University
Centre
Somerset

Part of Bridgwater & Taunton College

The Open University
Approved Institution

European Union
European Social Fund
Investing in jobs and skills

Bachelor Degree (Honours) in Science (Top-up) –
Computing and Internet Technologies

Programme Student Handbook

Academic Year: 2017-18

Contents

1. Programme Specification

Programme/award title(s)	BSc (Hons) Computing and Internet Technologies (3rd Year Top-Up)
Teaching Institution	Bridgwater and Taunton College
Awarding Institution	The Open University (OU)
Date of latest OU validation	1 August 2013
Next revalidation	April 2016
Credit points for the award	120 credits at Level 6 (BSc Hons) 60 credits at Level 6 (BSc)
UCAS Code	I190
Programme start date	September 2016
Underpinning QAA subject benchmark(s)	Honours degree subject benchmark statements – QAA Computing 2007
Other external and internal reference points used to inform programme outcomes	Framework for Higher Education Qualifications (FHEQ) 2014 SEEC Credit Level Descriptors 2010
Professional/statutory recognition	
Duration of the programme for each mode of study (P/T, FT,DL)	1 year Full Time 2 years Part Time
Dual accreditation (if applicable)	
Date of production/revision of this specification	09 December 2015

Educational aims and objectives

The programme is intended to:

- Provide a rigorous study of the theory and principles underlying computing and Internet technologies.

- Develop and challenge students by establishing a high degree of expertise in the application, integration and critical evaluation of a range of computer technologies, principles and practices.

- Develop in students an ability to use, compare and critically evaluate a range of formal and informal techniques, theories and methods applied to the development of computing technologies.

- Establish an understanding of the individual, social, ethical, organisational and economic implications of the application of computer technology and the role of the entrepreneur in defining the computing sector.

- Develop in students the ability to carry out a programme of work with minimal supervision

- Develop strong interpersonal skills in students to be able to take responsibility for their own professional development

- Provide appropriate experience of working on a final major project and develop the ability in students to work independently and with flair in a variety of contexts following professional codes of conduct and incorporating this into working practices.

- Provide the expertise and understanding required to make a contribution to the future development of practice and theory in the computing sector.

- Ensure accessibility to people of all ages and experiences.

- Provide students with an opportunity to obtain an in-depth knowledge and understanding of selected areas of interest.

- Be accessible to people of all ages and experiences and can be studied at a college in the South West region;

- Provide access to HE to local and non-traditional University students;

Relationship to other programmes and awards

The programme is accessible as a progression route to students with a Foundation Degree in Computing and Internet Technologies or very similar subject area.

Similarly, on successful completion of the BSc (Hons) Computing and Internet Technologies 3rd Year Top-Up, students can elect to continue onto post-graduate study (subject to meeting course entry requirements at their chosen institution) or seek employment in the computing industry.

2. Programme outcomes

2.1 Intended learning outcomes for Level 6

A. Knowledge and understanding	
Learning outcomes:	**Learning and teaching strategy/ assessment methods**
By the end of the programme learners will be able to: **A5** Critically assess computing principles relevant to the analysis and design of a range of digital and computer communication, programming and database systems; **A6** Evaluate disparagingly the business, organisational and management techniques relevant to those engaging in enterprise and the production of computer systems, products and processes.	At Level 6, students are expected to consolidate their critical knowledge and understanding of new material and to take greater responsibility for the selection of concepts, principles and methodology needed to analyse, synthesise and evaluate particular systems, processes and products in a range of contexts. Students undertake major individual project work addressing the development of A5 and A6 in focussing on aspects of the project life cycle of a specific computer system. The project is designed to allow students to integrate and contextualise their understanding skills and abilities in a supportive and semi-structured environment. **Assessment** Formal assessment of knowledge and understanding is through practical and written coursework, including a major dissertation, and time-constrained tests, which will include project/portfolio work, essays and presentations. Tests and examinations will assess individual knowledge and understanding.

B. Cognitive skills	
Learning outcomes:	**Learning and teaching strategy/ assessment methods**
By the end of the programme learners will be able to: **B5** Solve technical problems creatively and design contexts drawing on techniques or concepts, some of which are at the forefront of computing development or research, and deal with issues creatively in the presence of incomplete data; **B6** Critically evaluate technical information, concepts, arguments, assumptions and evidence derived from a wide variety of sources with the view to abstract from such information, to correctly apply those concepts and restate arguments and assumptions in a variety of ways appropriate for a given cognitive end or purpose.	At Level 6 individual project work addresses B5 and B6, in which student learning includes an appreciation of the open-endedness and incompleteness of knowledge in practical computer problems at system level. Throughout Level 6, the learner is encouraged to undertake independent study both to supplement and consolidate what is being taught/learnt and to broaden their individual cognitive skills and understanding of the subject. Some material will be presented via lectures and tutorials, but a significant component will be gained through self-study, some of it unguided. **Assessment** Student's cognitive skills are typically summatively assessed by a major dissertation and combinations of practical and written assignments, group and individual presentations, laboratory exercises, production of design documentation and specific demonstration of work, and unseen written examination. Formative feedback is given with returned assessed coursework.

C. Practical and professional skills	
Learning outcomes:	**Learning and teaching strategy/ assessment methods**
By the end of the programme learners will be able to: **C5** Critically review technical literature effectively and conduct a specialist literature review by planning and conducting a technical investigation using a wide range of authoritative sources; **C6** Commission, research, and sustain individual project activity and report on findings in a structured manner relying on minimal supervision.	At Level 6 practical and professional skills are acquired mainly through the implementation of a major computing project in which the students will need to independently undertake technical research conducted professionally and following the scientific method. Coursework and practical laboratories are also used to deliver practical and professional skills. The self-defined and individually managed final major project offers enhanced opportunities for developing either a wider range of professional skills, or developing specific practical skills to higher levels of proficiency. Throughout Level 6, the learner is encouraged to develop practical skills further by undertaking independent study. **Assessment** Apart from the major dissertation, a variety of other methods are used for assessment of practical and professional skills. These include laboratory exercises, oral presentations, formal reports, and implementation exercises with supporting documentation demonstrating a professional approach and evaluating methods and products.

