

## PROGRAMME SPECIFICATION – POSTGRADUATE PROGRAMMES

### KEY FACTS

Programme name	Software Engineering
Award	MSc
School	Mathematics, Computer Science, and Engineering
Department or equivalent	Department of Computer Science
Programme code	PSSWEN
Type of study	Full Time Part Time
Total UK credits	180
Total ECTS	90

### PROGRAMME SUMMARY

The core theme of the course is the systematic construction of software systems, covering the entire spectrum of the stages of this activity from analysis and design through to implementation. The course provides expertise in the use of some of the key object-oriented environments, analysis and design methods, and programming languages currently employed within the software industry. At the same time it equips students with an understanding of the enduring principles and concepts that will enable them to adapt effectively to the inevitable rapid changes in this area.

#### Aims

The overall aim of this programme is to equip students with a deep understanding of leading edge techniques for the analysis, design, and development of complex software systems and prepare them for high quality careers in the software industry or undertaking research in the field of software engineering. The programme will cover significant trends of system development including service-oriented systems, mobile and pervasive computing, or cloud computing.

There are three types of awards that you can get (please see the section “**WHAT AWARD CAN I GET?**”).

#### **Postgraduate Certificate in Software Engineering**

For all of you completing the Postgraduate Certificate in Software Engineering you will have had the opportunity to examine the theories related to the analysis, design, and development of complex software systems, and demonstrated sufficient ability in at least four taught modules (60 credits), which can be any combination of modules among the available ones.

#### **Postgraduate Diploma in Software Engineering**

For all of you completing the Postgraduate Diploma in Software Engineering, worth 120 credits, i.e., passing all eight taught modules, in addition to the above you will have explored the theory and practice and demonstrated significant ability in all the different aspects of software engineering, considering them from different perspectives and demonstrated critical insights for the different applicable methods and techniques used for

obtaining and analysing requirements, designing systems that meet their requirements, and developing such complex designs.

### **MSc in Software Engineering**

For all of you completing the MSc in Software Engineering, in addition to the above you will have demonstrated original application of knowledge in the area, either through the analysis, design, and development of a complex software artefact, the analysis, design, and development of a solution that meets a real client's needs, or the extension of the knowledge in the area through a research-type project (which quite often involves the development of software artefacts as well, e.g., the development of software tools to support software engineers). This will be achieved through your individual project, a substantial module worth 60 credits, that you can commence once you have successfully passed all your taught modules (120 credits).

### **WHAT WILL I BE EXPECTED TO ACHIEVE?**

**On successful completion of this programme, you will be expected to be able to:**

#### Knowledge and understanding:

- Identify the central ideas of software engineering and assess their applicability to varied computing problems.
- Critically evaluate the quality of software systems.
- Identify theoretical concepts and assess their relevance to software development.

#### Skills:

- Organise and carry out independently problem solving that incorporates elements of industrial and/or academic research.
- Analyse user requirements and design appropriate software solutions.
- Perform independent and effective time management.
- Design and develop object-oriented and service-based programs to solve realistic problems.
- Coherently summarise complex, subject specific information and present it to others in a structured and professional manner using oral and written presentation skills.
- Evaluate and use object-oriented and service-based software engineering environments, design methods and programming languages.
- Apply advanced methods and concepts to the analysis of problems and synthesis of solutions in a number of application areas.

#### Values and attitudes:

- Identify and evaluate the key legal, ethical and professional issues which arise in the development of software systems

- Identify the ownership of work and intellectual property in complex environments and reference it in a professional manner that is clear, consistent and unambiguous.

This programme has been developed in accordance with the QAA Subject Benchmark for Computing.

## **HOW WILL I LEARN?**

You will learn via a mix of learning and teaching strategies.

In taught modules you will learn through lectures and tutorials. Fundamental concepts are introduced in lectures. You will then apply the concepts in small exercises and in practical work in supervised tutorials.

In addition, you will engage in self-directed study to deepen your understanding, during which you will read recommended materials, engage in reflective exercises, participate in seminars and tutorials, and prepare for formative and summative assessments.

Some of the assessments and exercises will involve group work to enable you to learn how to work effectively in teams and learn other transferable skills.

The face-to-face teaching is supported via online tools which will also enable feedback and engagement via discussion forums and the dissemination of additional material made available to you.

For the individual project, you will learn through regular meetings with your project supervisor, in addition to self-directed study.

