The Module Form

CO2006 Software Engineering and System Development

Credits: *20* **Convenor:** *Dr A. Boronat* **Semester:** *1st*

Prerequisites:	*Essential: CO1003, CO1005, CO1019*		*Desirable: CO1001, CO1012*		
Assessment:	*Coursework: 100%*				
Lectures:	*10*	*hours*			
Seminars:	*21*	*hours*			
Tutorials:	*20*	*hours*	**Class Tests:**	*2*	*hours*
Surgeries:	*5*	*hours*	**Private Study:**	*84*	*hours*
Laboratories:	*8*	*hours*			

Subject Knowledge

Aims According to a report of the British Computer Society, only about 16% of IT projects can be considered truly successful and over 60% of them experience severe problems. The difficulties of software development led to the coining of the phrase "the software crisis" and the birth of software engineering as a discipline. However, in many companies, software is still developed in an ad-hoc way. The purpose of this module is to teach object-oriented methods for analysis, specification, design, implementation, and testing of software systems.

Learning Outcomes At the end of this course, successful students will be able to: explain the main phases in a software development process; analyse customer requirements following an agile methodology; produce object-oriented system designs, by applying design patterns and architectural styles; use UML for consistent specification of software systems and business processes; incorporate security into specifications and designs by following a flexible security specification process; and use appropriate techniques for software development and testing, including mechanisms for software reuse.

Methods Lectures, lecture notes, surgeries, recommended textbooks, worksheets, online videos, supervised laboratories, VLE discussion board, GitHub, formative feedback and web resources.

Assessment Formative coursework, online quizzes, assessed class tests and mini project.

Skills

Aims To teach students a range problem-solving skills tailored to SE, including knowledge acquisition and software modelling.

Learning Outcomes At the end of this course, successful students will be able to write short, clear summaries of technical knowledge; solve abstract and concrete problems (both routine seen, and simple unseen).

Methods Lectures, lecture notes, surgeries, recommended textbooks, worksheets, online videos, supervised laboratories, VLE discussion board, GitHub, formative feedback and web resources.

Assessment Formative coursework, online quizzes, assessed class tests and mini project.

Explanation of Prerequisites A sound knowledge of basic algorithms, data structures and programming is required. Some knowledge of database systems of basic web application development (HTML, CSS, Javascript) is desirable.

Course Description This module introduces students to principles and methods used to specify, design, implement and test software systems. In particular, the object-oriented paradigm will be followed, and techniques therein.

Detailed Syllabus

Introduction: Introduction to software engineering; the inherent complexity of software; examples of complex systems; basic notions and techniques for modelling software systems, build automation with Gradle, Groovy, agile principles; tasks; dependencies; repositories.

Spring MVC: architectural styles; MVC design pattern; controller; view; JSP; expression language; open and closed software architectures; vertical and horizontal prototypes; layers and partitions; coupling and cohesion; encapsulation and information hiding; subsystem decomposition; vertical and horizontal prototypes.

TDD/BDD: scenario-driven design; agile testing; TDD; BDD; user stories and use cases; JUnit; fault vs failure; the oracle problem; test model; testing activities; V model; unit testing; integration testing; system testing; acceptance testing, red/green/refactor, requirements validation and verification.

Spring Data JPA: ORM problem, JPA, entity; Hibernate; join types, fetch types; Spring Data; Query DSL; CRUD repositories;

Spring Security: threats; risks; vulnerabilities; exploits; authentication/authorization; access control with Spring Security; password storage; secure communication.

Reading List

`http://readinglists.le.ac.uk/lists/AE79369B-4CED-C912-2150-5BD837030B59/bibliography.html?style=ieee-with-url`

Resources Lecture notes, module web page, study guide, worksheets, handouts, lecture rooms with data projector, online resources, GitHub, VLE.

Module Evaluation Course questionnaires, course review.

