**BMED3501 BIOSIGNAL PROCESSING
COURSE CATALOG INFO**

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| **Course Code :**BMED3501 | **Course Name :**Biosignal Processing |
| **Semester** | **Lecture + Laboratory + PS** | **Local Credit** | **ECTS** | **Language** | **Category** | **Instructional Methods** | **Prerequisites** |
|  | (2+2+0) | 3 | 5 | English | Core | Course | ELEC2501 |
| **Course Content** | Application of analog, digital, and statistical techniques to the processing of biomedical signals. Sources, recording, analysis and processing of ECG, EEG, EMG, and evoked potentials. Filtering, detection and classification, spectrum and parameter estimation, and array signal processing. |
| **Course Outcomes** |  **CO 1.** Describe properties of discrete-time systems such as time-invariance, stability, causality, and linearity. **CO 2.** Evaluate the discrete Fourier transform (DFT) and discrete cosine transform of a sequence, compute the z-transform of a sequence. **CO 3.** Use the z-transform to evaluate the transfer function of linear time-invariant systems. **CO 4.** Design analog and digital filters for bioelectrical signals. **CO 5.** Apply biosignal processing techniques for real biomedical signals, and gain experience with the application of biomedical signal processing using MATLAB. |
|  | **Program Outcomes** |
| **PO1** | Adequate knowledge in fundamentals of mathematics (algebra, differential equations, integrals, probability etc), science (physics, chemistry, biology etc.), health science (anatomy and physiology) and computer science (programming and simulation); ability to use theoretical and applied knowledge in these areas in complex engineering problems. |
| **PO2** | Ability to identify, define, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose. |
| **PO3** | Ability to design and integrate components of a complex system or process, as they relate to Biomedical Engineering discipline, under realistic constraints and conditions, in such a way as to meet desired requirements; ability to apply modern design methods. |
| **PO4** | Ability to devise, select, and use techniques and tools needed for analyzing and solving complex problems encountered in engineering practice; ability to employ information technologies effectively. |
| **PO5** | Ability to design and conduct experiments, gather, analyze and interpret data. |
| **PO6** | Ability to work in intra-disciplinary and multi-disciplinary teams; ability to take individual responsibilities. |
| **PO7** | Ability to effectively communicate in Turkish, ability to express his/her knowledge, ideas and work in English via oral, written and visual means; ability to write effective reports and comprehend written reports; ability to give and follow instructions. |
| **PO8** | Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to educate him/herself |
| **PO9** | Consciousness to behave according to ethical principles, and about professional and ethical responsibility; knowledge on standards used in engineering practice. |
| **PO10** | Knowledge about business life practices such as project management, risk management, and change management; awareness in entrepreneurship, innovation; knowledge about sustainable development. |
| **PO11** | Knowledge about the global and social effects of engineering practices on health, environment, and safety, and contemporary issues of the century reflected into the field of engineering; awareness of the legal consequences of engineering solutions. |

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| **CONTRIBUTION OF COURSE OUTCOMESONBIOMEDICAL ENGINEERING PROGRAM OUTCOMES** |
| **Course\Program** | **CO1** | **CO2** | **CO3** | **CO4** | **CO5** |
| **PO1** | x |  |  |  |  |
| **PO2** |  | x | x |  |  |
| **PO3** |  |  |  | x | x |
| **PO4** |  |  |  |  |  |
| **PO5** |  |  |  |  |  |
| **PO6** |  |  |  |  |  |
| **PO7** |  |  |  |  |  |
| **PO8** |  |  |  |  |  |
| **PO9** |  |  |  |  |  |
| **PO10** |  |  |  |  |  |
| **PO11** |  |  |  |  |  |

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| **COURSE ASSESMENT AND ECTS WORK LOAD** |
| **Type of Work** | **Count** | **ECTS WORK LOAD** |
| **Time (Hour)(Including prep. time)** | **Work Load** |
| Attendance | 14 | 2 | 28 |
| Final Exam | 1 | 2 | 2 |
| Quizzes |  |  | 0 |
| Term project |  |  | 0 |
| Reports |  |  | 0 |
| Final Project |  |  | 0 |
| Seminar |  |  | 0 |
| Assignments |  |  | 0 |
| Presentation |  |  | 0 |
| Midterms |  |  | 0 |
| Project |  |  | 0 |
| Laboratory | 14 | 2 | 28 |
| Tutorial |  | 0 | 0 |
| Other(Self study) |  |  | 0 |
|  | **Total work load** | 58 |
|  | **Total work load/25** | 2.32 |
|  | **ECTS Credit** | 2 |