ÇANKAYA UNIVERSITY
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. 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**		15
Course Code	**ME 312**	**Number of Weekly Lecture Hours**	**3**	**Number of Weekly Lab/Tutorial Hours**	**2**	**Number of Credit Hours**	**4**
Course Web Site	http://me312.cankaya.edu.tr				**ECTS Credit**		5.00

Course Name *This information will appear in the printed catalogs and on the web online catalog.*	
English Name	Experimentation and Measurement
Turkish Name	Deney ve Ölçüm

Course Description
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.

This course covers following subjects: fundamentals of measurement, statistical analysis of measured quantities, uncertainty in measurement, basic measurement tools. Additionally, experiments on measurement of basic physical quantities will be carried out by the student.

Prerequisites (if any) *Give course codes and check all that are applicable.*	1st **ECE 281**	2nd	3rd	4th
	☐ Consent of the Instructor	☐ Senior Standing	☐ Give others, if any.	
Co-requisites (if any)	1st	2nd	3rd	4th
Course Type *Check all that are applicable*	☒ Must course for dept.	☐ Must course for other dept.(s)	☐ Elective course for dept.	☐ Elective course for other dept.(s)

Course Classification
Give the appropriate percentages for each category.

Category	Engineering and Natural Sciences	Engineering Sciences	Engineering Design		
Percentage	30.00	50.00	20.00		

Part II. Detailed Course Information

Course Objectives
Explain the aims of the course. Maximum 100 words.

This course aims to explain to the students the need for measurement and basic statistical tools to analyze measured quantities. The course also aims - to introduce students to the "art" of scientific measurements, data and error analysis - to acquaint students with a variety of sensors used in thermo-mechanical systems, including sensors to measure temperature, pressure, displacement, velocity, acceleration and strain - to provide an understanding of the role of error and uncertainty in measurements and analysis - to provide exposure to and experience in using state-of-the-art software used in experimentation (Labview, MATLAB, etc.) for data acquisition and/or analysis - to provide experience in working in a team in all aspects of the laboratory exercises

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

1. Students will be able to comprehend the need for measurement and gather notions of metrics
2. Students will be able to learn basic statistical tools to analyze measured quantities
3. Students will be able to learn to use experimental data
4. Students will be able to learn to use data analysis tools and basic measuring instruments

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

Author(s)	Title	Publisher	Publication Year	ISBN
Figliola and Beasley, Theory and Design for Mechanical Measurements, 5th ed., John Wiley & Sons, Inc., 2011, 978-0-47064618-2				

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.)

Weekly lectures will cover fundamental issues on measurement, instruments, and data analysis.

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.

In addition to the lecture hours, there will laboratory sessions demonstrating the topics covered in class and various mechanical engineering applications. During the laboratory sessions, students will also have the chance to experience various measurement instruments, devices and sensors. Students will collect the data, analyze the data, and report their findings in these laboratory sessions. Students will be extensively using MATLAB and/or MS Excel for data analysis. Students will use other office applications (MS Word mainly) for preparing their reports.

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

Students will be extensively using MATLAB and/or MS Excel for data analysis. Students will use other office applications (MS Word mainly) for preparing their reports.

©Property of Çankaya University

Course Outline
List the topics covered within each week.

Week	Topic(s)

1. Introduction to Experimentation and Measurement
2. Basic Concepts of Measurement
3. Design of experiments
4. Probability and Statistics
5. Probability and Statistics
6. Probability and Statistics
7. Uncertainty Analysis
8. Uncertainty Analysis
9. Static and Dynamic Characteristics of Signals
10. Static and Dynamic Characteristics of Signals
11. Measurement System Behavior
12. Measurement System Behavior
13. Temperature Measurements
14. Strain Measurement

Grading Policy
List the assessment tools and their percentages that may give an idea about their relative importance to the end-of-semester grade.

