# Programme Specification and Curriculum Map for BSc Honours Internet Application Development

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| **1. Programme title** | BSc Honours Internet Application Development |
| **2. Awarding institution** | Middlesex University |
| **3. Teaching institution** | Middlesex University |
| **4. Programme accredited by** | |
| **5. Final qualification** | BSc Honours |
| **6. Academic year** | 2009/10 |
| **7. Language of study** | English |
| **8. Mode of study** | Full Time or Part Time or Thick Sandwich |

**9. Criteria for admission to the programme**

Entry requirements are in accordance with the University regulations. We accept students from a range of backgrounds. Most students educated in the UK will have studied A Levels, AVCEs or an accredited Access Course. To enter a degree programme you would be expected to have achieved 160-240 UCAS tariff points including a minimum of 120-160 from two 6-unit awards or 60 points, or have successfully completed the Middlesex University School of Engineering and Information Sciences Foundation Year in Computing. All candidates should possess at least grade C in GCSE maths and English language, or equivalent. Mature applicants with relevant work experience are also welcome to apply.

You may be credited for part of the course provided you have appropriate prior learning such as a Higher National Diploma or similar. To obtain any qualification you must complete at least one academic year - 6 modules of the programme.

International students who have not been taught in the English medium must show evidence of proven ability in English such as TOEFL grade 550 or IELTS grade 6.0. The University provides pre-sessional English language courses throughout the year for candidates who do not meet the English requirements. For further information, visit the learning resources web site at: www.mdx.ac.uk/language

University policies supporting students with disabilities apply, as described in the University Regulations, 'Information for students with disabilities'.

**10. Aims of the programme**

The Internet Application Development programme aims to provide graduates with a solid grounding in essential skills in computing, including programming, database analysis and design, networks and operating systems, and it affords them ample scope for gaining practical, hands-on experience in these areas. In addition, the degree provides for specialisation through study of software design and development skills which are focused on Internet technologies such as the design and implementation of web-based client/server systems and the deployment, management and security of online databases. Thus, whilst supporting a diversity of career ambitions, the programme will appeal to those undergraduates considering a career as a web systems developer. In addition, the Internet Application Development programme aims to:

- Prepare the graduate for the computing industry, working in a project team (or research and development team), and to enable the graduate to bring specialist skills to that team.
- Provide a platform for further post-graduate study or research through exposure to established and emerging technologies and methods, and to active fields of research in Computer Science.

| 11. Programme outcomes | |
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| **A. Computing-related cognitive abilities**<br>On completion of this programme, the successful student will be able to:<br><br>1. Demonstrate knowledge and understanding of the complete software life cycle, from requirements elicitation to development and evaluation.<br><br>2. Design an evaluation framework for, and employ testing strategies to, a software system.<br><br>3. Demonstrate knowledge of underlying theory relevant to web-based systems, including database design, electronic data interchange (EDI), client-server architectures, networking and security.<br><br>4. Understand the role of software systems developers in society and the distinction between their professional and ethical responsibilities.<br><br>5. Critically evaluate technical and human features of web-based software systems.<br><br>6. Formulate and test hypotheses; collect and analyse qualitative and quantitative data to form evidentially supported conclusions in a computing context. | **Teaching/learning methods**<br>At each Level students take modules that develop a gradually increasing appreciation of the key topics in computer science, with particular reference to web system software development. Level 1 provides a context within which students are introduced to software engineering concepts. Modules taught at Level 2 provide more in-depth understanding of the design of more substantial, and more complex, software systems, including core topics of software development methodologies and the fundamentals of online database systems. At this stage students are also exposed to the crucial themes of professionalism, project management and teamwork. At Level 3 students are able to obtain in-depth knowledge in the specialist areas of client-server software frameworks for web system design, development and integration. In the final year students will demonstrate their knowledge and skills acquired throughout the programme via an individual project which includes the production of a software artefact<br><br>At all Levels, the majority of theoretical material will be presented in formal. Where appropriate, the main lecture will be supported by group seminars, practical laboratories and guided reading. Lectures will, on occasion, take the form of interactive sessions with group exercises, as well as the more traditional lecture format. Group-oriented tutorials are held in modules at both at Level 1 and at Level 2. In all modules, and at all Levels, students are encouraged to undertake independent reading both to supplement and consolidate what is presented in taught classes and to broaden their individual knowledge of the subject.<br><br>**Assessment**<br>Cognitive abilities are assessed by a combination of unseen examinations and practical assignments including computer programming tasks, software design documentation, written reports and marked essays. At Level 1, all modules will provide a degree of formative assessment via in-class tests and problem-solving exercises. For all Levels the majority of summative assessment will be individual work, with team-based work comprising a key component of assessment at Level 2. Level 3 (individual) projects are formally assessed on the basis of an initial proposal, an intermediate report, the final dissertation, and a demonstration of the associated software. |

