CMPE574 - Biometrics

Department:
Computer Engineering

Program Name: Computer Engineering	**Program Code:** 25	
Course Number: CMPE574	**Credits:** 3 Cr	**Year/Semester:** 2019-2020 Fall

☐ Required Course ☒ Elective Course ☐ Service Course

Prerequisite(s):

Catalog Description:

Introduction to biometrics, person recognition, modules of biometric systems, biometric functionalities: verification and identification, biometric system errors and performance measures, the design cycle of biometric systems, applications of biometric systems, face recognition, iris recognition, fingerprint recognition, additional biometric traits, introduction to multibiometrics

Course Web Page:
https://staff.emu.edu.tr/onsentoygar/en/teaching/cmpe574

Textbook:

Anil K. Jain, Arun A. Ross, Karthik Nandakumar, **Introduction to Biometrics**, Springer, 2011, ISBN: 978-0-387-77325-4

Topics Covered and Class Schedule:
(3 hours of lectures per week)

week 1	Introduction to biometrics **(**A general introduction to biometrics, person recognition, biometric systems, biometric functionalities)
weeks 2-3	Biometric system errors, the design cycle of biometric systems, applications of biometric systems
weeks 4-5	Face recognition (Introduction to face recognition, image acquisition, face detection)
weeks 6-7	Face recognition (Feature extraction and matching)
weeks 8-9	(Midterm Exams)
week 10	Iris recognition (Design of an iris recognition system, image acquisition, iris segmentation)
week 11	Iris recognition (Iris normalization, iris encoding and matching)
week 12	Fingerprint recognition (Friction ridge pattern, fingerprint acquisition, feature extraction and matching)
week 13	Fingerprint recognition (Friction ridge pattern, fingerprint acquisition, feature extraction and matching)
Week 14	Additional biometric traits, introduction to multibiometrics
week 15	Project Presentations
weeks 16-18	(Final Exams)

Course Learning Outcomes:

On successful completion of the course, the student is expected to be able to:

(1) Understand the basics of biometrics
(2) Learn the functionalities and applications of biometrics
(3) Learn biometric system error calculations
(4) Develop skills in the concepts of face recognition, iris recognition and fingerprint recognition
(5) Learn other biometric traits and multibiometrics
(6) Develop skills in performing an individual research project on recent developments in one of the major topics related with the course
(7) Develop skills in reading journal papers and writing a proposal, intermediate and final report for the project
(8) Gain ability in preparing a research project and presenting the project in front of other students and instructors
(9) Gain ability to compare different methods in a biometric system

	Method	**No**	**Percentage**
Assessment	Midterm Exam(s)	1	30 %
	Term Project	1	15 %
	Final Examination	1	40 %
	Assignments	2-4	10 %
	Attendance	-	5%

Contribution of Course to Criterion 5

Credit Hours for:
Mathematics & Basic Science : 0
Engineering Sciences and Design : 4
General Education : 0

Relationship of Course to Program Outcomes

The course has been designed to contribute to the following program outcomes:
a) apply knowledge of mathematics, science, and engineering,
e) identify, formulate, and solve engineering problems,
k) use the techniques, skills, and modern engineering tools necessary for engineering practice,
l) an ability to apply knowledge of probability and statistics, mathematics through differential and integral calculus, discrete mathematics, basic sciences, and computer science

Notes and Policies

Attendance in Lectures:

- Attendance will be taken every week.

Exams:

- If you miss midterm or final exam and submit a written report to your instructor stating your excuse within 3 days of that examination, you will be able to enter makeup exam at the end of the semester.
- If you miss both midterm and final exams and do not submit any written report, you will get an "NG" grade. In that case, if you submit report for both missed exams, you will be able to enter makeup exam for one of the missed exams.

PLAGIARISM

- Plagiarism (which also includes any kind of cheating in exams, assignments, and lab works) is a disciplinary offence and will be dealt with accordingly. Furthermore, the penalty of plagiarism is to get grade zero for the corresponding exam, assignment, or lab work.

IMPORTANT REMARKS

- You should have regular attendance to the lectures for being successful in the course.

Course related materials will be published on the course web site and you will be responsible from all. Note that the course web site will be updated during the semester. Therefore, please check it regularly.

Prepared by: Assoc.Prof.Dr. Önsen Toygar	**Date Prepared:** 23 September, 2019