**OSTIM TECHNICAL UNIVERSITY**
**FACULTY OF ECONOMICS AND ADMINISTRATIVE SCIENCES**
**MANAGEMENT INFORMATION SYSTEMS**
**DEPARTMENT**
**COURSE SYLLABUS FORM**

| MIS 461 R&D Management | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Course Name** | **Course Code** | **Period** | **Hours** | **Application** | **Laboratory** | **Credit** | **ECTS** |
| R&D Management | MIS 461 | 7 | 3 | 0 | 0 | 3 | 4 |

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|---|---|
| **Language of Instruction** | English |
| **Course Status** | Elective |
| **Course Level** | Bachelor |
| **Learning and Teaching Techniques of the Course** | Lecture, Question-Answer, Case Study |

## Course Objective

This course prepares the student as a manager at his/her high tech firms or governmental organization with a fundamental background in planning or managing R&D activities effectively, with the ability to control and carry all requirements of process, establish cooperation with related actors. The student will gain the knowledge of R&D Management mechanisms, phases of a R&D process, selection of methods, abilities of using some R&D management tools (project planning and budgeting, project selection, innovation management, project evaluation, etc.). They will get the ability of managing R&D activities as a responsible manager in R&D Management applications.

## Learning Outcomes

The students who succeeded in this course will be able;

1. To explain the basic R&D Management methods and processes,
2. To apply basic concepts, theories and analytical frameworks related to organization of R&D,
3. To apply basic concepts, theories and analytical frameworks related to R&D strategy,
4. To manage a research project from its initial design stages to the analysis of findings,
5. To analyze R&D problems in an empirical context and solve the most common challenges faced by research project managers by using management strategies,
6. To analyze the interplay between R&D and different company and business strategies, and their consequences for how companies should organize their development activities.

| Course Outline |
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| This course focuses on the organizational processes driving returns from R&D investments. Topics include connection R&D management to corporate, business and technology strategy-making processes, managing the resource allocation process, R&D investments decisions, risk management, measuring R&D effectiveness, management of the science/commerce interface, interfirm R&D, managing changing technology trends, and R&D portfolio planning. |

| Weekly Topics and Related Preparation Studies | | |
|---|---|---|
| **Weeks** | **Topics** | **Preparation Studies** |
| **1** | **Definitions of R&D Management and Basic Concepts** | – Introduction to the course<br>– Course Syllabus and requirements<br>– Reading Chapter 1 |
| **2** | **R&D—Reactive and Passive Partner to Responsive Collaborator**<br>– The Five Generations of R&D<br>– R&D Context, Structure, and Process<br>– Organizational Process in R&D | – Reading Chapter 2 |
| **3** | **Strategic Aspects of R&D Management**<br>– The Learning Organization<br>– Levels of Learning<br>– Corporate Planning<br>– R&D as a Business<br>– R&D Strategy as a Component of Corporate Strategy<br>– Factors to Be Considered in Formulating an R&D Strategy<br>– Selecting the R&D Strategy | – Reading Chapter 4 |
| **4** | **Project Planning and Budgeting**<br>– Project Deliverables<br>– The Budgeting System<br>– Traditional Budgeting Systems and Categories<br>– The Mechanics of the Budgeting Process<br>– Modern Planning and Budgeting Systems<br>– Alternative Approaches<br>– The Project Planning and Monitoring Process: Graphical Devices<br>– Project Review and Control | – Readings: Chapter 5 |
| **5** | **Road Mapping**<br>– Factors Influencing Roadmapping Types of Roadmaps<br>– Process of Technology Roadmapping<br>– Methods and Techniques of Technology | – Readings: Chapter 6 |