General Information

1 General Timetable

The timetable for the lectures is:

Week	Date	Time	Place
11	Monday, 2/10/2017	14:00	KE LT2
11	Tuesday, 3/10/2017	16:00	KE LT2
12	Tuesday, 10/10/2017	16:00	KE LT2
13	Thursday, 19/10/2017	16:00	KE LT2
13	Friday, 20/10/2017	15:00	KE LT2
15	Tuesday, 31/10/2017	16:00	KE LT2
16	Tuesday, 7/11/2017	16:00	KE LT2
18	Monday, 20/11/2017	14:00	KE LT2
18	Tuesday, 21/11/2017	16:00	KE LT2
19	Tuesday, 28/11/2017	16:00	KE LT2

Note that there are 26 h of seminars (online Pluralsight videos).

2 Surgeries

The timetable for the surgeries is:

Week	Date	Time	Place
13	Monday, 16/10/2017	14:00	KE LT2
15	Monday, 30/10/2017	14:00	KE LT2
17	Monday, 13/11/2017	14:00	KE LT2
20	Monday, 4/12/2017	14:00	KE LT2
21	Tuesday, 12/12/2017	16:00	KE LT2

3 Laboratories

The schedule of laboratory sessions is as follows:

Week	Date	Group A	Group B	Place
12	Monday, 9/10/2017	12:00-13:00	16:00-17:00	CW 301
13	Monday, 16/10/2017	12:00-13:00	16:00-17:00	CW 301
14	Monday, 23/10/2017	12:00-13:00	16:00-17:00	CW 301
15	Monday, 30/10/2017	12:00-13:00	16:00-17:00	CW 301
16	Monday, 6/11/2017	12:00-13:00	16:00-17:00	CW 301
17	Monday, 13/11/2017	12:00-13:00	16:00-17:00	CW 301
18	Monday, 20/11/2017	**no session**	–	–
19	Monday, 27/11/2017	12:00-13:00	16:00-17:002	CW 301
20	Monday, 4/12/2017	12:00-13:00	16:00-17:00	CW 301

Note that there are 20 h of tutorials (guided exercises with support through Blackboard).

4 Coursework

There are four weighted assignments in this module, consisting of two class tests, and a miniproject, split in three assignments. The marks stemming from each of these five assignments count towards the overall mark of the module. The table below summarises the different assignments involved in this module, including release, submission and marking deadlines where appropriate, and their assessment weight and nature.

Coursework	Type	Release	Submission	Marking	Marks	Weight
1	test	–	17/10/2017	31/10/2017	100	15%
2	miniproject (I)	19/10/2017	2/11/2017	9/11/2017	100	20%
3	miniproject (II)	2/11/2017	16/11/2017	30/11/2017	100	20%
4	miniproject (III)	20/11/2017	7/12/2017	21/12/2017	100	20%
5	test	–	13/12/2017	3/1/2017	100	25%

Coursework accounts for 100% of the total module mark; hence this module is a *coursework only module*. Coursework includes all worksheets, problemsheets, tests and so on.

You should appreciate that coursework is the sole component of the formal assessment on this module. In particular, failure to attempt a worksheet has two consequences: first, you will find it much more difficult to understand the material, and second, you will have to score higher on the remaining pieces of coursework than would otherwise have been the case in order to pass the module.

Normally, in order to *complete* the assessment on this module you need to have participated in over 50% of weighted coursework. Students who do not satisfy this rule will be deemed as not having completed the assessment on the module.

Moreover, note that, for an absence in a class test or a non submission of a major piece of coursework such as a miniproject, a self certification alone is not sufficient. You need to provide a medical note or other appropriate evidence. Your absence would then be given due consideration. If no evidence is provided, you will receive a mark of 0. Overall, this missed assessment will not count towards the 50% weighted coursework that you must participate in.

5 Feedback

The University Policy on the Return of Marked Work promises that you will receive marks and/or feedback on your coursework within **21 calendar days**.

`http://www2.le.ac.uk/offices/sas2/quality/student-feedback/return-of-marked-work`

The Department of Informatics will always strive to meet this 21 calendar day deadline, and *in many cases we will return marks and feedback within 10 working days*. Please also see Section 9.

When the marking has been completed, you will receive feedback, which includes the grade that you gained for the coursework and information to help you improve. The department has a standardised way to give feedback, which is a short document entitled *Coursework Feedback* which will be made available for every assessed piece of coursework. These documents will detail how and when feedback for the coursework was or will be given. They will be available as pdf files on the module's resources website.

Improvements to the module from last year include ...

