

# Software Engineering

<b>Final award</b>	<i>MSc</i>
<b>Intermediate awards available</b>	<i>PGCert, PGDip</i>
<b>UCAS code</b>	N/A
<b>Details of professional body accreditation</b>	N/A
<b>Relevant QAA Benchmark statements</b>	<i>Engineering</i>
<b>Date specification last up-dated</b>	January 2014

**Alternative locations for studying this programme- This programme is no longer recruiting**

<b>Location</b>	<b>Taught by UEL staff</b>	<b>Taught by local staff</b>	<b>Method of Delivery</b>
<b>AKMI Metropolitan College, Athens and Thessaloniki, Greece</b>	<b>No</b>	<b>Yes</b>	<b>Full &amp; Part time, in the Greek language</b>

## **Programme content**

The general aim of the programme is to enable software developers and IT experts to develop specialist knowledge in software engineering.

This will involve a comprehensive understanding of software requirements and system architecture design, software testing and validation, people management in a project environment and address issues of quality and costs involved in the development and maintenance of software.

Advanced topics in design and development of service-oriented systems will also be studied; students may choose between mobile software development and formal methods for software verification.

The programme is designed for exposing students in the principles and applications of software engineering; the programme will cover the fundamental practices that are expected from any software engineer a company would want to hire.

## **MSc Software Engineering at UEL**

The programme is based on many years of experience on real projects and it is taught by a team of lecturers with research expertise in the different aspects of software engineering.

Our programme offers you the opportunity to study the current state-of-the-art in engineering software development from requirements to testing and apply these to the practical work environment.

With a large proportion of computer laboratory and other practical work you will reinforce the theories and practices learnt in the classroom with 'hands on' experience. On completion of the programme, the successful student should have a good knowledge and understanding

of the state-of-the-art methodologies in software engineering, and should have learnt to use a variety of software tools and environments that are a required knowledge by software companies nowadays.

Along with typical software engineering and project management content, this programme offers specialist competences in service-oriented computing, mobile software development and software verification that are strongly required by different kind of companies. It is expected that the programme team would seek accreditation for professional recognition of graduates, in the near future.

### **Entry requirements**

The entry requirement for the MSc programme is normally satisfied by possession of one of the following:

The entry requirement for the MSc programme is normally satisfied by possession of one of a 2:2 or higher honours degree in a science or engineering subject which includes a sufficient level of computing theory and/or programming - such as, for example:

- Computing or Computer Science or Informatics or Computer Networks
- Information Systems, Information Technology or Software Engineering
- Electrical, Electronic or Computer Engineering,
- Digital Systems and/or Communication Engineering,
- Mathematics, Applied Mathematics or Physics.

Alternatively, a degree qualification of a standard equivalent to one of the above-mentioned degrees, obtained after a course of full-time study extending over a period of not less than three years in a recognised university outside the UK.

In the case of applicants whose first language is not English, then IELTS 6 (or equivalent) is required. International qualifications will be checked for appropriate matriculation to UK Higher Education postgraduate programmes.

Students that apply to enter stages of the programme may be admitted through normal Accreditation of Experiential Learning (AEL) or Accreditation of Certificated Learning (ACL) processes, or through an approved articulation agreement. Therefore such applicants must be able to demonstrate and evidence that they have the required learning outcomes as listed in the modules for which they are seeking exemption.

For study at AMC, applicants are normally expected to hold a Greek University Award (Ptychion) of no less than 6.5/10 in a science or engineering subject which includes a sufficient level of computing theory and/or programming - such as, for example:

- Computing or Computer Science or Informatics or Computer Networks
- Information Systems, Information Technology or Software Engineering
- Electrical, Electronic or Computer Engineering,
- Digital Systems and/or Communication Engineering,

- Mathematics, Applied Mathematics or Physics.

Alternatively, a degree qualification of a standard equivalent to a British award classification of no less than a lower second class honours (2:2) from a recognised university is expected.

