| COURSE DESCRIPTION FORM | |
|---|---|
| **Course Code and Name** | CENG467 INFORMATION THEORY (TECH.ELECT.) |
| **Course Semester** | 7 |
| **Catalog Content** | Entropy Measure Degree of Uncertainty of Physical System State, complex system entropy, theorem of entropies, Conditional Entropy |
| **Textbook** | Elements of Information Theory, John Wiley, T. M. Cover, 1991 |
| **Supplementary Textbooks** | - Information Theory, Interference and Learning Algorithms, Cambridge, D.J.C. Mackay, 2005<br>- Information Theory: Part I: An Introduction to the Fundamental Concepts, Arieh Ben-Naim, World Scientific Publishing Co. 2017 |
| **Credit** | 6 |
| **Prerequisites of the Course** **(** *Attendance Requirements***)** | - |
| **Type of the Course** | Elective |
| **Instruction Language** | English |
| **Course Objectives** | The object of this course is to teach overlaps complex system entropy, theorem of entropies, Conditional Entropy. Additionally, learning entropy Measure Degree of Uncertainty of Physical System are among the target of this course. |
| **Course Learning Outcomes** | At the end of this course, the students will be able to<br>1. Overlap entropy Measure Degree of Uncertainty of Physical System<br>2. Learn complex system entropy, theorem of entropies, Conditional Entropy |
| **Instruction Methods** | The mode of delivery of this course is face to face |
| **Weekly Schedule** | Week 1: Degree in Physical System State Entropy Measurement Uncertainty<br>Week 2: Entropy of a complex system: theorem of entropies<br>Week 3: Conditional Entropy<br>Week 4: Dependent on a combination of systems<br>Week 5 Entropy and Information<br>Week 6: Partial information<br>Week 7: Entropy and information systems to continuous change<br>Week 8: Entropy of Finite Markov Chain<br>Week 9: Entropy of Finite Markov Chain<br>Week 10: Problems of Information Encoding<br>Week 11: Problems of Information Encoding<br>Week 12: Shennon-Pheno code<br>Week 13: None Contact<br>Week 14: Transporting Capabilities Disabled Channels |
| **Teaching and Learning Methods** *(These are examples. Please fill which activities you use in the course)* | Weekly Theoretical Course Hours: 3<br>Reading<br>Searching in Internet and Library<br>Designing and Applying Materials<br>Preparing Reports<br>Preparing Presentation<br>Presentation<br>Mid-Term and Studying for Mid-Term<br>Final and Studying for Final |

**Assessment Criteria**

| | Quantity | Total Contribution (%) |
|---|---|---|
| Midterm Exams | 1 | 20 |
| Assignment | 5 | 20 |
| Application | 0 | 0 |
| Projects | 1 | 20 |
| Practice | 0 | 0 |
| Quiz | 0 | 0 |
| Percent of In-term Studies (%) | | 60 |
| Percentage of Final Exam to Total Score (%) | | 40 |
| Attendance | - | - |

**Workload**

| Activity | Total Number of Weeks | Duration (weekly hour) | Total Period Work Load |
|---|---|---|---|
| Weekly Theoretical Course Hours | 14 | 3 | 42 |
| Weekly Tutorial Hours | 0 | 0 | 0 |
| Reading Tasks | 8 | 4 | 32 |
| Studies | 8 | 4 | 32 |
| Material Design and Implementation | 12 | 1 | 12 |
| Report Preparing | 1 | 3 | 3 |
| Preparing a Presentation | 1 | 3 | 3 |
| Presentations | 1 | 1 | 1 |
| Midterm Exam and Preparation for Midterm Exam | 1 | 10 | 10 |
| Final Exam and Preparation for Final Exam | 1 | 15 | 15 |
| Other ( should be emphasized) | 0 | 0 | 0 |
| Total Workload | | | 150 |
| Total Workload / 25 | | | 6 |
| Course Credit (ECTS) | | | 6 |

**Contribution Level Between Course Learning Outcomes and Program Outcomes**

| Program Outcomes | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Sufficient knowledge on mathematics, science and computer engineering; ability to apply theoretical and practical knowledge in these areas to model and solve engineering problems | | | | X | |
| Ability to identify, define, formulate and solve complex engineering problems; ability to choose and apply appropriate analysis and modelling methods for these purposes | | | | | X |
| Ability to design a complex system, process, device, software, algorithm, or product under realistic constraints and circumstances to meet certain requirements; ability to apply modern design techniques for this purpose | | | | X | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Ability to choose, develop and use modern techniques and tools necessary for engineering applications; ability to effectively use computing technologies | | | | | X | |
| | Ability to design and implement systems or experiments to solve engineering problems, collect and interpret data to evaluate and analyze the results of solutions | | | X | | | |
| | Ability to work effectively in intradisciplinary and interdisciplinary teams or individually | | | | X | | |
| | Ability to efficiently prepare, evaluate and interpret reports | | | | X | | |
| | Ability to make presentations and conduct effective verbal and written communication in Turkish and English | | | X | | | |
| | Awareness of the necessity of lifelong learning; ability to access information, follow scientific and technological developments; ability to perpetually renew oneself | | | | X | | |
| | Awareness of professional and ethical responsibility, ability to act in accordance with ethical principles | | | | X | | |
| | Ability to apply knowledge on project management, risk management and change management | | | | | X | |
| | Awareness of entrepreneurship and innovation, ability to design and build sustainable systems | | | | X | | |
| | Ability to devise local and global solutions to contemporary issues considering the effects of engineering applications on health, environment and security | | X | | | | |
| | Awareness of the legal consequences of engineering solutions | | X | | | | |
| | Ability to apply knowledge on software development process and documentation rules | | | | X | | |
| | Knowledge on standards used in engineering applications | | | | | X | |
| | Awareness of occupational health and security, information security and privacy | | | X | | | |
| **The Course's Lecturer(s) and Contact Information** | Prof. Dr. Şeref SAĞIROĞLU<br>ss@gazi.edu.tr | | | | | | |