The Industrial Engineering Department was established in 1973/74 academic year in the Engineering Science Faculty of Ege University. The Department then became a part of the Mechanical Engineering Faculty of Ege University in 1978 and then joined the Engineering Faculty of Dokuz Eylul University in 1983.

There are 7 Professors, 5 Assistant Professors, 3 Instructors and 20 Research Assistants employed full-time in the Department. The Department has two major tracks, namely, Industrial Engineering (IE) and Operations Research (OR). The IE track covers topics such as production planning and inventory control, facilities planning and design, ergonomics, design of service systems and management, and manufacturing systems. The OR section on the other hand is interested in the areas of decision analysis, mathematical programming, simulation, forecasting and regression.

There are currently about 400 registered students in the Department and every year 80 new students register with the Department. Starting with the 1997/98 academic year, the knowledge of English has become compulsory.

Graduate, Graduate Adaptation and Doctorate programmes are opened in the framework of Institute of Natural and Applied Sciences (http://www.fbe.deu.edu.tr). The official medium of the graduate education is in English. Every year 15 IE and 5 non-IE graduates enroll with the graduate program. Number of students registering for the PhD program every year is around 5.

Chairman
Prof. Dr. Edip TEKER
Vice Chairman
Prof. Dr. G. Miraç BAYHAN
Vice Chairman
Asst. Prof. Dr. Mehmet ÇAKMAKÇI
Secretary
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Postal Address: Dokuz Eylül University, Department of Industrial Engineering, 35100 Bornova / Izmir, TURKEY

Socrates Programme Coordinator: Asst.Prof. Dr. Şeyda TOPALOĞLU
Dr. Bilge BİLGİN

E-mail: seyda.topaloglu@deu.edu.tr, bilge.bilgen@deu.edu.tr
Address: Dokuz Eylül University, Department of Industrial Engineering, 35100 Bornova / Izmir, TURKEY
Tel.No: 0232.3887869
Fax No: 0232.3887864
## ACADEMICS

### Professors

<table>
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<tr>
<th>Name-Surname</th>
<th>RESEARCH INTERESTS</th>
<th>e-mail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Edip TEKER</td>
<td>Management and Organization, Human Resources, International Banking, Financial Management, Cost Accounting, Innovation Management</td>
<td><a href="mailto:edip.teker@deu.edu.tr">edip.teker@deu.edu.tr</a></td>
</tr>
<tr>
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</tr>
<tr>
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</tr>
<tr>
<td>Dr. Irem ÖZKARAHAN</td>
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<tr>
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<tr>
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</tr>
<tr>
<td>Dr. Semra TUNALI</td>
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<td><a href="mailto:semra.tunali@deu.edu.tr">semra.tunali@deu.edu.tr</a></td>
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### Assistant Professors

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<tr>
<td>Dr. Latif SALUM</td>
<td>Systems Modeling and Analysis, Database Management, Production Planning, Petri Nets</td>
<td><a href="mailto:latif.salum@deu.edu.tr">latif.salum@deu.edu.tr</a></td>
</tr>
<tr>
<td>Dr. Mehmet ÇAKMAKÇI</td>
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<td><a href="mailto:mehmet.cakmakci@deu.edu.tr">mehmet.cakmakci@deu.edu.tr</a></td>
</tr>
<tr>
<td>Dr. Arslan ÖRNEK</td>
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<td><a href="mailto:arslan.ornek@deu.edu.tr">arslan.ornek@deu.edu.tr</a></td>
</tr>
<tr>
<td>Dr. Şeyda TOPALOĞLU</td>
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<td><a href="mailto:seyda.topaloglu@deu.edu.tr">seyda.topaloglu@deu.edu.tr</a></td>
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<tr>
<td>Instructors</td>
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<tr>
<td>Name-Surname</td>
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<tr>
<td>Dr. Gökalp YILDIZ</td>
<td>Simulation, Simulation optimization, Response surface methodology, Design of experiments, Pull systems, Dual resource constrained systems, The performance measurement of manufacturing systems, Scheduling, Statistics</td>
<td><a href="mailto:gokalp.yildiz@deu.edu.tr">gokalp.yildiz@deu.edu.tr</a></td>
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<tr>
<td>Dr. Bilge BİLGEN</td>
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</tr>
<tr>
<td>Özgür ESKI</td>
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<td><a href="mailto:ozgur.eski@deu.edu.tr">ozgur.eski@deu.edu.tr</a></td>
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<tr>
<td>Dr. Gonca TUNCEL</td>
<td>Petri nets, Production Planning, Scheduling in Production Systems, Simulation, Total Quality Management</td>
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</tr>
<tr>
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<td>Seren ÖZMEHMET</td>
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</tr>
<tr>
<td>Name</td>
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<tr>
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<td>Banu YETKİN EKREN</td>
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<tr>
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<td><a href="mailto:leyla.demir@deu.edu.tr">leyla.demir@deu.edu.tr</a></td>
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<tr>
<td>Burcu FELEKOĞLU</td>
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<td><a href="mailto:burcu.felekooglu@deu.edu.tr">burcu.felekooglu@deu.edu.tr</a></td>
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<tr>
<td>Hacer GÜNER</td>
<td>Optimization</td>
<td><a href="mailto:hacer.guner@deu.edu.tr">hacer.guner@deu.edu.tr</a></td>
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### Graduate Curriculum of Industrial Engineering Department

