**BMED3311 BIOMEDICAL INSTRUMENTATION I
COURSE CATALOG INFO**

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| **Course Code :**BMED3311 | **Course Name :**Biomedical instrumentation I |
| **Semester** | **Lecture + Laboratory + PS** | **Local Credit** | **ECTS** | **Language** | **Category** | **Instructional Methods** | **Prerequisites** |
|  | (2+2+0) | 3 | 6 | English | Core | Course | ELEC2201OR ELEC2205O |
| **Course Content** | Basic concepts of medical instrumentation. Origin of biosignals. Measurement of biosignals: electrocardiogram (ECG), electromyogram (EMG), electroencephalogram (EEG), electroneurogram (ENG), electroretinogram (ERG), electrooculogram (EOG). Basic sensors systems and their operating principles. Biopotential amplifiers. Fundamentals of electrodes and transducers. Biopotential electrodes. |
| **Course Outcomes** |  **CO 1.** Identify the basic concepts of biomedical devices, the origin of bio-signals, simple sensor systems used in biomedical devices, the types of electrodes used in detection and transfer of bio-signals to biomedical devices. **CO 2.** Identify the measurement of biosignals from different tissues and organs such as ECG, EMG, EEG, ENG, ERG and EOG, and the types and properties of amplifiers used in amplification of biosignals. **CO 3.** Work as a responsible member with the practical experiments performed in laboratories and develop data collection, data analysis and interpretation skills. |
|  | **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** |  |  |
| **PO1** |  |  |  |  |  |
| **PO2** |  |  |  |  |  |
| **PO3** |  |  |  |  |  |
| **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 |  |  | 0 |
| 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 | 14 | 0 | 0 |
| Other(Self study) |  |  | 0 |
|  | **Total work load** | 56 |
|  | **Total work load/25** | 2.24 |
|  | **ECTS Credit** | 2 |