## **WHAT TYPES OF ASSESSMENT AND FEEDBACK CAN I EXPECT?**

### Assessment and Assessment Criteria

Assessment is within each module, including the dissertation. Assessment methods vary according to the nature of the material. A combination of individual written assignments, exercises and unseen written examination is the norm, but some modules may use other methods, including individual practical exercises and group work projects.

Assessment Criteria are descriptions, based on the intended learning outcomes, of the skills, knowledge or attitudes that you need to demonstrate in order to complete an assessment successfully, providing a mechanism by which the quality of an assessment can be measured. Grade- Related Criteria are descriptions of the level of skills, knowledge or attributes that you need to demonstrate in order to achieve a certain grade or mark in an assessment, providing a mechanism by which the quality of an assessment can be measured and placed within the overall set of marks. Assessment Criteria and Grade-Related Criteria will be made available to you to support you in completing assessments. These may be provided in programme handbooks, module specifications, on the virtual learning environment or attached to a specific assessment task.

## Feedback on assessment

Feedback will be provided in line with our Assessment and Feedback Policy. In particular, you will normally be provided with feedback within three weeks of the submission deadline or assessment date. This would normally include a provisional grade or mark. For end of module examinations or an equivalent significant task (e.g. an end of module project), feedback will normally be provided within four weeks. The timescale for feedback on final year projects or dissertations may be longer. The full policy can be found at: [https://www.city.ac.uk/\\_data/assets/pdf\\_file/0008/68921/assessment\\_and\\_feedback\\_policy.pdf](https://www.city.ac.uk/_data/assets/pdf_file/0008/68921/assessment_and_feedback_policy.pdf)

## Assessment Regulations

In order to pass your Programme, you should complete successfully or be exempted from the relevant modules and assessments and will therefore acquire the required number of credits.

The pass mark for each module is 50%.

If you fail an assessment component or a module, the following will apply:

1. Compensation: where you fail up to a total of 20 credits at first or resit attempt (15 for a Postgraduate Certificate), you may be allowed compensation if:
  - Compensation is permitted for the module involved (see the What will I Study section of the programme specification), and
  - It can be demonstrated that you have satisfied all the Learning Outcomes of the modules in the Programme, and
  - A minimum overall mark of no more than 10% below the module pass mark has been achieved in the module to be compensated, and
  - An aggregate mark of 50% has been achieved overall.

Where you are eligible for compensation at the first attempt, this will be applied in the first instance rather than offering a resit opportunity.

If you receive a compensated pass in a module you will be awarded the credit for that module. The original component marks will be retained in the record of marks and your original module mark will be used for the purpose of your Award calculation.

2. Resit: Where you are not eligible for compensation at the first attempt, you will be offered one resit attempt.

If you are successful in the resit, you will be awarded the credit for that module. The mark for each assessment component that is subject to a resit will be capped at the pass for the module. This capped mark will be used in the calculation of the final module mark together with the original marks for the components that you passed at first attempt.

If you do not meet the pass requirements for a module and do not complete your resit by the date specified you will not progress and the Assessment Board will require that you be withdrawn from the Programme.

If you fail to meet the requirements for the Programme, the Assessment Board will consider whether you are eligible for an Exit Award, as per the table below.

If you would like to know more about the way in which assessment works at City, please see the full version of the Assessment Regulations at: [http://www.city.ac.uk/data/assets/word\\_doc/0003/69249/s19.doc](http://www.city.ac.uk/data/assets/word_doc/0003/69249/s19.doc)

### WHAT AWARD CAN I GET?

#### Master's Degree:

	HE Level	Credits	Weighting (%)
Taught	7	120	(please see below)
Dissertation	7	60	

Class	% required
With Distinction	70
With Merit	60
Without Classification	50

#### Postgraduate Diploma:

	HE Level	Credits	Weighting (%)
Taught	7	120	(please see below)

Class	% required
With Distinction	70
With Merit	60
Without Classification	50

#### Postgraduate Certificate:

	HE Level	Credits	Weighting (%)
Taught	7	60 (minimum)	(please see below)

Class	% required
With Distinction	70
With Merit	60
Without Classification	50

**Weighting of module marks:** When computing the award degree, we consider the *weighted average* of the student's passed modules. That is we take the modules that the student has passed and weight each module mark of these by the number of credits that module has, then divide the total by the total number of credits the student has passed.

## WHAT WILL I STUDY?

Six core modules plus two elective modules; this is followed by the dissertation component. Optionally, the dissertation can be carried out within a period of internship.

### Taught component

The taught component is taken in one of two standard length patterns: full-time (one year) and part-time (two years).