#### Güz Yarıyılı/Fall Semester

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#### Bahar Yarıyılı/Spring Semester

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PREREQUISITES

None

DESCRIPTION

Objectives: This course introduces the concept of systems approach and enterprise modeling. These play an important role in today’s highly sophisticated information systems. The course also introduces some of the advanced tools used in enterprise modeling.

Learning outcomes:

To make students to be aware that enterprise systems can be viewed and analyzed from different perspectives.

To demonstrate cases that, without this awareness, the system development will likely to be not successful.

To provide students with the opportunity to study and evaluate the advanced tools in enterprise modeling.


TEACHING AND LEARNING METHODS

The course is taught in a lecture, class presentation and discussion format. All class members are expected to attend both the lecture and seminar hours and take part in the discussion sessions. Besides the taught lecture, group presentations are to be prepared by the groups.

TEXTBOOK


ASSESSMENT

35 % Assignments
20 % Midterm Exam
45 % Final Project
PREREQUISITIES

High level of Operations Research techniques

DESCRIPTION

Objectives: The focus of the course is on the formulation, analysis, and use of mathematical models of inventory systems.

Learning outcomes:

This course is expected to help the student to understand the basic and advanced concepts of inventory systems.

They are expected to gain knowledge to do research in this area.

Contents: It covers the fundamental concepts of inventory theory. Predictable (or deterministic) and unpredictable (or stochastic) supply and demand processes and nonstationary data, models with temporal variations; single item, single location models and complex networks are topics that are studied throughout the course. Though this highly quantatively oriented course presumes a fairly strong technical background, at the same time it aims to take students closer to applications than the theory itself.

TEACHING AND LEARNING METHODS

The course is taught in a lecture, class presentation and discussion format. All class members are expected to attend and both the lecture and seminar hours and take part in the discussion sessions. Besides the taught lecture, group presentations are to be prepared by the groups assigned for that Week and presented to open a discussion session.

TEXTBOOK


ASSESSMENT

25 % 1st Midterm Exam
25 % 2nd Midterm Exam
50 % Final Exam
Course Code: IND 506  
Course Title: Planning and Design of Service Systems

Level: Graduate  
Semester: Spring  
ECTS Credit: 6

Status: Elective  
Hours a Week: T. (3+0)  
Total Class Hours: 14 Weeks x 3h. = 42h.

Instructor: Prof. Irem Ozkarahan  
Instruction Language: English

PREREQUISITIES

Some Understanding of Service Systems Concepts

DESCRIPTION

Objectives: People in operational environments need guidance on measures for employee scheduling effectiveness and yield management, as well as an understanding of advantages and disadvantages of various methods available for developing scheduling solutions. This course will consolidate, integrate and results that are inaccessible to students since these concepts either are ignored or at most receive 10% of the course time in academic course dealing with production planning.

Learning outcomes:

This course gives the students the required background to apply solutions as well as further research on many problems that will run into in the operational environment.


Also, for the project the students need to learn a simulation package named SERVICE MODEL. There will be a few tutorial sessions to be held in the Computer Lab. to teach the software.

TEACHING AND LEARNING METHODS

The course consists of lectures, discussions, project presentations. Students should come the class after reading the assigned material so that they can participate in class discussions.

TEXTBOOK

Haksever, C., Render, B., Russell, R.S., Service Management and Operations, Prentice Hall 200. Also, some selected material from the literature.

