

## CECS 542 Requirements Engineering Course Syllabus, Spring 2017

**Professor:** Dr. Birgit Penzenstadler

**Class meetings:** Lecture: Mon/Wed 5:30pm-6:20pm in ECS-302

Lab: Mon/Wed 6:30-7:45pm in ECS-403

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**Office Hours:** 4:00 – 5:00 Monday, Wednesday

### DESCRIPTION

Requirements Engineering lays the crucial foundation for successful software development. This course aims at equipping students with requirements engineering techniques for software-intensive systems. Students will learn a systematic approach to develop requirements through cooperative problem analysis, representation, and validation.

Lecture: 2 hours.

Lab: 4 hours.

Assessment: Team project plus exams. Letter grade only (A-F).

### I. PREREQUISITE TOPICS

CECS 343 or CECS 543 or other basic knowledge about the principles of software engineering and the software lifecycle.

### II. COURSE TOPICS

This course exposes students to the problem of determining and specifying *what* a proposed software system should do, *why* and for *whom* the system is needed; not *how* the system should do it, which is the topic of downstream software engineering activities such as design and coding. There are some nontechnical aspects of the course, with respect to communication and negotiation with multiple stakeholders. Most of the course covers technical approaches to the requirements problem, such as techniques for eliciting stakeholder goals and requirements, notations and models for documenting and specifying requirements, and techniques for analyzing requirements.

In detail, the course covers:

- WHY do we need Requirements Engineering?
- Principles: Definitions, process, roles, problem/solution view, artifact orientation
- System Models: Decomposition and abstraction, system views
- Frameworks: What reference structures can I use for requirements?
- Business Case Analysis: Why are we building this system?
- Stakeholders: Who are the people to talk to about requirements?
- Goals and Constraints: What are the major objectives for the system?
- System Vision: What exactly do we want to achieve?
- Domain Models: What are the surrounding systems ours interacts with?
- Usage Models: How will the system interact with the user?
- Software quality models: How to determine the quality characteristics?
- Quality requirements: How to specify which qualities need to be met?
- System specification: How to hand over to design?
- Quality assurance: How to ensure that RE is done in a good way?
- Change management: How to evolve requirements?

### III. COURSE OBJECTIVES

- Overall: A general introduction to requirements engineering.
- Specific: a knowledge of and an ability to apply:
  - Stakeholder analysis
  - Goal analysis
  - Creating a system vision

- Developing a domain model
- Developing a usage model (UML use cases)
- Eliciting and specifying quality requirements
- Quality assurance techniques
- Requirements management

Sample assignments:

- Eliciting and documenting the stakeholders for a software system.
- Developing a use case in UML.
- Performing a review of quality requirements.

## V. COURSE REQUIREMENTS AND ASSESSMENT

**Semester Team Project:** The students will undertake a semester-long requirements engineering project, composed of individual, written assignments (to practice and demonstrate the skills from the course objectives above). Students may form teams of no more than three members. All members must participate equally, although not necessarily doing the same jobs.

**No late work accepted.** Deadlines will be *strictly adhered to*. The project will require a number of deliverables. Almost every semester there is at least one team, and often more, that does a very poor job. In most cases a team member who has contributed little or nothing causes this. You have a responsibility to your team to contribute time and effort to the project. If I determine that you have not contributed, you will receive zero points for the project. The project is composed by 5 assignments:

- Stakeholder model (10% of the grade)
- Goal model (10%)
- System vision (10%)
- Usage model (10%)
- Quality requirements (10%)

**Written Exams:** There are two individual written exams. Each will be 25% of your grade. These exams plus the team assignments sum up to 100%.

### Week Plan

	Date	Lecture	Lab Assignments
1	23-Jan	Introduction & RE main terms	<i>Due dates Monday 9 am</i>
	25-Jan	EARS – Easy Approach to Requirements Syntax	Review HFOSS projects for interest: <a href="http://openmrs.org/">http://openmrs.org/</a> Practice EARS for their requirements
2	30-Jan	Principles: Definitions, process, roles, problem/solution view, artifact orientation	Identify equivalents or instances of these terms and concepts in HFOSS project; Research the NaPiRE study
	1-Feb	Frameworks in RE	Research the ISO RE standard 29148
3	6-Feb	AMDiRE	Take a standard requirements specification and sort information into AMDiRE model
	8-Feb	Business Case Analysis	Reengineer a business case (pitch) for a system
4	13-Feb	Stakeholders	Reengineer list of stakeholders in HFOSS project
	15-Feb	Stakeholders	Make stakeholder model ( <i>deliverable</i> )
5	20-Feb	Goals and Constraints	Reengineer list of goals in HFOSS project
	22-Feb	Goals and Constraints	Make goal model ( <i>deliverable</i> )
6	27-Feb	System Vision	Research system vision, read “rich picture” paper & tutorial
	1-Mar	System Vision	Reengineer system vision ( <i>deliverable</i> )

