University of Bedfordshire

Course Information Form

This Course Information Form provides the definitive record of the designated course

General Course Information

Course Title	MSc Software Engineering and Applications
Qualification	MSc
FHEQ Level	Level 7
Intermediate Qualification(s)	N/A
Awarding Institution	University of Bedfordshire
Location of Delivery	AA - University Square Campus
Mode(s) of Study and Duration	Full-time over 1 year (Feb, April, June and Aug entry) Full-time over 15 months (Oct and Nov entry)
Professional, Statutory or Regulatory Body (PSRB) accreditation or endorsement	N/A
UCAS Course Code	N/A
External Benchmarking	QAA Subject Benchmark Statement Computing (2011) QAA FHEQ Level Descriptors (2014)
Entry Month(s)	Oct, Nov, Feb, April, June and Aug

Why study this course
The MSc in Software Engineering and Applications with Placement course is about building professional software developers and helping them to create applications of latest emerging technologies. It is an ideal course for Computer Science graduates and experienced programmers who want to solve real-world problems, evaluating advanced software engineering environments, and built up complex software applications based on emerging technology with improved readability, testability, and extensibility. A range of topics from advanced programming to popular development platforms, open source frameworks, Big Data ecosystem and Cloud Computing will be explored to fulfil the goal and to open up your career opportunities.

Educational Aims

The educational aims of the course are as follows:
1. Development of advanced analytical and technical skills in core areas of software engineering, which include advanced programming, design patterns, architecture patterns, data architectures, distributed and parallel systems, Hadoop, Cloud Computing and web services.
2. Development of professional skills in management of projects related to software engineering.
3. Achievement of critical understanding of core software engineering technologies, development platforms and related open source frameworks.

4. Development of problem solving skills which are required for applications to real-world tasks by utilising applied software development techniques and open source frameworks
5. Acquire the skills related to research methodologies, ethics, and legal aspects, that is required for work within the areas of Computer Science.

Course Structure

The Units which make up the course are:

Unit Code	Level	Credits	Unit Name	Core or option
CIS120-6	7	30	Research Methodologies and Project Management	Core
CIS110-6	7	30	Distributed and Parallel Computing Technologies	Core
CISNEW1-6	7	30	Software Design Patterns and Data Architectures	Core
CISNEW2-6	7	30	Applied Software Development Techniques and Applications of Open Source Frameworks	Core
CISNEW3-6	7	60	MSc Project - Software Engineering and Applications	Core

Course-Specific Regulations

Entry requirements
Standard:
A good UK honours degree or equivalent in a computing-related subject.
Additional:
Those applicants who do not have a first degree may be granted entry on the basis of their work experience. Such work experience must total five or more years and be relevant to the degree. You need to provide evidence of having previous knowledge and skills in the following (or closely aligned) topics: programming, software development, data handling and modelling, computing applications and/or project management during your undergraduate studies, or having evidence of equivalent work experience.

Additional Course Costs
N/A

Graduate Impact Statements
The course has been designed to develop graduates who are able to:

- Apply specialist knowledge in the field of software engineering and its applications.

- Contribute specialist expertise that is complementary to teams working on projects ranging from software design to implementation and deployment.

- Explore and utilise emerging new technology and software engineering techniques to solve industry problems.

Course Learning Outcomes

1. Demonstrate deep and systematic understanding of the key principles, methodologies and the tools used for Software Engineering.

2. Undertake a substantial investigation to address significant areas of theory and/or practice in the area of the Software Engineering, selecting appropriate methodological processes and critically evaluating their effectiveness.

3. Propose and justify the application of appropriate forms of advanced problem solving along with creativity and innovation to apply advanced methodologies and tools in the Software Engineering.

4. Incorporate a critical ethical dimension to your practice; to systematically understand employability, legal frameworks, economics, risk and apply the standards and practices of professional bodies.

5. Consistently apply, develop and evaluate tools, techniques and methods consistent with current research and or professional practice at the forefront of the specialist area of Software Engineering.