ASSESSMENT

20 % Tests  
20 % Project  
40 % Final exam
Course Code: IND507  
Course Title: Modeling and Analysis of Manufacturing Systems Using Petri Nets

Level: Graduate  
Semester: Fall  
ECTS Credit: 7

Status: Elective  
Hours a Week: T. (3+0)  
Total Class Hours: 14 Weeks x 3h. = 42h.

Instructor: Prof. Dr. G. Miraç Bayhan  
Instruction Language: English

PREREQUISITIES
None

DESCRIPTION

Objectives: This course aims to give the fundamentals of Petri nets for specifying, modeling and evaluating the performances of manufacturing systems.

Learning outcomes: At the end of this course the student will have the ability

to model components of a manufacturing system like machines, transportation systems, storage facilities and tools, and to evaluate the future behavior of system at one and the same time,

to analyze and optimize cyclic manufacturing systems,

to make short term plans and schedules for acyclic manufacturing systems.


TEACHING AND LEARNING METHODS

The course consists of lecture and class discussion. Students therefore should read the assigned chapters and prepared for class participation.

TEXTBOOK


ASSESSMENT

40% Mid-term exam
10% Homework
10% Presentation
40% Final project
Course Code: IND 511  
Course Title: Investment Decision Making  
Level: Graduate  
Semester: I  
ECTS Credit: 6  
Status: Elective  
Hours a Week: T. (3+0)  
Total Class Hours: 14 Weeks x 3h. = 42h.  
Instructor: Prof. Dr. Hasan ESKİ  
Instruction Language: English

PREREQUISITIES

None

DESCRIPTION

Objectives: To consider the theoretical approaches and models that can be used in practice related with investment analysis and investment decision process under different conditions.

Learning outcomes:

This course is expected to help the student to understand the investment analysis and investment decision process under different conditions.

To consider the theoretical investment analysis approaches and models.

To develop the students analytical abilities and ability to present and criticize arguments.

Contents:  
1) Investment Process and The Scope of Investment Decisions,  
2) Investment Project Evaluation Methods (General Explanations and Definitions, Static Methods, Dynamic Methods),  

TEACHING AND LEARNING METHODS

The course consists of lecture and seminar studies. Students should present their subjects and give reports.

TEXTBOOKS

Schneider, D. (1975), Investition und Finanzierung, Opladen. To be announced.

ASSESSMENT

15 % 1st midterm exam  
10 % 2nd midterm exam  
25 % Homework and  
50 % Final exam
**Course Code:** IND512  
**Course Title:** Forecasting and Time Series Analysis for Management

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<td>Status</td>
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<tr>
<td>Elective</td>
<td>T. (3+0)</td>
<td>14 Weeks x 3h. = 42h.</td>
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<tr>
<th>Instructor</th>
<th>Instruction Language</th>
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<tbody>
<tr>
<td>Prof. Dr. G. Miraç Bayhan</td>
<td>English</td>
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**PREREQUISITIES**

None

**DESCRIPTION**

**Objectives:** This course aims to deal exclusively with discrete time series observed at equal intervals, and the understanding and description of the generating mechanism, the forecasting of future values, and optimal control of a system.

**Learning outcomes:** After completing this course a student will:
- define the underlying process of a time series,
- know how to select one or more forecasting techniques applicable to the data that need to be forecast,
- understand and be able to apply forecasting models and theory.

**Contents:** Regression methods and moving averages, Exponential smoothing methods, Discounted Least squares and Direct Smoothing, Smoothing models for seasonal data, Forecasting, Analysis of forecast errors, Adaptive-Control forecasting methods, The Box-Jenkins models.

**TEACHING AND LEARNING METHODS**

The course consists of lecture and class discussion. Students therefore should read the assigned chapters and prepared for class participation.

**TEXTBOOK**

Forecasting Methods for Management (1989). Spyros Makridakis and Steven C. Wheelwright, John Wiley and Sons, USA.

**ASSESSMENT**

- 40% Mid-term exam
- 10% Homework
- 10% Presentation
- 40% Final project
**Course Code:** IND 513  
**Course Title:** Expert Systems  
**Level:** Graduate  
**Semester:** Spring  
**ECTS Credit:** 5  
**Status:** Elective  
**Total Class Hours:** 14 Weeks x 3h. = 42h.  
**Instructor:** Prof. Irem Ozkarahan  
**Instruction Language:** English

**PREREQUISITIES**

None

**DESCRIPTION**

**Objectives:** The primary goal of this course is to give students a basic understanding of expert systems and how they are developed. To aid the students’ achievement of this goal, a specific expert system development tool is taught. The course is a blend of theory and practice.

