



## ESOĞÜ Electrical-Electronics Engineering Department

**COURSE CODE:** 151226356

**COURSE TITLE:** COMMUNICATIONS

| Semester   | Weekly Hours |   | COURSE        |                           |                               |               |          |  |
|--|--------------|---|---------------|---------------------------|-------------------------------|---------------|----------|--|
|  | Theoretical  | Practical   | Credits       | ECTS                      | Type                          |               |          |  |
| 6  | 3            | 0   | 3             | 6                         | Compulsory ( x ) Elective ( ) |               |          |  |
| Write the credit (for non-credit courses weekly hours) below (If necessary distribute the credits.). |              |   |               |                           |                               |               |          |  |
| <b>Math and Basic Science</b>  |              | <b>Electrical Engineering</b><br>[mark (√) if there is high design content]   |               | <b>General Education</b>  | <b>Humanities</b>             |               |          |  |
|  |              | 3 ( )   |               |                           |                               |               |          |  |
| <b>Assessment</b>  |              | <b>THEORETICAL-PRACTICAL COURSES</b>  |               | <b>LABORATORY COURSES</b> |                               |               |          |  |
|  |              | <b>Type</b>   | <b>Number</b> | <b>%</b>                  | <b>Activity Type</b>          | <b>Number</b> | <b>%</b> |  |
| <b>Midterm</b>   |              | Midterm   | 2             | 50                        | Quiz                          |               |          |  |
|  |              | Quiz  | 2             | 20                        | Lab performance               |               |          |  |
|  |              | Homework  |               |                           |                               | Report        |          |  |
|  |              | Project   |               |                           |                               | Oral exam     |          |  |
|  |              | Other (.....)   |               |                           |                               | Other (.....) |          |  |
| <b>Final</b>   |              |   |               | 30                        |                               |               |          |  |
| <b>Makeup exam (Oral/Written)</b>  |              | Written   |               |                           |                               |               |          |  |
| <b>Prerequisites</b>   |              | 151224299 SIGNALS AND SYSTEMS   |               |                           |                               |               |          |  |
| <b>Brief content of the course</b>   |              | Information-coding, fundamentals of electronic communications, signal/noise power-energy, sampling and quantization, AM, VSB, SSB-SC AM, DSB-AM, FM, QAM, PM, PAM, TV principles, random processes, introduction to source coding. Digital representation, transmission, receiver structure, decision performance, correlators & matching filters, SS & OFDM.   |               |                           |                               |               |          |  |
| <b>Objectives of the course</b>  |              | Learn the modulation techniques used in electronic communications, effects of noise, study on the methods for reducing the effects of noise,  |               |                           |                               |               |          |  |
| <b>Contribution of the course towards professional education</b>                                     |              | Students will get familiar with the techniques used in electronic communication and get ready for the advanced techniques in communication.   |               |                           |                               |               |          |  |
| <b>Outcomes of the course</b>  |              | 1) Students get to know analog & digital comm. and the techniques within. They learn most of the “how/why”s.<br>2) Improve the ability to solve introductory problems in communication.<br>3) Start building a knowledge base for advanced communication techniques.  |               |                           |                               |               |          |  |
| <b>Textbook of the course</b>  |              | E. Seke, Sayısal Haberleşmeye Giriş, Seçkin Yayıncılık, 2015.   |               |                           |                               |               |          |  |
| <b>Other reference books</b>   |              | 1) B. Sklar, Digital Communications, Fundamentals and Applications, Prentice Hall, 2000<br>2) J. G. Proakis, M. Salehi, Communication Systems Engineering, Prentice Hall, 2002  |               |                           |                               |               |          |  |
| <b>Required material for the course</b>  |              | The course is mostly theoretical. However some simulation is presented to the students. Some communication equipment brought to the class is used to demonstrate basic communication techniques and signals. A communication lab equipped with communication lab-kits is required for the lab counterpart that is planned and mandatory in the curriculum.<br>Note: in pandemic distance learning sessions, some demonstrations will be performed online by the instructor. |               |                           |                               |               |          |  |

| WEEKLY PLAN OF THE COURSE |   |
|---------------------------|---|
| Week                      | Topics  |
| 1                         | Introduction to Information and representation                                    |
| 2                         | Basic keywords on signals and communication, spectrum, power and energy           |
| 3                         | Amplitude modulation, SSB-AM, DSB-AM, VSB, intro. to other modulation techniques. |
| 4                         | Frequency and Phase Modulation  |
| 5                         | Digital comm. principles.   |
| 6                         | First midterm   |
| 7                         | Sampling, quantization, companding, expanding                                     |
| 8                         | Frequency, phase and amplitude shift modulation                                   |
| 9                         | Random processes and noise, noise figure, SNR                                     |
| 10                        | Noise power, SNR  |
| 11                        | Second midterm  |
| 12                        | Shannon theorems, introduction to source coding                                   |
| 13                        | Spread spectrum   |
| 14                        | OFDM  |
| 15,16                     | Final   |

| NO | OUTCOMES OF THE PROGRAMME   | 3 | 2 | 1 | 0 |
|----|---|---|---|---|---|
| 1  | Adequate knowledge of mathematics, science and Electrical and Electronic Engineering; ability to practice theoretical and practical knowledge of these areas into modeling and solving problems of Electrical and Electronic Engineering          | X |   |   |   |
| 2  | Ability to identify complex engineering problems in Electrical and Electronic Engineering and related fields, for this purpose having skills to formulate, select and apply appropriate methods.  |   |   | X |   |
| 3  | Having skills to apply modern design methods to design a complex system, equipment or product that should work under realistic conditions and constraints and satisfy specific requirements concerning the Electrical and Electronic Engineering. |   |   |   | X |
| 4  | Having skills to develop, select and apply modern techniques and tools needed for Electrical and Electronic Engineering applications, skills to use information technology effectively.   |   |   |   | X |
| 5  | Skills to design and conduct tests, collect data, analyze results, and interpret data for the experimental investigation of Electrical and Electronic Engineering problems  |   |   |   | X |
| 6  | Ability to function effectively as an individual and as a member of teams within the discipline and in multidiscipline areas.   |   |   | X |   |
| 7  | Communicating effectively in oral and written form both in Turkish and English.   |   |   |   | X |
| 8  | Awareness of the necessity of lifelong learning, access to information, monitoring developments in science and technology and the ability to self-renewing  |   | X |   |   |
| 9  | Understanding of professional and ethical responsibility  |   |   |   | X |
| 10 | Information on project management, change management and risk management practices, awareness on entrepreneurship, innovation and sustainable development.  |   |   |   | X |
| 11 | Information about universal and societal effects of engineering applications on health, safety and environment; awareness of the legal consequences of engineering solutions.   |   | X |   |   |

**Scale for assessing the contribution of the course to the program outcomes:**

**3: Very high**

**2: Medium**

**1: Small**

**0: None**

**Name of Instructor(s):** Erol Seke

**Signature(s):** Erol Seke

**Date:** 03.03.2011