6. Demonstrate comprehensive understanding and critical awareness of the current and emerging methodologies, tools, standards, and research in the subject area.

7. Identify, evaluate and maintain capabilities to support effective communication of complex ideas and developments in a comprehensive, effective, systematic and professional way using a variety of communication media (e.g. formal written reports, essays and presentations with supporting oral communication).

PSRB details

N/A

Learning and Teaching

A wide variety of teaching styles will be used throughout this course. The most important aspect will be that of a student-centred approach, and the University will encourage you through relevant guidance to become an independent thinker who can take responsibility for their own learning, and who can adapt to a wide variety of different situations within the context of Software Engineering.
The course will make use of traditional lectures and practical sessions as well as encouraging you to engage in various scenarios such as managing your own projects and achieving professional output through teamwork.
Unit content such as lecture slides or practical sheets are made available electronically through the University's virtual learning environment.
To aid curriculum and assessment design, the University uses the FHEQ credit level descriptors as points of reference for determining progression in terms of level of demand and complexity and the degree of learner autonomy involved in specific learning opportunities (Quality Handbook Chapter 1, section 1.3.3).

Assessment

Assessment Map

Unit Code	C/O	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CIS110-6						WR-Gr	Ex								
CIS120-6						CW-Port									
CISNEW1-6			WR-I			PJ-Art									
CISNEW2-6				WR-Gr		PJ-Art									
CISNEW3-6							WR-I								PJ-Proj

Developing your employability

Employability is understood widely as encompassing knowledge, skills and a professional attitude which your tutors expect you to display in all your units. All University of Bedfordshire courses aim to help you to be prepared for the world of work. The Careers Service is there to support you throughout the duration of your study. Our curriculum gives you skills that are valuable for a career within the Software Engineering, but it is also relevant for a wider range of applications.

The unit 'Research Methodologies and Project Management' in particular requires you to work in a team so as to apply a current project management methodology that embraces all of these knowledge areas in an integrated way while going through the stages of planning, execution and project control; you will work as part of a team, take responsibility and make autonomous decisions that impact on the project team performance.

The unit 'Applied Software Development Techniques and Applications of Open Source Frameworks' help you to bridge the skill gap between the academia and industry by addressing the practical aspect of the software engineering process at the development phase of the software lifecycle. You will gain the key techniques and skills required by the professional development through a capstone project using open source frameworks.

In addition and somewhat complementary the project fosters independent and autonomous study: you learn to take up the responsibility of conducting your project, typically derived from your own ideas, in collaboration with a dedicated member of the academic staff as project supervisor.

After Graduation

On completing this course students are likely to progress into the following areas:

Career:
Programmer/Software Engineer
Data Analyst
System Analyst
Software Architect
Software Consultant
Software Engineering Team Leader
Project Manager

Further study:
MSc by Research, MPhil, PhD.

Additional Information

Student Support during the course

At institutional level, the university has in place a range of easily accessible support structures for new and existing students.

The Student Information Desk offers confidential advice on all aspects of academic study. It provides information about other areas of university-wide student support such as extenuating circumstances, housing, health, counselling, study support, special needs and disability advice, and careers service. The Study Hub team provide workshops and one to one support for

academic skills. The university chaplaincy runs regular meetings, social events and trips. The Student Union provides additional support and activities.

Course specific support is also in place. Arriving students receive a comprehensive induction in the week prior to the commencement of the academic year. Course co-ordinators will meet with their student groups to explain the course structure and other issues relating to the student experience. These introductions will give you outlines of your course and units, a description of the ways you will be encouraged to develop your knowledge and skills, and signpost resources and materials to assist the process of your learning and success. An important part of this induction is the training to use BREO (Bedfordshire Resources for Education Online). BREO is your personalized virtual learning environment that contains lecture notes, links for online assignment submission, staff contact details, links to central student services and much more. We expect that you use BREO regularly, and that you use your university email where we send you updates about all aspects of your course that need your attention.