**Learning outcomes:**

This course gives the students the required background to understand the theory and practice of expert systems.


**TEACHING AND LEARNING METHODS**

The course consists of lectures, discussions, lab. Practices on VP-Expert package and project presentations. Students should come to the class after reading the assigned material so that they can participate in class discussions.

**TEXTBOOK**


**ASSESSMENT**

30 % 1st Exam  
30 % 2nd Exam  
40 % Project
**PREREQUISITIES**

None

**DESCRIPTION**

**Objectives:** The purpose of this course is to introduce ways in which the concept and solution of mathematical models can be brought to bear on the resolution of decision making problems associated with the maintenance, replacement and reliability of equipments.

**Learning outcomes:**

This course is expected to help the student to appreciate how models can be handled related to the objectives of the models.

**Contents:** This course analyses the appraisal of particular maintenance problems; investigates the concepts of replacement decisions, including group replacement.

**TEACHING AND LEARNING METHODS**

The course is taught in a lecture, class presentation and discussion format. All class members are expected to attend the lecture and prepare at least two term papers.

**TEXTBOOK**


**ASSESSMENT**

20 % First hour exam  
25 % Second hour exam  
15 % Term papers  
40 % Final exam
**PREREQUISITIES**

Intermediate level of Operations Research techniques

**DESCRIPTION**

**Objectives**: To give a good insight into the fundamental ideas of Dynamic Programming (DP) and stochastic systems and a good working knowledge of the relevant techniques with emphasis on applications in manufacturing and production planning.

**Learning outcomes**: This course is expected to help the student to learn basic and advanced concepts of deterministic and stochastic dynamic programming

They are expected to gain knowledge to do research in this area.

**Contents**: Specifically, applications of Dynamic Programming methodology to problems of production planning, scheduling and inventory control are presented. Throughout the course development of deterministic and stochastic DP recursions are emphasized.

**TEACHING AND LEARNING METHODS**

The course is taught in a lecture, class presentation and discussion format. All class members are expected to attend and both the lecture and seminar hours and take part in the discussion sessions. Besides the taught lecture, group presentations are to be prepared by the groups assigned for that Week and presented to open a discussion session.

**TEXTBOOK**


**ASSESSMENT**

25 % 1st Midterm Exam
25 % 2nd Midterm Exam
50 % Final Exam
PREREQUISITIES
None

DESCRIPTION

Objectives: Most decisions involve multiple (conflicting) objectives. For example, most governmental decisions have political ramifications, with each constituency benefiting along some dimensions but losing among others. Multi Objective and Multicriteria Approaches can help us to make the best decision in these kinds of decisions.

Learning outcomes:
This course gives the students the required background to understand the method of decision making under multi objective and multicriteria situations.

Contents: Introduction to Decision Making, Overview of Multicriteria Decision Making, Fundamentals of Multiobjective Programming
- The Idea of Linear Programming
- Solving Linear Programming Problems
- Multiobjective Linear Programming
- Goal Programming
The Solution of Multiobjective Problems, Multi Attribute Decision Making Approaches, Analytical Hierarchy process (AHP), Practice on EC (Expert Choice Software)
Utility and Trade off Curves
- Utility Theory
- Multiattribute Utility Analysis

TEACHING AND LEARNING METHODS

The course consists of lectures, discussions, project presentations. Students should come to the class after reading the assigned material so that they can participate in class discussions.

TEXTBOOK

Selected material from literature on Fuzzy and Multiobjectives, Multicriteria Concept

ASSESSMENT

30 % Test
30 % Paper Presentation
40 % Project
**Course Code:** IND 521  
**Course Title:** Innovation Management  
**Level:** Graduate  
**Semester:** Spring  
**ECTS Credit:** 6  
**Status:** Elective  
**Hours A Week:** T. (3+0)  
**Total Class Hours:** 14 Weeks x 3h. = 42h.  
**Instructor:** Prof. Dr. Edip TEKER  
**Instruction Language:** English

**PREREQUISITIES**

None

**DESCRIPTION**

**Objectives:** The goal of this course is to introduce the students to the underlying economics and management theory of innovation.