| **B. Computing-related practical abilities**<br>On completion of this programme the successful student will be able to:<br><br>1. Apply analytical skills to create requirements specifications using recognized methods.<br><br>2. Deploy appropriate software tools to develop models of web-based information systems and their processes as a result of analysis and design activities, and make an informed and balanced selection from alternative technological solutions, in a web-based context.<br><br>3. Apply sound programming principles to the construction and maintenance of software artefacts using programming paradigms and languages appropriate to both client-side and server-side Internet application development.<br><br>4. Design, build and deploy databases to meet application requirements.<br><br>5. Work effectively as a member of a web-system design team.<br><br>6. Prepare detailed software design documentation. | **Teaching/learning methods**<br>Skills and experience will be built up through a combination of theoretical discussion in lectures and seminars, problem-based seminar activities, weekly laboratory sessions that will comprise both individual programming work and group design exercises, and directed self-study. These sessions may be supplemented by drop-in workshops and tutorials.<br><br>As students progress from Level 1 to Level 2, they will enhance their practical abilities in building software, whilst developing analytical and design skills with reference to software development methods taught in formal lectures. As part of the curriculum at Level 2 students will develop individual portfolios of achievement. This is complemented by a strong focus on effective teamwork and project management. By the time students reach Level 3 of the programme, they will have completed modules which have guided them in how to design and prepare detailed software design reports, which will be crucial in the production of the final year dissertation.<br><br>**Assessment**<br>Software design and development skills will primarily be assessed through the production of software artefacts in modules at all Levels. Foundational database skills will be assessed through a series of in-class tests and practical assignment at Level 1. Practical assignments will be employed both for formative assessment and summative assessment, and at Level 1 this will include at some code documentation, debugging and code testing.<br><br>At Level 2 a similar pattern of assessment will be developed, in which students will be required to design object-oriented software systems as part of their practical assignments, and prepare appropriate design reports in addition to code documentation. More advanced database theory assessed via unseen written examination at Level 2. Analysis and design skills will also be assessed by unseen written examinations at Level 2 and also as part of the individual software development project at Level 3.<br><br>Teamwork skills will also be assessed at Level 2 by means of staff and peer assessed presentations and the production of portfolios with contributions made by individuals and groups. Web application software design will be assessed via both practical work and unseen written examination at Levels 2 and 3 |
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| C. Additional Transferable Skills | Teaching/learning methods |
|---|---|
| On completion of this programme the successful student will be able to:<br><br>1. Communicate effectively (in writing, verbally and through graphical notations).<br><br>2. Learn independently in a variety of situations with a spirit of critical enquiry, effectively planning and managing resources and time for the purposes of continuing professional development.<br><br>3. Be effective at information-retrieval from a range of sources (including electronic sources such as the Internet, CD-ROM and electronic catalogues), including scholarly reviews and research materials, and be able to cite and reference information sources appropriately for different audiences.<br><br>4. Understand and apply appropriate mathematical methods, such as relational algebra.<br><br>5. Give technical presentations to different audiences, supported by effective use of presentation media and technology.<br><br>6. Have a broad range of general information and communications technology skills. | The development of transferable skills is of concern throughout the programme, and is given some prominence at Level 1. Transferable skills are developed through a variety of strategies including:<br><br>The development of communication skills via group work and discussions including group presentations at both Levels 1 and 2, and an individual presentation for the final year project.<br><br>The development of written skills, including essay writing and technical writing is central to a number of modules starting in the first year of study and followed through at Levels 2 and 3. Students develop individual work portfolios of individual and group project work as part of the assessment pattern of specific modules at Levels 1 and 2.<br>The development of effective research skills is facilitated specifically with respect to professionalism and self management at Level 2 and further enhanced via individual project supervision at Level 3.<br>The development of problem solving skills are also central to the teaching and assessment strategies of several modules, starting at Level 1 through Level 3, ranging from practical programming problems to the application of appropriate relational algebra.<br><br>**Assessment**<br>Transferable skills are assessed mainly by assignments, in-class tests, individual and group portfolios, and individual and group project work. Problem-solving skills, including the application of appropriate mathematical models are assessed via in-class tests at Level1, and also via unseen written exam at Levels 2 and 3. Technical presentation skills are assessed at Level 2 in two taught modules and in the final year for the individual software development project. |

