

## **Course 2: Project Management for Industry 4.0**

### **Course Objective:**

In the new world of Industry 4.0, digitized connectivity may be considered the main driver of change industries have to deal with. This change increases the opportunities to create new business models, exploring network of systems that will allow to increase the cooperation between and across companies and industries. It is expected an increase in customized services that ultimately can become a service for each customer. In this case, we will be dealing with a project service for each customer each time. These projects will be developed by interdisciplinary distributed teams using digital platforms.

This course aims to prepare graduates to perform in and manage projects and teams in the new highly agile digitized challenging smart industries.

### **Learning Outcomes:**

The students on the completion of this course should be able to

CLO1 - Discuss Project Management relevance in the context of IND4.0 (Apply)

CLO2 - Evaluate the needs of an organization regarding IND 4.0, taking into account maturity / readiness models (Evaluate)

CLO3 - Plan, develop and manage projects in the context of IND 4.0, using frameworks of project management, such as PMI, IPMA and Agile/Lean (Create)

CLO4 - Support team decision making processes in accordance with the contingencies and uncertain environments of IND 4.0. (Evaluate)

CLO5 - Perform as a member of an extraordinary team, either distributed or co-located, using different tools and techniques, considering the team development phases (Create).

CLO6 – Develop a project within a real context, in interaction with an industry organization.

### **Prerequisite: None**

### **Course Outline**

#### **Module 1: Management of Industry 4.0 Projects**

1. Introduction to Project Management in a new era of digitalization
2. Industry 4.0 maturity models (Acatech and PWC models)
3. Project Management Processes of initiating and planning a project for evaluating I4.0 maturity levels
4. Agile project management for fast adaptation in the era of the fourth industrial revolution
5. Project Management execution - time management and project indicators for assessing projects related to I4.0 maturity levels

#### **Module 2: Project Team Management for Industry 4.0**

1. Project communication management in a new era of digitalization
2. Project Management monitoring and control – time compression and team project indicators
3. Project team management in a new era of digitalization. Team formation and development of distributed and multicultural teams in Industry 4.0 environments

4. Software tools for project management in a new era of digitalization
5. Decisions under high uncertainty in the context of fast changing environments of the of the fourth industrial revolution

### **Workshop Sessions: Project supervision sessions**

1. Team formation and team dynamics
2. Project selection – development of instruments for assessing the Industry 4.0 maturity level
3. Exploring the dimensions of the Industry 4.0 maturity model
4. Visual planning of the project for I4.0 maturity model self-diagnosis
5. Developing the methodology for maturity level self-diagnosis
6. Creating and validating the I4.0 maturity self-diagnosis model
7. Applying the I4.0 maturity self-diagnosis model
8. Creating and validating the I4.0 maturity self-diagnosis model

### **Laboratory Sessions: None**

### **Learning Resources:**

**Textbook:** No designated textbook, but class notes and handouts will be provided

### **Reference books:**

- Schuh, G., Anderl, R., Gausemeier, J., Hoppel, M. t. and Wahlster, W. (2017) *Industrie 4.0 Maturity Index – Managing the Digital Transformation of Companies*: Acatech. Available at: [https://en.acatech.de/wp-content/uploads/sites/6/2018/03/acatech\\_STUDIE\\_Maturity\\_Index\\_eng\\_WEB.pdf](https://en.acatech.de/wp-content/uploads/sites/6/2018/03/acatech_STUDIE_Maturity_Index_eng_WEB.pdf) (Accessed: 2019.06.03).
- Oehmen, J. (Ed.). (2012). *The Guide to Lean Enablers for Managing Engineering Programs, Version 1.0*. Cambridge, MA: Joint MIT PMI INCOSE Community of Practice on Lean in Program Management. <http://dspace.mit.edu/bitstream/handle/1721.1/70495/Oehmen%20et%20al%202012%20-%20The%20Guide%20to%20Lean%20Enablers%20for%20Managing%20Engineering%20Programs.pdf>
- Jeff Sutherland (2014) *SCRUM - A Arte de Fazer o Bom Trabalho em Metade do Tempo*. Leya
- Harold Kerzner (2009) *Project Management: A Systems Approach to Planning, Scheduling, and Controlling*; John Wiley & Sons; ISBN: 0470278706.
- PMI-PMBOK (2013) “A Guide to the Project Management Body of Knowledge (PMBOK Guide 5th ed.)”. *Pennsylvania, USA: Project Management Institute (PMI)*.
- Finocchio Junior, José (2013) *Project Model Canvas - Gerenciamento de Projetos Sem Burocracia*. Elsevier – Campus. ISBN: 978-85-352-7456-1. <http://www.livrariasaraiva.com.br/produto/4967937/project-model-canvas-gerenciamento-de-projetos-sem-burocracia/>

### **Teaching and Learning Method:**

This is a project-based learning course, where teams of students will solve an open ended problem related to the Industry 4.0. During lecture sessions, concepts will be discussed as much as possible in an inductive manner, using student-centered methodologies (e.g. simulations, think-pair-share, gamification and project-based learning). During workshop sessions, teams of students will develop their projects with the supervision of the instructors, developing different competences related to technical parts of Project Management, and including, but not limited to, project planning, execution

and controlling, time management, team management, decision making, problem-solving, critical thinking, written communication, oral communication, presentation, communication and teamwork.

**Time Distribution and Study Load:**

Lectures: 30 hours

Workshop / project: 30 hours

Self-study: 45 hours

**Evaluation Scheme:** The final grade will be computed according to the following weight distribution: Individual weekly portfolio entries (10%); overall global portfolio (40%); project presentation and discussion (50%). These will be divided in Oral communication (40%); Written communication (20%); Presentation (10%); Peer Assessment (10%) and Personal Development (20%).

An “A” would be awarded if a student can demonstrate clearly effective project management competences for industry 4.0.

A “B” would be awarded if a student can show good progress on project management competences for industry 4.0.

A “C” would be given if a student can show reasonable progress on project management competences for industry 4.0.

A “D” would be given if a student shows a lack of improvement in project management competences for industry 4.0.

**Instructor:**

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