**BMED4805 REHABILITATION ROBOTICS
COURSE CATALOG INFO**

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| **Course Code :**BMED4805 | **Course Name :**Rehabilitation robotics |
| **Semester** | **Lecture + Laboratory + PS** | **Local Credit** | **ECTS** | **Language** | **Category** | **Instructional Methods** | **Prerequisites** |
|  | (3+0+0) | 3 | 5 | English | Core | Course | BMED2401 |
| **Course Content** | Application of the fundamental robot mechanics to the rehabilitation robots. Application of the biomechanical methods including quantitative instrumentation to analyze human movement, to diagnose movement disorders, and to assess rehabilitation outcomes. Describing the features of healthy versus pathological human movement. Gait analysis and evaluation of healthy and patients with neuromuscular diseases. Types of rehabilitation robots, their classifications, and their applications. Sensing, actuation, and control principles deployed in various rehabilitation robots. |
| **Course Outcomes** |  **CO 1.** Classify the types and components of rehabilitation robot systems. **CO 2.** Identify the kinematical analysis of robots. **CO 3.** Identify the dynamical analysis of robots **CO 4.** Examine gait analysis using motion capture and force platform systems. **CO 5.** Examine how to diagnose and monitor the treatment processes of some of the motoneuron diseases. **CO 6.** Examine how to carry out the EMG signal recording. **CO 7.** Identify the fundamental EMG signal processing methods. |
|  | **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** | **CO6** | **CO7** |
| **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 | 3 | 42 |
| 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 |  | 0 | 0 |
| Tutorial |  | 0 | 0 |
| Other(Self study) |  |  | 0 |
|  | **Total work load** | 44 |
|  | **Total work load/25** | 1.76 |
|  | **ECTS Credit** | 2 |