**Learning outcomes:**
- Acquiring a knowledge and understanding of key concepts and approaches of innovation
- Understanding theoretical and empirical differences between the dynamics of innovation process
- Considering creative thinking in generating innovation
- Being able to analyze, interpret and extrapolate information about technology
- Being able to synthesize information and theory from a range of sources

**Contents:** Needs for innovation and technology in a competitive world, Industrial modernization development, issues and challenges, Technology usage and adaptation by SMEs, Approaches to technology development and industrial modernization, Industrial modernization-partnership and integration strategies, Innovation typologies, Economics of Innovation, Concepts in Action, Managing Innovation and Change, Tools and Techniques Improvement of Creativity, Management of Technology-intensive Innovations, Managing Creativity and Innovation as a Strategic Organizational Process, Business Process Improvement and Innovation, Practical project studies at the interface of technology and management.

**TEACHING AND LEARNING METHODS**

The course consists of lectures, class discussions and student presentations.

**TEXTBOOK**


**ASSESSMENT**

- 25 % Midterm exam
- 25 % Seminar paper & presentation
- 50 % Final exam
**Course Code:** IND522  
**Course Title:** Advance Engineering Management  
**Level:** Graduate  
**Semester:** Spring  
**ECTS Credit:** 6  
**Status:** Elective  
**Hours A Week:** T. (3+0)  
**Total Class Hours:** 14 Weeks x 3h. = 42h.  
**Instructor:** Asst. Prof. Dr. Arslan M. Örnek  
**Instruction Language:** English

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**PREREQUISITIES**

None

**DESCRIPTION**

**Objectives:** Make the students familiar with the contemporary and current developments in engineering management

**Learning outcomes:**

This course is expected to help the student to appreciate the basic concepts of Business Process Reengineering, Theory of Constraints, and Concurrent Engineering.

**Contents:** Business Process Reengineering, Theory of Constraints, and Concurrent Engineering

**TEACHING AND LEARNING METHODS**

The course is taught in a lecture, class presentation and discussion format. All class members are expected to attend and both the lecture and seminar hours and take part in the discussion sessions. Besides the taught lecture, group presentations are to be prepared by the groups assigned for that Week and presented to open a discussion session.

**TEXTBOOK**


**ASSESSMENT**

25 % 1st Midterm Exam  
25 % 2nd Midterm Exam  
50 % Final Exam
**PREREQUISITIES**

An introductory knowledge of operations research, especially some modeling experience in linear and integer programming.

**DESCRIPTION**

**Objectives:** The course aims to provide an introduction to combinatorial optimization and to give an understanding of constraint programming solution technique to solve combinatorial problems.

**Learning outcomes:**

This course is expected to get the students acquainted with combinatorial optimization problems in practice and to develop their mathematical modeling abilities in defining these problems.

To give the students basic methodologies underlying the constraint programming technique.

To make the students use a constraint programming tool.

**Contents:** This course investigates the modeling of combinatorial optimization problems; gives an overview of solution techniques; analyses mixed-integer programming, branch-and-bound technique, constraint propagation, domain reduction, backtracking, and search strategies in constraint programming; discusses the comparison of constraint programming to integer programming; and covers hybrid strategies and a training on a special constraint programming software.

**TEACHING AND LEARNING METHODS**

The course consists of lectures, class discussions and student presentations. All the class members are expected to attend both the lecture and seminar hours. Besides the taught lecture, the students are required to present their assigned journal articles.

**TEXTBOOK**


**ASSESSMENT**

- 25% Midterm exam
- 15% Homework + Paper Presentations
- 25% Term Project
- 35% Final exam
**Course Code:** IND 525  
**Course Title:** Total Quality Techniques

**Level:** Graduate  
**Semester:** Fall  
**ECTS Credit:** 6

**Status:** Elective  
**Hours A Week:** T. (3+0)  
**Total Class Hours:** 14 Weeks x 3h. = 42h.

**Instructor:** Assistant Professor Dr. Özcan Küllüncü  
**Instruction Language:** English

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**PREREQUISITIES**

None

**DESCRIPTION**

**Objectives:** This course focuses on tools and techniques in Total Quality Management (TQM). After discussing overview of principles and practices of TQM, new and well known tools and techniques in TQM (six sigma, benchmarking, FMEA, quality function deployment and etc.) are discussed.

**Learning outcomes:**

This course will enable students to:
- Appreciate the complexity of organizational quality issues.
- Address typical Quality Management problems with greater confidence.
- Expand their knowledge of Quality Management concepts and practices.
- Understand and apply the various tools and techniques of Quality Management.
- Anticipate issues and problems they will face when implementing quality programs


**TEACHING AND LEARNING METHODS**

The course is taught in a lecture, class presentation and discussion format. All class members are expected to attend and both the lecture and seminar hours and take part in the discussion sessions. Besides the taught lecture, group presentations are to be prepared by the groups assigned for that Week and presented to open a discussion session.

