Syllabus
Course description

Course title	Project, Process and Technology Management
Course code	47540
Scientific sector	ING-IND/17, ING-IND/35
Degree	Master
Semester	1st
Year	1st
Academic Year	2019-2020
Credits	10 ECTS
Modular	Yes

Total lecturing hours	Module1: 28h lecture Module2: 28h lecture
Total lab hours	
Total exercise hours	Module1: 18h exercise Module2: 18h exercise
Attendance	Recommended
Prerequisites	None
Course page	https://www.unibz.it/en/faculties/sciencetechnology/master-industrial-mechanical-engineering/course-offering/

Specific educational objectives	The course is one of the basics of the scientific area of Industrial Engineering. The course gives a general overview of the main scientific contents. During the course, the presented theoretical topics will be integrated through targeted application-oriented exercises and through a real game-based business simulation. The learning objectives of module 1 are to introduce engineering students in the fundamentals of project management. Specifically, it will deal with the subjects of project planning, project scheduling and project monitoring. The learning objectives of module 2 are to introduce students to the fundamentals of process and technology management. In particular, the part that concerns the process management will deal with process identification, modelling and redesign and the part that concerns the technology management will deal with technology foresight and related methods.

Module 1	Project Management
Lecturer	Patrick Dallasega
Scientific sector of the lecturer	ING-IND/17
Teaching language	English

Office hours	See on timetable
Teaching assistant (if any)	Andrea Revolti
Office hours	See on timetable

List of topics covered	1. Introduction to Project Management
	2. Project planning
	   a) The Work Breakdown Structure (WBS)
	   b) The Organizational Breakdown Structure (OBS)
	   c) Planning of resources
	
	3. Project scheduling methods
	   a) Network diagram techniques (AOA, AON)
	   b) The Critical Path Method (CPM)
	   c) The Program Evaluation Review Technique (PERT)
	   d) Project Crashing
	   e) Resource allocation
	
	4. Project progress measurement and forecast
	   a) Progress measurement
	   b) The Earned Value Analysis (EVA)
	   c) The Earned Value Performance Measurement (EVPM)
	
	5. Project risk management
	   a) Methodologies for project risk identification
	   b) Methodologies for project risk evaluation
	
	6. Construction Project Management
	   a) The Last Planner System (LPS)
	   b) The Location Based Management System (LBMS)
	
	7. Exercises
	   a) Exercises on AOA, AON
	   b) Exercises on CPM, PERT, project crashing, resource allocation
	   c) Exercises on EVA
	   d) Exercises using Microsoft Project
	   e) Last Planner Simulation game
	   f) Excursion to the Brenner Base Tunnel to view the project management as well as the logistics processes

Teaching format	Frontal lectures and exercises in computer lab

Module 2	Process and Technology Management
Lecturer	Elisa Castellarin
Scientific sector of the lecturer	ING-IND/35
Teaching language	English
Office hours	See on timetable
Teaching assistant *(if any)*	-
Office hours	-

| List of topics covered (Module 2 ING-IND/35) | 1. **Process management**
    a. Introduction to process management
    b. Process identification and description
    c. Process modelling
    d. Business Process Model and Notation (BPMN)
    e. Process redesign

Exercises:
  • Exercises on the usage of the BIZAGI software
  • Exercises on process modeling using BIZAGI software

2. **Technology management**
    a. Basics of technology roadmapping
    b. Processes of technology roadmapping: "fast-start" technology roadmapping (T-plan), technology-driven and market-driven view, exploratory oriented technology roadmaps (scenario planning)
    c. Implementing and institutionalizing technology roadmapping
    d. Linking technology roadmapping to other instruments of strategic planning

Exercises
  • 4-hour workshop using T-plan method
  • 4-hour workshop using scenario planning method

3. **Innovation management**
  • Managing open innovation
  • Collaboration and innovation management |
| **Teaching format** | Frontal lectures and exercises in class (laptops are required for some exercises) |

| Learning outcomes | **Intended Learning Outcomes (ILO)**

Module 1

<u>Knowledge and understanding</u>

1. The students know the basic and most common methodologies of Project Management (Planning, Scheduling and Monitoring) and the main used tools.
2. The students are able to understand the issues relating to the development, implementation and management of production and logistics systems; |

Applying knowledge and understanding

3. Students will be able to apply theoretical concepts of planning, organizing and managing projects.
4. By means of exercises performed in the computer laboratory, the student will be able to use software tools like Microsoft Project, which is one of the most used tools of local companies.