- A more dynamic delivery of contents by implementing a flipped classroom approach using new technologies: Pluralsight, Blackboard and GitHub. With the new format, students will be able to go through selected tutorials and examples from Pluralsight and they will be able to structure their study time in a way that fits best for their needs. A discussion board on Blackboard will be used to communicate with students in order to resolve doubts about parts of the syllabus, such as terminology and examples. A guided plan of activities will be provided to students for managing their progress.
- The use of GitHub for releasing coursework and for submitting coursework.
- The use of a conductor software project throughout the module so that theoretical notions can be understood by applying them in a working software project incrementally and gradually.
- Consistent marking by using automated assessment technology.
- Separation of development and testing in two separate pieces of coursework.

- Pair programming in lab sessions to facilitate discussion and collaborative learning.
- Less emphasis on specific view technology (JSPs).
- Replacement of Cucumber with the Spock framework for behaviour-driven development, providing a more self-contained solution for testing the miniproject.

6 Module Assessment The module mark is the coursework mark. You require 40% to pass the module.

Note that assessment arrangements and calculations are likely to be different if you are resitting.

7 Attendance at Surgeries and Problem Classes The nature of your academic obligations varies from course to course. In the case of all the Informatics modules offered by the Department of Informatics, the obligations include attendance at all surgeries, problem classes and laboratories. The surgeries, problem class sessions and/or supervised laboratories offered on these modules make a vital contribution to the learning process needed if you are to pass the module. Experience has shown that students who fail to attend these sessions do significantly worse than those who do attend. It has therefore been decided (see 3.3 of Policy on Attendance at Timetabled Teaching Events)

`www2.le.ac.uk/offices/sas2/regulations/documents/policy-for-attendance-at-timetabled-teaching-events`

that attendance at all surgeries, problem classes and laboratories is a **requirement of this module**. Registers of attendance in addition to University monitoring may be kept. The department can decide that students who do not attend **may have their registration withdrawn**.

In the event that you miss a surgery, problem class or laboratory due to illness or other such reasons, it is essential that you inform the module convenor (you must also read Sections 11 and 12) so that this fact can be recorded. If you are having problems, you should discuss them with the module convenor and/or your personal tutor (or other members of staff as appropriate).

8 Students with Specific Learning Difficulties and Long Term Conditions The *AccessAbility Centre* of the University offers services and support for students with dyslexia, and other specific learning difficulties, disabilities and long term conditions. Each academic department has an *AccessAbility Tutor*. In Informatics this role is performed by the Welfare Tutor, *Dr Fer-Jan de Vries*. He is the person within the department who you can talk to about any disability-related issues. You can find more details at

`https://campus.cs.le.ac.uk/ForStudents/welfare`.

Assessment in Informatics can take many forms. You may have been provided with an *Assessed Work Cover Sheet* by the AccessAbility Centre which you should attach to your written assessments so that your work can be properly assessed by the module convenors. You might also require special arrangements for class tests and oral assessments (such as additional time, quiet rooms or handouts in specific formats) in which case you should discuss your needs with the AccessAbility tutor at least 7 days prior to such assessment for appropriate arrangements to be made.

9 Late Submission of Course Work Please note that every assessed/summative or formative coursework (worksheet/problemsheet/etc) in the Department of Informatics has a deadline for submission. We need you to meet these deadlines, since it is in your interest that we keep to the prearranged timetable for the marking and return of coursework so that you receive constructive feedback on your progress in good time. *Remember that the University policy is for all feedback to be issued within 21 calendar days*

of the coursework submission date. In Informatics we aim to better this wherever possible, but remember that quality marking and feedback does take time.

In Section 4 we specify the submission and return dates for individual courseworks, and hence a *turnaround time in working days* for marking and feedback.

The following rules apply in regard of late submission of coursework.

Turnaround of More Than 10 Working Days

We adopt the standard University Rules of Assessment:

- `www2.le.ac.uk/offices/sas2/regulations/documents/senatereg7-assessment.pdf`
- `www.le.ac.uk/sas/assessments/late-submission`.

Roughly speaking, you may submit after the submission date, but *you will immediately lose 10% (of the maximum mark available, even if only a minute late), and a further 5% for each further whole day late.* Thus it is still *essential that you submit your coursework in time* in order to ensure you have obtained the best mark possible.