All students will be allocated a personal academic tutor when they join the course. This academic will be responsible of monitoring your academic progress and will help you with any academic issues that might come up. The personal tutor is your consistent point of contact for support and guidance, but will on occasion refer you to other university staff for specific issues. Further support is provided by lecturers who have office hours and by the course administration team.

Students may be required, at the discretion of the course coordinator, to undergo diagnostic testing for academic English language abilities, and may further be required, at the course coordinator's discretion, to participate in academic English support workshops or classes laid on by the University.

Course Equality Impact Assessment

Question	Y/N	Anticipatory adjustments/actions
Is the promotion of the course open and inclusive in terms of language, images and location?	Y	Communication with the marketing department and relevant University services will be maintained to assure full visibility of the course diet, structure and delivery, and to ensure that promotion materials for the course are open and inclusive in terms of language and images.
Are there any aspects of the curriculum that might present difficulties for disabled students? For example, skills and practical tests, use of equipment, use of e-learning, placements, field trips etc.	N	The curriculum requires the use of computing equipment during practical sessions and computer-based assessments. Reasonable adjustments are implemented when necessary, such as allowing more time to complete exams, and/or providing print-outs.
Are there any elements of the content of the course that might have an adverse impact on any of the other groups with protected characteristics[1]?	N	No elements of the content of the course might have an adverse impact on any of the other groups with protected characteristics.
If the admission process involves interviews,	N	No formal interview or review of

[1] Age, Gender reassignment, Marriage and civil partnership, Pregnancy and maternity, Race, Religion and belief, Sex, Sexual orientation

performances or portfolios how have you demonstrated fairness and avoid practices that could lead to unlawful discrimination?		portfolios is adopted as entrance criteria for this course
Have you framed the course learning outcomes and Graduate Impact Statements in a non-discriminatory way?	Y	Inclusive and non-discriminatory language is used for learning outcomes and Graduate Impact Statements.
Does the course handbook make appropriate reference to the support of disabled students?	Y	A dedicated section on this area can be found in the course handbook and the appropriate supporting references are made to the support of disable students.

Administrative Information – Faculty completion	
Faculty	Creative Arts, Technologies and Science
Portfolio	Postgraduate Computer Science and Technology
Department/School	Computer Science and Technology
Course Coordinator	Renxi Qiu
Semester pattern of operation	N/A
PSRB renewal date (where recognised)	
Version number	01/18
Approved by (c.f. Quality Handbook ch.2)	University Approval
Date of approval (dd/mm/yyyy)	22/06/2018
Implementation start-date of this version (plus any identified end-date)	*AY 19/20*
Study model type if not on-campus	N/A

	Name	**Date**
Form completed by	Renxi Qiu	20/03/2018
Signature of Chair of Faculty TQSC		

Course Updates – ensure that the revised CIF is given a new version number each time a change is made		
Date	**Nature of Update**	**FTQSC Minute Ref:**

Administrative Information – Academic Registry completion	
Route code (post approval)	*MSSEAAAF*
JACS / HECoS code (KIS)	
SLC code (post approval)	
Qualification aim (based on HESA coding framework)	

Annexes to the Course Information Form

*These annexes will be used as part of the approval and review process and **peer academics** are the target audience.*

General course information

Course Title	*MSc Software Engineering and Applications*
Qualification	*MSc*
Route Code (SITS)	*MSSEAAAF*
Faculty	*Faculty of Creative Arts, Technologies & Science*
Department/School	*School of Computer Science and Technology*
Version Number	*2018/01*

Annex A: Course mapping of unit learning outcomes to course learning outcomes

Unit code	CIS110-6	CIS120-6	CISNEW1-6	CISNEW2-6	CISNEW3-6
Level	7	7	7	7	7
Credits	30	30	30	30	60
Core or option	C	C	C	C	C
Course Learning Outcome (number)	*Insert LO1 and/or LO2 for each unit into cell corresponding to the course learning outcome*				
1	LO1	LO1	LO1	LO1	
2	LO2		LO2	LO2	LO1
3			LO2	LO2	LO2
4		LO2			LO2
5	LO2		LO2	LO2	
6	LO1		LO1	LO1	LO2
7	LO1, LO2	LO1, LO2	LO1, LO2	LO1, LO2	LO1, LO2

Annex B: Named exit or target intermediate qualifications

This annex should be used when Schools wish to offer intermediate qualifications which sit under the main course qualification as named exit or target awards, rather than unnamed exit/default awards.

