TED UNIVERSITY

Syllabus for
EE 413 – Communication Systems II

Fall 2016-2017

Instructor:	**Asst. Prof. Dr. H. Ugur Yildiz**
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Time Schedule:	**Lecture:**	**Wednesday (12.00 – 13.50)**	**@G009**
	Lab:	**Friday (09.00 – 10.50)**	**@ A311-L**
Office Hours:	**Wednesday (16.00 –18.00)** **(or by appointment)**		

Course Code & Number	EE 413	**Course Title**	Communication Systems II
Type of Course	☐ Compulsory ☑ Elective	**Semester**	☑ Fall ☐ Spring ☐ Summer
Level of Course	BSc	**Year of Study**	Senior
Course Credit Hours / ECTS	(2+2+0) 3 / 5 ECTS	**Pre-requisite / Co-requisite**	Pre-requisite: EE 312 Co-requisite: None
Mode of Delivery	☑ Face-to-face ☐ Distance learning	**Language of Instruction**	☑ English ☐ Turkish
Course Coordinator	Asst. Prof. Huseyin Ugur Yildiz Phone: 0312-585-0221 E-mail: hugur.yildiz@tedu.edu.tr Office Room: 351		
Computer Usage	MATLAB assignments		
Textbook	S. Haykin and M. Moher, Communication Systems, Int. Student Version, 5th Editon, Wiley, 2010.		
Supplementary Reading	J.G. Proakis and M. Salehi, Fundamentals of Communication Systems, Global Edition, 2nd Editon, Pearson, 2015.		
Module and Instructor Evaluation Date	Evaluation will be held on the last day of the class		

Course Catalog Description	Sampling Process, Pulse Amplitude Modulation, Quantization, Pulse Code Modulation, Baseband Transmission of Digital Signals, Band-pass Transmission of Digital Signals, Information and Forward Error Correction.
Course Objectives	This course aims to provide basic skills required to understand and design various communication systems application involving digital communication techniques.
Course Learning Outcomes (LO)	Having successfully completed this course, students will be able to: LO-1: Understand analog to digital conversion and sampling process. LO-2: Analyze pulse amplitude modulation (PAM), pulse code modulation (PCM), and quantization. LO-3: Interpret baseband pulses and matched filter detection. LO-4: Calculate probability of error due to noise; identify inter-symbol interference (ISI) and eye pattern. LO-5: Analyze Nyquist's criterion for distortionless transmission and baseband M-ary PAM transmission. LO-6: Define band-pass transmission model. LO-7: Understand the transmission of binary PSK, FSK, and M-ary data transmission systems along with their noise performances. LO-8: Express entropy, source-coding theorem, lossless data compression, discrete memoryless channel concepts and calculate the channel capacity. LO-9: Define channel coding theorem and error control coding; determine the capacity of the Gauss channel. LO-10: Analyze linear block codes, convolutional codes, and trellis-coded modulation.

TENTATIVE COURSE OUTLINE						
	Week	**Month / Day**	**Topics**	**Learning Outcome (LO)**	**Textbook Reading**	**Assignments / Exams**
	1	09/28 09/30	Digital Representation of Analog Signals	1	Ch. 7.1-7.4	
	2	10/05 10/07	Digital Representation of Analog Signals	2	Ch. 7.8, 7.9	
	3	10/12 10/14	Baseband Transmission of Digital Signals **Lab#1:** Quantization	3	Ch.8.1, 8.2	Quiz#1
	4	10/19 10/21	Baseband Transmission of Digital Signals	4	Ch. 8.3-8.5	
	5	10/26 10/28	Baseband Transmission of Digital Signals	5	Ch. 8.6-8.8	
	6	11/02 11/04	**No Lecture** **Lab#2:** Probability of Error Analysis			Quiz#2
	7	11/09 11/11	**No Lecture**			**Midterm**
	8	11/16 11/18	Band-pass Transmission of Digital Signals	6	Ch. 9.1, 9.2	
	9	11/23 11/25	Band-pass Transmission of Digital Signals	7	Ch.9.3, 9.4	
	10	11/30 12/02	Band-pass Transmission of Digital Signals	7	Ch.9.5, 9.6	
	11	12/07 12/09	Information and Forward Error Correction **Lab#3:** M-ary Data Transmission	8	Ch. 10.1-10.3	Quiz#3
	12	12/14 12/16	Information and Forward Error Correction	8	Ch.10.4, 10.6, 10.7	
	13	12/21 12/23	Information and Forward Error Correction	9	Ch.10.8-10.10	
	14	12/28 12/30	Information and Forward Error Correction **Lab#4:** Huffman Coding	10	Ch.10.11-10.13	Quiz#4
	FINAL EXAMS WEEK (date and time to be announced later).					

