Course Information

Course Code	5710483
Course Section	1
Course Title	INTRODUCTION TO COMPUTER VISION
Course Credit	3
Course ECTS	6.0
Course Catalog Description	Image formation, camera models and parameters, stereo vision, shape from stereo, shape from single image cues, apparent motion, optical flow, introduction to 3D shape representation and recognition.
Prerequisites	No prerequisites
Schedule	Friday , 13:40 - 15:30, BMB3 Monday , 08:40 - 10:30, BMB3
Course Website	http://user.ceng.metu.edu.tr/~gcinbis/courses/Spring18/CENG483

Instructor Information

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Office Phone	
Office Hours	By appointment -- please email.

Course Assistants

Name/Title	Araş.Gör. Ezgi Ekiz
Office Address	
Email	
Office Hours	

Course Objectives

The course introduces the basic problems, common terminology and key methods of computer vision. Main objective is to let students gain necessary skills to apply contemporary computer vision techniques to visual understanding problems in computer science and engineering.

Course Learning Outcomes

At the end of this course, students will be able to:

- **Understand** formation of images, the types of camera models and the camera parameters.
- **Apply** different image processing and feature extraction techniques to images to extract low-level meaningful information.
- **Understand** different mid-level and high-level vision problems such as motion estimation, depth estimation, object recognition, scene understanding and **apply** them on real-world problems.
- **Describe** the different vision theories and the link between visual perception and computer vision.
- Gather **hands-on** experience on implementing contemporary deep learning based approaches for computer vision

Instructional Methods

The following instructional methods will be used to achieve the course objectives: Lecture, questioning, discussion, group work, simulation.

Tentative Weekly Outline

Week	Topic	Relevant Reading	Assignments
1	Math basics & Linear Algebra overview		

Week	Topic	Relevant Reading	Assignments
2	Image formation, cameras and calibration		
3	Filtering		
4	Interest point detectors		
5	Local descriptors		
6	Segmentation, clustering, texture		
7	Recognition: learning-based vision		
8	Recognition: object recognition		
9	Recognition: introduction to deep learning		
10	Recognition: deep learning applications in computer vision		
11	Stereo vision		
12	Monocular depth cues		
13	Structure from motion		
14	Shape Models		

Course Textbook(s)

Optional: Simon J.D. Prince, Computer Vision: Models, Learning, and Inference, http://www.computervisionmodels.com

Optional: R. Szeliski, Computer Vision: Algorithms and Applications, 2010.

Course Material(s) and Reading(s)

Material(s)

None.

Reading(s)

None.

Supplementary Readings / Resources / E-Resources

Readings

Optional: D. Forsyth, J. Ponce, Computer Vision: Modern Approach, 2002.

Optional: B. Jahne, H. Haubecker, Computer Vision and Applications, 2000.

Optional: R. Szeliski, Computer Vision: Algorithms and Applications, 2010.

Assessment of Student Learning

Assessment	Dates or deadlines
Homeworks Homeworks will involve programming in Python and utilizing major scientific libraries in Python.	March, April, May
Midterm exam	
Final exam	
Class participation	

Course Grading

Deliverable	Grade Points
Homeworks (3)	55
Midterm exam	20
Final exam	20
Participation	5
Total	100

Course Policies

Class Attendance

Attendance does not directly affect the final grade.

Class Participation

Regular active participation in class throughout the semester will contribute to the final grade.

Final Exam Entrance Conditions

Attending the midterm exam and qualifying to take a midterm grade of 10 or more is required to qualify to take the final exam.

Not qualifying to take the final exam will lead to automatic NA grade.

Having taken none of the mid-term and final examinations will lead to automatic NA grade.

Information for Students with Disabilities

To obtain disability related academic adjustments and/or auxiliary aids, students with disabilities must contact the course instructor and the ODTÜ Disability Support Office as soon as possible. If you need any accommodation for this course because of your disabling condition, please contact me. For detailed information, please visit the website of Disability Support Office: http://engelsiz.metu.edu.tr/

Academic Honesty

The METU Honour Code is as follows: *"Every member of METU community adopts the following honour code as one of the core principles of academic life and strives to develop an academic environment where continuous adherence to this code is promoted. The members of the METU community are reliable, responsible and honourable people who embrace only the success and recognition they deserve, and act with integrity in their*

use, evaluation and presentation of facts, data and documents."