Making judgements

5. The students are able to interpret Key Performance Indicators of project management to understand if projects are over, under or on budget and time.

Communication skills

6. Ability to structure and prepare a presentation describing project management concepts with business language

Ability to learn

7. Ability to autonomously extend the knowledge acquired during the study course in different industrial contexts

Module 2

Knowledge and understanding

8. The students will understand the issues related to the process identification, modeling and redesign and will know the basic and most common methods used in process management
9. The students will know various methods used for the technology management and foresight
10. The students will understand how firms can rely on external collaboration to innovate

Applying knowledge and understanding

11. Students will be able to apply theoretical concepts of process management and to use BPMN tools for the process description and modeling
12. Students will learn how to apply theoretical models of technology foresight and to implement complex technology foresight methods like T-start and scenario planning

Making judgments

13. Students will be able to transfer the knowledge and methods learned to real practical applications
14. Students will be able to describe processes in a way that allows to find their criticalities and to redesign them
15. Students will be able to recognize consciously the technological positioning of a company and to find options for its development and improvement, using technology foresight

Communication skills

16. Students will be able to present process analyses and technology roadmaps
17. Students will be able to interact in a competent and professional way in complex, multi-participants workshops like the ones used in T-plan and scenario planning methods

Ability to learn

18. Students will be able to autonomously extend the knowledge acquired during the study course by reading and understanding

Assessment	**Module1**		
	Form	**Length /duration**	**ILOs assessed**
	Written exam	2 x 1,5 hours	1,2,3,4,5
	Presentation case study	15 minutes per student group	5,6,7

Module 2

Form	**Length /duration**	**ILOs assessed**
Oral exam	15-20 minutes per student	8-18

Assessment language	English
Evaluation criteria and criteria for awarding marks	Project Management – Module 1: The final grade is calculated from the results of the written exam. The theoretical part counts 60% and the exercise part counts 40% of the final grade. Process and Technology Management – Module 2: The final grade is based on an oral exam. The assessment of the oral exam is based on the knowledge of the contents covered by the course, clarity of answers, mastery of language and ability to establish connections between topics.

	Final grade: The final grade results from the average of Module 1 and Module 2.

Required readings	Lecture notes and documents for exercise will be available on the reserve collections
Supplementary readings	**Module 1** • "Project Management for Construction" by Hendrickson http://www.ce.cmu.edu/pmbook/ • Meredith, J. and Mantel, S., (2000) "Project Management: A managerial Approach", J. Wiley & Sons New York • De Marco, A. (2011). "Project Management for Facility Constructions", Springer Science & Business Media. • Cantamessa, M., Cobos, E., Rafele, C., (2007) "Il Project Management – Un approccio sistemico alla gestione dei progetti", ISEDI De Agostini. • Pmi lexicon pm terms PMI.org • Project Management: A Systems Approach to Planning, Scheduling, and Controlling 11th Edition by Harold R. Kerzner (Author) • Project Management – Competency Development Framework • www.iso.org ISO21500:2013 – ISO21502-5 • www.pmi.org Project Management standard - PMBOK® GUIDE V Edition • http://www.ipma-usa.org/ IPMA_ICB_4_0_WEB **Module 2** Process management • Dumas, M., La Rosa, M., Mendling, J., & Reijers, H. A. (2018), 2nd edition. "Fundamentals of business process management", Berlin: Springer. • Moore, C., Benedict, T., Bilodeau, N., & Vitkus, P. (2013). "BPM CBOK Version 3. 0: Guide to the Business Process Management Common Body of Knowledge", available at: https://www.abpmp.org/page/guide_BPM_CBOK • Modeler user guide of BIZAGI, available at: http://help.bizagi.com/process-modeler/en/ Technology management • Moehrle, M. G., Isenmann, R., & Phaal, R. (2013). "Technology roadmapping for strategy and innovation. Charting Route to Success". Berlin: Springer. Innovation managament • Dodgson, M., Gann, D. M., & Phillips, N. (Eds.). (2013). "The Oxford handbook of innovation management". Oxford: Oxford University Press.