



# SYSTEM DESIGN

## IE 477 - IE 478

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### *Course Coordinators:*

Dr. Savaş Dayanık

Dr. Nesim K. Erkip

Dr. Emre Uzun

### *University-Industry Collaboration Projects Coordinator:*

Yeşim Gülseren

### *Assistants:*

Atahan Bayır

Ege Bilaloğlu

Başak Fiş

İsmail Burak Taş

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# Characteristics

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- Project-based and Problem Solving
- Synthesis – Capstone Project
  - Oral and Written Communication
  - Team work
- Two semesters, but you will receive a grade at the end of each semester



# Industrial Project

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- To solve a real-life problem and implement proposed solutions
  - Subject committee (academic advisor, industrial advisor, teaching assistant, course coordinators, interested faculty members)
  - Company pays the transportation and some other expenses
  - Reports and Presentations
  - May require a number of site visits
    - Leave a few half-days for group meetings and potential company visits if requested
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# Industrial Project

## A typical text book explanation

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- The following steps may be taken:
    - Study/analyze the system to understand the problem
    - Formulate the problem and define scope of the project
    - Literature Review
    - Develop models
    - Implement the models using appropriate software or your own codes
    - Validate the model and test your results
    - Implement the proposed system/prepare manual
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# Roles in Teamwork

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- Natural Roles:
    - LEADER – Contact person is not necessarily the leader
    - PEACEMAKER, CONSENSUS BUILDER
  - All in the group should share the following roles:
    - CONTRIBUTOR
    - PROBLEM SOLVER
    - ASSIST
    - Natural roles (LEADER , PEACEMAKER) should occasionally be shared as well – last year as a student.
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# Project Teams

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- Different Skills
    - Think about roles
    - At least 2 members good in programming
    - Others?
  - Presentation skills
    - English/Turkish
  - Good to have a car owner :)
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# Companies





# Workshops/Seminars

## Fall Semester

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- Capstone Project - How to approach?
- Managing the Budget
- TÜBİTAK Funding
  