D. Key/transferable skills	
Learning outcomes:	**Learning and teaching strategy/ assessment methods**
By the end of the programme learners will be able to: **D5** Conduct research effectively, drawing on a wide variety of sources (including libraries, the Internet and electronic catalogues) under minimal direction, and be proficient in the use of referencing sources of information; **D6** Deploy the general design, implementation and test principles or techniques appropriate for the development of particular computing products or processes and apply a scientific approach to problem solving.	At Level 6 transferrable skills will be addressed using lectures and tutorials for the presentation of instructional material, with practicals, independent study and project work offering the opportunity to practise the skills in a supportive environment. The students are being expected to take an increased responsibility for developing their own transferable skills and identifying resources to support this development. Throughout, the learner is encouraged to develop key transferable skills further by undertaking independent study and research. **Assessment** Assessment of key transferable skills will be undertaken via a combination of written coursework, dissertation and presentations as well as practical tutorial exercises and recorded verbal feedback, online self-assessment questions and production of draft documentation.

3. Programme Structure

Programme Structure - LEVEL 6 Full-time			
Compulsory modules	**Credit points**	**Optional modules**	**Credit points**
Relational Databases	20	*Choose ONE:*	
Mobile Application Development	20		
Final Major Computing Project	40	Mobile Network and Security Management	20
Advanced Programming	20	Collaborative Working and Entrepreneurial Skills	20

Award: BSc Degree with Honours   -   Requires 360 credit points (minimum of 120 credit points must be at Level 6)
BSc Degree without Honours - Requires 300 credit points (minimum of 60 credit points must be at Level 6)

Programme Structure - LEVEL 6 Part-time Yr. 1			
Compulsory modules	**Credit points**	**Optional modules**	**Credit points**
Relational Databases Mobile Application Development	20 20	**Choose ONE:** Mobile Network and Security Management Collaborative Working and Entrepreneurial Skills	 20 20

Programme Structure - LEVEL 6 Part-time Yr. 2			
Compulsory modules	**Credit points**	**Optional modules**	**Credit points**
Final Major Computing Project Advanced Programming	40 20	N/A	

Distinctive features of the programme structure
Where applicable, this section provides details on distinctive features such as:
- **where in the structure above a professional/placement year fits in and how it may affect progression**
- **any restrictions regarding the availability of elective modules**
- **where in the programme structure students must make a choice of pathway/route**

The programme equips graduates with a range of valuable skills securely underpinned by relevant and up-to-date knowledge of the principles of computing and modern internet technologies.

The programme fosters autonomy within the student body in their professional development and a professional approach, bound by professional codes of conduct appropriate to employment within the computing sector;

The programme provides opportunities for learners to develop products and/or relationships with regional, national and international companies involved with Computing and Internet Technologies as well as foster own entrepreneurial skills to support the South West.

As part of the programme, the learner has electronic access to e-books, electronic journals and research papers as well as resources such as e-book readers, graphic tablets and laptop computers.

In addition, the learner is offered the opportunity to choose further options to enhance their knowledge of the subject area and to potentially gain additional industry-recognized certifications should they wish to.

At Level 6, the programme:

- Provide skills and knowledge to enter a range of computing professions, which have seen increased demand for employees at graduate level, and will equip learners with the necessary skills and academic standing to enter postgraduate study.

- Enhances employability of students by providing training with industry-standard software and access to specialised resources such as the Networking Laboratory.

- Incorporate substantial practical and theoretical work by undertaking a major computing project in which the learner will have the opportunity to independently conduct technical research conducted professionally and following scientific methodologies, thus preparing them for the workplace.

- Offers the opportunity for learners to undertake two further industry-recognized certifications due to specific modules having embedded curriculum developed by worldwide leaders in computing technologies.

Support for students and their learning

Seminars/Tutorials/Workshops

Seminars, tutorials and workshops are a crucial part of the learning process, as students have the opportunity to analyse problems and discuss issues in depth. Students should come to these sessions prepared to participate fully as these are a key means of facilitating active learning. These sessions are invaluable in developing independent learning; critical thinking and stronger analytical skills facilitating a process that encourages students to develop many of the key skills employers look for in the creative media industries.

Other Academic Support

Some modules may have relatively little formally timetabled teaching. This is part of a deliberate strategy to help develop and manage students' own learning. Where this is the case, there will be other academic support such as:

- o Formative and summative feedback on assessed work – to help develop knowledge, understanding and skills through undertaking assessments and practical projects;

- o Tutorials – many subjects have timetabled tutorials where work can be discussed with subject tutors. Students can also arrange to meet College tutors to discuss work;

- o Additional learning support – many of our students benefit from the additional learning support by our dedicated learning support team. This support is tailored to each students individual support need to support students with general study skills as well as specialist additional support in close collaboration with the course programme team;

- o College Virtual Learning Environment, Student Portal and email. Some staff use these to initiate discussions and set up learning support groups for their modules;

- o Electronic learning – Access to eBooks, electronic journals and research papers as well as resources such as eBook readers and laptop computers all serve to facilitate and support student learning and research practice;

- o Learning packs. Some modules use learning packs for students to work through in their own time. These may involve exercises to help develop understanding of the materials.

Criteria for admission	
Qualification(s) Required for Entry to the BSc (Hons) Computing and Internet Technologies	**Comments**
Candidates must have:	
Key Skills / Functional Skills requirement	Level 2 English and Maths or equivalent.
GCSEs required at Grade C or above	*4 GCSE subjects or equivalent including Mathematics at Grade C*
A level 5 qualification in Computing such as: HND Computing FdSc Computer Science FdSc Computing and Internet Technologies or similar.	APL/APEL of applicant's prior learning at HE level considered*
APEL/APCL possibilities	APCL may be awarded in respect of a completed programme of study (e.g. HND, DipHE, PG Diploma) or in respect of one or more modules or units of a programme. APEL is the award of credit towards an Open University award in respect of knowledge and skills acquired through life, work experience, and/or study which are not formally attested through certification by a recognised professional or academic body. **Academic regulations for OU Validated Awards will be applied.**
Interview/portfolio requirements	Interview
Disclosure and Barring Services (DBS) Check – (formerly CRB check)	No

Language of study
English

Information about assessment regulations

Please refer to the Open University Academic Regulations available on the VLE

Methods for evaluating and improving the quality and standards of teaching and learning.

All programme teams participate in Annual Programme Monitoring during their Programme Committee Meeting every Autumn. This process involves obtaining student views as well as the views of the staff that delivered each module and where appropriate may consider the views of employers who have been involved with the programme. In order to ensure robust evaluation of the programme, the programme team also consider the programme statistics, (including retention, achievement, gender and ethnicity), and student survey results, in addition to the External Examiner report.

