



ÇANKAYA UNIVERSITY

Faculty of Engineering

Course Definition Form

This form should be used for either an elective or a compulsory course being proposed and curricula development processes for an undergraduate curriculum at Çankaya University, Faculty of Engineering. Please fill in the form completely and submit the printed copy containing the approval of the Department Chair to the Dean's Office, and mail its electronic copy to deryac@cankaya.edu.tr. Upon the receipt of *both copies*, the printed copy will be forwarded to the Faculty Academic Board for approval. Incomplete forms will be returned to the Department. The approved form is finally sent to the President's office for approval by the Senate.

Part I. Basic Course Information

Department Name	Mechanical Engineering	Dept. Numeric Code	1 5
Course Code	M E 4 3 0	Number of Weekly Lecture Hours	3
		Number of Weekly Lab/Tutorial Hours	0
		Number of Credit Hours	3
Course Web Site	http://me430.cankaya.edu.tr	ECTS Credit	0 5

Course Name <i>This information will appear in the printed catalogs and on the web online catalog.</i>	
English Name	Applications of Solar Energy
Turkish Name	Güneş Enerjisi Uygulamaları

Course Description <i>Provide a brief overview of what is covered during the semester. This information will appear in the printed catalogs and on the web online catalog. Maximum 60 words.</i>	
Radiant energy transfer, absorption and reflection and its application to solar exchangers; energy balances for solar energy devices; Design methods for heating of buildings by solar energy. Active and passive solar applications; economics, and practice of solar energy applications.	

Prerequisites (if any) <i>Give course codes and check all that are applicable.</i>	1 st	2 nd	3 rd	4 th
	M E 3 1 3			
	<input type="checkbox"/> Consent of the Instructor		<input type="checkbox"/> Senior Standing	
	<input type="checkbox"/> Give others, if any. 			
Co-requisites (if any)	1 st	2 nd	3 rd	4 th
Course Type <i>Check all that are applicable</i>	<input type="checkbox"/> Must course for dept. <input type="checkbox"/> Must course for other dept.(s) <input checked="" type="checkbox"/> Elective course for dept. <input type="checkbox"/> Elective course for other dept.(s)			

Course Classification <i>Give the appropriate percentages for each category.</i>					
Category	Mathematics & Natural Sciences	Engineering Sciences	Engineering Design	General Education	Other
Percentage	10%	30%	40%	20%	0%

Part II. Detailed Course Information**Course Objectives**

Explain the aims of the course. Maximum 100 words.

1. To introduce students to the concept of solar energy
2. To introduce the students materials used in solar energy devices
3. To enhance the students understanding on solar energy availability, collection and potential utilization of solar energy in solar collector devices
4. To introduce the students to the concepts of solar energy utilization in an environment friendly manner and their integration in the design of modern solar energy devices.
5. To introduce the design methods used in solar energy devices using computers

Learning Outcomes

Explain the learning outcomes of the course. Maximum 10 items.

1. To be able to identify and explain the difference between active, passive and photovoltaic solar systems.
2. To develop an understanding that solutions to energy-related problems are complex involving sociological, economic, political and technological considerations, decisions and development.
3. To gain insight into the issues surrounding solar energy development and use.
4. To become knowledgeable about applications as they apply to commercial, residential and industrial markets.

Textbook(s)

List the textbook(s), if any, and other related main course materials.

Author(s)	Title	Publisher	Publication Year	ISBN
J.A.Duffie and W.A.Beckman	Solar <u>Engineering of Thermal Processes, third ed.</u>	John Wiley	2006	13: 978-0471698678

Reference Books

List the reference books as supplementary materials, if any.

Author(s)	Title	Publisher	Publication Year	ISBN

Teaching Policy

Explain how you will organize the course (lectures, laboratories, tutorials, studio work, seminars, etc.)

There are 3 hours of lectures each week.

Laboratory/Studio Work

Give the number of laboratory/studio hours required per week, if any, to do supervised laboratory/studio work, and list the names of the laboratories/studios in which these sessions will be conducted.

There is no regular laboratory work for this course.

Computer Usage

Briefly describe the computer usage and the hardware/software requirements in the course.

Students are expected to prepare their projects and homework using computer. Students will write solar system performance prediction spreadsheets. In addition students may use Matlab, Maple or Mathematica in their homeworks and projects.

Course Outline <i>List the topics covered within each week.</i>	
Week	Topic(s)
1	Theory of solar radiation
2	Theory of solar radiation
3	Availability of terrestrial solar radiation
4	Availability of terrestrial solar radiation
5	Heat transfer in solar energy devices
6	Heat transfer in solar energy devices
7	Flat plate collectors
8	Concentrating collectors
9	Active solar energy systems
10	Active solar energy systems
11	Passive solar energy systems
12	Passive solar energy systems
13	Economics of solar energy systems
14	Photovoltaic systems

Grading Policy <i>List the assessment tools and their percentages that may give an idea about their relative importance to the end-of-semester grade.</i>								
Assessment Tool	Quantity	Percentage	Assessment Tool	Quantity	Percentage	Assessment Tool	Quantity	Percentage
Homework	7	15	Case Study			Attendance		
Quiz	7	15	Lab Work			Field Study		
Midterm Exam	1	20	Class Participation			Project	1	20
Term Paper			Oral Presentation			Final Exam	1	30