COURSE ASSIGNMENTS
A. Midterm Exam [25%]
There will be a closed-book midterm exam that will be on the 7th. Date and time of the exams will be announced later.
B. Final [35%]
There will be a cumulative closed-book final exam covering all topics. Date and time of the final will be announced at the end of the semester.
C. Laboratory Work [20%]
There will be 4 laboratory works with equal weight. Each lab session lasts 80 minutes.
D. Quizzes [20%]
There will be 4 quizzes, 5% for each quiz. Quizzes will be held before the beginning of each lab session. Each quiz will last for 20 minutes.

COURSE ASSESSMENTS & LEARNING OUTCOMES MATRIX	
Assessment Methods	**Course Learning Outcomes**
Laboratory Work	LO # 1…10
Quizzes	LO # 1…10
Midterm Exam	LO # 1…5
Final Exam	LO # 1…10

Teaching Methods & Learning Activities	☑ Telling/Explaining ☑ Questioning ☑ Reading ☑ Problem Solving	☑ Collaborating ☑ Web Searching ☑ Hands-on Activities ☑ Experiments
Assessment Methods (Formal & Informal)	☑ Test/Exam ☑ Quiz ☑ Laboratory Performance and Reports	☑ Observation
Student Workload (Total 108 Hrs)	☑ Lectures .....**42**. hrs ☑ Course Readings .....**28**. hrs ☑ Lab Applications .....**8**. hrs	☑ Quizzes ……..…..**5**. hrs ☑ Midterm ……..…..**10**. hrs ☑ Final……..…..**15**. hrs

COURSE POLICIES

I. Attendance

- Regular class attendance is expected for all students at the University. You are not required but advised to attend all classes.
- Please send your professor a brief e-mail to explain your absence in advance.
- Your absence will not reduce your attendance rate *if and only if* you have a legitimate reason for missing a class (such as illness, death in family, a traffic accident, etc.). In case of an illness or emergency, you must supply a formal documentation that supports your claim.
- Classes start on the hour. Please be respectful of your classmates by being on time.
- All electronic equipment should be turned off and kept out of sight before lecture starts.

II. Make-up Exams

Make-up for the Midterm Exam will be available *if and only if* you have a legitimate reason for missing the exam (such as illness, death in family, a traffic accident, etc.). In case of an illness or emergency, you must supply a formal documentation that supports your claim.

III. Late Submission Policy

Late submissions will not be graded. There will be *no* make-up for quizzes and laboratory works. Missed laboratory works and quizzes will result in a grade of zero (0).

IV. Participation

In their book, The Adult Student's Guide to Survival & Success, Al Siebert and Mary Karr suggest that the most effective learning technique of all is to study by *asking and answering questions*. Develop the habit of reading textbooks, taking lecture notes, and studying by asking and answering questions. When you do this, you save many hours of studying and have time to spend with your family or friends.

There are several ways to go about asking and answering questions.

- When studying on your own, write questions that occur to you while you're reading and then go back and find the answers.
- If you're part of a study group, make a list of questions to ask the group.
- In the classroom, participate fully by asking questions and answering the ones posed by your instructor.

Curiosity is one of the cornerstones of learning. Be curious. Ask questions. Learn faster.

V. Cheating & Plagiarism

Collaboration is strongly encouraged; however, the work you hand in must be solely your own. Cheating and plagiarism are very serious offenses and will be penalized accordingly by the university disciplinary committee.

Cheating has a very broad description which can be summarized as "acting dishonestly". Some of the things that can be considered as cheating are the following:
- Copying answers on exams, home works and lab works,
- Using prohibited material on exams,
- Lying to gain any type of advantage in class,
- Providing false, modified or forged data in a report,
- Plagiarizing (see below),
- Modifying graded material to be re-graded,
- Causing harm to colleagues by distributing false information about an exam, homework or lab.

All of the following are considered plagiarism:
- Turning in someone else's work as your own,
- Copying words or ideas from someone else without giving credit,
- Failing to put a quotation in quotation marks,
- Giving incorrect information about the source of a quotation,
- Changing words but copying the sentence structure of a source without giving credit,
- Copying so many words or ideas from a source that it makes up the majority of your work, whether you give credit or not.
(www.plagiarism.org)

VI. Disability Support

If you have a disabling condition which may interfere with your ability to successfully complete this course, please contact Dr. Aslı Bugay (email: asli.bugay@tedu.edu.tr) or Dr. Huseyin Ugur Yildiz (email: hugur.yildiz@tedu.edu.tr). For more information please see Handbook for Registered Students.

*** GOOD LUCK ***