The programme team produces an action plan based on their evaluation to assist in bringing about the developments they have identified. Each Spring the Programme Committee Meeting is held again to review progress with the action plan and to canvas opinions from staff, students and employers connected to the programme. This evaluation process is overseen by the cross-college Academic Board (chaired by the College Principal), the Board receives summary reports of all HE matters in the Autumn and Spring and produces and monitors a top level cross-college HE action plan/Quality Improvement Plan as a result.

The College runs a formal lesson observation scheme and every lecturer is observed at least once each year. Areas of good practice are identified as part of this process and shared across the College. Areas for development are also highlighted to individuals to help each member of teaching staff in their own personal development. If required, a Developmental Action Plan is produced for any member of staff whose lesson observation identifies the need to improve. Advanced Practitioners produce this plan with the member of staff and work with them to facilitate the necessary improvement. Frequent Continuing Professional Development (CPD) sessions are run at the College for academic staff, to share good practice and to support effective teaching and learning. Peer observations are also encouraged and facilitated by Advanced Practitioners. This is a supportive and productive developmental tool where staff observe each other.

Somerset College has a formal structure for hearing the student voice. In addition to programme level activities designed for students to feedback comments to their teaching team, the College also appoints a student representative for each Curriculum Area. This representative collates comments from the Curriculum Area team meetings and feeds back to a central meeting attended by managers from across the College. The focus of this meeting is to obtain feedback about any cross College matters, or unresolved issues

as well as highlighting matters to celebrate from across the curriculum areas. In addition to this the Learning Resource Centre hold regular student forums to gain feedback, which helps them to improve their service to learners. Students are requested to complete written surveys (First Impressions, Student Perception Questionnaire/National Student Survey (NSS), in order to formally record their impressions of the College's programmes.

These mechanisms are all designed to evaluate and improve the quality and standards of teaching and learning.

4. Curriculum map for Level 6

This table indicates which study units assume responsibility for delivering (shaded) and assessing (✓) particular programme learning outcomes.

Level	Study module/unit	A5	A6	B5	B6	C5	C6	D5	D6	D7
6	Relational Databases	✓								
	Mobile Application Development								✓	
	Mobile Networks and Security Management				✓					
	Collaborative Working and Entrepreneurial Skills					✓				
	Dissertation		✓	✓		✓	✓	✓		✓
	Advanced Programming	✓								

5. Assessment Criteria (Levels 6)

The following level descriptors are provided by SEEC (2010) and are used in developing the grading criteria for each assignment of the programme. This is how we ensure that the level of demand, complexity, depth of study and degree of learner autonomy expected at each level of the programme are appropriately established.

Grading criteria	70%+	66-69%	56 – 59%	40% - 49%	0 – 39%
Knowledge and Understanding Knowledge base and ethical issues	Fluent and systematic understanding of computer technology and its relationship and application in the computing sector. Understanding of specialist areas evidenced with depth, effectiveness and flair.	Very good and mostly systematic understanding of computer technology and its relationship and application in the computing sector. Understanding of specialist areas is demonstrated to a very good standard effectively.	Good and methodical understanding of computer technology and its relationship and application in the computing sector. Understanding of specialist areas is demonstrated to a good standard.	Limited understanding of computer technology and its relationship and application in the creative media industry Understanding of specialist areas is often inconsistent and limited.	Weak understanding of computer technology and its relationship and application in the computing sector Understanding of some specialist areas is weak and gaps in knowledge are evident.
Cognitive / Intellectual Skills Analysis, synthesis, evaluation and application of knowledge and skills	Effectiveness, confidence and flexibility shown with ideas at a level of abstraction and identifies effectively the possibility of new concepts whilst working on computing projects. The student is able to identify and define complex problems independently and with flair and is able to identify, select and use investigative strategies and techniques to undertake critical analysis, evaluating the outcomes with confidence working independently. Analyses, evaluates and applies knowledge and methodology by synthesising ideas and information to generate novel solutions and achieves a body of work that is coherent and resolved. Outcomes and conclusions evidence the ability to judge effectively the reliability, validity and significance of evidence to support conclusions and/or recommendations given.	Very good level of flexibility and confidence with abstract ideas and identifies very well the possibility of new concepts whilst working on computing projects. The student is able to identify and define complex problems very well and is able to identify, select and use investigative strategies and techniques to undertake critical analysis, evaluating the outcomes to a very good standard. Analyses, evaluates and applies knowledge and methodology by synthesising ideas and information to generate novel solutions and achieves a body of work that is to a very good standard. Outcomes and conclusions evidence the ability to judge very well the reliability, validity and significance of evidence to support conclusions and/or recommendations given.	Good level of flexibility and confidence with abstract ideas and identifies well the possibility of new concepts whilst working on computing projects. The student is able to identify and define complex problems well and is able to identify, select and use investigative strategies and techniques to undertake critical analysis, evaluating the outcomes to a good standard. Analyses, evaluates and applies knowledge and methodology by synthesising ideas and information to generate novel solutions and achieves a body of work that is to a good standard. Outcomes and conclusions evidence the ability to make sound judgements regarding the reliability, validity and significance of evidence to support conclusions and/or recommendations given	A limited flexibility and confidence when working with abstract ideas and identifies (but in an inconsistent way) the possibility of new concepts whilst working on computing projects. The student has demonstrated a limited ability to identify and define complex problems and can identify, select and use investigative strategies and techniques to undertake critical analysis, evaluating the outcomes but in an inconsistent and limited way. Skills of analysis, evaluation and the application of knowledge and methodology by synthesising ideas and information to generate novel solutions produced limited success. Outcomes and conclusions evidence a limited ability to make sound judgements regarding the reliability,	Weak flexibility and confidence when working with abstract ideas and identifies (but in a poor way) the possibility of new concepts whilst working on computing projects. The student has evidenced a very limited ability to identify and define complex problems and can identify, select and use investigative strategies and techniques to undertake critical analysis, evaluating the outcomes but in an inconsistent and very limited way. Skills of analysis, evaluation and the application of knowledge and methodology by synthesising ideas and information to generate novel solutions are very weak. Outcomes and conclusions evidence a very limited ability to make sound judgements

