Multidisciplinary Courses to be Opened in Spring 2020-2021

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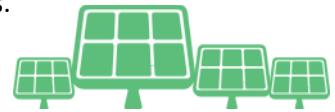
IE322 Industrial Engineering Practices in Energy Sector

About the Course

IE 322 Industrial Engineering Practices in Energy Sector is a multidisciplinary project-based course to be taught by an energy industry professional instructor in Spring 2020-2021 Semester. Main activities of the course will be focused on to understand and analyze the management, planning, economical evaluation and decision making of energy investments, considering current and future energy supply, demand, amount of sources and sustainability. Full proposal will be performed in multidisciplinary teams. Physical implementation of the project will not be required. The project topics will be based on the theme of "Evaluation of primary and renewable energy sources based power plants". Topics within the theme can be suggested by the teams or chosen among the instructor. There will be a midterm exam, grading will be carried out both midterm and proposals on individual and team basis. The course will be fully online, attendance will be required online to both lectures and practical sessions.

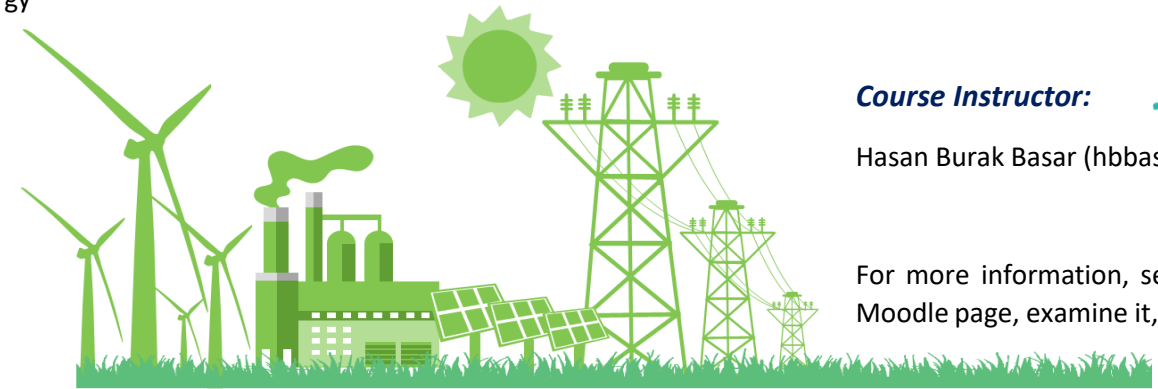


Course Highlights

- Presenting key indicators that are used to describe the energy system and its social and environmental impact
- Improving energy efficiency and promoting sustainable energy systems
- Learning policies to manage energy resources constrained by finite natural resources and global climate change
- Analyzing alternative and renewable energy sources in energy production and utilization
- Helping the students learn the advantages and drawbacks of different energy resources
- Improving project management capabilities on energy management issues
- Learning coordination of different disciplines in power plant projects
- Working with interdisciplinary practices in the energy sector
- Learning the responsibilities of engineering disciplines in a power plant
- Making decision and evaluation of different type of energy investments
- Developing a long-term energy strategy with a multidisciplinary synergy
- Planning on an engineering perspective
- Improving analytic skills for the assessments

Main topics to be covered will be,

- Energy resource capacity in Turkey and World
- Impact of energy in the past, present and future World
- Social and environmental impacts of different energy sources
- Impacts of fossil fuels and greenhouse effect
- Investigation of renewable and sustainable energy options
- Application of engineering principles underlying the supply, demand, amount and sustainability of alternative energy sources
- Assessment of sustainable building technologies
- Green energy solutions and carbon trade
- Types of primary power plants and technologies (fossil, nuclear and renewable energy resources)
- Methods and tools of economical evaluation of power plants
- Decision making on different type of power plant investments
- Future energy needs, energy storage methods and alternatives



Course Instructor:

Hasan Burak Basar (hbbasar@vatecco.com)

For more information, self-enroll to the course Moodle page, examine it, and join the lecture.

IE443 Occupational Health and Safety

About the Course

IE 443 Occupational Health and Safety course is a multidisciplinary done by single instructor for multidisciplinary students including project based work.