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| | Roadmapping<br>– Advantages of R&D | |
| **6** | **Project Selection**<br>– Significance of Project Selection<br>– Economic Rating Methods<br>– Ranking, Voting, and Scoring Methods<br>– Risk Analysis Approach<br>– Decision Analysis (DA) Approach<br>– Expert Judgment<br>– Project Selection Terminologies | – Readings: Chapter 7 |
| **7** | **Project Evaluation**<br>– Risks Associated with R&D Project Selection<br>– Choice Among Projects<br>– Criteria for Evaluation of Research Project Proposals<br>– Data for Evaluation and Selection<br>– The Estimation of Costs and Benefits of R&D Projects<br>– Evaluation of the Benefits | – Readings: Chapter 8 |
| **8** | **MIDTERM EXAM** | |
| **9** | **Human Resource Management in R&D**<br>**Attraction and Retention of Talent**<br>**Management in R&D** | – Readings: Chapter 9-10 |
| **10** | **Creativity in R&D Organizations**<br>– Creativity in R&D Organizations<br>– The Creative Process<br>– The Creativity Climate in R&D<br>– Training for Creativity<br>– Techniques of Creativity<br>– Managing Creativity in R&D | – Readings: Chapter 11 |
| **11** | **Portfolio Management**<br>– Portfolio Alignment and Balance<br>– Objectives of Portfolio Management<br>– Methods of Portfolio Management | – Readings: Chapter 14 |
| **12** | **New Product Development**<br>– What Is New Product Development?<br>– How to Evolve an NPD Strategy<br>– Theoretical Understanding of NPD<br>– Execution of NPD | – Readings: Chapter 15 |
| **13** | **University-Industry Cooperation Management** | |

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| **14** | **R&D Management Applications/Cases** | |
| **15** | **TUBITAK Supported Project Applications** | |
| **16** | **FINAL EXAM** | |

| **Textbook(s)/References/Materials:** |
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| **Textbook:** K.B. Akhilesh. (2014). R&D Management, Springer, India. |
| **Supplementary References:** 1. Kennett, B. (2014). Planning and managing scientific research. ANU Press. https://www.jstor.org/stable/j.ctt6wp816 (free access)<br>2. Singh, H. (2014). Mastering Project Human Resource Management: Effectively Organize and Communicate with All Project Stakeholders. FT Press.<br>3. Andersen, J., Toom, K., Poli, S., & Miller, P. F. (2017). Research Management: Europe and Beyond. Academic Press.<br>4. Wingate, L. M. (2014). Project management for research and development: guiding innovation for positive R&D outcomes. CRC press. |
| **Other Materials:** Case studies |

| Assessment | | |
|---|---|---|
| **Studies** | **Number** | **Contribution margin (%)** |
| Attendance | | |
| Lab | | |
| Class participation and performance | | |
| Field Study | | |
| Course-Specific Internship (if any) | | |
| Quizzes / Studio / Critical | | |
| Homework | | |
| Presentation | | |
| Projects | 1 | 20 |
| Report | | |
| Seminar | | |
| **Midterm Exam/Midterm Jury** | **1** | **30** |
| **General Exam / Final Jury** | **1** | **50** |
| **Total** | | **100** |
| **Success Grade Contribution of Semester Studies** | | **50** |
| **Success Grade Contribution of End of Term** | | **50** |
| **Total** | | **100** |

| ECTS / Workload Table | | | |
|---|---|---|---|
| **Activities** | **Number** | **Duration (Hours)** | **Total Workload** |
| **Course hours (Including the exam week): 16 x total course hours)** | 16 | 3 | 48 |
| Laboratory | | | |
| Application | | | |
| Course-Specific Internship (if any) | | | |
| Field Study | | | |
| **Study Time Out of Class** | 16 | 2 | 32 |
| Presentation / Seminar Preparation | | | |
| Projects | 1 | 10 | 10 |
| Reports | | | |
| Homework | | | |
| Quizzes / Studio Review | | | |
| Preparation Time for Midterm Exams / Midterm Jury | 1 | 15 | 10 |
| Preparation Period for the Final Exam / General Jury | 1 | 20 | 20 |
| **Total Workload** | **(120/30 = 4)** | | **120** |