				validity and significance of evidence to support conclusions and/or recommendations given	regarding the reliability, validity and significance of evidence to support conclusions and/or recommendations given
Personal and enabling skills Group working, use of learning resources, self evaluation, management of information, autonomy, communication and problem solving skills	Highly effective in taking responsibility for own learning and personal development using reflection and feedback to analyse own capabilities, appraises alternatives and plans and implements action whilst working on computing projects. Is highly effective in professional and interpersonal communication in a wide range of situations.	Very effective in taking responsibility for own learning and personal development using reflection and feedback to analyse own capabilities, appraises alternatives and plans and implements action whilst working on computing Very effective in professional and interpersonal communication in a wide range of situations.	Effective in taking responsibility for own learning and personal development using reflection and feedback to analyse own capabilities, appraises alternatives and plans and implements action whilst working on computing projects. Effective in professional and interpersonal communication in a wide range of situations.	Limited ability to be effective in taking responsibility for own learning and personal development using reflection and feedback to analyse own capabilities, appraises alternatives and plans and implements action whilst working on computing projects Limited ability to act effectively in professional and interpersonal communication in a wide range of situations.	Ability to be effective in taking responsibility for own learning and personal development using reflection and feedback to analyse own capabilities, appraises alternatives and plans and implements action is weak whilst working on computing projects. Ability to act effectively in professional and interpersonal communication in a wide range of situations is very weak.

Performance and practice Application of skills and autonomy in skill use	Able to adapt self and role in a given situation and is aware of personal responsibility and professional codes of conduct in relation to the computing sector and incorporates this into their practice. Able to seek and apply new practical and technological solutions to own performance with flair, skill and confidence and identifies how these might be evaluated effectively. Works successfully within a team and supports or is proactive in leadership demonstrating the ability to negotiate in a professional context, and manage conflict – proactively seeking to resolve it.	Very good at adapting self and role in a given situation and shows a very good awareness of personal responsibility and professional codes of conduct in relation to the computing sector and incorporates this into their practice. Able to seek and apply new practical and technical techniques and processes to own performance to a very good standard, skill and confidence and identifies how these might be evaluated to a very good standard. Works very well within a team and supports or is proactive in leadership demonstrating the ability to negotiate in a professional context, and can manage conflict effectively.	Good at adapting self and role in a given situation and shows a good awareness of personal responsibility and professional codes of conduct in relation to the computing sector and incorporates this into their practice. Seeks and applies new practical and technical techniques and processes to own performance to a good standard, skill and confidence and identifies how these might be evaluated to a good standard. Works very well within a team and supports in leadership demonstrating the ability to negotiate in a professional context, and can manage conflict.	Good at adapting self and role in a given situation but to limited success. Awareness of personal responsibility and professional codes of conduct in relation to the computing sector and how it is incorporated into their practice is inconsistent. Able to seek and apply new practical and technical techniques and processes to own performance with limited success, skill and confidence and identifies how these might be evaluated at a limited level. Works with limited success within a team demonstrating the ability to negotiate in a professional context and manage conflict with limited scope.	Weak and ineffective in adapting self and role in a given situation. Awareness of personal responsibility and professional codes of conduct in relation to the computing sector and how it is incorporated into their practice is weak. Very limited ability to seek and apply new practical and technical techniques and processes to own performance. The ability to identify how these might be evaluated is very weak or non-existent. Works poorly within a team demonstrating limited and weak skills in being able to negotiate in a professional context and manage conflict.

Module Specification – SCCI61

1. Factual information			
Module title	SCCI61 - Relational Databases	**Level**	6
Module tutor	George Seba	**Credit value**	20
Module type	Taught	**Notional learning hours**	200

2. Rationale for the module and its links with other modules
The module examines relational databases and the mathematical fundamentals of relational theory behind modern database management systems. The module combines both theory and practice, covering the concepts underpinning relational databases and the practical experience of applying the concepts in different situations. Extensive knowledge of Structured Query Language is one of the most sought-after skills by employers in the IT sector.

3. Aims of the module
To enable learners to:

- Appraise the types of software that are necessary for accessing a database, and how each database has to be specially designed to satisfy the requirements of its users.

- Examine the mathematical theory underpinning relational technologies, finding ways in which the theory is used in the database environment.

- Analyse the steps involved in developing and implementing a database system using Structured Query Language (SQL).

- Examine the tasks and techniques appropriate for each step in the development process and compare implementation alternatives and data representations.

4. Pre-requisite modules or specified entry requirements
None

Intended learning outcomes

A. Knowledge and Understanding	Learning and teaching strategy
At the end of the module, learners will be able to: **A1** Plan, design and document a relational model of a given problem statement or informal request **A2** Develop and apply a strategy for testing that a database functions as designed.	Primary • Lecture & Tutorials • Self-Directed Study • Active Learning Secondary • Practical sessions • Online resources Assessment • Assessment 2

C. Practical and professional skills	Learning and teaching strategy
At the end of the module learners will be able to: **C1** Apply logical processing models for a query containing sub queries **C2** Write an appropriate SQL query which satisfies a given problem statement or an informal request and use quantifiers to write search conditions that use some, all or no values from a table returned by a subquery adhering to professional codes of conduct. **C3** Be able to design and construct databases and database management systems using data management software	Primary • Lecture & Tutorials • Directed Independent Study • Active Learning Secondary • Problem solving exercises • Online resources Assessment • Assessment 1 • Assessment 3 • Examination

6. Indicative content.

Content for this unit will include:

SQL statements (Select, Where, Order By, etc.); Single row functions; Number and Date functions; Case and Character manipulation; Conversion and NULL functions; Conditional expressions; Cross and Natural joins; Inner vs, Outer joins; Self joins and Hierarchical queries; Cartesian product; Group functions; Rollup, Cube operations and Grouping sets; Single-row and Multiple-row subqueries; Correlated subqueries; DML; DDL; Constraints; Views; Sequences and Synonyms; Privileges and Regular expressions; Transactions, etc.

7. Assessment strategy, assessment methods and their relative weightings

Assessment Mode: Coursework 100%

- Assignment 1 – 50%
- Assignment 2 – 50%

Assessment Criteria (Threshold Level) **:**

Assignment 1
Will demonstrate the learner's ability to retrieve data using simple, composite and correlated queries, subqueries, joins, unions, quantifiers; enforce referential integrity; define constraints; ability to use domains in SQL, access control, create views; use SQL routines, triggers and procedures, implement transaction management, etc.

Assignment 2
Will demonstrate the learner's in depth understanding of the structure of relational representations and ability to work with Cartesian product and join operations, non-equijoins, outer joins, self joins, cross joins, natural joins, and join clauses; Review group functions, group by syntax, and having clauses; working with sequences, indexes and synonyms, etc.