Assessment Tool	Quantity	Percentage	Assessment Tool	Quantity	Percentage	Assessment Tool	Quantity	Percentage
Midterm Exam	1	25	Lab Work	10	40	Final Exam	1	35

ECTS Workload
List all the activities considered under the ECTS.

Activity	Quantity	Duration (hours)	Total Workload (hours)
Attending Lectures (*weekly basis*)	14	3.00	42.00
Attending Labs/Recitations (*weekly basis*)	14	2.00	28.00
Preparation beforehand and finalizing of notes (*weekly basis*)	14	0.50	7.00
Collection and selection of relevant material (*once*)	14	1.00	14.00
Self study of relevant material (*weekly basis*)			
Homework assignments			
Preparation for Quizzes			
Preparation for Midterm Exams (*including the duration of the exams*)	1	4.00	4.00
Preparation of Term Paper/Case Study Report (*including oral presentation*)			
Preparation of Term Project/Field Study Report (*including oral presentation*)	1	14.00	14.00
Preparation for Final Exam (*including the duration of the exam*)	1	10.00	10.00
		TOTAL WORKLOAD / 25	119.00/25
		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
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..

No	Program Qualifications	Contribution				
		0	**1**	**2**	**3**	**4**
1	Adequate knowledge in mathematics, science and engineering subjects pertaining to engineering; ability to use theoretical and applied information in these areas to model and solve complex engineering problems.					**X**
2	Ability to identify and define complex engineering problems; ability to select and apply proper analysis tools and modeling techniques for formulating and solving such problems.				**X**	
3	Ability to design a complex system, a process or product under realistic constraints and conditions in such a way as to meet the desired requirements; ability to apply modern design methods for this purpose.			**X**		
4	Ability to devise, select and use modern techniques to analyze and solve complex problems for engineering practice; ability to use information technologies effectively.			**X**		
5	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.					**X**
6	Ability to work efficiently in intra-disciplinary and multidisciplinary teams by collaborating effectively; ability to work individually.			**X**		
7	Ability to communicate effectively in Turkish and in English both orally and in writing; knowledge of at least one foreign language; ability to write report, to read report, to prepare design and production reports, to give presentation, to give instruction and receive instruction, effectively.			**X**		
8	Awareness of life-long learning; ability to access information, to follow developments in science and technology, and to keep continuous self-improvement.	**X**				
9	Awareness of professional and ethical responsibility; knowledge in standards used in engineering applications.			**X**		
10	Knowledge in project management, risk management and change management; awareness of entrepreneurship and innovation; knowledge in sustainable development.	**X**				
11	Knowledge in global and social effects of engineering practices on health, environment, safety and contemporary issues; awareness of the legal consequences of engineering solutions.		**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: ME312	Former Course's Name: **103392**
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:
Frequency of Offerings *Check all semesters that the course is planned to be offered.*	☐ Fall	☒ Spring	☐ Summer	

First Offering	Academic Year 2020	Semester ☐ Fall	☒ Spring

Maximum **Class Size** Proposed	60	Student **Quota** for Other Departments		Approximate **Number of Students** Expected to Take the Course	60

Justification for the proposal
Maximum 80 words

Measurement is a fundamental tool in mechanical engineering practices. Therefore, senior students are offered a course on measurement of physical quantities and related instrumentation, and analysis of the data collected by using these instruments.

Part IV Approval

©Property of Çankaya University

	Faculty Member *Give the Academic Title first.*	Signature	Date
Proposed by	Dr. Öğr. Üyesi Samet AKAR		29/04/2022

Departmental Board Meeting Date		Meeting Number		Decision Number	
Department Chair	Prof. Dr. Haşmet TÜRKOĞLU	Signature		Date	

Faculty Academic Board Meeting Date		Meeting Number		Decision Number	
Dean	Prof. Dr. Sıtkı Kemal İDER	Signature		Date	

Senate Meeting Date		Meeting Number		Decision Number	

CU-2019-ME312-21ab906d-176f-4b89-9699-bede84473da5