**TEXTBOOK**


**ASSESSMENT**

30 % Cases  
20 % Term Paper  
40 % Final Exam  
10 % Class Participation
**Course Code:** IND 5026  
**Course Title:** Facilities Planning and Design

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<td>Graduate</td>
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**Status:** Elective  
**Hours A Week:** T. (3+0)  
**Total Class Hours:** 14 weeks * 3h. = 42h.

**Instructor:** Assistant Professor Dr. Özcan Kılınçcı  
**Instruction Language:** English

**PREREQUISITIES**

None.

**DESCRIPTION**

**Objectives:** This course focuses on planning and design of manufacturing facilities. Facilities design teaches the analytical tools necessary to effectively tackle the problem of designing the layout of a productive facility. The course also discusses location problems, i.e., analytical methods to determine optimal locations of machines/work centers in a manufacturing area. CRAFT, COLMAD, and M ATLAB programs are used to solve the facilities design problems.

**Learning outcomes:** The purpose of this course is to develop basic knowledge and skill in using the principles and practices of solving problems related to industrial plant layout and equipment purchase

**Contents:** Defining Requirements (Strategic facilities planning / Facilities design / Flow, space, and activity, relationships / Personnel Requirements) / Layout and Computer-Aided Layout / Warehousing / Simultaneous Development of Plant layout and Material Handling / Introduction to MATLAB / Facility Layout (Basic facility location problems / Location analysis fixed cost / Continuous facility location) Facility Design with Group Technology / Types of Assembly Line Balancing Problems / MATLAB Presentations / Term Paper Presentations

**TEACHING AND LEARNING METHODS**

The course is taught in a lecture, class presentation and discussion format. All class members are expected to attend and both the lecture and seminar hours and take part in the discussion sessions. Besides the taught lecture, group presentations are to be prepared by the groups assigned for that week and presented to open a discussion session.

**TEXTBOOKS**


**ASSESSMENT**

Homework (%30) + Term Paper (%20) + Final Exam (%40) + Class Participation (%10)
**Course Code:** IND 527  
**Course Title:** Systems Simulation

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<td>Status:</td>
<td>Hours a Week:</td>
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<td>Elective</td>
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<td>14 Weeks x 3h. = 42h.</td>
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<tr>
<td>Instructor:</td>
<td>Prof. Dr. Semra Tunali</td>
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<td>Instruction Language:</td>
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**PREREQUISITIES**

Introductory course in Statistics

**DESCRIPTION**

**Objectives:** This course concerns with the applications of simulation modeling techniques to the design and analysis of systems in manufacturing, distribution and service sectors. Emphasis will be on data analysis, model building and evaluation of alternative designs.

**Learning outcomes:**

Understand the fundamental methodologies of process-oriented discrete event simulation modeling,

Become familiar with a commercial simulation modeling language (ARENA).

**Contents:** The topics covered in class will consist of queuing models, input data analysis, validation, verification, model development in ARENA and output analysis.

**TEACHING AND LEARNING METHODS**

The course will involve lecture presentations and discussion of both homework assignments and also the recent published work on various simulation applications. To implement the basic concepts taught in class, the students will be required to carry out a comprehensive term project.

**TEXTBOOK**


**ASSESSMENT**

20% Assignments  
30 % Term Project  
50% Final Exam
PREREQUISITIES

None

DESCRIPTION

Objectives: to learn, application of methods and instruments of the design of tasks, equipment, systems, and work environments of the human operator (human factors) and the others with regard to the physiological and psychological aspects (ergonomics) in production.

LEARNING OUTCOMES:

Analyses with physiological and psychological aspects of tasks, equipment, systems and work environments in the production.

Man – Machine Interface.

Systems Analyses.

TEACHING AND LEARNING METHODS

Lectures, using slides and transparent sheets and other audio-visual equipment

TEXTBOOK


Wojda, F. “Ergonomie und Arbeitsgestaltung”, Vienna University of Technology

Schmidtke, H. “Ergonomie”, Carl Hanser Verlag, München 2001

Kirchner, J.H.; Baum. E. “Ergonomie für Konstrukteure und Arbeitsgestalter”, Carl Hanser Verlag, München 1990

ASSESSMENT

%25 I. Examination
%25 Research Seminaries
%50 Final-Examination
Course Code: IND 529  
Course Title: Analysis of Automated Manufacturing Systems

Level: Graduate  
Semester: Fall  
ECTS Credit: 7

Status: Elective  
Hours a Week: T. (3+0)  
Total Class Hours: 14 Weeks x 3h. = 42h.