Turnaround of 10 Working Days or Less

- The submission deadline stated is a **strict deadline**, there will be **no late submissions** and work handed in late will receive **no marks**.

We adopt this policy to show fairness to all students. On the occassions where we return coursework within 10 working days, there are often tight schedules that markers have to work to and you **must** make sure that you submit your coursework by the due date. The strict date also allows the possibility for early general feedback before marked work is returned. The proccesses do **not** allow for late submissions.

In the event of your being unable to do coursework because of illness or other bona fide reason, allowance will be made provided that a medical certificate or other adequate documentary evidence is produced (see Sections 11 and 12). For coursework only modules, note also the 50% rule concerning the completion of coursework in Section 4.

In view of the importance of handing in work on time, you need to make a conscious effort to organise your time effectively. Note in particular that when we allocate, say, three weeks for a piece of coursework, we mean that it will take you three weeks (allocating the correct proportion of your time to the module) to carry out the work. You will not be able to meet the deadline if you spend two and a half weeks on something else and then try to do all the work in the last three days.

10 Plagiarism

The issue of plagiarism is very important. You MUST read the University's statement and the departmental regulations concerning plagiarism. These can be found in the University Regulations at

`www.le.ac.uk/sas/assessments/plagiarism`

and in the Information for Students web pages at:

`https://campus.cs.le.ac.uk/ForStudents/plagiarism/Plagiarism.html`

The University regards plagiarism and collusion as very serious offences and so they are subject to strict penalties. The penalties that departments are authorised to apply are defined in the Regulations governing student discipline, see

`www.le.ac.uk/senate-regulation11`

11 Mitigating Circumstances

It is **your** responsibility to inform your department(s) of any matters (whether of an academic, personal, medical or other nature) which may be relevant to your academic performance, and to supply substantiating evidence, for example, a medical certificate. Such information **must be submitted promptly**, with the following departmental deadlines governing the latest submission date for evidence of special circumstances. Please try to submit well before the deadlines.

In order for the Board of Examiners to consider mitigating circumstances the relevant Notification of Illness forms must be submitted by 12 noon of the Friday one week after the end of the January and Midsummer examination periods or by 12 noon of the Wednesday following the end of the September examination period.

Appeals against degree classification and appeals against termination of course may be disallowed if the appeal is based on mitigating circumstances which the appeals panel believes should have been communicated earlier to the department concerned.

In general terms, the presentation of medical or other special circumstances does not of itself guarantee that academic concessions will be granted. Cases are considered on their merits in the light of the extent to which the adverse circumstances might reasonably be deemed to have affected your performance or justified a failure to meet deadlines.

12 Notification of Illness

It is your responsibility to make all reasonable efforts to hand in coursework to the Department on time. Even if absent due to ill health, the Department will accept written coursework handed in by other people, and also by mail, as long as the date on the post mark of the submission is the submission date (or earlier).

Students who suffer a minor illness lasting at most five working days are required to report this to the department under the following circumstances:

- if the illness leads to absence from classes at which attendance is compulsory;
- where it might be a contributory factor in a failure to meet submission deadlines or to perform up to expectations in any academic assignment.

You must self-certify your illness using a **Notification of Illness** form available at

`https://campus.cs.le.ac.uk/ForStudents/welfare`.

Note that self-certification for missed class tests or miniprojects is normally not sufficient: see Section 4.

Normally, Notification of Illness forms which are returned after that might not be considered promptly (for example, for the purpose of excusing coursework non-submission). However, all such forms will be considered at the subsequent Board of Examiners meeting.

Where the illness is of more than five working days' duration or it is of a non-minor nature, medical advice should be sought and a medical certificate submitted to the Office. You are responsible for collecting medical certificates from the Victoria Park Health Centre (formerly Freemen's Common Health Centre) and supplying a copy to the Department.

It is your responsibility, when required to produce such medical evidence, to acquire it.

Victoria Park Health Centre charges the University for providing medical certificates and reports. Students and tutors may be asked to complete an application form before a letter is written (this request form is submitted to Victoria Park Health Centre through the Student Welfare Service for audit purposes). Other general practices may charge for providing reports and such charges must be met by you.