**12. Programme structure (levels, modules, credits and progression requirements)**

**12. 1 Overall structure of the programme**

The course is studied in three modes:

- Three years full-time, 100% University-based.
- Part-time students study over longer periods, depending on the proportion of full-time to part-time study.
- Four years full-time ‘thick-sandwich’, where one complete year is an industry placement (so 75% is University-based and 25% is industry-based).

Details of the thick-sandwich industry placement year (usually taken between Levels 2 and 3) are given in the 'Supervised Industrial Placement in The School of Engineering and Information Sciences' Module Narrative, module code CMT3355 in the School of The School of Engineering and Information Sciences Subject Handbook.

Key features of the programme are:
The course is undertaken at three Levels, 1, 2 and 3. Each Level is arranged as a single academic year of 24 weeks duration.
There are two 'entry points' to the programme: September (Autumn term) and January (Winter term). In both cases, a single academic year of 24 weeks duration commences from the time of the entry point.

The course is divided into study units called modules. Each module has a credit value of 30 credits. Each 30-credit module represents approximately 300 hours of student learning, endeavour and assessment including up to a maximum of 72 hours of teaching. Each Level comprises four compulsory modules, such that each Level of the programme comprises 120 credits.
Levels 1, 2 and 3 all comprise four compulsory modules. There are no optional taught modules on the three-year programme.

A distinctive feature of the course is a sustained sequence of software systems analysis, design and implementation modules designed to ensure that all graduates have experience, skills and confidence in the full software system life cycle, and in particular a high degree of system development competence with respect to web-based software systems.

| **12.2 Levels and module** | |
|---|---|
| Level 1 | |
| COMPULSORY[1] | PROGRESSION REQUIREMENTS |
| Students must take all of the following:<br>CMT1314<br>Programming with data structures and algorithms<br><br>BIS1200<br>Database management systems<br><br>CMT1300<br>Discovering interaction design<br><br>CCM1418<br>Introduction to operating systems, architectures and networks | Every student on the programme must meet the set learning outcomes of the programme to progress from Level 1 to Level 2. This normally requires an overall pass for each of the compulsory modules.<br><br>Computer programming is a core feature of the Internet Application Development course.<br><br>Students will be required to demonstrate a satisfactory Level of competence in computer programming in order to progress to Level 2. Introductory compute programming will be taught and assessed in module CMT1314. |

[1] Compulsory modules are those that must be taken, that is, the qualification cannot be awarded unless these modules have been successfully completed. Each of these modules makes a unique contribution to the learning objectives of the programme.

| Level 2 | |
|---|---|
| COMPULSORY | PROGRESSION REQUIREMENTS |
| Students must take all of the following:<br><br>CMT2313<br>Object-oriented software development<br><br>BIS2311<br>Object-oriented analysis and design<br><br>CCM2426<br>Professional project development and management<br><br>BIS2212<br>Database systems: design and online. | Every student on the programme must meet the set learning outcomes of the programme to progress from Level 2 to Level 3. This normally requires an overall pass for each of the compulsory modules.<br><br>Having attained a satisfactory Level of competency in general computer programming at Level 1, students will study more advanced software design at Level 2, in addition to the fundamentals of online database design. Accordingly, in order to progress to Level 3, students will be required to achieve a satisfactory Level of attainment with respect to the assessment requirements of modules CMT2313 and BIS2212. |