Instructor: Prof. Dr. Semra Tunali  
Instruction Language: English

PREREQUISITIES

None

DESCRIPTION

Objectives: This course will focus on various automation technologies applied in discrete-parts manufacturing. Besides lectures, there will be problem solving sessions illustrating how these automation technologies help to improve the productivity of manufacturing systems.

Learning outcomes: After successfully completing this course, the students will:

Learn about automation and production systems technology in modern manufacturing.

Gain insight to various analytical approaches used for performance evaluation of automated manufacturing systems.

Contents: The topics covered in class will consist of automated flow lines, automated assembly, automated material handling, group technology and flexible manufacturing systems.

TEACHING AND LEARNING METHODS

The course will involve lecture presentations, problem solving sessions and also discussion of recent published research on performance evaluation of automated manufacturing systems. The students will be required to carry out a term project involving the recent trends in the area of automated manufacturing.

TEXTBOOK


ASSESSMENT

20 % Term Project
40% Midterm Exam
50% Final Exam
PREREQUISITIES

Operations research and mathematical programming

DESCRIPTION

Objectives: This is a quantitatively oriented course dealing with lean production and inventory management.

Learning outcomes:

This course is expected to help the student to learn and understand basic and advanced concepts of lean production systems and how they are applied.
To develop the students analytical and modeling abilities to carry out research in this area.

Contents: Specifically, applications of Operations Research methodology to problems of production planning, scheduling and inventory control are presented. Throughout the course modeling concepts that are useful in solving production management problems in the areas of lean manufacturing, integrated supply chain, shop floor control and aggregate planning will be emphasized.

TEACHING AND LEARNING METHODS

The course is taught in a lecture, class presentation and discussion format. All class members are expected to attend and both the lecture and seminar hours and take part in the discussion sessions. Besides the taught lecture, group presentations are to be prepared by the groups assigned for that Week and presented to open a discussion session.

TEXTBOOK


ASSESSMENT

25 % 1st Midterm Exam
25 % 2nd Midterm Exam
50 % Final Exam
PREREQUISITIES

None

DESCRIPTION

Objectives: The goal of this course is to provide attendees with a framework for analyzing and understanding the unique cost structure of each business. This understanding facilitates decision-making about short-term (operational) and long-term (strategic) directions of the business. Thus, the course aims to predispose students with the basic tools to enable them to use accounting information to assist management in decision-making and with the planning and controlling of an organization’s activities.

Learning outcomes:

- Understanding the functions of business and seeing how cost accounting data is used as a tool to assist in making business decisions
- Acquiring knowledge about the characteristics and purposes of cost accounting and budgeting
- Understanding the benefits of limitations of direct costing and activity based costing
- Understanding the benefits of budgeting and identifying the budgets that comprise the master budget
- Understanding the usage of static and flexible budgeting for management control

Contents: Explain the role of cost and management accounting in the management process, Describe how different concepts are used for identifying costs according to the purposes for which those costs are needed, Explain the Cost-Volume-Profit model and the limitations of its use, Describe and critically evaluate the different costing systems that operate in organizations, Describe the role of budgeting within the planning process, Explain how a standard costing system operates and prepare variances.

TEACHING AND LEARNING METHODS

The course consists of lectures, class discussions and student presentations.

TEXTBOOK


ASSESSMENT

- 25 % Midterm exam
- 25 % Seminar paper & presentation
- 50 % Final exam


**Course Code:** IND 602  
**Course Title:** Simulation of Manufacturing Systems  
**Level:** Graduate  
**Semester:** Spring  
**ECTS Credit:** 7  
**Status:** Compulsory  
**Hours a Week:** T. (3+0)  
**Total Class Hours:** 14 Weeks x 3h. = 42h.  
**Instructor:** Prof. Dr. Semra Tunali  
**Instruction Language:** English  

**PREREQUISITIES**

Statistics and an introductory level course in Simulation.

**DESCRIPTION**

**Objectives:** This course aims at teaching advance subjects in simulation such as design of experiments, variance reduction techniques, metamodelling, and simulation optimization.

**Learning outcomes:** After completing this course successfully, the students will:

- be aware of many advanced statistical issues involved in design and analysis of simulation experiments
- develop an understanding of how simulation can be used as a tool for optimization.