- Project Management
- Presentation Techniques
- Team Work and Communication



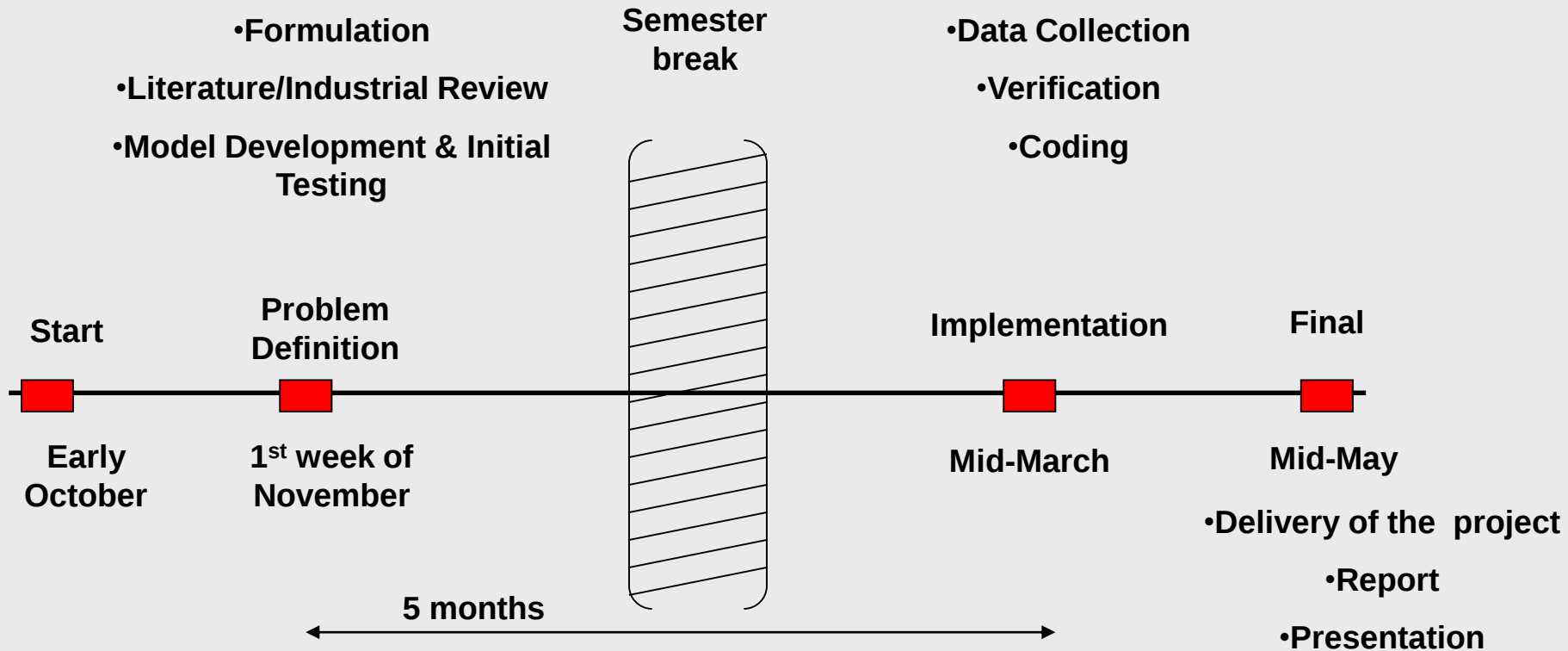
# Effective Project Management

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- ***Project Plan***
  - Tasks, packages, sub-packages, etc.
- ***Time plan***
  - Deadlines, due dates, deliverables
- ***Resource Allocation***
  - Team work
- ***Coordination***



# The System





# Requirements

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- Kick-off Meeting Early October
- Project Proposal Report Late October to Early November
- Project Proposal Presentation Early to Mid November
- Meeting with Course Coordinators, Nov 27 – Dec 2
- End-of-Semester Report, Report Due December 25
- End-of-Semester Meeting with Course Coordinators Mid January
- Project Progress Report, Mid March
- Final Report, Mid May
- Final Presentations, Late May



# Project Proposal (Late Oct to Early Nov)

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- Complaints and symptoms from the company
- Required outcomes, expectations: **Deliverables**
- Project constraints and limitations



**Definition and Scope of the Problem - CONSENSUS**

**!!Go beyond the initial description!!**

**Main project activities: Workpackages, Timetable**

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# Meeting with Course Coordinators (Nov 27–Dec 2)

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- You will prepare a presentation video and upload it by Nov 24
  - A short version of the proposal presentation to course coordinators
- In the meeting you will be asked questions about the project and your proposal
  - To enable coordination between projects



# End of semester report and presentation

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- Brief definition of the Problem
  - Literature Review
    - Previous studies in the scientific literature
    - Similar Studies in the industry
  - Proposed Methodolgy
  - Model Development and Testing
  - Timetable
  - For the meeting, you will prepare a presentation video and upload it by Jan 6
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# Important

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- Attendance to all of the workshops and seminars is obligatory from the beginning of the semester!
  - Check our web-site frequently.  
[courses.ie.bilkent.edu.tr/ie477](https://courses.ie.bilkent.edu.tr/ie477)
  - PUNCTUALITY IS VERY IMPORTANT
    - **Submit all of your requirements on time.**
    - Be ready for any meeting at least 10 minutes before the scheduled time.
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# Important

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- No excuse for any part time job you may have.
  - You have to perform all of your duties that are assigned to you in your group.
  - You have to attend all meetings with your advisors and coordinators!



# Important

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- You will find a report template on course web site.
  - WORD template for reports
  - LaTeX template for the booklet (will be provided)



# Team Formation

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- For information on team dynamics follow announcements on <https://courses.ie.bilkent.edu.tr/ie477>
- For each team, fill out the “Team Information Form” via the link sent to you online **until 17:00 TODAY!**
  - Names, e-mail addresses, elective courses, summer trainings, strongest and weakest skills.
  - **ONE SUBMISSION PER GROUP.**
- Each team should have a project contact person
- **Students with no groups:**
  - Inform TAs via [ie477@ie.bilkent.edu.tr](mailto:ie477@ie.bilkent.edu.tr)



# Project Assignments

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- Projects will be announced by early next week.
- Each team is going to send their rankings of the projects and a single page cover letter until **September 23 Wednesday by 17:00**
- Fill the required online form (to be provided on the course web page.)



# Project Assignments

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- Goal: Given a set of preferences by student groups and projects, design an assignment process.
  - Stable Matching Problem - 2012 Nobel Prize in Economics: Shapley and Roth  
[http://www.nobelprize.org/nobel\\_prizes/economic-sciences/laureates/2012/](http://www.nobelprize.org/nobel_prizes/economic-sciences/laureates/2012/)
  - D. Gale and L. S. Shapley, “College Admissions and the Stability of Marriage”, *The American Mathematical Monthly*, 69, 1 (1962), pp. 9-15
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# Project Assignments

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- Groups:
  - Rank all projects based on how much you wish to get assigned.
- Projects:
  - Rank all groups (information form)
- Basis is the same as the original algorithm. However, we may consider additional constraints imposed by the companies (such as at most one project), as well as others.
- Applied to assign projects to groups in the last five years.