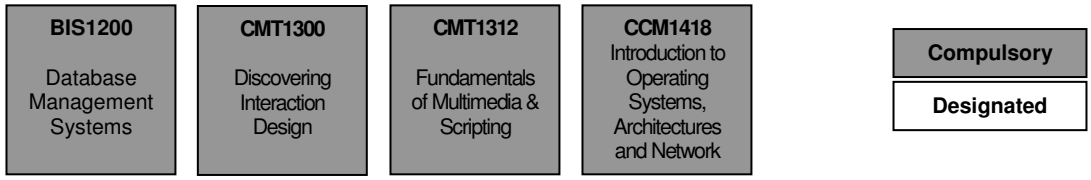
| Level 3 | |
|---|---|
| COMPULSORY | PROGRESSION REQUIREMENTS |
| Students must take all of the following:<br><br>CMT3313<br>Client/server web system development<br><br>CMT3315<br>Advanced web technologies<br><br>BIS3214<br>Data warehousing and business intelligence<br><br>CMT3333<br>Software development project | Of key importance to the overall Level 3 learning outcomes is the ability of graduates to demonstrate how effectively they have consolidated their knowledge and skills from other modules via an individual project, which specifically involves the production of a useful software artefact. Students will be required to meet all of the assessment requirements for the project module, CMT3333. |

| ***12.3 Non-compensatable modules.*** | |
|---|---|
| ***Module Level*** | ***Module code*** |
| *Level 1* | *CMT1314 Programming with data structures and algorithms* |
| *Level 2* | *CMT2313 Object-oriented software development* |
| *Level 2* | *BIS2212 Database systems: design and online.* |
| *Level 3* | *CMT3333 Software development project* |

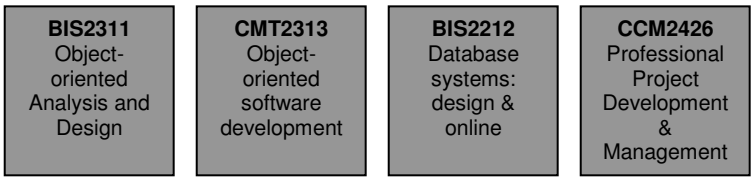
## 12.3 Programme Diagram

Students enrolled on the four year programme with Foundation Year complete the Foundation Year before starting this study:

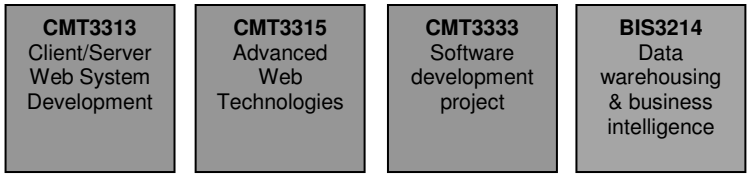
**Level 1**




**Level 2**




**Level 3**




Students taking the programme in part-time mode study at a reduced rate, typically two modules at the appropriate Level per academic year and should complete a given academic Level before proceeding to the next.

Students who leave the programme after successfully completing all Level 1 modules will receive the award of Certificate.

Students who leave the programme after successfully completing all Level 2 modules will receive the award of Diploma.

## 14. Information about assessment regulations

- Information on how the University formal assessment regulations work, including details of how award classifications are determined, can be found in the University Regulations at www.mdx.ac.uk/regulations/.
- Practical aspects of the programme are often assessed via coursework that may be carried out using specialist software and may include lab tests.
- Theoretical material is assessed by coursework and examinations.
- Grades are awarded on the standard University scale of 1–20, with Grade 1 being the highest. To pass a module all components, both coursework and examination, must be passed individually with a minimum grade of 16. Failure in one of the components will result in the failure of the module.

For additional information on assessment and how learning outcomes are assessed please refer to the individual module narratives for this programme.

## 15. Placement opportunities, requirements and support

All Undergraduate students have the opportunity to go on Industrial Placement. Industrial Placements are encouraged as this valuable experience enhances a student's future career prospects. Additionally students normally achieve better results in their final year. In brief:

- The placement provides a years experience as an appropriately paid graduate trainee.
- Industrial placement is conditional on the successful completion of all modules at Level 1 and Level 2, therefore students need 240 credits before they are able to embark on an industrial placement.
- Obtaining a placement is co-ordinated through the Campus Placement Office.
- For Undergraduate programmes, students wishing to undertake a placement position must register for CMT3985.
- Each placement will be assigned to an industrial tutor who will visit the student on placement.
- On graduation the degree will be qualified with the term "…with approved industrial experience".

The placement option is not available to direct-entry students in their final year.

