



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	<input type="text"/>
Course Code	M E 4 1 7 <input type="text"/>	Number of Weekly Lecture Hours	<input type="text" value="3"/>
		Number of Weekly Lab/Tutorial Hours	<input type="text" value="0"/>
		Number of Credit Hours	<input type="text" value="3"/>
Course Web Site	http://me417.cankaya.edu.tr	ECTS Credit	<input type="text" value="0"/> <input type="text" value="5"/>

Course Name <i>This information will appear in the printed catalogs and on the web online catalog.</i>	
English Name	DESIGN OF MECHANISMS AND MACHINES
Turkish Name	MEKANİZMA VE MAKİNE TASARIMI

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>	
Mechanism design. Kinematic synthesis, Cam design, Optimization in design of mechanisms, Balancing in mechanisms.	

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 0 2 <input type="text"/>	M E 3 0 7 <input type="text"/>	<input type="text"/>	<input type="text"/>
	<input type="checkbox"/> Consent of the Instructor	<input type="checkbox"/> Senior Standing	<input type="checkbox"/> Give others, if any. <input type="text"/>	
Co-requisites (if any)	1 st	2 nd	3 rd	4 th
	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
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	15 %	25 %	60 %	0 %	0 %

Part II. Detailed Course Information

Course Objectives

Explain the aims of the course. Maximum 100 words.

1. To teach kinematic synthesis of mechanisms through application of algebraic equations
2. To teach cam design for a given motion to suit to a specified acceleration variation.
3. To teach how to model elements of single degree of freedom systems and perform free vibration analysis of such systems
4. To teach methods of optimization in design of machines and mechanisms
5. To teach balancing and effects of balancing in linkages

Learning Outcomes

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

1. Ability to conduct kinematic synthesis of mechanisms
2. Capability to analyze motion in mechanisms and apply motion generation synthesis
3. Ability to model cam characteristics for a specified motion for a machine velocity and acceleration configuration over a working cycle.
4. Ability to write equation of motion of single degree of freedom systems and derive balancing parameters
5. Ability to identify need of optimization in mechanisms and machines
6. Ability to design a mechanism for a given motion considering balance.
7. Ability to formulate equations for the optimization of mechanisms.
8. Ability to solve equations of motion for mechanisms to obtain optimum dimensions

Textbook(s)

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

Author(s)	Title	Publisher	Publication Year	ISBN
R.L.Norton	Design of Machinery: An Introduction To The Synthesis and Analysis of Mechanisms and Machines	McGraw Hill	2000	

Reference Books

List the reference books as supplementary materials, if any.

Author(s)	Title	Publisher	Publication Year	ISBN
J.E. Shigley and J.J. Uicker	Theory of Machines and Mechanisms, 2nd Edition	McGraw-Hill	1995	
A.G Erdman.,G.N. Sandor	Mechanism Design	Prentice Hall	1997	

Teaching Policy

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

There will be three hours 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 will be no regular laboratory sessions..

Computer Usage

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

There will be a project to be prepared using Matlab and Autodesk Inventor.

Course Outline <i>List the topics covered within each week.</i>	
Week	Topic(s)
1	Introduction
2	Introduction
3	Kinematic synthesis
4	Kinematic synthesis
5	Kinematic synthesis
6	Cam design
7	Optimization in design of mechanisms
8	Optimization in design of mechanisms
9	Optimization in design of mechanisms
10	Optimization in design of mechanisms
11	Balancing in mechanisms
12	Balancing in mechanisms
13	Balancing in mechanisms
14	Review

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	5	15	Case Study			Attendance		
Quiz			Lab Work			Field Study		
Midterm Exam	1	25	Class Participation			Project	1	30
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	5	4	20
Preparation for Quizzes	-	-	-
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	24	20
Preparation for Final Exam (<i>including the duration of the exam</i>)	1	12	12
TOTAL WORKLOAD / 25			125/25 = 5
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 <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Former Course's Code <input type="text"/>	Former Course's Name Dynamics of Machinery
Is there any similar course which has content overlap with other courses offered by the university?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Most Similar Course's Code <input type="text"/>	Most Similar Course's Name <input type="text"/>
Frequency of Offerings <i>Check all semesters that the course is planned to be offered.</i>	<input 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="5"/>	/	<input type="text" value="2"/> <input type="text" value="0"/> <input type="text" value="1"/> <input type="text" value="6"/>
			Semester	<input type="checkbox"/> Fall <input checked="" type="checkbox"/> Spring
Maximum Class Size Proposed	<input type="text" value="60"/>	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*

In order to increase the knowledge of the students in the design of mechanisms and machines a course like this is this needed. A term project will be included in the course which will include all the subjects taught in the course.

Part IV Approval

Proposed by	Faculty Member <i>Give the Academic Title first.</i>	Signature	Date
	Assist. Prof. Dr. Özgün SELVİ		
	Prof. Dr. S. Kemal İDER		

Departmental Board Meeting Date	13.03.2015	Meeting Number	2015/05	Decision Number	7
Department Chair	Prof. Dr. S. Kemal İDER	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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