Teaching Project Management at different levels of study

Krešimir Fertalj
Introduction

- Undergraduate study
  - Management in Engineering
  - Software Design Project

- Graduate study
  - Project
  - Project Management

- Doctoral study
  - Project Management and Doctoral Research

- Postgraduate specialist study
  - curriculum
Management in Engineering

- Undergraduate study: 2. sem
- ECTS credits: 3
- Study hours: 30 (15 * 2)
- Students: 700++
- Lecturers: 5

Course Description
- … to gain knowledge on business, legal, and project engineering environment

Main topics:
- engineering profession,
- engineering ethics,
- intellectual property,
- engineering approach to problem solving,
- teamwork,
- projects and PM,
- project planning,
- risks in projects,
- management and managers,
- organizing and leadership.
Management in Engineering (grading)

- Lectures: 7 + 6 in 2 cycles
- Exams: written
- Seminar: small project plan
- Tests: 2 computer based

Grading System

<table>
<thead>
<tr>
<th>Type</th>
<th>Continuous Assessment</th>
<th>Exam</th>
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<tbody>
<tr>
<td></td>
<td>Threshold</td>
<td>Percent of Grade</td>
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<td>Class participation</td>
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<td>10 %</td>
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<td>Final Exam: Written</td>
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<tr>
<td>Exam: Written</td>
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[Software Design] Project

- Undergraduate (5. semester) & graduate study (3. semester)
- ECTS credits: 8, Study hours: N/A

Team work on R&D project
- finding the literature,
- analysis of similar problems,
- identification of requirements,
- definition of technical objectives,
- planning and time management,
- creation of alternative solutions,
- decision making,
- solution implementation,
- writing technical documentation

Schedule by weeks
- 01-01 Mentor assignment
- 02-02 Team forming
- 03-05 Work on project
- 06-06 Project plan submission
- 07-10 Work on project
- 12-12 Submission of final work
- 13-13 Project presentation
- 14-15 Project evaluation
Groups of 6 to 8 students
- may be joined of subgroups of more than one mentor
- may be joined of \( m \) individuals on \( n \) projects for the same mentor

Teams guided by teaching staff
- by schedule or sporadically
- projects more/less transparent

Mentor assigns max 100 pts/std
- 60 points – deliverables
- 30 points – organization
- 10 points – presentation

Team leader (student) distributes points to the group
- discretionary, or
- based on mentor’s decision

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<th>Points</th>
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<td>Very Good (4)</td>
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<tr>
<td>Excellent (5)</td>
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Project management

- Graduate study, 3. semester
- ECTS credits: 4
- Study hours: 30 (15 * 2)
- Students: cca 80-200, avg 120
- Lecturers: 2, Assistants: 2-3

General Competencies (short)
- Project definition, teamwork, project life cycle, skills in project planning and management

Schedule by weeks
1. Project management fundamentals.
2. Project management context.
3. Project life cycle, basic processes and process groups.
4. Project initiation.
5. Project planning.
6. Project scheduling.
8. Mid-term exam.
10. Human resources management.
14. Invited lecture
15. Final exam
Project management - grading

- Lectures: 7 + 6 in 2 cycles
- Exams: mid exam, final exam, tests
- Homework: proposal, plan, review

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<th>Grade</th>
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### Grading System

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<td>Attendance</td>
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## Project management - statistics

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<td>2011/12</td>
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<td>average</td>
<td>117</td>
<td>109</td>
<td>95,09%</td>
<td>3,57</td>
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</table>
Doctoral Study

(PhD as a Project)
A short course (generic skill)

- 2 * 3 hours
- form of a workshop – crash course

The aim

- to strengthen the skills of PhD students in the field of PM
- with a focus on research and scientific projects
- and linking best PM practices with doctoral research.
Motivation

- Lack of ...
  - Well-defined scope of doctoral study
  - Integration of study with research (projects)
  - Clear milestones and deadlines
  - Risk identification and risk mitigation
  - Effective planning – especially of CC/SCI papers
  - Communication with mentor
Discussion / assignment

- When and how a PhD dissertation research field is formally confirmed?
- Define your research field, research challenges and area of interest!