Section 1: General course information

Intermediate Qualification(s) and titles	N/A
Mode(s) of Study and Duration	
Type of Intermediate Qualification(s)	
Route Code(s) (SITS) of Intermediate Qualification(s)	

Section 2: Qualification unit diet

One table to be used for each intermediate qualification

Confirmation of unit diet for:	*Insert intermediate qualification and title*	
The units to achieve the credits required may be taken from any on the overall diet for the main course qualification		☐
A combination of units from a restricted list must be taken to achieve the credits required (specify the list below)		☐
A specific set of units must be taken to achieve the credits required (specify units below)		☐

List of units (if applicable):-

Section 3: Course structure and learning outcomes

One table to be used for each intermediate qualification

Annex C: Course mapping to FHEQ level descriptor, subject benchmark(s) and professional body or other external reference points

One set of mapping tables to be produced for the course and each named intermediate qualification

Course (or intermediate) qualification and title	MSc Software Engineering and Applications

FHEQ Descriptor for a higher education qualification	QAA FHEQ Descriptor for a HE Qualification at Level 7 (2014)	Course Learning Outcome(s)								
		1	2	3	4	5	6	7		
A systematic understanding of knowledge, and a critical awareness of current problems and/or new insights, much of which is at, or informed by, the forefront of their academic discipline, field of study, or area of professional practice		✓	✓			✓				
A comprehensive understanding of techniques applicable to their own research or advanced scholarship			✓				✓			
Originality in the application of knowledge, together with a practical understanding of how established techniques of research and enquiry are used to create and interpret knowledge in the discipline				✓	✓	✓	✓			
Conceptual understanding that enables the student: • to evaluate critically current research and advanced scholarship in the discipline; • and to evaluate methodologies and develop critiques of them and, where appropriate, to propose new hypotheses.			✓			✓	✓	✓		
Deal with complex issues both systematically and creatively, make sound judgements in the absence of complete data, and communicate their conclusions clearly to specialist and non-specialist audiences				✓			✓	✓		
Demonstrate self-direction and originality in tackling and solving problems, and act autonomously in planning and implementing tasks at a professional or equivalent level				✓		✓				
Continue to advance their knowledge and understanding, and to develop new skills to a high level							✓	✓		
the qualities and transferable skills necessary for employment requiring: • the exercise of initiative and personal responsibility; • decision-making in complex and unpredictable situations; • and the independent learning ability required for continuing professional development.				✓		✓	✓	✓		

Subject Benchmark Statement(s)	QAA Subject Benchmark Statement - Master's degree in computing (2011)	Evidence and/or Course Learning Outcome(s) *How the course takes account of relevant subject benchmark statements*
A systematic understanding of the knowledge of the domain of their programme of study, with depth being achieved in particular areas,		LO1