This course provides information about Occupational Health and Safety Legislations, basic principles of occupational health and safety, educate individuals who will generate analytical solutions and perform these solutions at site to protect employees' health and working conditions and provide advices on this issue.

Content of the course is giving information about occupational health and safety, to introduce principles and legislations, to explain occupational health and safety requirements to be applied in the workplace, to provide information about occupational accidents, risk assessment and occupational audits, to provide a proactive approach to occupational health and safety.

Grading of course will be based on a midterm and a project work done by multidisciplinary students instead of a second midterm and final exam. Course will be hybrid based lesson.

Main topics to be covered will be

- Basic Principles of Occupational Health and Safety,
- Occupational Health and Safety Legislation, Risk Factors (Physical, Chemical, Biological, Ergonomic, Electrical, Psychosocial),
- Ergonomics,
- Work accident and occupational disease management,
- Health and Safety Education Management,
- Risk Assessment Management, Emergency Management,
- Accident Investigation, Inspection and Safety System,
- Occupational Health and Safety Audit Management,
- ISO 45001 Management System

Course Highlights

- The ability of multidisciplinary students to work in collaboration on occupational health and safety,
- Learning about occupational health and safety legislation,
- To get general information about occupational health and safety,
- Improve project management skills with a multidisciplinary synergy.

Course Instructor

Dr. Müge UĞUR ÖZÇELİK (muge.ugur@parttime.atilim.edu.tr)

IE446 Innovative Products, Services & Systems

About the Course

IE 446 Innovative Products, Services & Systems is a multidisciplinary project-based course in Spring 2021 semester. This course aims to create a general mindset about innovative products, services and systems. İt provides multidisciplinary perspectives that focus on terminology, methodology and strategy related to design and development of innovative products, services and on the design and development of systems that create those products and services. The topics include innovation, innovative products, services and systems. During the lecture; related subject information will be explained in detail within the framework of examples. During the semester; students will select study topics of their own choosing and apply course materials to those topics. Topics may include innovative organizations, products, services and systems or any topic involving design, development and innovation.

Upon successful completion of the course;

- The students will be able to understand the roles, dimensions, and scopes of innovations.
- The students will acquire a broad perspective about innovative products, services and systems.
- The students will analyze how firms can undertake strategic renewal through innovation of product, services and systems.
- The students will experience interdisciplinary study in a project they are doing.

Main topics to be covered will be

- Introduction to Innovation
- The Core Concept of Creativity and Innovation
- Innovation Types
- Innovative Product, Service, and System Design and Development Process
- Innovative Products, Services and Systems
- Innovative Products, Services and Systems- Case Studies and Critics
- Creating New Innovative Mindset
- Building the Innovation Cases
- Interdisciplinarity in research; Successful teamwork and interdisciplinary working practices
- Creativity and idea generation techniques
- Idea selection, decision schemes

Course Highlights

- Exciting design challenges through collaboration with peers in a multidisciplinary synergy
- Learning new ways of thinking and doing to develop innovative processes of product, services and systems.
- Enjoying the course with in-class creative activities
- Enhancing creativity and project management skills

Course Instructor

Selen Yorulmaz Özsümer: (selenyorulmaz.ozsumer@gmail.com)

ISE432 INNOVATION AND ENTREPRENEURSHIP IN IT

About the Course

ISE 432 - Innovation and Entrepreneurship in IT is a multidisciplinary course to be taught in Spring 2021 semester. The main activities of the course will be focused on gap or problem analysis, transformation of these gaps or problems into an opportunity which will end up with an entrepreneur company. There will be two exams, case study evaluations, video analysis, and dynamic study module activities during the course. Students will also work in multidisciplinary teams as venture capitalists to evaluate companies and agree to invest money. At the end of the semester, students, individually or group, will prepare an entrepreneurship project and present it in front of the classmates, who will decide to make an investment on students' idea.

Main topics to be covered will be;

- Introduction to Entrepreneurship
- Recognizing Opportunities and Generating Ideas
- Feasibility Analysis
- Developing an Effective Business Model
- Industry and Competitor Analysis
- Writing a Business Plan
- Preparing the Proper Ethical and Legal Foundation
- Assessing a New Venture's Financial Strength and Viability
- Building a New-Venture Team
- Getting Financing or Funding

Course Highlights

- Exciting entrepreneurship challenges through collaboration with peers in a multidisciplinary synergy
- Improving creative thinking and transforming an idea to a company
- Enjoying the course with diversity of activities
- Enhancing elevation pitch presentation skills to convince people to make an investment on your idea.

