

## MSc program, Biomedical Engineering Department

<b>Course Unit Title</b>	Information Theory and Coding	
<b>Course Unit Code</b>	BME 506	
<b>Type of Course Unit</b>	Elective	
<b>Level of Course Unit</b>	MSc program	
<b>National Credits</b>	3	
<b>Number of ECTS Credits Allocated</b>	10	
<b>Theoretical (hour/week)</b>	4	
<b>Practice (hour/week)</b>	-	
<b>Laboratory (hour/week)</b>	-	
<b>Year of Study</b>	-	
<b>Semester when the course unit is delivered</b>	-	
<b>Course Coordinator</b>	Assist.Prof.Dr. Ali Serener	
<b>Name of Lecturer (s)</b>	Assist.Prof.Dr. Ali Serener	
<b>Name of Assistant (s)</b>	-	
<b>Mode of Delivery</b>	Face to Face	
<b>Language of Instruction</b>	English	
<b>Prerequisites</b>	-	
<b>Recommended Optional Programme Components</b>		
<b>Course description:</b> This course covers intermediate to advanced information theory and channel coding topics. Topics covered include fundamentals of channel coding as well as powerful error-correcting codes such as low-density parity-check codes and turbo codes.		
<b>Objectives of the Course:</b>		
<ul style="list-style-type: none"> <li>• Study advanced information theory and modern error-correcting codes</li> </ul>		
<b>Learning Outcomes</b>		
After completing the course the student will be able to		Assessment
1	<ul style="list-style-type: none"> <li>• have a better understanding of information sources</li> </ul>	1,2,3,4
2	<ul style="list-style-type: none"> <li>• have a better understanding of how channels are modeled.</li> </ul>	1,2,3,4
3	<ul style="list-style-type: none"> <li>• understand advanced error correcting codes and their applications.</li> </ul>	1,2,3,4
Assessment Methods: 1. Written Exam, 2. Assignment, 3. Project/Report, 4. Presentation, 5. Lab. Work		
<b>Course's Contribution to Program</b>		
		CL

1	Apply the rules of scientific research and ethics	3
2	Discuss complex biomedical engineering issues as well as own research results comprehensively and in the context of current international research and present these in writing and orally	4
3	Solve problems by systems analytical thinking both in subject specific and interdisciplinary concepts	4
4	Combine specialized knowledge of various component disciplines	3
5	Carry out in dependent scientific work and organize (capacity of teamwork), Conduct and lead more complex projects	4
6	To assess the social and environment-related effects of their actions	4

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

### Course Contents

Week	Topics	Exam
1	Entropy and Information, 1.1-1.10	HW #1
2	Entropy and Information, 1.11-1.21	
3	Information Channels, 2.1-2.5	
4	Information Channels, 2.6-2.10	Quiz #1
5	Source Coding, 3.1-3.3	
6	Source Coding, 3.4-3.6	
7	Fundamentals of Channel Coding, 5.1-5.3	
8		Midterm
9	Fundamentals of Channel Coding, 5.4-5.7	HW #2
10	Error-Correcting Codes, 6.1-6.4	
11	Low Density Parity Check Codes, Lecture Notes	
12	Convolutional Codes, Lecture Notes	Quiz #2
13	Convolutional Codes, Lecture Notes	
14	Turbo Codes, Lecture Notes	
15		Final

### Recommended Sources

1. Fundamentals of Information Theory and Coding Design, R. Togneri and C. J.S. deSilva, CRC Press.

### Assessment

Assignments	25%	Programming and Research
Midterm Exam	30%	Written Exam
Final Exam	45%	Written Exam
Total	100%	

### Assessment Criteria

Final grades are determined according to the Near East University Academic Regulations for Undergraduate Studies

**Course Policies**

1. Attendance to the course is mandatory.
2. Students may use calculators during the exam.
3. Cheating and plagiarism will not be tolerated. Cheating will be penalized according to the Near East University General Student Discipline Regulations

**ECTS allocated based on Student Workload**

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class (including Exam weeks)	16	4	64
Labs and Tutorials	-	-	-
Assignment	2	15	30
Project/Presentation/Report	-	-	-
E-learning activities	-	-	-
Quizzes	2	10	20
Midterm Examination	1	30	30
Final Examination	1	30	30
Self Study	14	8	112
Total Workload			286
Total Workload/30(h)			9.53
ECTS Credit of the Course			10