What’s there, what’s “in”, how do I fit? → scientific contribution
PhD as a project

- **Project**
  - A temporary endeavor to create a unique …

- **Progressive Elaboration**
  - The iterative process of …

- **S.M.A.R.T. goals**
  - specific, measurable, attainable, realistic, timely

- **Results:**
  - artifact, document, potential, …, knowledge

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- **Discussion / assignment**

  **Describe**
  - *time constraints,*
  - *uniqueness*
  - *progressive elaboration*
  - *goals*

  **of your PhD dissertation**
Scope and Creep, Project phases

- **Scope** - project boundaries, work (not) to be done, deliverables
- **Creep** – scope, hope, effort, feature creep
- **Project phases**
  - Defining project phases & deliverables
  - Monitoring project progress through the stages
  - Gates: performance, deliverables, ...

- **Discussion / assignment**
  - Identify possible creep(s) of your PhD and appropriate mitigation(s)
  - Define four main phases of your PhD
  - How would phases be verified?
  - How would mentor be involved?

(students fill templates, an oral analysis follows)
PM process groups

- Discussion
  - PhD work processes?
  - Critical ones?
Project planning

- Rolling wave planning
- Work breakdown structure (WBS)
  - Activity, Work package, Task
- Project milestones

Brainstorming
- main PhD WBS activities
Project scheduling

- Project Network Diagram (PND)
- Time, effort, duration estimation
- Gantt chart

Discussion / assignment

- Define milestones for each year of your PhD study!
- Estimate time (deadline) of publication of your CC/SCI indexed paper!
- Draw the network diagram for your PhD WBS!

(students fill templates, an oral analysis follows)
Project communications management

- Communications planning
  - within project (team) in general

- Information distribution
  - Communication channels
  - Communication matrix and frequency

- Performance reporting
  - Formats and volume of information

- Meetings and performance reporting

- Manage stakeholders

Discussion

- Communication between PhD student and mentor
  - Channels
  - Format
  - Frequency
  - Reporting
  - Meetings

- Other stakeholders ?
Risk management

- Risk assessment
  - Risk identification
  - Risk analysis
  - Prioritization

- Risk control
  - Risk management planning
  - Risk resolution
    - Avoidance
    - Sharing
    - Reduction
    - Retention
  - Risk monitoring

- Assignment
  - Identify risks of PhD as a project!
  - Analyse consequences (delays, costs, etc.)
  - Define strategy (Plan B) for each risk: trigger, resolution, timeframe
The outcome

- Teachers: 3
- Students: 15

- High student satisfaction
  - useful,
  - interesting,
  - motivating
  - ...

Sve polivale, vrlo ukrasno realizovano proces proce doktorate, tj. doktorovog studija u opelii.
Predavanja odgovaraju konven,o tj. vrlo korisno.

URLO Zanimljivo i korisno. Predstaviti:
1. Više uređena (bar 2 x 3h) - 1.105 više primjava
2. Mogućnost pojačanja ranije takvom studijom

3. Č.

Predavanja su bila iznimno korisna i zanimljiva i interaktivnost je dobro došla na se miho zaptamo i da se potrežnje bitne stvari o temu doktorovog istraživanja.

Trebalo bi istaknuti više konkretnih primjava, samo onih koji su direktno riru doktorata. Primjeri koji su preprečivši, ili uželi za poseban domenu, nisu prema korisni. Primjeri za risler v projektu najveći priliker problem i odvajalištenj
receptizije (Hvala Feraji!)
Specialist Study

Project Management
Specialist study “Project Management”

- **Idea**
  - Generic curriculum, applicable in different domains

- **Goal**
  - to create a complete specialist-specialist in project management
  - as opposed to professional training by certification of partial knowledge

- **Motivation**
  - knowledge and skills on PM are necessary in both technical and non-technical domains and both civil and public sector
  - academic community more/less lacking knowledge and skills and generally the unique approach to managing scientific projects and research
About the study

- **Duration:** 1 academic year, i.e. 2 semesters
  - Final specialist work (thesis) can be done and defended in 3rd sem.

