ÖREBRO UNIVERSITET

Course syllabus
Third-cycle courses and study programmes

Efficient Software Design and Development, 2 credits

Effektiv design och utveckling av programvara, 2 hp

Course Code/Codes	50DT051
Subject Area	Computer Science (Datavetenskap)
School/equivalent	School of Science and Technology (Institutionen för naturvetenskap och teknik
Valid from	2016-12-15
Approved	2016-12-15
Revised	,
Approved by	Head of School Peter Johansson
Translation to English, date and signature	, ,

1 Course content

The course presents established and novel methodologies and tools that enable efficient design and development of high quality software. The focus of the course is on systematic engineering of software using designs based on robust and extensible software architectures; methods to ensure software quality; and heuristics for clean program code. A special focus is put on (collaborative) software development for creating products that practical research can be built upon in a reliable way. The course is independent from any particular programming language.

2 Outcomes

2.1 The course in relation to the doctoral programme

The course shall primarily refer to the following intended learning outcomes for third-cycle courses and study programmes as described in the Higher Education Ordinance, i.e. the doctoral student shall demonstrate:

Knowledge and understanding
- familiarity with research methodology in general (part of outcome 2)
- familiarity with the methods of the specific field of research in particular (part of outcome 2)

Competence and skills
- the ability to plan and use appropriate methods to undertake research and other qualified tasks within predetermined time frames (part of outcome 4)
- the capacity to support the learning of others (part of outcome 8)

Judgement and approach
- intellectual autonomy and disciplinary rectitude (part of outcome 9)
- specialised insight into the possibilities and limitations of research, its role in society and the responsibility of the individual for how it is used (outcome 10)

The intended learning outcomes are listed in the same order as in the general syllabus for the programme.

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2.2 Intended course learning outcomes

To obtain a passing grade, the doctoral student shall demonstrate:

Knowledge and understanding
- knowledge of modern software engineering methods, software architectures and design patterns suitable for complex programming problems as encountered in practical PhD work
- the ability to report on software quality properties

Competence and skills
- the competence to explain and use coding standards, quality assurance and documentation approaches
- sufficient understanding of code “smells” and heuristics to master the production of high-quality program code.

Judgement and approach
- the ability to explain the relevance of systematic approaches to software development and to select appropriate methods for research problems
- the competence of contributing to software development in teams with heterogeneous competences with different background.

3 Reading list and other teaching material

The following course readings and teaching material will be used on the course:

The following course readings and teaching material will be used on the course. The particular selection of literature will be extended to match the actual needs of the students.

Martin Robert C. (latest edition)
Clean Code – A Handbook of Agile Software Craftmanship
Prentice Hall

Bass Len, Kazman Rick., Clements Paul. (latest edition)
Software Architecture in Practice (SEI Series in Software Engineering)
Addison Wesley

4 Teaching formats

Teaching on the course takes the following format:

Teaching on the course takes place in a number of seminars devoted to particular topics. For the seminars, the students will have to prepare by reading given literature and analysing design and programming solutions also as used in their research..

5 Examination

The course is assessed through an examination in the format of

After each seminar a report needs to be written/extended for documenting improved methods, design or code.
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For examinations consisting of several examination components, the following applies: If during the course it is concluded that a doctoral student is unable to complete a certain examination component, the examiner may set a substitute assignment provided that circumstances do not reasonably allow for the course component to be completed at a later date during the run of the course.

6 Grades

Examinations on third-cycle courses and study programmes are to be assessed according to a two-grade scale with either of the grades ‘fail’ or ‘pass’ (local regulations).

The grade shall be determined by a teacher specifically nominated by the higher education institution (the examiner) (Higher Education Ordinance).

To obtain a passing grade on examinations included in the course, the doctoral student is required to demonstrate that he/she attains the intended course learning outcomes as described in section 2.2. Alternatively, if the course consists of multiple examinations generating credit, the doctoral student is required to demonstrate that he/she attains the outcomes that the examination in question refers to in accordance with section 5.

A student who has failed an examination is entitled to a retake.

If an examination consists of several examination components, and a student fails an examination component, the examiner may, as an alternative to a retake, set a make-up assignment with regard to the examination component in question.

A doctoral student who has failed an examination twice for a specific course or course element is entitled, upon his/her request, to have another examiner appointed to determine the grade.

7 Admission to the course

7.1 Admission requirements

To gain access to the course and complete the examinations included in the course, the applicant must be admitted to a doctoral programme at Örebro University.

7.2 Selection

Selection between applicants who have been admitted to doctoral programmes at Örebro University and who otherwise meet the admission requirements as listed above is made according to the following order of precedence:

If no other selection criteria are specified in this section, priority shall be given to applicants with a lower number of course credits left before the award of their degree over applicants with a higher number of remaining course credits. Should two or more students have equal number of credits, selection will be done through the drawing of lots. This also applies within any selection groups listed unless otherwise stated.

7.3 Other applicants than doctoral students admitted at Örebro University

Other applicants than doctoral students admitted at Örebro University may be given access to the course on the grounds of provisions for and/or agreements regarding contracted courses, joint degrees, national graduate schools or cooperation in other respects with other universities.

Any decisions on what such other applicants may be given access to the course are made separately and on the basis of the provisions and/or agreements that occasion the student to apply for the course.

For participation in the course in other respects, the same provisions shall apply as for doctoral students admitted to Örebro University.

8 Transfer of credits for courses, study programmes and other experience

Provisions on the transfer of credits can be found in the Higher Education Ordinance and on the university's webpage.

9 Other information

The course is taught in English.

Transitional provisions

None.