8. Mapping of assessment tasks to learning outcomes					
Assessment tasks	Learning outcomes				
	A1	**A2**	**C1**	**C2**	**C3**
Assessment 1 (50%)	✓				✓
Assessment 2 (50%)		✓	✓	✓	

9. Teaching staff associated with the module	
Tutor's name and contact details	**Contact hours**
George Seba **sebag@bridgwater.ac.uk**	45 hours

10. Key reading list
Date, C. J. (2012) *Database design and relational theory: normal forms and all that jazz.* Sebastopol: O'Reilly

Date, C. J. (2013) *Relational theory for computer professionals.* Sebastopol: O'Reilly

Greco, S., Molinaro, C. and Spezzano, F. (2012) *Incomplete Data and Data Dependencies in Relational Databases.* Morgan & Claypool Publishers

Halpin, T. and Morgan, T. (2008) *Information Modelling and Relational Database.* 2nd edn. Burlington, MA: Morgan Kaufmann. |

11. Other indicative text (e.g. websites)
Transactions On Database Systems (TODS), Journal – Association of Computing Machinery (ACM)

J Shanmugasundaram, K Tufte, Gang He, Chun Zhang, D DeWitt, J Naughton, (1999). *Relational Databases for Querying XML Documents: Limitations and Opportunities.* Department of Computer Sciences, University of Wisconsin-Madison

H Gallaire, (1981) *Impacts of Logic and Databases* (Invited Paper). Published in VLDB '81 Proceedings of the seventh international conference on Very Large Data Bases - Volume 7, pages 248 – 259. VLDB Endowment 1981, Conference VLDB (Very Large Data Bases)

Other resources, such as e-books, e-journals and conference proceedings, to support you on this module, are available on the VLE and via the Ebsco Discovery Service. This service provides access to research databases IEEE Xplore Digital Library, Academic Search Elite, Gale databases and others. |

Module Specification – SCCI62

1. Factual information			
Module title	SCCI62 - Mobile Application Development	**Level**	6
Module tutor	Stephen Fletcher	**Credit value**	20
Module type	Taught	**Notional learning hours**	200

2. Rationale for the module and its links with other modules

Mobile computing devices are an integral part of today's computing and information systems.
The design and development of software applications for devices such as smart phones and tablets requires a critical understanding of the platform and its constraints.

The designers and developers need to appreciate the distinct characteristics of mobile applications and be able to select appropriate tools and standards to design and develop such applications. This module introduces the student to mobile application development using an
Integrated development environment.

3. Aims of the module

- The module builds on learners' previous knowledge and understanding of computer systems, operating systems, interface design and programming skills.
- Learners will be implementing realistic applications for a smart phone using up-to-date tools.
- The module will critically examine ways in which completed mobile phone applications can be taken to the relevant market place to create commercial opportunities.

4. Pre-requisite modules or specified entry requirements
Introduction to Mobile Programming

5. Intended **Module** Learning Outcomes

A. Knowledge and understanding	Learning and teaching strategy
At the end of the module, learners will be expected to: **A1:** Design and create mobile applications implementing industry standard design concepts and professional programming practices using object-oriented environments.	The delivery of this unit will consist of lectures and tutorials; directed independent study; active learning; practical demonstrations and the use of online resources.

B. Cognitive skills	Learning and teaching strategy
At the end of the module, learners will be expected to: **B1:** Effectively problem-solve with regards to the planning and production of applications that are produced autonomously/with minimal supervision.	The delivery of this unit will consist of lectures and tutorials; directed independent study; active learning; practical demonstrations and the use of online resources.

C. Practical and Professional Skills	Learning and teaching strategy
At the end of the module, learners will be expected to: **C1:** Publish completed mobile phone applications to the relevant market place in order to create commercial opportunities.	The delivery of this unit will consist of lectures and tutorials; directed independent study; active learning; practical demonstrations and the use of online resources.

D. Key Transferable Skills	Learning and teaching strategy
At the end of the module, learners will be expected to: **D1:** Review the design and development process and reflect on professional practice.	The delivery of this unit will consist of lectures and tutorials; directed independent study; active learning; practical demonstrations and the use of online resources.

6. Indicative content
Mobile application life cycle; mobile application ecosystem; mobile hardware (sensors); mobile software (operating systems) mobile application design; mobile application development; UI; UX; data services; networking services; alternative external services; reading structure data; deploying and promoting mobile applications;

7. Assessment strategy, assessment methods and their relative weightings
Assessment Mode: 100% coursework comprising of the following two assignments: Assignment 1 – 50% Assignment 2 – 50% **Assessment Criteria:** The module learning outcomes will be assessed via two assessments in which the learners will design, create, test, review and deploy mobile applications for a set of given requirements. Assignment 1 – Plan, develop, test a mobile application for a given set of requirements (Android App Development) - 50% Assignment 2 – Plan, develop, test, review and deploy a mobile application that implements an external service (Android App Development) - 50%.

8. Mapping of assessment tasks to module learning outcomes

Assessment tasks	Module Learning Outcomes			
	A1	**B1**	**C1**	**D1**
Practical Assignment	✓	✓		
Practical Assignment			✓	✓

9. Teaching staff associated with the module

Stephen Fletcher fletchers@bridgwater.ac.uk 01823 366382	Contact hours: 45 hours

10. Key reading list

Allen, S. (2010) *Pro Smartphone Cross-Platform Development: iPhone, Blackberry, Windows Mobile, and Android Development and*
Distribution. New York: Apress

Annuzzi, J. and Darcey, L. (2014) *Advanced Android Application Development*. Addison Wesley

Lee, W. (2011) *Beginning Android Application Development*. Indianapolis, IN: John Wiley & Sons

Neuburg, M. (2015) *Programming iOS 9: Dive Deep into Views, View Controllers, and Framework.* O'Reilly.

11. Other indicative text (e.g. websites, blogs, periodicals, etc.)

Other resources, such as e-books, e-journals and conference proceedings, to support you on this module, are available on the VLE and via the Ebsco Discovery Service. This service provides access to research databases IEEE Xplore Digital Library, Academic Search Elite, Gale databases and others.

Module Specification – SCCI65

1. Factual information			
Module title	SCCI65 - Mobile Network and Security Management	**Level**	6
Module tutor	Amber Shah	**Credit value**	20
Module type	Taught	**Notional learning hours**	200

2. Rationale for the module and its links with other modules
This module enables learners to examine and critically appraise mobile network protocols and security issues that are affecting not just large organizations but individual users. Emphasis is placed on the 'national infrastructure', fraud and associated bodies and how RF networks are evolving.

