP2</td>
<td>6</td>
</tr>
<tr>
<td>Thu</td>
<td>Concepts of Intelligent Technologies</td>
<td>George Magoulas</td>
<td>Year 1 of 3yr BSc</td>
<td>6</td>
</tr>
<tr>
<td>“</td>
<td>Introduction to Search Engines and Web Navigation (evening lectures in 2015/16, daytime lectures on 2016/17)</td>
<td>Mark Levene</td>
<td>SP1 or equivalent</td>
<td>6</td>
</tr>
<tr>
<td>“</td>
<td>Organizational Behaviour</td>
<td>Gintare Visockaite</td>
<td>None</td>
<td>5</td>
</tr>
<tr>
<td>“</td>
<td>Calculus 2 (Sch. of Economics, Mathematics and Statistics. The second half of this 30 credit module runs in the spring term.)</td>
<td>Manuel Breuning</td>
<td>A Level Mathematics</td>
<td>5</td>
</tr>
<tr>
<td>Fri</td>
<td>Cloud Computing Concepts</td>
<td>Dell Zhang</td>
<td>SP2</td>
<td>6</td>
</tr>
<tr>
<td>“</td>
<td>Principles of Geographical Information Systems (Sch. of Geography. The second half of this 30 credit module runs in the spring term.)</td>
<td>Joana Barros Sam Waples</td>
<td>Experience using PC software</td>
<td>6</td>
</tr>
</tbody>
</table>

#### Spring Term, optional modules
<table>
<thead>
<tr>
<th>Day</th>
<th>Module</th>
<th>Lecturers</th>
<th>Prerequisites</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mon</td>
<td>Management of Innovation</td>
<td>Marion Frenz, Prof Helen Lawton-Smith, Prof Daniele Archibugi</td>
<td>MS1, MS2</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Practical Software Engineering</td>
<td>Oded Lachish</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Computer Organization and Systems Software</td>
<td>Szabolcs Mikulas</td>
<td>ICS</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Wireless and Mobile Computing (daytime teaching 14:00-17:00)</td>
<td>George Roussos</td>
<td>SP1, SP2, CN, IS recommended</td>
<td>6</td>
</tr>
<tr>
<td>Tues</td>
<td>Financial Management (The first half of this 30 credit module runs in the summer term)</td>
<td>Qian Gu</td>
<td>QM, Microecon, Macroecon, FA, MA</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Computer Networking</td>
<td>Andrea Cali</td>
<td>None</td>
<td>5</td>
</tr>
<tr>
<td>Wed</td>
<td>Database Management</td>
<td>Peter Wood</td>
<td>ISC, ISM, ICS, ITP</td>
<td>6</td>
</tr>
<tr>
<td>Thu</td>
<td>Interactive Systems Design</td>
<td>George Magoulas</td>
<td>ISC</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Software and Programming 3</td>
<td>Keith Mannock</td>
<td>SP2</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Advanced Web Authoring (15 credits only, teaching duplicated in the summer term)</td>
<td>Int. to Web Authoring or equivalent, knowledge of HTML, CSS and web design</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Employment Relations and Human Resource Management</td>
<td>Rebecca Gumbrell-McCormick</td>
<td>MS1, MS2</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Calculus 2 (Sch. of Economics, Mathematics and Statistics. The first half of this 30 credit module runs in the autumn term.)</td>
<td>Manuel Breuning</td>
<td>A Level Mathematics</td>
<td>5</td>
</tr>
<tr>
<td>Fri</td>
<td>Enterprise Computing</td>
<td>Keith Mannock</td>
<td>Experience with web applications and Java</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Principles of Geographical Information Systems (Sch. of Geography. The first half of this 30 credit module runs in the autumn term.)</td>
<td>Joana Barros Sam Waples</td>
<td>Experience using PC software</td>
<td>6</td>
</tr>
</tbody>
</table>
### Summer Term, optional modules

<table>
<thead>
<tr>
<th>Day</th>
<th>Module</th>
<th>Lecturers</th>
<th>Prerequisites</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tues</td>
<td>Macroeconomics for Business</td>
<td>Luca Andriani</td>
<td>None</td>
<td>5</td>
</tr>
<tr>
<td>Wed</td>
<td>Operations Management</td>
<td>John Kelly, Alex Dalzell</td>
<td>MS1, MS2</td>
<td>5</td>
</tr>
<tr>
<td>Thu</td>
<td>International Business</td>
<td>Paz Estrella Tolentino</td>
<td>Microecon, Macroecon</td>
<td>6</td>
</tr>
<tr>
<td>&quot;</td>
<td>Advanced Web Authoring (15 credits only, teaching duplicated in the spring term)</td>
<td>Int. to Web Authoring or equivalent, knowledge of HTMP, CSS and web design</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Fri</td>
<td>Commercial Law for Business</td>
<td>Marion Frenz, Peter Trim, Hazel Dawe</td>
<td>None</td>
<td>5</td>
</tr>
<tr>
<td>&quot;</td>
<td>Research Methods in Management (compulsory for a type1 or type 2 project)</td>
<td>Marion Frenz</td>
<td>QM, MS1, MS2</td>
<td>6</td>
</tr>
</tbody>
</table>
BSc in Information Systems & Management

Options Choice Form (2015/2016)

Name: (Please print clearly) _________________________________________________

If you are 4 year part time student entering Year 3 or a 3 year full time student entering year 2:

Please indicate your choice of options by entering the names of your choices in the table below. You must attempt modules with a total value of 360 credits during the programme.

<table>
<thead>
<tr>
<th>Module Code</th>
<th>Name of Optional Module</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If you are entering your final year (and have any remaining options to take)

Please indicate your choice of option or options for your final year in the table below. You must attempt modules with a total value of 360 credits during the programme.

<table>
<thead>
<tr>
<th>Module Code</th>
<th>Name of Optional Module</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If possible, please indicate below the Department in which you intend to complete the compulsory final year project:

Computing Project: ☐  Management Project: ☐

(NB: to undertake the Management Research Project OR a Type 2 Computing Project, it is necessary to first undertake the Research Methods in Management module before attempting the project).

Students who wish to change options after submitting this form should contact the Programme Administrator (bscadmin@dcs.bbk.ac.uk).

Please make sure that you have checked the timetable and that there are no clashes between the modules you attempt. Please also check that you have studied the pre-requisites for optional module/s you have chosen.

Please return this form to the Programme Administrator by 21st September 2015.

BSc Administrator
Department of Computer Science and Information Systems
Birkbeck College
London
WC1E 7HX