Software Engineering

Programme Requirements:

**Software Engineering - MSc**

\[(\text{CS5098 (60 credits) or CS5099 (60 credits)) and CS5001 (15 credits) and CS5030 (15 credits) and CS5031 (15 credits) and (CS5032 (15 credits) or CS5033 (15 credits)) and} \]

Between 0 and 30 credits from Module List: CS4052, CS4100 - CS4450 and

Between 0 and 30 credits from Module List: IS5102 - IS5150 and

Between 0 and 75 credits from Module List: CS5003 - CS5089 (except CS5019, CS5029), ID5059

**MPhil:**

120 credits from taught element of programme requirements (not including project/dissertation) plus a thesis of up to 40,000 words

CS5001 is compulsory except when exempted following satisfactory performance in an assessment conducted by the school.

**Compulsory modules:**

**CS5001 Object-Oriented Modelling, Design Programming**

<table>
<thead>
<tr>
<th>SCOTCAT Credits:</th>
<th>15</th>
<th>SCQF Level: 11</th>
<th>Semester:</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic year:</td>
<td>2018/9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planned timetable:</td>
<td>Variable</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This module introduces and revises object-oriented modelling, design and implementation up to the level required to complete programming assignments within other MSc modules. Students complete a number of practical exercises in laboratory sessions.

**Anti-requisite(s)**

You cannot take this module if you take CS5002

**Learning and teaching methods of delivery:**

- **Weekly contact:** Lectures, tutorials and practical classes.
- **Scheduled learning:** 77 hours
- **Guided independent study:** 73 hours

**Assessment pattern:**

As used by St Andrews:

- Coursework = 100%

**Module teaching staff:**

TBC Module coordinator(s): Director of Postgraduate Teaching - Computer Science (dopgt-cs@st-andrews.ac.uk)
### CS5030 Software Engineering Principles

<table>
<thead>
<tr>
<th>SCOTCAT Credits:</th>
<th>15</th>
<th>SCQF Level 11</th>
<th>Semester</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic year:</td>
<td>2018/9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planned timetable:</td>
<td>To be arranged.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This module examines the key concepts in small and large-scale software development. Project management is explored, along with the processes involved in developing system requirements, functionality and high-level descriptions necessary to guide the development of, and assess, a working system.

**Learning and teaching methods of delivery:**
- **Weekly contact:** Lectures, seminars, tutorials and practical classes.
- **Scheduled learning:** 25 hours
- **Guided independent study:** 125 hours

**Assessment pattern:**
- **As used by St Andrews:**
  - 2-hour Written Examination = 60%, Coursework = 40%

**Re-assessment pattern:**
- 2-hour Written Examination = 60%, Existing Coursework = 40%

**Module teaching staff:**
TBC
Module coordinator(s): Director of Postgraduate Teaching - Computer Science (dopgt-cs@st-andrews.ac.uk)

### CS5031 Software Engineering Practice

<table>
<thead>
<tr>
<th>SCOTCAT Credits:</th>
<th>15</th>
<th>SCQF Level 11</th>
<th>Semester</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic year:</td>
<td>2018/9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planned timetable:</td>
<td>To be arranged.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This module introduces advanced software engineering methods supporting the development of complex, composite software systems with an emphasis on software configuration management, reuse and test-driven development practices. It examines software reuse at different levels of scale, from software libraries and components to service-oriented architectures and discusses how reuse presents both challenges and opportunities for the development of quality software. A key process in today's software engineering practice is testing; the module introduces testing methods that complement the different scales of reuse-oriented development, from unit-level testing to integration testing and system-level testing. Students work on a project to design, implement and test a complex, distributed application to put the content of the lectures into practice. Reference is made to the content of the co-requisite Software Engineering Principles module where appropriate, so that students learn how the practices studied fit into a larger software engineering lifecycle.

**Pre-requisite(s):**
Undergraduate - before taking this module you must pass CS2002 and (pass CS2001 or pass cs2101)

**Co-requisite(s):**
Postgraduate - in the same year as taking this module you should take CS5030 and take CS5001

**Learning and teaching methods of delivery:**
- **Weekly contact:** Weekly lectures, seminars, tutorials and practical classes.
- **Scheduled learning:** 25 hours
- **Guided independent study:** 125 hours

**Assessment pattern:**
- **As used by St Andrews:**
  - Coursework = 100%

**Re-assessment pattern:**
No Re-assessment available

**Module teaching staff:**
TBC
Module coordinator(s): Director of Postgraduate Teaching - Computer Science (dopgt-cs@st-andrews.ac.uk)
The aim of this module is to provide students with an understanding of the concepts and development techniques used for critical, socio-technical systems. When students have completed this module they will: understand the notion of system dependability and the key characteristics of dependable systems; understand the specialised software engineering techniques that may be used to ensure dependable system operation; have practical experience of applying some of these techniques in systems specification, design or implementation.