3. Aims of the module
To enable the learners to: • Examine protocols and operation of mobile networks and past and emerging technological developments in this field and its integration to network; • Critically appraise the security issues affecting mobile network operation and techniques to resolve them; • Model mobile networks using a variety of recognised methods to clarify, evaluate and communicate system design concepts applying security management; • Design and produce a mobile network technology solution to the existing system.

4. Pre-requisite modules or specified entry requirements
None

5. Intended **Module** Learning Outcomes

A. Knowledge and understanding	Learning and teaching strategy
At the end of the module, learners will be expected to: **A1** Analyse and critically evaluate current system and its inherent mobile network integration problem in a given situation **A2** Analyse a specific network management problem and apply concepts and issues learnt to design one or more aspects of a network management solution	**Primary** • Lecture & Tutorials • Directed Independent Study • Practical Exercises • Active Learning **Secondary** • Problem solving exercises • Online resources **Assessment** • Assignment 1

B. Cognitive skills	Learning and teaching strategy
At the end of the module, learners will be expected to: **B1:** Propose and create a secure mobile network and integration solution including relevant technological designs, which supports all recommendations and conclusions with an evaluation, by comparing its benefits versus the old system. **B2:** Analyse and carefully choose emerging technologies for a mobile network integration solution to enhance the effectiveness of organisational processes by reducing cost and its benefits to different user categories.	**Primary** • Lecture & Tutorials • Directed Independent Study • Practical Exercises • Active Learning **Secondary** • Problem solving exercises • Online resources **Assessment** • Assignment 2

6. Indicative content

Evolution of wireless NW, Telecommunication infrastructure, Wired and wireless networks and telephony, cellular structures and systems, base stations, mobile networks and cellular, emerging technologies, RF and RF Spectrum, Transmission techniques, Encoding and encoding techniques, Topologies and protocols, Addressing techniques (unicast, multicast etc), electromagnetic Spectrum, IEEE 802.x, satellite communication infrastructure, signal to noise ratio etc.

7. Assessment strategy, assessment methods and their relative weightings

Assessment Mode: 100% coursework

Assessment Criteria: (Threshold Level)

Assignment 1 – 50%: Learners have to demonstrate the ability to critically appraise the protocols and operation of mobile networks and the security issues affecting mobile network operation and techniques to resolve them.

Assignment 2 – 50%:
As part of this assessment learners are required to model mobile networks using a variety of recognised methods to clarify, evaluate and communicate system design concepts applying security management.

8. Mapping of assessment tasks to module learning outcomes

Assessment tasks	Module Learning Outcomes			
	A1	**A2**	**B1**	**B2**
Assignment 1	✓	✓		
Assignment 2			✓	✓

9. Teaching staff associated with the module

Amber Shah: amber.shah@somerset.ac.uk ☎**01823 366470**	**Contact hours**: 45 hours

10. Key reading list

Al-Bayatti, A, (2010) *Security Management for Mobile Ad hoc Network of Networks (MANoN): Mobile Ad hoc Networks (MANET), Security Management, Security Architecture*. Düsseldorf, Germany: VDM Verlag Dr. Müller
Dahlman, E., Parkvall, S. and Skold, J. (2013) *4G: LTE/LTE– Advanced for Mobile Broadband.* 2nd edn. Academic Press.
Karmakar, N. C. (2016) *Advanced Chipless RFID: Imaging 60 GHz MIMO/MLD.* John Wiley & Sons
Sinha, A. K. (2015) *Theory of Satellite and Mobile (Cellular) Telecommunications: Transmission Systems Planning, Design and Analysis.* Xlibris
Zhang, Y. (2009) *RFID and Sensor Networks: Architectures, Protocols, Security, and Integrations (Wireless Networks and Mobile Communications Series)*. California: CRC Press
Zhu, B, (2009) *Security and Privacy in Mobile Ad Hoc Networks: Key management and anonymous secure routing in large ad hoc networks.* Dusseldorf, Germany: VDM Verlag.
Other links relevant to topics will be uploaded on VLE under lecture slides.

11. Other indicative text (e.g. websites, blogs, periodicals, etc.)

Other resources, such as e-books, e-journals and conference proceedings, to support you on this module, are available on the VLE and via the Ebsco Discovery Service. This service provides access to research databases IEEE Xplore Digital Library, Academic Search Elite, Gale databases and others.

Other links relevant to topics will be uploaded on VLE under lecture slides.

Module Specification – SCCI66

1. Factual information

Module title	SCCI66 - Collaborative Working and Entrepreneurial Skills	**Level**	6
Module tutor	Lucy Fortt	**Credit value**	20
Module type	Taught	**Notional learning hours**	200

2. Rationale for the module and its links with other modules

This module provides students with a critical and in depth understanding of the concept of entrepreneurship and how it operates in the computing industry. Particular emphasis is placed upon how creativity and entrepreneurial activity can be combined in a business plan as a potential freelancer or independent development in the computing sector.

3. Aims of the module

To enable students to:

- Recognise the nature and concepts of enterprise, entrepreneurship and self-employment.

- Generate and evaluate potential business development ideas

- Critically appraise the feasibility and appropriateness of developing small business opportunity as a potential personal career option.

- Develop the key components of a business plan.

- Critique the development and management of business initiatives

4. Pre-requisite modules or specified entry requirements

None

Intended **Module** Learning Outcomes

D. Key Transferable Skills	Learning and teaching strategy
At the end of the module, learners will be expected to: **D1** Work effectively and to industry codes of conduct on collaborative projects. **D2** Evaluate the role of the entrepreneur and SMEs in the relevant industry and the wider economic, social, ethical and legal issues relating to the computing sector **D3** Plan and implement actions utilizing effective time management and organisational skills in order to develop self and role in the relevant industry.	☐ Class exercises ☐ Case studies ☐ Practical coursework ☐ Project work ☐ Tutorial / seminar discussions ☐ Feedback via coursework assessment process (essays etc) ☐ Verbal feedback ☐ Peer group critique

6. Indicative content.

Students will be provided with a comprehensive overview of the contemporary business environment and the role of small businesses in the economy and examine and define successful business models. Business planning, management and financial modelling will also be covered in this module.

Skills and self-development in relation to enterprise (creativity, innovation, communication, motivation and attitude) and key components for self-employment success are also within the scope of this module.