- **Overall ECTS credits:** 60

- **Admission conditions:**
  - a graduate degree with at least 300 ECTS credits
  - knowledge of English
  - interview with candidate

- **The academic title acquired by completing the study**
  - sveučilišni specijalist upravljanja projektima (hr)
  - university project management specialist (en)
  - universitatis specialista moderandi inceptorum (lat)
  - univ. spec. mod. incep. (short)
Competences

- Apply methods, techniques and tools for project management,
- Evaluate and apply management and decision-making,
- Adapt project management and control processes to global environments and distributed project teams,
- Apply stakeholder communication with regard to project context and stakeholder role,
- Manage changes to tailor project delivery,
- Analyse and improve the organization's project management practices,
- Evaluate projects, operational and strategic,
- Assess and manage risk in project implementation
The program

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<th>Lecturing hrs</th>
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<tr>
<td>Foundations of Project Management</td>
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<tr>
<td>Stakeholder Management and Communications Management</td>
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<tr>
<td>Project Leadership</td>
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<tr>
<td>Project Governance</td>
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<td>Organizational Behaviour and Projects</td>
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<td>Portfolio and Program Management</td>
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<td>Project Procurement and Supply Chains</td>
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<td>Business and Commercial Aspects of Projects</td>
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**Course description template**

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Lecturers and Management

- Professional council of study "Project Management,"
  - 3 professors: chairman, co-chairman, member

- Committee on lifelong learning
  - Administrative support, supervision, mediation to faculty council

- Teaching staff: 15
  - 8 Faculty of EE and Engineering
  - 5 Faculty of Economics
  - 2 IT company
Workflow of study

- **Lectures**
  - First 2 semesters – lecturing, obligatory+elective courses (2 *18 ECTS)
  - Student enrolls courses with min. 18 ECTS/semester in total
  - Weekly cycles
  - Afternoon sessions

- **Thesis (final specialist work)**
  - Mentor is assigned on admission to study
  - Theme of work – at the end of 1st semester
  - Work on thesis – 2nd semester, can be continued in 3rd
Students may attend courses from other postgraduate studies
- If required for specialisation
- with the consent of the mentor

Recognition of credits from other courses
- for attended other postgraduate (specialist and doctoral) studies
- a credit score based on the documented course contents

Lecturing in English
- All courses are offered in English
- Lectures given by international guests are given in English
Constraints

- Regular deadline to complete the study – 3 years

- Study can be paused and continued – with administrative permission

- Continuation of the study – with approval
  - the teaching obligations and
  - the obligation to pay the study costs
  - are determined in accordance with the current academic year

- Certificate of the completed part of the study
  - for the passed exams
Completing the study

- By earning 60 ECTS credits in total and
- By making and defending the specialist thesis

- Assignment of thesis – after min. 20 ECTS credits earned
- Defence of thesis – after 36 ECTS earned (all courses passed)

- Defence of thesis – once
  - Committee - mentor as president + 2 members,
  - Work evaluation (positive)
  - Oral defence, public
  - Result – defended / not defended
How the study programme was made

- PMI Curriculum Guidelines
- Referent studies
  - Project Management Fast Track – Ryerson University, Toronto
  - Master of Science in Project Management Online - Northwestern University, Evanston (Chicago)
  - MSc in Project Management Module - University of Liverpool,
  - Project Management - UC Berkeley Extension
  - Applied Project Management Certificate Program – University of California Division of Continuing Education
- Resolutions
  - Committee for lifelong learning
  - Faculty council
  - Senate
  - Agency for Science and HE
References

- ECTS Information Package for Academic Year ... Course Catalogue – Undergraduate Study, University of Zagreb Faculty of Electrical Engineering and Computing, https://www.fer.unizg.hr/issn/1848-3550, Accessed January 8th, 2018
- ECTS Information Package for Academic Year ... Course Catalogue – Graduate Study, University of Zagreb Faculty of Electrical Engineering and Computing, https://www.fer.unizg.hr/issn/1848-3550, Accessed January 8th, 2018
- IS 2010 Curriculum Guidelines for Undergraduate Degree Programs in Information Systems, https://www.acm.org/binaries/content/assets/education/curricula-recommendations/is-2010-acm-final.pdf, Accessed January 30th, 2018