7	6-Mar	Domain Models	Research different types of domain models
	8-Mar	Review - Q & A	Time for more questions
8	13-Mar	Midterm	-
	15-Mar	<i>Feedback</i>	Time for questions
9	20-Mar	Usage Models	Reengineer use cases (draft)
	22-Mar	Usage Models	Refine/rework use cases ( <i>deliverable</i> )
10	27-Mar	Scaling RE & Refining requirements	Practice requirements refinement on project
	29-Mar	Software	Continue requirements refinement
---	3-Apr	Spring break	
	5-Apr	Spring break	
11	10-Apr	Quality requirements	Reengineer quality requirements
	12-Apr	Quality requirements	Finalize quality requirements ( <i>deliverable</i> )
12	17-Apr	Quality assurance	Perform peer review (Understanding Design and Checking Compliance)
	19-Apr	Quality assurance	Receive peer review feedback
13	24-Apr	Requirements management and change management	Bug tracker activity
	26-Apr	Requirements management and change management	Bug tracker activity
14	1-May	Advanced topics in RE	Research agendas in RE
	3-May	Final presentations	-
15	8-May	Final presentations	-
	10-May	Review - Q & A	Time for more questions
Finals week	tbd	Final exam	-

## VI. FURTHER READING

Please note that these books are not a script for the class, but just additional reading suggestions:

Karl Wieggers and Joy Beatty: "Software Requirements"

Axel van Lamsweerde: "Requirements Engineering"

### Academic Honesty:

**Cheating and plagiarism** will not be tolerated in this course. Any individual caught cheating on quizzes, homework, lab projects, or the final exam will be punished to the full extent allowed under University regulations. Plagiarism on papers or assignments is not acceptable and work that is plagiarized will not receive credit. Plagiarism is considered cheating. *Note:* any time another person's work is used without giving them proper credit, it is considered plagiarism and cheating. It is also considered plagiarism if you try to reuse work from other courses for the deliverables in this course.

*At a minimum*, any student caught cheating will receive no credit for the work concerned, and will receive a reduction of one letter grade from their final course grade. The official CSULB Policy on Cheating and Plagiarism can be found here:

[http://web.csulb.edu/divisions/aa/catalog/current/academic\\_information/cheating\\_plagiarism.html](http://web.csulb.edu/divisions/aa/catalog/current/academic_information/cheating_plagiarism.html)

**Reasonable Accommodation:** Individuals with disabilities who need assistance or modification to the University's programs and/or activities should inform the person(s) responsible for these programs and/or activities immediately upon knowing that such modification is necessary. Individuals registered with the

California Department of Rehabilitation may be eligible for assistance through that agency. Students may be eligible for assistance through the Office of Disabled Student Services, located in Brotman Hall 270, telephone (562) 985-5401. For evaluation and service, contact that office directly. If the modification or accommodation provided is inappropriate or insufficient, you may seek the assistance of the Office of Equity and Diversity, located in University Student Union 301, telephone (562) 985-8256. If a reasonable accommodation has been requested but was not provided, the individual may access the complaint resolution process.

**COE Tutoring Center Announcement**

Take advantage of free peer tutoring to keep up your grades in the most challenging classes. Tutoring is available for undergraduate engineering students in departmental courses for Electrical Engineering, Mechanical & Aerospace Engineering, Civil Engineering, Computer Engineering/Science, and Chemical Engineering.

Tutoring is on a first-come-first-serve, walk-in basis. Tutors are available Monday-Thursday in the Fall and Spring terms. All tutoring sessions take place in the Engineering Student Success Center (ESSC) in EN2, Room 300 between the hours of 9:00 a.m. – 6:00 p.m.

Visit the website for detailed tutoring schedules:

[http://web.csulb.edu/colleges/coe/views/essc/academic\\_success/engineering\\_tutor.shtml#asp\\_ETP](http://web.csulb.edu/colleges/coe/views/essc/academic_success/engineering_tutor.shtml#asp_ETP)