ECTS Workload <i>List all the activities considered under the ECTS.</i>			
Activity	Quantity	Duration (hours)	Total Workload (hours)
Attending Lectures (<i>weekly basis</i>)	14	3	42
Attending Labs/Recitations (<i>weekly basis</i>)	-	-	-
Preparation beforehand and finalizing of notes (<i>weekly basis</i>)	14	0.5	7
Collection and selection of relevant material (<i>once</i>)	1	2	2
Self study of relevant material (<i>weekly basis</i>)	14	1	14
Homework assignments	7	3	21
Preparation for Quizzes	7	1	7
Preparation for Midterm Exams (<i>including the duration of the exams</i>)	1	8	8
Preparation of Term Paper/Case Study Report (<i>including oral presentation</i>)	-	-	-
Preparation of Term Project/Field Study Report (<i>including oral presentation</i>)	1	12	12
Preparation for Final Exam (<i>including the duration of the exam</i>)	1	10	10
TOTAL WORKLOAD / 25			123/25=4.92
ECTS Credit			5

Total Workloads are calculated automatically by formulas. To update all the formulas in the document first press CTRL+A and then press F9.

Program Qualifications vs. Learning Outcomes						
<i>Consider the below program qualifications determined in terms of learning outcomes of all the courses in the curriculum and capabilities. Look at the learning outcomes of this course given above. Relate these two using the Likert Scale by marking with X in one of the five choices at the right.</i>						
No	Program Qualifications	Contribution				
		0	1	2	3	4
ME-01	Adequate knowledge in mathematics, science and engineering subjects pertaining to Mechanical Engineering; ability to use theoretical and applied information in these areas to model and solve Mechanical Engineering problems.				x	
ME-02	Ability to identify and define complex Mechanical Engineering problems; ability to select and apply proper analysis tools and modeling techniques for formulating and solving such problems.					x
ME-03	Ability to design a complex system, process, product or a machine under realistic constraints and conditions, in such a way as to meet the requirements; ability to apply modern design methods for this purpose.				x	
ME-04	Ability to devise, select, and use modern techniques and computing tools needed for Mechanical Engineering practice; ability to employ and make use of information technologies effectively with the use of engineering design software.				x	
ME-05	Ability to design and devise experimental setup, conduct experiments, gather data, analyze and interpret results for investigating Mechanical Engineering problems.		x			
ME-06	Ability to search databases and other information sources effectively; ability to identify and extract effectively the required information and knowledge from literature and other sources.			x		
ME-07	Ability to work efficiently in teams; ability to collaborate effectively in intra-disciplinary and multidisciplinary teams; ability to take responsibility within teams.				x	
ME-08	Ability to work individually, to take independent initiatives, and to create original inferences.			x		
ME-09	Ability to communicate effectively in Turkish, both orally and in writing.	x				
ME-10	Knowledge of a minimum of one foreign (English in particular) at a fluency level enough to follow easily Mechanical Engineering knowledge presented in that language and enough to communicate effectively with colleagues.				x	
ME-11	Ability to report the findings, conclusions and interpretations related to a project work, ability to write technical reports, to prepare and conduct effective presentations.				x	
ME-12	Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to keep continuously self improved.				x	
ME-13	Awareness of professional and ethical responsibility issues.		x			
ME-14	Capability to grasp business life practices such as project management, risk management, change management and strategic management.		x			
ME-15	Awareness of environmental issues, occupational safety and health, and their legal consequences. Knowledge about contemporary issues and the global and social effects of engineering practices; awareness of the legal consequences of engineering solutions			x		
ME-16	Awareness of entrepreneurship, innovation, and sustainable development.		x			

Contribution Scale to a Qualification: 0-None, 1-Little, 2-Medium, 3-Considerable, 4-Largest

Part III New Course Proposal Information

State only if it is a new course

Is the new course replacing a former course in the curriculum?	Yes	No	Former Course's Code				Former Course's Name	
	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="text"/>				<input type="text"/>	
Is there any similar course which has content overlap with other courses offered by the university?	Yes	No	Most Similar Course's Code				Most Similar Course's Name	
	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="text"/>				<input type="text"/>	
Frequency of Offerings <i>Check all semesters that the course is planned to be offered.</i>			<input checked="" type="checkbox"/> Fall <input checked="" type="checkbox"/> Spring <input type="checkbox"/> Summer					
First Offering	Academic Year	<input type="text" value="2"/> <input type="text" value="0"/> <input type="text" value="1"/> <input type="text" value="4"/> / <input type="text" value="2"/> <input type="text" value="0"/> <input type="text" value="1"/> <input type="text" value="5"/>				Semester	<input type="checkbox"/> Fall <input checked="" type="checkbox"/> Spring	
Maximum Class Size Proposed	<input type="text" value="30"/>	Student Quota for Other Departments	<input type="text" value="-"/>				Approximate Number of Students Expected to Take the Course	<input type="text" value="60"/>

Justification for the proposal*Maximum 80 words*

As a contemporary subject, the area of solar energy systems is rapidly growing due to requirement for alternative energy sources.. Therefore, this course is designed to introduce the basic methods of solar energy applications.

Part IV Approval

Proposed by	Faculty Member <i>Give the Academic Title first.</i>	Signature	Date
	Prof. Dr. Nevzat Onur		
	Prof. Dr. Taner Altunok		

Departmental Board Meeting Date		Meeting Number		Decision Number	
Department Chair	Prof. Dr. Can ÇOĞUN	Signature		Date	

Faculty Academic Board Meeting Date		Meeting Number		Decision Number	
Dean	Prof. Dr. Celal Zaim ÇİL	Signature		Date	

Senate Meeting Date		Meeting Number		Decision Number	
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