including both foundations and issues at the forefront of the discipline and/or professional practice in the discipline; this should include an understanding of the role of these in contributing to the effective design, implementation and usability of relevant computer-based systems.	
A comprehensive understanding, and a critical awareness of: the essential principles and practices of the domain of the programme of study as well as current research and/or advanced scholarship; current standards, processes, principles of quality and the most appropriate software technologies to support the specialism; the relevance of these to the discipline and/or professional practice in the discipline; and an ability to apply these.	LO2, LO3
Consistently produced work which applies to and is informed by research and/or practice at the forefront of the developments in the domain of the programme of study; this should demonstrate critical evaluation of aspects of the domain, including appropriate software support, the ability to recognise opportunities for software or hardware tool use as well as possible tool improvement, an understanding of the importance of usability and effectiveness in computer systems development, and generally the acquisition of well-developed concepts.	LO5
Understanding of the professional, legal, social and ethical framework within which they would have to operate as professionals in their area of study; this includes being familiar with and being able to explain significant applications associated with their programme of study and being able to undertake continuing professional development as a self-directed lifelong learner across the elements of the discipline.	LO4, LO7
The ability to apply the principles and practices of the particular programme's domain in tackling a significant domain related activity; the solution should demonstrate a sound justification for the approach adopted as well as originality (including exploration and investigation) and a self-critical evaluation of effectiveness but also critical awareness of current problems and new insights, and a sense of vision about the direction of developments in aspects of the domain of the programme.	LO3, LO6

The format of the following mapping tables may be adjusted.

Qualification Characteristic	*QAA Masters Degree's Characteristics Statement (2015)*	Evidence *How the course takes account of relevant qualification characteristics documents*
They are usually predominantly composed of structured learning opportunities (are 'taught'). Frequently, at least a third of the programme is devoted to a research project, leading to a dissertation or the production of other output such as an artefact, performance or musical composition.		This course has 4 'taught' units carrying 120 (out of 180; thus, two third of the programme) credits. The final unit is a research project that carries 60 (out of 180; thus, a third of the programme) credits.
They include research methods training, which may be provided in a range of different ways (for example, through content modules).		This course offers a specific unit "research methods and project management" to provide research methods training.
In the case of integrated master's degrees, master's level study is integrated with study at honours degree level within a single programme. The first two characteristics above apply to the master's level part of the overall award.		This is not an integrated master's degree and this course is not integrated with any bachelor degree programme.
Related awards, such as postgraduate certificate and postgraduate diploma, will often be offered as stages in the progression to a specialised/advanced study master's degree to facilitate continuing professional development at different stages of a professional career.		Postgraduate certificate and postgraduate diploma are offered as exit awards.

Professional body or other external reference points	*(insert title and year)*	Evidence *How the course takes account of*

		Professional body or other external reference points

Annex D: Diet Template

Course Title:	MSc Software Engineering and Applications		
Route Code:	MSSEAAAF	Mode: Full Time	
Length of course:	Full-time over 1 year		

Please note a separate diet sheet is needed for each location of delivery (i.e. Luton, Bedford, partner location), each start date (i.e. October, February), each course length (i.e. 12 month, 15 month) & each attendance mode (i.e. Full Time).

Location of delivery (please tick):

Luton AA	✓	
Bedford AB		
Milton Keynes AD		
Other (please state)		

Delivery pattern - please highlight all applicable start months, if other please state):

Semesterised	OCT	FEB	JUN	Exception……………………………		
PG Block delivery (intake months ONLY)	BLK1 OCT	BLK2 NOV	BLK3 FEB	BLK4 APR	BLK5 JUN	BLK6 AUG
Yearlong delivery	OCT (TY)	FEB (FY)				
Other (outside of agreed patterns)[2]						

A list of valid available period codes can be found on the intranet at https://in.beds.ac.uk/registry/student-records/srs-training-and-development/sits. Please refer to this when completing the diet sheet below. If your diets differ year to year e.g. SET A, SET B, please indicate clearly the academic year and set applicable.

If your diet includes units which have not yet been assigned codes, please ensure this is clear by using NEW in the unit code column, followed by the correct prefix to be used e.g. ASS. Student Records will then assign a new unit code. Please note that a change in the credit value of an existing unit will require a new unit code to be created.