Pre-requisite(s): Undergraduate - before taking this module you must pass CS3099

Learning and teaching methods of delivery: Weekly contact: Weekly lectures, seminars, tutorials and practical classes.
Scheduled learning: 25 hours Guided independent study: 125 hours

Assessment pattern: 2-hour Written Examination = 60%, Coursework = 40%
Re-assessment pattern: 2-hour Written Examination = 60%, Existing Coursework = 40%

This module introduces students to the concept of software architecture, as an aid to software design, reuse and evolution. When students have completed this module, they will: have knowledge of the key elements of software architectures; recognise architectural styles of existing software systems; be able to describe the software architecture of a non-trivial system accurately; be able to construct systems that satisfy an architectural description; understand how software architecture aids design, reuse and evolution of software.

Co-requisite(s): Postgraduate - you must also take CS5031

Learning and teaching methods of delivery: Weekly contact: Lectures, seminars, tutorials and practical classes.
Scheduled learning: 25 hours Guided independent study: 125 hours

Assessment pattern: 2-hour Written Examination = 60%, Coursework = 40%
Re-assessment pattern: 2-hour Written Examination = 60%, Existing Coursework = 40%

Module teaching staff: TBC Module coordinator(s): Director of Postgraduate Teaching - Computer Science (dopgt-cs@st-andrews.ac.uk)
One of:

**CS5098 Group Project and Dissertation in Computer Science**

<table>
<thead>
<tr>
<th>SCOTCAT Credits:</th>
<th>60</th>
<th>SCQF Level</th>
<th>Semester</th>
<th>Full Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic year:</td>
<td>2018/9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planned timetable:</td>
<td>To be arranged.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This module is a group-based MSc project on a topic in Computer Science. It results in an individual dissertation of no more than 15,000 words submitted by each student. Typically the dissertation comprises a review of related work, the extension of old or development of new ideas, software implementation and testing, analyses and evaluation. The dissertation may also include an agreed collaboratively-written group report. Each student is individually assessed, taking into account both individual and group submissions. Students are required to give a presentation of their work.

**Pre-requisite(s):** Requires admission to dissertation phase of msc and permission of the head of school.

**Anti-requisite(s):** You cannot take this module if you take CS5099

**Learning and teaching methods of delivery:**

- **Scheduled contact:** Meetings with supervisor.
- **Scheduled learning:** 13 hours
- **Guided independent study:** 587 hours

**Assessment pattern:**

As used by St Andrews:

- Coursework = 100%

**Module teaching staff:**

TBC Module coordinator(s): Director of Postgraduate Teaching - Computer Science (dopgt/cs@st-andrews.ac.uk)

---

**CS5099 Dissertation in Computer Science**

<table>
<thead>
<tr>
<th>SCOTCAT Credits:</th>
<th>60</th>
<th>SCQF Level</th>
<th>Semester</th>
<th>Full Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic year:</td>
<td>2018/9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planned timetable:</td>
<td>To be arranged.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This module is an individually supervised MSc project on a topic in Computer Science. It results in a dissertation of no more than 15,000 words. Typically the dissertation comprises a review of related work, the extension of old or development of new ideas, software implementation and testing, analyses and evaluation. Students are required to give a presentation of their work.

**Pre-requisite(s):** Requires admission to dissertation phase of msc and permission of the head of school

**Anti-requisite(s):**

You cannot take this module if you take CS5098

**Learning and teaching methods of delivery:**

- **Scheduled contact:** Meeting with supervisor.
- **Scheduled learning:** 0 hours
- **Guided independent study:** 0 hours

**Assessment pattern:**

As used by St Andrews:

- Coursework = 100%

**Module teaching staff:**

TBC Module coordinator(s): Director of Postgraduate Teaching - Computer Science (dopgt/cs@st-andrews.ac.uk)

---

Optional modules are available - see the pdf online called Computer Science optional modules 2018-2019