## 16. Future careers

All programmes in the School of Engineering and Information Sciences – their curricula and learning outcomes – have been designed with an emphasis on currency and the relevance to future employment.

- The majority of graduates are employed in IT posts relevant to the subject.
- Over 20% of students pursue further postgraduate study or research.

The employer links with the School are encouraged in a number of ways e.g. by inviting practitioners from industry as guest speakers in lectures; through links with companies where students are employed as part of their Industrial placement and through alumni both in the UK and overseas

Campus Careers Offices can be found on each campus for advice, support and guidance – or go to www.mdx.ac.uk/careers

## 17. Particular support for learning

The School's Teaching and Learning Strategy is compliant with those of the University, in seeking to develop learner autonomy and resource-based learning. In support of the students learning experience:

- All new students go through an induction programme and some have early diagnostic numeric and literacy testing before starting their programme. Learning Resources (LR) provide workshops for those students needing additional support in these areas.
- Students are allocated a personal email account, secure networked computer storage and dial-up facilities
- New students are provided with a CD containing the schools Subject Handbook at enrolment (electronic copies for all students can also be found at http://www.mdx.ac.uk/24-7/cs. If you require a hard copy of this Subject Handbook please request them from Graham Davies (G.X.Davies@mdx.ac.uk or 020 8411 6079)
- New and existing students are given module handbooks for each module they study. Soft copies of all module handbooks can be found on Oasis. Web-based learning materials are provided to further support learning
- Extensive library facilities are available on all campuses. WebCT pages are available as learning resources through the Oasis system

- Students can access advice and support on a wide range of issues from the Student Services Counter and the Student Information Desk. Student Advisers aligned to subject areas offer confidential one to one advice and guidance on programme planning and regulations
- Placements are supported by Campus Placement Offices and School academics; please refer to section 15 of this programme specification
- High quality specialist laboratories equipped with industry standard software and hardware where appropriate, for formal teaching as well as self-study
- Access to campus based teaching and learning support drop in sessions, arranged by the school to provide assistance and guidance
- School Academic Advisers for each subject offering personal academic advice and help if needed. Rotas for the operation of Academic Advice Rooms at each campus can be found at http://www.mdx.ac.uk/24-7/cs/index.htm#tutor
- Tutorial sessions for each module organised for groups of up to 20 students are provided for additional teaching support
- Formative feedback is given on completion of student coursework
- Past exam papers with solutions and marking schemes for all modules are available for students in module handbooks and at http://www.mdx.ac.uk/24-7/cs/index.htm
- Research activities of academic staff feed into the teaching programme, which can provide individual students with ad-hoc opportunities to work with academics on some aspect of research

Middlesex University encourages and supports students with disabilities. Some practical aspects of School of Engineering and Information Sciences programmes may present challenges to students with particular disabilities. You are encouraged to visit our campuses at any time to evaluate facilities and talk in confidence about your needs. If we know your individual needs we'll be able to provide for them more easily. For further information contact the Disability Support Service (email: disability@mdx.ac.uk) or contact Natalie Costa on 020 8411 2514.

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| **18. JACS code (or other relevant coding system)** | G450 |
| **19. Relevant QAA subject benchmark group(s)** | Computing |

## 20. Reference points

The following reference points were used in designing the programme:

- QAA computing subject benchmark statement
- QAA framework for higher education qualifications in England, Wales and Northern Ireland
- QAA/QAAS guidelines for programme specifications
- QAA code of practice for the assurance of academic quality and standards in he
- University's regulations
- Module narratives
- British computer society (BCS) guidelines for exemption and accreditation
- Middlesex University and School of Engineering and Information Sciences teaching learning and assessment policies and strategies
- University policy on equal opportunities.

## 21. Other information

Middlesex University has formal links with 250 institutions world-wide, including student exchange agreements with more than 100 institutions. Currently a number of students both from the UK/EU and overseas take part in such exchanges. For further details please visit http://www.europe.mdx.ac.uk/ or contact Elli Georgiadou, the School of Engineering and Information Sciences coordinator of European Affairs & International Exchanges (email: e.georgiadou@mdx.ac.uk).

This is a new programme which will be submitted for partial BCS exemption from the Certificate, Diploma and Diploma Project

Please note programme specifications provide a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve if s/he takes full advantage of the learning opportunities that are provided. More detailed information about the programme can be found in the student programme handbook and the University Regulations.