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[2] Where you are proposing a teaching pattern outside of the University agreed patterns, you should provide a mapping document for the course against the University standard patterns of assessment points, exam boards, terms dates and breaks

Units for Year 1 for Academic Year …2019/20…………. (Foundation Year where applicable)

Unit Code	Unit Name	Unit Location	Core/ Option*	Period of study	Credits
CIS120-6	Research Methodologies and Project Management	Luton AA	C	6 Weeks	30
CIS110-6	Distributed and Parallel Computing Technologies	Luton AA	C	6 Weeks	30
CISNEW1-6	Software Design Patterns and Data Architectures	Luton AA	C	6 Weeks	30
CISNEW2-6	Applied Software Development Techniques and Applications of Open Source Frameworks	Luton AA	C	6 Weeks	30

Units for Year 2 for Academic Year …2020/21…………. (Foundation Year where applicable)

Unit Code	Unit Name	Unit Location	Core/ Option*	Period of study	Credits
CISNEW3-6	MSc Project - Software Engineering and Applications	Luton AA	C	15 Weeks	60

*If your diet includes optional units, please ensure the appropriate rules are noted on the diet.

Please contact Student Records at studentrecords@beds.ac.uk with any queries.

MSc Software Engineering and Applications 15 months

Block No.	Block Dates	BLK1 Oct 2019	BLK2 Nov 2019
Block 1	Oct 2019 – Nov 2019	CIS110-6 Distributed and Parallel Computing Technologies	
Block 2	Nov 2019 – Feb 2020	CISNEW2-6 Applied Software Development Techniques and Applications of Open Source Frameworks	CISNEW2-6 Applied Software Development Techniques and Applications of Open Source Frameworks
Block 3	Feb 2020 – April 2020	CIS120-6 Research Methodologies and Project Management	CIS120-6 Research Methodologies and Project Management
Block 4	April 2020- June 2020	CISNEW1-6 Software Design Patterns and Data Architectures	CISNEW1-6 Software Design Patterns and Data Architectures
Block 5	June 2020- August 2020	Vacation	CIS110-6 Distributed and Parallel Computing Technologies
Block 6	Aug2020 – Oct 2020		Vacation
Block 1	Oct 2020 – Nov 2020	CISNEW3-6 MSc Project - Software Engineering and Applications	
Block 2	Nov 2020 – Feb 2021		CISNEW3-6 MSc Project - Software Engineering and Applications
Block 3	Feb 2021 – April 2021		
		15 Months	**15 Months**

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Block No.	Block Dates	BLK3 Feb 2020	BLK4 April 2020	BLK5 June 2020	BLK6 Aug 2020
Block 3	Feb 2020 – April 2020	CIS120-6 Research Methodologies and Project Management			
Block 4	April 2020- June 2020	CISNEW1-6 Software Design Patterns and Data Architectures	CISNEW1-6 Software Design Patterns and Data Architectures		
Block 5	June 2020- August 2020	CIS110-6 Distributed and Parallel Computing Technologies	CIS110-6 Distributed and Parallel Computing Technologies	CIS110-6 Distributed and Parallel Computing Technologies	
Block 6	Aug2020 – Oct 2020	CISNEW2-6 Applied Software Development Techniques and Applications of Open Source Frameworks	CISNEW2-6 Applied Software Development Techniques and Applications of Open Source Frameworks	CISNEW2-6 Applied Software Development Techniques and Applications of Open Source Frameworks	CISNEW2-6 Applied Software Development Techniques and Applications of Open Source Frameworks
Block 1	Oct 2020 – Nov 2020	CISNEW3-6 MSc Project - Software Engineering and Applications	CIS120-6 Research Methodologies and Project Management	CIS120-6 Research Methodologies and Project Management	CIS120-6 Research Methodologies and Project Management
Block 2	Nov 2020 – Feb 2021		CISNEW3-6 MSc Project - Software Engineering and Applications	CISNEW1-6 Software Design Patterns and Data Architectures	CISNEW1-6 Software Design Patterns and Data Architectures
Block 3	Feb 2021 – April 2021			CISNEW3-6 MSc Project - Software Engineering and Applications	CIS110-6 Distributed and Parallel Computing Technologies
Block 4	April 2021- June 2021				CISNEW3-6 MSc Project - Software Engineering and Applications
Block 5	June 2021- Aug2021				
		12 Months	**12 Months**	**12 Months**	**12 Months**