
Design of the Capstone Software Engineering Course at the University of Ottawa

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**Second International Workshop on
Software Engineering Course Projects
CASCON 2005**

SE-2004 Extract

From curriculum guideline 14, p43

Case studies

- Exposure to real systems and project case studies
- Taught to critique these as well as to reuse the best parts of them.

Project-based classes

- Some courses should be set up to mimic typical projects in industry.
- These should include group-work, presentations, formal reviews, quality assurance, etc.
- It can be beneficial if such a course were to include a real-world customer or customers.
- Group projects can be interdisciplinary.
- Students should also be able to experience the different roles typical in a software engineering team: project manager, tools engineer, requirements engineer, etc.

SE2004 Extract, continued

Capstone course(s)

- Students need a significant project, preferably spanning their entire last year, in order to practice the knowledge and skills they have learned.
- Unlike project-based classes, the capstone project is managed by the students and solves a problem of the student's choice.

Software Engineering Courses At the University of Ottawa

We follow the SE-2004 curricula, since I developed them:

Courses marked ** have significant group projects, others may too

- CS1, CS2
- SEG2105: Intro to SE **
- SEG2106: Software construction
- SEG3101: Software requirements **
- SEG3102: Software design **
- SEG3103: Software quality **
- SEG3125: User interfaces **
- SEG4105: Project management **
- SEG4145: Real time systems (not core in SE-2004)
- SEG4910/4911: Capstone project **
- Discrete structures, data structures, databases I, databases 2, operating systems, algorithms, electives, etc.

Principles of our Capstone Project

1. Full year course

- Single semester courses are inadequate

2. Groups of 3-4

3. They must find a real customer

- Somebody who actually seeks the result
- Or somebody to represent ‘the open market’

4. Must involve serious SE work

- Includes their own project management, hence they choose the process model. Waterfall is discouraged.

Capstone project principles (2)

5. Expected workload same as a normal course

- 8 person-weeks per person, spread over 8 months.

6. Professor in charge acts as CEO of the student's 'corporation'.

7. Cohorts of students overlap, so some groups are finishing as others starts

- Starting students see presentations of finishing ones

8. Students attend presentations each week and are asked to complement and criticize the work of others

Capstone project principles (2)

9. To submit:

- Monthly project plan and any updated artifacts
- Final report at end

Typical capstone presentation schedule

Start of semester 1: Initial meeting to set parameters and start finding a project

Mid semester 1: First presentation

- Plans and first iteration

Early semester 2: Second presentation

- Second or third iteration
- Includes in-class design review

Late semester 2: Final presentation

- Includes demonstration

Capstone project: Marking

25% satisfaction of customers

- Customers complete a form at the midpoint and endpoint

20% effectiveness of project management and professionalism of the team

- Being late for delivery loses points here
- Based on monthly reports

10% quality of presentations

40% final report - discussed on next page

An average of 5 marks for difficulty

- Very challenging work can make up for losses elsewhere - to a max of 5 more marks

Capstone project: Marking (2)

Final report:

- 20%: Quality of the software's design, including maintainability, usability and reliability
- 10%: Quality of writing
- 10%: Completeness

Team member adjustment

- Members or the professor can vary members marks based on contribution level
- Average remains the same
 - Marks given to one person are taken from others