**Curriculum map for BSc Honours Internet Application Development**

This section shows the highest level at which programme outcomes are to be achieved by all graduates, and maps programme learning outcomes against the modules in which they are assessed.

**Programme learning outcomes**

| **Knowledge and understanding** | | **Practical skills** | |
|---|---|---|---|
| A1 | Demonstrate knowledge and understanding of the complete software life cycle, from requirements elicitation to development and evaluation. | C1 | Communicate effectively (in writing, verbally and through graphical notations). |
| A2 | Design an evaluation framework for, and employ testing strategies to, a software system. | C2 | Learn independently in a variety of situations with a spirit of critical enquiry, effectively planning and managing resources and time for the purposes of continuing professional development. |
| A3 | Demonstrate knowledge of underlying theory relevant to web-based systems, including database design, electronic data interchange (EDI), client-server architectures, networking and security. | C3 | Be effective at information-retrieval from a range of sources (including electronic sources such as the Internet, CD-ROM and electronic catalogues), including scholarly reviews and research materials, and be able to cite and reference information sources appropriately for different audiences. |
| A4 | Understand the role of software systems developers in society and the distinction between their professional and ethical responsibilities. | C4 | Understand and apply appropriate mathematical methods, such as relational algebra. |
| A5 | Critically evaluate technical and human features of web-based software systems. | C5 | Give technical presentations to different audiences, supported by effective use of presentation media and technology. |
| A6 | Formulate and test hypotheses; collect and analyse qualitative and quantitative data to form evidentially supported conclusions in a computing context. | C6 | Have a broad range of general information and communications technology skills. |
| **Cognitive skills** | | | |
| B1 | Apply analytical skills to create requirements specifications using recognized methods. | | |
| B2 | Deploy appropriate software tools to develop models of web-based information systems and their processes as a result of analysis and design activities, and make an informed and balanced selection from alternative technological solutions, in a web-based context. | | |
| B3 | Apply sound programming principles to the construction and maintenance of software artefacts using programming | | |

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| | paradigms and languages appropriate to both client-side and server-side Internet application development. | | |
| B4 | Design, build and deploy databases to meet application requirements. | | |
| B5 | Work effectively as a member of a web-system design team. | | |
| B6 | Prepare detailed software design documentation. | | |

| Programme outcomes | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A1 | A2 | A3 | A4 | A5 | A6 | B1 | B2 | B3 | B4 | B5 | B6 | C1 | C2 | C3 | C4 | C5 | C6 |
| Highest level achieved by all graduates | | | | | | | | | | | | | | | | | |
| 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 1 |

| Module Title | Module Code by Level | Programme outcomes | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | A1 | A2 | A3 | A4 | A5 | A6 | B1 | B2 | B3 | B4 | B5 | B6 | C1 | C2 | C3 | C4 | C5 | C6 |
| Programming with data structures and algorithms | CMT1314 | √ | √ | | | | | | | √ | | | √ | √ | | | | | |
| Database management systems | BIS1200 | | | √ | | | | | | | √ | | | | | | √ | | |
| Discovering interaction design | CMT1300 | | | | | √ | √ | √ | | | | | | | √ | √ | | | |
| Intro to OS, architectures and networks | CCM1418 | | | √ | | | | | | | | | | | | | √ | √ | √ |
| | | | | | | | | | | | | | | | | | | | |
| Object-oriented software development | CMT2313 | √ | √ | | | | | | | √ | | | √ | | | | | | |
| Object-oriented analysis and design | BIS2311 | √ | | | | | | √ | √ | | | √ | | √ | | | | | |
| Professional project development & management | CCM2426 | √ | | | √ | | | | | | | √ | | | √ | √ | | √ | |
| Database systems: design and online | BIS2212 | | | √ | | | | | √ | √ | √ | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| Client/server web system development | CMT3313 | | | √ | | √ | | | √ | √ | | | | | | | | | |
| Advanced web technologies | CMT3315 | | | √ | | √ | | | √ | √ | | | √ | | | | | | |
| Data warehousing and business intelligence | BIS3214 | | | | | | √ | √ | √ | | | | | | | | √ | | |
| Software development project | CMT3333 | √ | √ | | | √ | √ | √ | | √ | | | | √ | √ | √ | | √ | |