| Course' Contribution Level to Learning Outcomes | | | | | | |
|---|---|---|---|---|---|---|
| **Nu** | **Learning Outcomes** | **Contribution Level** | | | | |
| | | **1** | **2** | **3** | **4** | **5** |
| **LO1** | To explain the basic R&D Management methods and processes | | | | | X |
| **LO2** | To apply basic concepts, theories and analytical frameworks related to organization of R&D | | | | | X |
| **LO3** | To apply basic concepts, theories and analytical frameworks related to R&D strategy | | | | | X |
| **LO4** | To manage a research project from its initial design stages to the analysis of findings | | | | | X |
| **LO5** | To analyze R&D problems in an empirical context and solve the most common challenges faced by research project managers by using management strategies | | | | | X |
| **LO6** | To analyze the interplay between R&D and different company and business strategies, and their consequences for how companies should organize their development activities | | | | | X |

| | Relationship Between Course Learning Outcomes and Program Competencies (Department of Management Information Systems) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Nu** | **Program Competencies** | **Learning Outcomes** | | | | | | **Total Effect (1-5)** |
| | | **LO1** | **LO2** | **LO3** | **LO4** | **LO5** | **LO6** | |
| **1** | Recognize and distinguish the basic concepts such as data, information, and knowledge in the field of Management Information Systems and know the processes to be followed for data acquisition, storage, updating, and security. | x | x | x | | x | x | **5** |
| **2** | Develop and manage databases suitable for collecting, storing, and updating data. | | | | | x | x | **2** |
| **3** | As a result of his/her ability to think algorithmically, easily find solutions to the problems concerning the basic business functions. | | x | x | x | x | x | **5** |
| **4** | Learn programming logic, have information about current programming languages. | | | | | | | |
| **5** | Be able to use up-to-date programming languages. | | | | | | | |
| **6** | Be able to take part in teamwork or lead a team using knowledge of project management processes. | x | x | x | x | x | x | **5** |
| **7** | Know ethical and legal rules, use professional field knowledge within the scope of ethical and legal rules. | | x | | x | x | x | **4** |

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|---|---|---|---|---|---|---|---|---|
| **8** | Have knowledge in the fundamental areas of business administration namely management and organization, production, finance, marketing, numerical methods, accounting, etc., and have the knowledge and skills to work in-depth in at least one of them. | x | x | | x | x | x | **4** |
| **9** | Be able to solve the problems encountered in the field of internet programming by designing web applications. | | | | | | | |
| **10** | Develop and manage logistics and supply chain management activities | | | x | | x | x | **4** |
| **11** | Adapt his/her theoretical knowledge and the experience he/she will gain through practice at the departments of businesses such as information technologies, R&D, and management to real life. | | x | | x | x | | **3** |
| **12** | Be able to develop strategies that will provide a competitive advantage with his/her advanced knowledge of management strategies and management functions. | | x | | x | x | x | **4** |
| **13** | Develop a business idea, commercialize the business idea, and design and manage his/her own venture using entrepreneurial knowledge. | x | x | x | x | x | x | **5** |
| **14** | By using English effectively, they can follow, read, write, speak and communicate universal information in the field of management information systems in a foreign language with professional competence. | x | x | | x | | | **2** |
| Total Effect | | | | | | | | **43** |

**Policies and Procedures**

**Web page:** https://www.ostimteknik.edu.tr/management-information-systems-english-1241/915

**Exams:** The exams aim at assessing various dimensions of learning: knowledge of concepts and theories and the ability to apply this knowledge to real-world phenomena, through analyzing the situation, distinguishing problems, and suggesting solutions. The written exams can be of two types, ie. open-ended questions, which can also be in the form of problems or multiple-choice questions.

**Assignments:** Homework (Assignments) might be applicable. Scientific Research Ethics Rules are very important while preparing assignments. The students should be careful about citing any material used from outside sources and reference them appropriately.

**Missed exams:** Any student missing an exam needs to bring an official medical report to be able to take a make-up exam. The medical report must be from a state hospital.

**Projects:** Not applicable.

**Attendance:** Attendance requirements are announced at the beginning of the term. Students are usually expected to attend at least 70% of the classes during each term.

**Objections:** If the student observes a material error in his/her grade, he/she has the right to place an objection to the Faculty or the Department. The claim is examined and the student is notified about its outcome.