AMC will assess all students before acceptance on to a masters programme to ensure they have a level of English reading competence sufficient to utilise relevant publications. English reading support and development will be offered to any student who is found to require it.

### **Programme structure**

The programme will be delivered across two semesters of 15 weeks duration for the taught modules of the full-time mode of study, with the project dissertation being completed during the following semester A or B or the Summer Vacation. The part-time provision will span two academic years for the taught modules, followed by the project dissertation. UK students opting for the part-time mode of study can accumulate credits over a longer period of time and obtain the MSc award in no more than six years.

### **Learning environment**

The programme benefits from access to UEL laboratories, library, computing facilities and IT labs. Teaching is delivered through formal lectures, tutorials, workshops, practical classes and laboratory sessions. Most lectures are supported by programme notes, which allow the student to concentrate on the lecture and complete some independent studies of his/her own. Group work is also encouraged in some modules.

### **Assessment**

Assessment varies from module to module but will include written examinations, coursework, and project work, and tests on competence in practical sessions.

### **Relevance to work/profession**

The School has strong links with industry and benefits from programmes designed to meet the needs of industrial partners. The School also hosts an Industrial Liaison Board meeting with members attending from local industry.

### **Dissertation/project work**

The research dissertation is a key element of this programme and it counts as a double module. Research topics are often developed from work based problems and many are supported by research collaborations with companies.

The objective of the dissertation is to develop the student's ability to study independently, making their own critical appraisal of the chosen subject and drawing conclusions therefrom.

Students will be required to demonstrate that the research undertaken has been completed to an appropriate level for a Masters award. The dissertation must therefore provide students with the opportunity to demonstrate:

- Their ability to apply practical and analytical skills present in the programme as a whole
- Innovation and/or creativity
- Synthesis of information, ideas and practices to provide a quality solution together with an evaluation of that solution
- That their project meets a real need in a wider context
- The ability to self-manage a significant piece of work

The research will be required to make a contribution to the understanding of the field studied and will be supervised by a member of staff with a research interest in the field.

### **Added Value**

Provide Students with improved employment prospects that will enable them to seek jobs as software engineers, software analysts and architects, project managers, in the area of service-oriented computing, mobile systems and safety-critical systems.

### **Your future career**

Many MSc students successfully move to careers in software and computing industry as software engineers.

Students can also start a PhD programme, while others can work as software architects or project managers.

### **How we support you**

The School prides itself on its student support systems. Based on the practice of industry we operate an open door policy with students encouraged to consult with their tutors. Personal Tutors and Programme Tutors will monitor your progress and provide assistance and advice with academic and personal problems. The School facilities include dedicated computer labs and equipment, which you are free to use, as long as they are not required for a class. Technical support is readily available supported by academics.

Employer links are maintained through our Industrial Liaison Group and employers are invited to attend the University to talk to students about careers. The professional bodies also visit the University regularly and provide details on the qualification process and the advantages available to members.

### **Bonus factors**

The programme benefits from teaching staff maintaining close links with industry and participating in international research projects.

### **Programme aims and learning outcomes**

#### **What is this programme designed to achieve?**

This programme is designed to give you the opportunity to:

Gain advanced theoretical and critical practical knowledge of all the different aspects of software engineering

- Develop a software system from requirements to testing
- Manage software projects taking into account resources, time, quality, costs
- Design and develop service-oriented systems
- Acquire technical knowledge on mobile software development or formal methods for software verification

### **What will you learn?**

#### **Knowledge**

- Provide a comprehensive understanding of all the activities necessary to commercial software development
- Develop expertise in service oriented computing and secure software engineering
- Apply software engineering tools to improve software development process

#### **Thinking skills**

- Exercise appropriate engineering judgement in decision-making processes.
- Systematically analyse problems and implement effective solutions

#### **Subject-Based Practical skills**

- Develop a major software project from requirements to testing
- Manage a software project taking into account resources, quality, deadlines and costs
- Apply and develop expertise in service oriented computing and secure software engineering

#### **Skills for life and work (general skills)**

- Demonstrate an ability to study independently and effectively and to be able to present and convey technical information to others.
- Develop interpersonal skills and be able to contribute and work effectively in a team environment

### **The programme structure**

#### **Introduction**

All programmes are credit-rated to help you to understand the amount and level of study that is needed.

