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## Advanced Project Management course for engineers

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Project management has become in the last two decades one of the most rapidly advancing fields in scientific research and practice, and it continues its development towards full professional recognition. Today the need for efficient and effective project management methods is widely recognized by both clients and top managers. In order to cater for their needs there is a growing demand for training programs that put an emphasis on cutting edge project management theories and practices. Accordingly, as part of this trend, formal educational methods, tools and techniques were developed in order to facilitate the teaching of project management.

The processes involved in a complicated area such as project management is characterized by a variety of factors and effects, which can be measured by execution measures. In order to improve project management skills new methodologies, methods, techniques and tools are developed at an accelerated rate. At the same time advanced teaching and training tools, aimed at supporting project planning, monitoring and control, are also being developed.

The need for experienced, well-trained project managers is growing fast. The number of new PMI (Project Management Institute) members and the number of new PMPs (Project Management Professionals) are an indication that project management is a fast-growing discipline. The traditional approach for training new project managers is to teach the appropriate body of .knowledge and to train the new managers on the job

Despite these facts, the traditional approach for training new project managers is to teach the appropriate body of knowledge and to train the new managers on the job. On-the-job training (OJT) is expensive and time consuming, thus it is advisable to reduce its duration to a minimum while ensuring the highest possible quality of training. The cost of OJT includes the cost of risks associated with mistakes which result due to lack of experience. In this regard, training project managers on the job is costly due to the high cost of mistakes done by inexperienced project .(managers (Shtub 2008

Simulations are recognized as an efficient and effective way of teaching and learning complex dynamic systems as well as a tool to avoid the cost of risks associated with OJT. Efficiency is gained by reducing the time it takes to reach a specified level of learning, and effectiveness is gained by achieving better results in performing the tasks learned as well as in transferring the

knowledge gained to similar tasks. In particular, simulations are becoming an integral part of management and engineering education as students learn by using and building simulations of complex systems and processes (Canizares, 1997; Jones & Schneider, 1996; Lu et al., 1996; Nahvi, 1997, Dalziel, 2003, Pfahl, D. et al. 2004, Parush et al., 2002, 2005, L. Davidovitch et al .(2006

The Project Team Builder (PTB) is a project management simulator designed for teaching project management and for training project managers in using the tools and techniques of Project Management in a dynamic, stochastic environment. The PTB enables step by step project management and control. On each step create a new and different situation that obligating a situation analysis and decision making

The existing project management courses do not sufficiently expose the students to the many common obstacles encountered by most projects, and do not properly provide them with the tools and methods that we possess to handle these challenges, and the techniques for implementing them wisely. A new and innovative approach to project management teaching and training is the need of the hour, this need is strongly emphasized both in the academy and the economic sectors and the desirability of such an approach has been widely noted in the recent literature (Brent, 1999, Paola L. G 2006, W.-N. Lee et.al. 2007, Thomas J. 2007, Milentijevic, et al.,2008, Wurdinger, S., et al. (2008). To address this need and to bridge this gap of knowledge we introduce a new approach for .project management course

The Proposed course introduces a new and innovative Project Simulation-Based learning (PSBL) approach geared towards providing the students with comprehensive knowledge about the latest advances in the techniques and tools in this area and their adaptability to projects that are carried out in all sectors, including the economic, business, industrial and educational systems and public administration. The proposed approach is based on a software tool that combines an interactive, dynamic case study and a simple yet effective Project Management System. Based on this approach, a newly designed project management course is introduced. The proposed course will combine both Project -Based learning for teaching project management and applying PTB simulation for the implementation of the theory. The demonstration and the assimilation of the theory will be conducted through case studies prepared by the students. These case studies will be further converted into scenarios and will be executed on the PTB. To our best knowledge it is the first time that such a course is introduced. The course syllabus is presented in appendix A.

## Appendix A: Course syllabus

**Course title: Advanced Project Management course for engineers**

**ECTS Credit:** 3.5

**Structure:** 2 hrs lecture + 1.5 hrs exercise

### Overview

The course is geared towards providing the students with comprehensive knowledge of the discipline of project management, and especially about the latest advances in the techniques and tools in this area and their adaptability to projects that are carried out in all sectors, including the economic, business, industrial and educational systems and public administration. The primary aim of the course is to expose the students to the central role played by project management as a strategic and innovative tool in organizations. The course will also emphasize the role of project management as a means of survival in today's organizations and as necessary and crucial knowledge for managers in all of the organization levels. Also, the course will address many common obstacles encountered by most projects, the tools and methods that we possess to handle these challenges, and the techniques for implementing them wisely. The Project-Based Learning (PBL) approach will be adopted in the teaching process. The demonstration and the assimilation of the theory will be conducted through case studies prepared by the students. These case studies will be further converted into scenarios and will be executed on the PTB.

### The topics of the course

1. Project management overview
2. Defining the project
3. Project management
4. Project manager
5. Organization structure
6. Structuring the project
7. Project scheduling
8. Resource management
9. Budget management
10. Risk management
11. Project control
12. Multi projects
13. Introduction to PMBOK
14. Simulation
15. The Project Team Builder (PTB)

### Evaluation

- During the course, the students will be required to define and present case studies and to implement them using the PTB.
- As coursework, the students will have to carry out a project in the field/subject of their own choice where they will run a case to demonstrate their ability to define, plan, execute and review a project. The project will be executed and tested on the PTB and the results will be analyzed and discussed.

### Literature

#### 1. Books

Shtub A. et al. **Project management engineering, technology and implementation**, Prentice Hall New Jersey, 1994. Harold K. PhD. **Project management a systems approach to planning, scheduling, and controlling**, Ninth edition, John Wiley & sons Inc. 2008.

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**PMBOK Guide**, third edition, 2004.

#### 2. Articles

During the course additional articles and reading material will be presented.

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