Course Instructor

Dr. Sacip TOKER (sacip.toker@atilim.edu.tr)

MATE458 Materials for Catalysis and Fuel Cells

About the course

This course combines reaction engineering concepts with practical materials engineering, catalysis, and fuel cell knowledge. Kinetics and mechanisms of catalytic reactions, activity, and selectivity concepts will be summarized for students coming from different backgrounds. Deactivation of catalysts, synthesis, and characterization methods for catalytic materials will also be covered in the scope of this course. The relationship between the catalyst structure and the activity will be highlighted. A special emphasis will be given on material properties of the catalysts, their relationship with catalytic activity, and how to examine the material properties by using different characterization techniques. Electro-catalysis, photo-catalysis, fuel cells, and materials used for these applications will also be covered. Materials used in chemical reactors and material selection and development strategies will also be discussed. Types of fuel cells, their operation modes and principles, properties of fuel cell components and materials used for different fuel cell components will also be covered. Especially, solid oxide fuel cells and materials used in their applications will be emphasized. The course has an interdisciplinary approach introducing students to new technologies in relation to real life industrial applications. Interdisciplinary projects will also be conducted with multidisciplinary teams composed of students from different departments. Each group will prepare a report for a given project and make a presentation at the end of the semester.

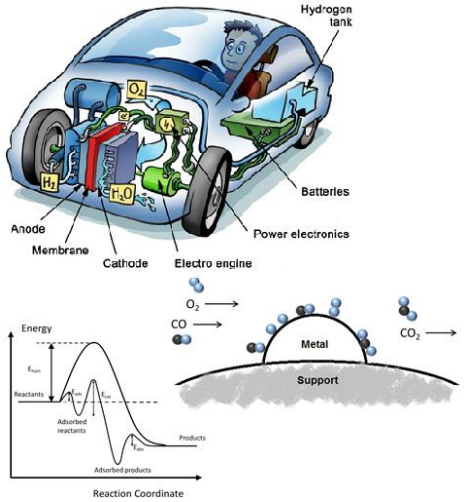
Course Content

- Fundamentals of catalysis and catalytic reactors
- Catalyst synthesis methods
- Properties of catalytic materials and basics characterization methods
- Catalyst structure activity relationship
- Fundamentals of electro-catalysis and photo-catalysis
- Different types of fuel cells, and materials used for these applications
- Existing technology applications; future trends and emerging technologies
- Term projects in multidisciplinary teams

This course is designed for students from different backgrounds and no prior knowledge on the course content is required. For more information, please visit the course Moodle page and join the first class.

Multidisciplinary term project topic examples

- Solid oxide fuel cells for homes
- PEM fuel cells for automobiles
- Photocatalytic wastewater treatment
- Photocatalytic hydrogen generation reactors
- Electrocatalytic carbon dioxide reduction
- Steam reforming reactors for hydrogen production
- Batteries for Electric Cars
- Microbial fuel cells



Open for departments

- Metallurgical and Materials Engineering
- Chemical Engineering
- Energy Systems Engineering
- Mechanical Engineering
- Automotive Engineering
- Manufacturing Engineering

Instructor:

Dr. Doruk Doğu
Office: C-113
e-mail: doruk.dogu@atilim.edu.tr

MECE422 Multidisciplinary Engineering Design

About the Course

MECE422 Multidisciplinary Engineering Design is a multidisciplinary project-based course to be taught jointly by a multidisciplinary team of three instructors in Spring 2021 semester. The main activities of the course will be focused on needs analysis, conceptual design and detailed design of a full proposal performed in multidisciplinary teams. Physical implementation of the project will not be required. The project topics will all be based on theme of "Towards a community-based, sustainable campus" with Atılım University campus in mind. Topics within the theme can be suggested by the teams or chosen among the instructor-suggested ideas. There will be no exams; grading will be carried out both on individual and team basis. The course will be fully online; attendance will be required online to both lectures and practical sessions. Main topics to be covered will be