**Contents:** Output data analysis, Ranking and Selection, Variance Reduction Techniques, Design of experiments, Metamodelling, Simulation Optimization

**TEACHING AND LEARNING METHODS**

The course will involve lecture presentations and discussion of both homework assignments and also the recent published research in the area of simulation optimization. To implement the basic concepts taught in class, the students will be required to carry out a comprehensive term project.

**TEXTBOOK**


**ASSESSMENT**

20% Homework  
30% Term Project  
50% Final Exam
**Course Code**: IND 603  
**Course Title**: Production and Manufacturing Systems  
**Level**: Graduate  
**Semester**: Fall  
**ECTS Credit**: 6  
**Status**: Compulsory  
**Hours A Week**: T. (3+0)  
**Total Class Hours**: 14 Weeks x 3h. = 42h.  
**Instructor**: Prof. Irem Ozkarahan  
**Instruction Language**: English

**PREREQUISITIES**

Some Understanding of Optimization Concepts

**DESCRIPTION**

**Objectives**

This course will first review most of the basic scheduling issues and solution methodologies we encounter in services and manufacturing environment. In addition, the new approaches that are available to be used to solve the issues we have in scheduling, and future directions are covered.

**Learning outcomes**

This course gives the students the required background so that they can go into doing research using the scheduling theory, past and new concepts to be used in this area.

**Contents:**

The topics that will be covered are the manufacturing and Service Models, Machine and Job Shop Scheduling, Economic Lot Scheduling, Interval Scheduling and Timetabling in Sports and Entertainment, Planning and Scheduling and Timetabling in Transportation. Readings from Appendices from Pinedo’s Book.

Along with the CD_ROM that comes with the text students need to use Morton’s Heuristic Scheduling Book’s software named PARCIFAL which is available at the Computer Lab., or any other appropriate software.

**TEACHING AND LEARNING METHODS**

The course consists of lectures, reading assignments, classroom presentations and discussions on the reading assignments, projects and software applications.

**TEXTBOOK**

Pinedo Michael L., Planning and Scheduling in Manufacturing and Services, Springer Science 2005

**ASSESSMENT**

There will be one exam from the text. Student will pick a topic from the course related literature or from the text’s appendices and present it in class. The suggested presentation time is about half an hour. Each student is also expected to write a paper on the application of the topic that was picked using the suggested software or other and present it in class for 20-30 minutes.

40 % Test  
30 % Presentations  
30 % Paper
**PREREQUISITES**

None

**DESCRIPTION**

**Objectives:** This course aims to enable students to use mathematical tools such as Stochastic Petri Nets and Queuing Networks, as well as their integration, in modeling and analysis of manufacturing systems. To be able to use such tools, one needs to learn the basics of Stochastic Processes such as Markov Chains. This course also introduces basics of Stochastic Processes.

**Learning outcomes:**

To demonstrate the difficulties of analytical modeling in real world manufacturing systems.

To analyze a manufacturing system in transition and steady state, and discuss their applicability.


**TEACHING AND LEARNING METHODS**

The course is taught in a lecture, class presentation and discussion format. All class members are expected to attend both the lecture and seminar hours and take part in the discussion sessions. Besides the taught lecture, group presentations are to be prepared by the groups.

**TEXTBOOK**


**ASSESSMENT**

20 % Assignments
35 % Midterm Exam
45 % Final Exam
PREREQUISITIES
Operations research and mathematical programming

DESCRIPTION

Objectives: This course introduces students to Optimization Theory and its use in Operations Research, Industrial Engineering and allied disciplines

Learning outcomes:
This course is expected to help the student to fully learn optimization theory as applied in Operation Research.

Students are expected to gain analytical abilities to carry out research in this area

Contents: The course examines the existence of solutions to optimization problems in \( \mathbb{R}^n \) (n-dimensional Euclidean space) and how these solutions may be identified. The topics covered include finite-dimensional optimization (unconstrained optimization, Lagrange's Theorem, the Kuhn-Tucker Theorem), the role of convexity in optimization, and parametric continuity of solutions to optimization. Finally, the course also covers a wide variety of problems encountered in Operations research and Industrial Engineering.

TEACHING AND LEARNING METHODS
The course is taught in a lecture, class presentation and discussion format. All class members are expected to attend and both the lecture and seminar hours and take part in the discussion sessions. Besides the taught lecture, group presentations are to be prepared by the groups assigned for that Week and presented to open a discussion session.

TEXTBOOK

ASSESSMENT
25 % 1st Midterm Exam
25 % 2nd Midterm Exam
50 % Final Exam