7. Assessment strategy, assessment methods and their relative weightings

Assessment Mode: 100% coursework

Assessment Criteria:

Collaborative project and presentation of business development idea	50%
Reflective evaluation of enterprise and business skills	50%

8. Mapping of assessment tasks to module learning outcomes			
Assessment tasks	**Module Learning Outcomes**		
	D1	**D2**	**D3**
Collaborative project and presentation	☐		
Reflective evaluation portfolio		☐	☐

9. Teaching staff associated with the module	
Tutor's name and contact details	Contact hours
Lucy Fortt Forttl@bridgwater.ac.uk 01823 366 661	45 hours

10. Key reading list

Ashton, R. (2012) *How to start your own business for entrepreneurs.* 2nd edn. Harlow: Pearson

Barringer, B. & Ireland, D. (2015) *Entrepreneurship: Successfully Launching New Ventures.* Harlow: London: Pearson Education

Bolton, B. & Thompson, J. (2013) *Entrepreneurs: talent, temperament and opportunity.* 3rd end. Abingdon: Routledge

Canfield, J. (2015) *The Success Principles: How to Get from Where You Are to Where You Want to Be.* 10th edn. New York: HarperCollins

Finch, B. (2013) *How to Write a Business Plan.* 4th end. London: Kogan Page

Morris, M. (2012) *A Practical Guide to Entrepreneurship: How to Turn an Idea into a Profitable Business.* London: Kogan Page

Nierenberg, A. R. (2014) *Network Like you Mean it: the Definitive Handbook for Business and Personal Networking.* Upper Saddle River, NJ: Pearson Education

Townsend, H. (2014) *The Financial Times Guide to Networking: How to Use the Power of Online and Offline Networking for Business and Personal Success.* 2nd edn. Harlow: Pearson Education

Williams, S. (2015) *The Financial Times Guide to Business Start Up 2016: the Most Comprehensive Annually Updated Guide for Entrepreneurs.* London: Financial Times/ Prentice Hall

11. Other indicative text (e.g. websites)

Other resources, such as e-books, e-journals and conference proceedings, to support you on this module, are available on the VLE and via the Ebsco Discovery Service. This service provides access to research databases IEEE Xplore Digital Library, Academic Search Elite, Gale databases and others.

Module Specification – SCCI63

1. Factual information			
Module title	SCCI63 - Dissertation	**Level**	6
Module tutor	George Seba	**Credit value**	40
Module type	Taught	**Notional learning hours**	400

2. Rationale for the module and its links with other modules
This individual project will provide learners with the opportunity to apply the knowledge and skills that they have acquired on the programme, in a scientific manner to enable the development of a substantial computing project and write a comprehensive dissertation. Learners will develop strategies allowing them to understand and practice problem solving with regard to research, synthesis, realization and evaluation. The module culminates in a final presentation of their computing project to a panel.

3. Aims of the module
To enable learners to:

- Become proficient in the extended application and manipulation of a range of tools, techniques and technologies in the production and delivery of a complex computing project

- Appraise, plan and manage a self-developed design brief in a professional manner, demonstrating appropriate adherence to professional codes of conduct

- Demonstrate proficiency in negotiating, communicating and justifying ideas and solutions to industry standards

- Exercise self-management skills

4. Pre-requisite modules or specified entry requirements
None

Intended learning outcomes

A. Knowledge and Understanding	Learning and teaching strategy
At the end of the module learners will be able to: **A1** Appraise essential facts, concepts, theory, principles and practice in the development of a dissertation proposal.	There is no set syllabus for this module. Students either choose a project from a published list or propose a project of their own. In the former case the student is then allocated to the supervisor who had put that project on the list. This is an extended piece of work, completed under supervision of a staff tutor. The students agree a specification for a task, which may be the analysis and design of a system, the development of software or similar and produces a finished dissertation and/or product. This activity approximates closely with the development of an individual project within industry.

B. Cognitive Skills	Learning and teaching strategy
At the end of the module, learners will be able to: **B1** Develop and apply new creative techniques and processes in the development and application of problem solving strategies throughout the major computing project process **B2** Conduct specialist literature review in order to judge the reliability, validity and significance of evidence to support conclusions and/or recommendations in the design, production and evaluation of a computing asset. **B3** Critically evaluate and test the extent to which the developed computing asset meets defined criteria	The students will engage into high-quality academic research in the form of literature review which will inform the methodology and the research question of their project. The supervisor will provide support and guidance on how literature review should be conducted and structured. In the case of 'own-projects', this must be first discussed with the Project Coordinator who will determine whether it is viable and of sufficient substance. If the Project Coordinator is satisfied, he/she will then direct the student to appropriate members of staff who might be able to supervise. If the student identifies a suitable supervisor, then the project is approved.

C. Practical and professional skills	Learning and teaching strategy
At the end of the module, learners will be able to: **C1** Manage own learning and work independently with confidence adhering to professional codes of conduct and applying the entrepreneurial skills required in the computing sector. **C2** Deploy new and previously acquired skills in the specification, design, implementation and evaluation of a major computing project **C3** Examine, analyse and critically evaluate progress regularly in the form of a production log, reflecting upon strategies and methodologies appropriately in order to devise appropriate solutions in relation to the planning, development and implementation of a major computing project.	The Coordinator provides a briefing session at the start of the project and before the deadlines for the summative assessments. The students will use this module to implement new and existing skills - both technical and academic - in order to develop their project at near professional standards. The project runs continuously through both teaching terms of the third year with students responsible for organising themselves and their work, with advice from their supervisor, whom they are expected to see on a mutually agreed regular basis and as part of the formal progress monitoring process, the supervisor will sign off workbook entries regularly.

D. Key transferrable skills	Learning and teaching strategy
At the end of the module, learners will be able to: **D1** Plan and implement actions taking responsibility for continuing professional development including time management and organisational skills **D2** Demonstrate due regard to moral and ethical considerations within the proposal of the dissertation and continued throughout the development of the research practices.	Lectures/seminars/workshops may be given on generic issues, as necessary, depending on subject areas for each project. The onus of this module is on independent student work, i.e. individuals contributing to project work and interaction with academic supervisor. Contact will be as a whole class, groups, and individual as necessary. The learner will normally be expected to spend at least 400 hours on their project work. Selection of a project and preparation for the project begins soon after the start of the academic year for Level 6.

6. Indicative content.

This module requires students to develop a self-directed brief (with support from the project supervisor) which involves the research, planning and design and implementation of a computing project. Regular progress review meetings with your allocated project supervisor will take place throughout the year with support and guidance offered with the initial project concept, rationale and deliverables. Project reporting will include detail of project planning, research and development, use of resources and the presentation of the honours project findings in a dissertation which supports the final presentation of the computing project.