Module Title	SITS Code	Module Credits	Core/ Elective	Can be Compensated?	Level
Advanced Programming - Concurrency	INM420	15	C	Y	7
Software Systems Design	INM330	15	C	Y	7
Advanced Databases	INM370	15	C	Y	7
Research Methods and Professional Issues	INM373	15	C	Y *	7
Service Oriented Architectures	INM381	15	C	Y	7
Data Visualization	INM402	15	E	Y	7
Business Engineering with ERP Solutions	INM342	15	E	Y	7
Mobile and Pervasive Computing	INM421	15	E	Y	7
Object Oriented Programming in C++	INM359	15	E	Y	7
Cloud Computing	INM429	15	E	Y	7
Advanced Algorithms and Data Structures	INM422	15	E	Y	7
Big Data	INM432	15	E	Y	7

\* Compensation for INM373 will only be applied at resit.

### Dissertation component

A dissertation project of 60 credits is required for the Masters award.

Module Title	SITS Code	Module Credits	Core/ Elective	Can be Compensated?	Level
Individual Project	INM363	60	C	N	7

*INM373 Research Methods and Professional Issues must be passed with a mark of at least 50% without compensation to proceed with INM363 Individual Project.*

For students studying in a Part-Time mode, it is suggested (though not compulsory) to take the modules in this order:

**Year 1, Term 1:**

- INM330 – Software Systems Design
- A module from the term 1 electives:
  - INM359 – Object Oriented Programming in C++
  - INM422 – Advanced Algorithms and Data Structures
  - INM432 – Big Data

**Year 1, Term 2:**

- INM370 – Advanced Database Technologies
- A module from the term 2 electives:
  - INM342 – Business Engineering with ERP Solutions
  - INM402 – Data Visualization
  - INM421 – Mobile and Pervasive Computing
  - INM429 – Cloud Computing

**Year 2, Term 1:**

- INM373 Research Methods and Professional Issues
- Another module from the term 1 electives:
  - INM359 – Object Oriented Programming in C++
  - INM422 – Advanced Algorithms and Data Structures
  - INM432 – Big Data

**Year 2, Term 2:**

- INM381 – Service Oriented Architectures
- INM420 – Advanced Programming – Concurrency

Another possibility is to take two term 1 electives in Year 1 and take INM330 and INM373 together in Year 2 (INM373 should be taken in Year 2, so that it is closer to the individual project).

**TO WHAT KIND OF CAREER MIGHT I GO ON?**

The MSc in Software Engineering prepares students for a career in the industry as a general software engineer, working on the design, analysis, and development of complex software systems. It also prepares students for further research studies, if they wish to pursue a PhD.

If you would like more information on the Careers support available at City, please go to: <http://www.city.ac.uk/careers/for-students-and-recent-graduates>.

**WHAT PLACEMENT OPPORTUNITIES ARE AVAILABLE?**

Students who successfully complete the taught part of their course without re-sits have the option of doing an internship on which they can base their dissertation. The internship period is from July to December. Students produce an internship-based proposal along with a back-up non-internship-based proposal by the deadlines stipulated in the MSc Project Guidance Document.

As well as the support of their academic supervisor, students on internship are supported by a work-based learning advisor from the Professional Liaison Unit.

- Further details of the Postgraduate Internship Scheme are available from the Professional Liaison Unit - <http://www.city.ac.uk/informatics/professional-liaison-unit>

### **WILL I GET ANY PROFESSIONAL RECOGNITION?**

Accredited by BCS The Chartered Institute for IT as partially meeting the educational requirement for CITP registration for a period of 5 intakes from the 2011 intake, up to and including the 2015 intake, in the full time and part time modes.

Please contact BCS directly for information about partial accreditation and further details regarding the CITP registration process: <http://www.bcs.org>.

### **HOW DO I ENTER THE PROGRAMME?**

Each application is considered on its merits and is given full consideration by admissions staff.

The usual minimum entrance requirement is a good second class honours degree from a UK university, a recognised equivalent from an accredited overseas institution or an equivalent professional qualification.

Applicants should have previous exposure to computing, acquired either as part of a previous degree or through professional experience; in particular, applicants should have good programming skills, preferably in an OO language, and knowledge of the theory and practice of relational databases.

For those students whose first language is not English, the following qualification is also required:

- IELTS: 6.5 (minimum of 6.0 in all four components)

Please note that TOEFL is not accepted as evidence of English language ability for students that require a Confirmation of Acceptance for Studies.

To ensure that students are properly prepared for study, and to maximise the benefit gained from the course, admissions staff will also take close account of the areas and nature of previous academic and other achievements.

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