- Introduction to Multidisciplinary Engineering Design
- Interdisciplinarity in research; Successful teamwork and interdisciplinary working practices
- An overview of engineering design process and methodology, Systems engineering perspective
- Project Management Techniques and Tools
- Need identification and assessment, benchmarking (QFD etc..) problem definition
- Requirements Engineering in Information Systems
- Creativity and idea generation techniques
- Methods and tools of functional/physical/task decomposition
- Idea selection, decision schemes
- Conceptual and functional Design Techniques in Information Systems
- Integration of multi-domain subsystems, product architectures
- Modelling and simulation of engineering systems

Course Highlights

- Exciting design challenges through collaboration with peers in a multidisciplinary synergy
- Learning new ways of thinking and doing to develop innovative solutions for engineering design problems
- Enjoying the course with in-class creative activities
- Enhancing creativity and project management skills using software tools

Instruction Team

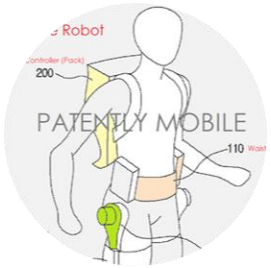
Section 1 (AE, EE, ISE, MATE, MECE): Dr. Zühal Erden (zuhal.erden@atilim.edu.tr)

Section 2 (CHE, ENE, IE, ME, MECE): Dr. Cihan Turhan (cihan.turhan@atilim.edu.tr)

Section 3 (CHE, CMPE, MECE, MFGE, SE): Dr. Bilge Say (bilge.say@atilim.edu.tr)

Although students will be registered to the assigned sections, lectures and practical sessions will be conducted jointly as a single section.
For more information, self-enroll to the course Moodle page, examine it, and join the first session…

SE426 Emerging Technologies



Disruptive Technologies

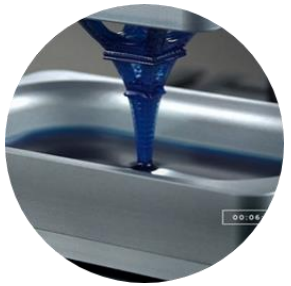
Evolution of Technology

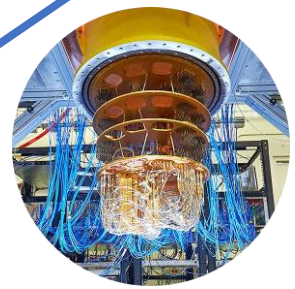
Nature of Innovation

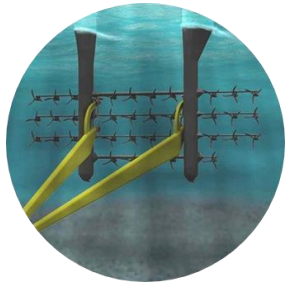
Combination & Structure

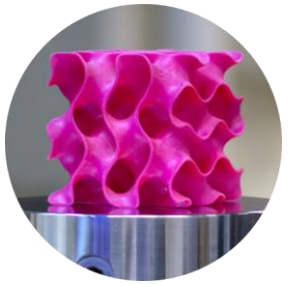
Origin of Technologies

Technological Revolution









Instructor:
Dr. Davut Çulha

Other Multidisciplinary courses to be opened in Spring 2020-2021;

- ***CMPE468 Machine Learning for Engineers***
  - ***Instructor:*** Doç. Dr Murat Karakaya
  - *https://www.atilim.edu.tr/en/compe/page/1599/courses*
- ***ENE308 Solar Energy Technology***
  - ***Instructor:*** Dr Murat Durak
  - *https://www.atilim.edu.tr/en/ects/site-courses/33/1548/detail*
- ***ME420 Project Management in Manufacturing Engineering***
  - ***Instructor:*** Bahram Lotfisadigh
  - *https://www.atilim.edu.tr/en/me/page/2257/courses*
- ***ME481 Nanofabrication***
  - ***Instructor:*** Baybars Oral
  - *https://www.atilim.edu.tr/en/me/page/2257/courses*
- ***ME482 Introduction to CAD/CAM***
  - ***Instructor:*** Candaş Urunga
  - *https://www.atilim.edu.tr/en/me/page/2257/courses*