7. Assessment strategy, assessment methods and their relative weightings

Assessment Mode: 100% coursework

Dissertation Proposal	10%
Dissertation	60%
Presentation (Viva)	20%
Project Workbook	10%

Assessment Criteria:

This module requires the design, development, production and evaluation of a complex and substantial piece of work. Therefore the assessment criteria requires that a full range of skills are tested and demonstrated by the student from the articulation of their full knowledge and understanding of the subject field, their creative and technical abilities as well as ability to demonstrate professional autonomy and abidance to professional codes of conduct.

8. Mapping of assessment tasks to learning outcomes

Assessment tasks	Learning outcomes								
	A1	B1	B2	B3	C1	C2	C3	D1	D2
Dissertation Proposal (10%)	✓								✓
Dissertation (60%)		✓	✓	✓	✓			✓	
Viva (Presentation) (20%)						✓			
Project Workbook (10%)							✓		

9. Teaching staff associated with the module

Tutor's name and contact details	Contact hours
George Seba (sebag@bridgwater.ac.uk, 01823 366319)	135 hours

10. Key reading list

Biafore, B. and Stover, T. (2012) *Your Project Management Coach: Best Practices for Managing Projects in the Real World.* Indianapolis, Indiana: John Wiley & Sons

Cottrell, S. (2014) *Dissertations and project reports: a step by step guide*. Basingstoke: Palgrave Macmillan

Dawson, C.W. (2015) *The Essence of Computing Projects: A Student's Guide. Harlow:* Prentice Hall

Mcmillan, K. and Weyers, J. (2011) *How to write dissertations and project reports*. 2nd edn. Harlow: Pearson Education

Walliman, N. (2014) *Your undergraduate dissertation: the essential guide for success*. 2nd edn. London: Sage.

11. Other indicative text (e.g. websites)

Other resources, such as e-books, e-journals and conference proceedings, to support you on this module, are available on the VLE and via the Ebsco Discovery Service. This service provides access to research databases IEEE Xplore Digital Library, Academic Search Elite, Gale databases and others.

Module Specification – SCCI64

1. Factual information			
Module title	SCCI64 - Advanced Programming	**Level**	6
Module tutor	Stephen Fletcher	**Credit value**	20
Module type	Taught	**Notional learning hours**	200

2. Rationale for the module and its links with other modules

This module extends knowledge and experiences of object oriented programming paradigm with reference to design and development. Learners' will advance their comprehension of design and implementation practices using contemporary industry standard methodologies, techniques and environments to solve complex programming algorithms.

3. Aims of the module

- To enable students to enhance previous programming knowledge and aptitude;
- To provide an opportunity for the learners to enhance programming expertise and solve complex problems;
- To develop students understanding of the object-oriented programming paradigm.

4. Pre-requisite modules or specified entry requirements

Programming Fundamentals

5. Intended **Module** Learning Outcomes

A. Knowledge and understanding	Learning and teaching strategy
At the end of the module, learners will be expected to: **A1:** Create applications using the object oriented programming paradigm and object oriented concepts	The delivery of this unit will consist of lectures and tutorials; directed independent study; active learning; practical demonstrations and the use of online resources.

B. Cognitive skills	Learning and teaching strategy
At the end of the module, learners will be expected to: **B1:** Critically analyse and evaluate software engineering practices and procedures to modelling and developing solutions	The delivery of this unit will consist of lectures and tutorials; directed independent study; active learning; practical demonstrations and the use of online resources.

C. Practical and Professional Skills	Learning and teaching strategy
At the end of the module, learners will be expected to: **C1:** Apply fundamental object oriented programming concepts to complex solutions using algorithms and programming techniques to meet user requirements.	The delivery of this unit will consist of lectures and tutorials; directed independent study; active learning; practical demonstrations and the use of online resources.

D. Key Transferable Skills	Learning and teaching strategy
At the end of the module, learners will be expected to: **D1:** Autonomously solve complex problems and develop appropriate solutions using industry standard methodologies	The delivery of this unit will consist of lectures and tutorials; directed independent study; active learning; practical demonstrations and the use of online resources.

6. Indicative content

Object-oriented fundamentals; programming concepts; objects, classes and abstract classes; inheritance; aggregation; association; polymorphism; interfaces; enumerated types and generics; abstract data types and collection (queues, stacks, link list); sorting and searching algorithms (bubble sort, selection sort, insertion sort, hash sort, merge and binary sort etc.);String processing (searching, parsing and replacing); recursion (linear and non-linear methods); exceptions and assertions; implementing external services; deploying object-oriented applications.

7. Assessment strategy, assessment methods and their relative weightings

Assessment Mode: 100% coursework comprising of the following:

Written assessment evaluating and analysing contemporary modelling methods – 50%

Practical programming assessments - Two advanced programming assessments using an object-oriented programming language and environment – 50%

Assessment Criteria:

The learning outcomes of the module will be assessed via:-

Written Assessment: A written assessment evaluating and analysing object-oriented modelling tools and techniques.

Practical Programming Assessment: Practical programming assessments to solve complex object-oriented programming problems

8. Mapping of assessment tasks to module learning outcomes

Assessment tasks	Module Learning Outcomes			
	A1	B1	C1	C2
Written Assessment		✓		
Practical programming assessments	✓		✓	✓

9. Teaching staff associated with the module

Stephen Fletcher fletchers@somerset.ac.uk 01823 366382	Contact hours: 45 hours

10. Key reading list

Van Vliet, H. (2008) *Software Engineering: Principles & Practice*. 3rd edn. John Wiley & Sons
Sommerville, I. (2016) *Software Engineering*. 10th edn. Pearson Education
Martin, R. (2013) *Agile Software Development, Principles, Patterns and Practices*. Pearson
Arnold, J. (2014) *Advanced Java Optimisations Techniques*. Createspace
Cole, K., McChesney, R. and Raszka, R. (2011) *Advanced Java EE Development for Rational Application Developer 7.5.* 2nd edn. MC Press.

11. Other indicative text (e.g. websites, blogs, periodicals, etc.)

Other resources, such as e-books, e-journals and conference proceedings, to support you on this module, are available on the VLE and via the Ebsco Discovery Service. This service provides access to research databases IEEE Xplore Digital Library, Academic Search Elite, Gale databases and others.