One credit is equal to 10 hours of directed study time (this includes everything you do e.g. lecture, seminar and private study).

Credits are assigned to one of 5 levels:

0 equivalent in standard to GCE 'A' level and is intended to prepare students for year one of an undergraduate degree programme

1 equivalent in standard to the first year of a full-time undergraduate degree programme

2 equivalent in standard to the second year of a full-time undergraduate degree programme

3 equivalent in standard to the third year of a full-time undergraduate degree programme

M equivalent in standard to a Masters degree

### **Credit rating**

The overall credit-rating of this programme is *180 for Masters, 60 for PGCert, 120 for PGDip.*

### **Typical duration**

The typical duration of this programme is one year full-time or two years part-time. It is possible to move from full-time to part-time study and vice-versa to accommodate any external factors such as financial constraints or domestic commitments. Many of our students make use of this flexibility and this may impact on the overall duration of their study period.

### **How the teaching year is divided**

The teaching year is divided into two semesters of roughly equal length. A typical student registered in a full-time attendance mode will study two 30 credit modules per semester and a typical student registered in a part-time attendance mode will study one or two modules per semester. The advanced independent research module may occur during the summer period semester C or one of the other *semesters*.

### **What you will study when**

<b>Semester</b>	<b>UEL Module Code</b>	<b>Module Title</b>	<b>Credit Status</b>	
<b>A</b>	CN7010	<b>Software Engineering</b>	<b>30</b>	<b>Core</b>
<b>A</b>	CN7921	<b>Design and Application of Mobile Computing Systems</b>	<b>30</b>	<b>Optional</b>
<b>A</b>	EG7117	<b>Formal Methods</b>	<b>30</b>	<b>Optional</b>
<b>B</b>	CN7005	<b>Project management</b>	<b>30</b>	<b>Core</b>
<b>B</b>	CN7011	<b>Service Oriented Computing</b>	<b>30</b>	<b>Core</b>
<b>A,B,C</b>	EG7130	<b>Dissertation</b>	<b>60</b>	<b>Core</b>

### **Requirements for gaining an award**

- In order to gain a Postgraduate Certificate, you will need to obtain 60 credits at Level M.
- In order to gain a Postgraduate Diploma, you will need to obtain 120 credits at Level M
- In order to obtain a Masters, you will need to obtain 180 credits at Level M. These credits will include a 60 credit level M core module of advanced independent research.

### **Masters Award Classification**

Where a student is eligible for an Masters award then the award classification is determined by calculating the arithmetic mean of all marks and applying the mark obtained as a percentage, with all decimals points rounded up to the nearest whole number, to the following classification

70% - 100%	Distinction
60% - 69%	Merit
50% - 59%	Pass
0% - 49%	Not passed

### **Further information**

#### **Teaching, learning and assessment**

##### **Teaching and learning**

Various teaching methods are employed on the programme, including lectures, tutorials, seminars and laboratory work. In a lecture period, a member of the academic staff or a visiting lecturer presents ideas or information to a body of students. In a seminar, ideas are discussed by a group of students. The discussion is led by a member of the staff or a nominate student and moderated by one or more members of staff. In a tutorial the students solve problems under the guidance of a member of staff with whom they can also discuss information presented in a previous lecture.

In each field the time allocated over the semester to lecture, tutorials, seminars and laboratory work is left to the discretion of the lecturer involved. While more formal instruction (lectures and laboratory work) necessarily constitutes an important aspect of the work, tutorials, and to lesser extent seminars, are of value in providing time for students to discuss their problems with members of staff.

To enable students to derive maximum benefit from their period of attendance, lectures are designed to cover only essential subject matter, this being complemented by lecture notes. Considerable importance is attached to home assignments and a commitment to private study.