# Example

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| Group A   | Group B   | Group C   | Project Z |
|-----------|-----------|-----------|-----------|
| Project Y | Project Z | Project Z | Group A   |
| Project X | Project X | Project X | Group C   |
| Project Z | Project Y | Project Y | Group B   |



# Writing Principles

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- Language: English (unless otherwise is stated);  
Paper Size: A4;  
Paper layout: Portrait;  
Margins: All margins must be 2 cm;  
Line spacing: 1.5 lines;  
Page Numbers: All pages must include page numbers;  
Font: Times New Roman;  
Font type and size: Normal, 12 points;
  - Please state your **team number**, **project title**, **names of the team members** (always in alphabetical order of the last names), **academic and industrial advisors** in all of the written documents that you submit.
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# Upload / Naming Principles

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- You will upload a lot of documents to the links provided.
  - Your file names must contain your 4-5 character project short-code along with its purpose:
    - Example from previous years:
      - Arçelik Bolu Pişirici Cihazlar Fab: ARBOL
      - BSH Ev Aletleri: BSHE
      - ETİ Talep Tahmin: ETIT
      - DHL Depo İyileştirme: DHLD
    - File name could be: ARBOL-ProposalReport
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# Assessment

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- Project proposal presentation
- Project proposal report
- Short presentation to Coordinators
- End of semester presentation
- End of semester report
- Academic Advisor evaluation
- Industry Advisor evaluation
- Peer evaluation

*An individual letter grade at the end of each semester*



# Grade

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- If we observe that you have not accomplished the goals to be reached by the end of this semester, you may receive an F as a group!
  - You will have to repeat IE 477 in the spring semester.



# Effect of Peer Evaluation

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| Grup AA   | Student A | Student B | Student C | Student D | Student E | Student F | Student G | AVG. |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------|
| Student A |           | 5         | 5         | 5         | 5         | 5         | 5         | 5.00 |
| Student B | 5         |           | 5         | 5         | 5         | 5         | 5         | 5.00 |
| Student C | 5         | 5         |           | 5         | 5         | 5         | 5         | 5.00 |
| Student D | 5         | 5         | 5         |           | 5         | 5         | 5         | 5.00 |
| Student E | 5         | 5         | 5         | 5         |           | 5         | 5         | 5.00 |
| Student F | 5         | 5         | 5         | 5         | 5         |           | 5         | 5.00 |
| Student G | 5         | 5         | 5         | 5         | 5         | 5         |           | 5.00 |

STUDENT F: We are the leaders



# Effect of Peer Evaluation

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| Grup BB   | Student A | Student B | Student C | Student D | Student E | Student F | Student G | AVG. |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------|
| Student A |           | 1         | 5         | 2         | 5         | 5         | 3         | 3.50 |
| Student B | 1         |           | 1         | 4         | 1         | 1         | 3         | 1.83 |
| Student C | 5         | 2         |           | 2         | 5         | 5         | 3         | 3.67 |
| Student D | 1         | 5         | 1         |           | 3         | 2         | 5         | 2.83 |
| Student E | 1         | 3         | 3         | 3         |           | 5         | 3         | 3.00 |
| Student F | 2         | 3         | 3         | 4         | 5         |           | 3         | 3.33 |
| Student G | 1         | 5         | 1         | 4         | 1         | 1         |           | 2.17 |

[illegible]

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# Important Dates

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- **September 16 Wednesday, until 17:00** - Reporting team members.
    - Submit the filled “Team Information Form”.
    - Students with no groups inform TA.
  - **September 23 Wednesday until 17:00** - Ranking industrial project preferences along with a cover letter. Group time schedule.
  - **September 26** – Announcement of the Project assignments.
  - **September 28 – October 16** – Kick-off Meetings
  - **28 days after your Kick-Off** – Project Proposals Due (inc. Saturday & Sunday)
  - **November 2 – November 20** – Proposal Meeting
  - **November 27 – December 2** – Meeting with course coordinators
  - **December 25** – End-of-semester report submission to course coordinators
  - **January 11, 12** – End-of-semester meeting with course coordinators
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# Yeşim Gülseren

Bilkent TTO

Üniversite-Sanayi İşbirliği Koordinatörü

## Destek Verilen Çalışmalar

- İş Dünyası ile iletişim
- Projelere Hazırlık ve Bilgilendirme
- Proje Yönetimi, Koordinasyon
- Projelerin mali, idari ve yasal süreçleri
- İç İletişim ve Motivasyon
- Seyahat Organizasyonu
- Fuar, Kitap ve etkinlik Organizasyonu
- Kariyer Planlama
- Girişimcilik
- Sektör Tanıtım Etkinlikleri



**Rektörlük Binası 3. Kat**

**No : 308**

[yesime@bilkent.edu.tr](mailto:yesime@bilkent.edu.tr)



# Industrial Project

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- INFORMS Undergraduate Operations Research Prize ?
- YA/EM Öğrenci Proje Yarışması ?
- TÜBİTAK 2241-A Sanayi Odaklı Lisans Bitirme Tezi Destekleme Programı ?



# Industrial Project

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- We are planning to organize
  - 19<sup>th</sup> Industrial Engineering Project Fair and Competition
  - Industrial Projects 2021 Book



# Projeler Kitabı





# Endüstri Mühendisliği Bölümü

## Proje Fuarı ve Yarışması

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