You are recommended to plan their work in advance, where practicable a programme of work, requirements of home assignments, together with reading references and tutorial sheets are distributed at the beginning of each section of each module. Regular assessments of the students' work are undertaken in order to monitor progress and identify problem areas.

## **Assessment**

*Modules are allocated a mark out of 100%. The pass mark for each module is based on an aggregate mark of 50%. The aggregate mark comprises marks from components whose threshold is 40%. Assessment may incorporate one, two or three components.*

*The module specifications specify the mode of assessment for each module.*

*Assessment methods include formal examinations, phase tests, time constrained assignments, coursework, project work and group exercises.*

## **How we assure the quality of this programme**

### **Before this programme started**

Before this programme started, the following was checked:

- there would be enough qualified staff to teach the programme;
- adequate resources would be in place;
- the overall aims and objectives were appropriate;
- the content of the programme met national benchmark requirements;
- the programme met any professional/statutory body requirements;
- the proposal met other internal quality criteria covering a range of issues such as admissions policy, teaching, learning and assessment strategy and student support mechanisms.

This is done through a process of programme approval which involves consulting academic experts including some subject specialists from other institutions.

### **How we monitor the quality of this programme**

The quality of this programme is monitored each year through evaluating:

- external examiner reports (considering quality and standards);
- statistical information (considering issues such as the pass rate);
- student feedback.

Drawing on this and other information, programme teams undertake the annual Review and Enhancement Process which is co-ordinated at School level and includes student participation. The process is monitored by the Quality and Standards Committee.

Once every six years an in-depth review of the whole Subject Area is undertaken by a panel that includes at least two external subject specialists. The panel considers documents, looks at student work, speaks to current and former students and speaks to staff before drawing its conclusions. The result is a report highlighting good practice and identifying areas where action is needed.

### **The role of the programme committee**



This programme has a programme committee comprising all relevant teaching staff, student representatives and others who make a contribution towards the effective operation of the programme (e.g. library/technician staff). The committee has responsibilities for the quality of the programme. It provides input into the operation of the Review and Enhancement Process and proposes changes to improve quality. The programme committee plays a critical role in the quality assurance procedures.

### **The role of external examiners**

The standard of this programme is monitored by at least one external examiner. External examiners have two primary responsibilities:

- To ensure the standard of the programme;
- To ensure that justice is done to individual students.

External examiners fulfil these responsibilities in a variety of ways including:

- Approving exam papers/assignments;
- Attending assessment boards;
- Reviewing samples of student work and moderating marks;
- Ensuring that regulations are followed;
- Providing feedback through an annual report that enables us to make improvements for the future.

### **Listening to the views of students**

The following methods for gaining student feedback are used on this programme:

- Module evaluations
- Student representation on programme committees
- Student/Staff consultative committee

Students are notified of the action taken through:

- circulating the minutes of the programme committee
- a newsletter published three times a year
- providing details on the programme noticeboard

### **Listening to the views of others**

The following methods are used for gaining the views of other interested parties:

- Questionnaires to former students
- Annual student satisfaction questionnaire
- Industrial liaison committee
- Placements Officer

### **Further information**

Further information about this programme is available from:

- The UEL web site (<http://www.uel.ac.uk>)
- The student handbook
- Module study guides
- UEL Manual of General Regulations and Policies <http://www.uel.ac.uk/qa/>
- UEL Quality Manual <http://www.uel.ac.uk/qa/>
- Regulations for the Academic Framework <http://www.uel.ac.uk/academicframework/>
- The Schools website <http://www.uel.ac.uk/ace>
- The Software Engineering group website <http://www.uel.ac.uk/ace/research/dse/>
- The Programme Leader website <http://www.uel.ac.uk/ace/staff/paolofalcarin/>
- Regulations for the Academic Framework <http://www.uel.ac.uk/academicframework/>
- School of Architecture, Computing and Engineering web site (<http://www.uel.ac.uk/ace/>)