

| <b>INFORMATION ON THE BIOMEDICAL ENGINEERING DOCTORATE PROGRAM</b> |   |
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| <b>General Information</b>   | <p>The Biomedical Engineering PhD program was established in 2015 to educate creative and qualified engineers, doctoral researchers and academicians, who can define the human body as a comprehensive system using engineering methods and take part in the development of more effective diagnosis and treatment strategies. As of 2017, 2 professors, 2 associate professors, 2 assistant professors, and 1 research assistant are working full-time in the department.</p> <p>Our Ph.D. program is carefully crafted and updated periodically following international standards to meet the needs of both academic and business environments after graduation.</p>                              |
| <b>Program Purpose</b>   | <p>The aim of TOBB ETÜ Biomedical Engineering PhD Program is to graduate doctorate researches and academicians who have strong scientific and technical knowledge, able to work successfully in design, production, application and R&amp;D studies at industry, research and academic institutions. These graduates are sensitive to environmental, social, economic and professional ethics, have the responsibility and leadership qualities and contribute to scientific knowledge accumulation and produce solutions to the problems of the national industry.</p>   |
| <b>Degree Earned</b>   | <p>The students who successfully complete the program are awarded the degree of PhD in Biomedical Engineering.</p>  |
| <b>Level of Degree Earned</b>                                      | <p>This is a PhD Degree (NQF-HETR 8) program.</p>   |
| <b>Requirements and Rules of the Degree Earned</b>                 | <p>To graduate from the Biomedical Engineering PhD Program, students have to achieve a minimum of 3.00 out of 4.00 Grade Point Average and has to pass all of the courses in the curriculum with a minimum of BB/G grade (TOBB ETU Graduate Education Rules And Regulations, Article 9, Article 10). A minimum of 120 ECTS credits have to be earned for graduation. In addition, the students have to complete the mandatory seminar education and Doctoral Dissertation within a specified period, following well-defined specifications (TOBB ETU Graduate Education Rules And Regulations, Article 22).</p>   |
| <b>Registration Admission Requirements</b>                         | <p>Candidates, having Bachelors and Master Degree, can apply the Biomedical Engineering PhD Program fulfilling the minimum requirements set by the Graduate School of Natural &amp; Applied Sciences (ALES and proficiency in English language). The acceptance depends on the results of the scientific evaluation and the interviews made and the quotas announced by the Institute of Natural &amp; Applied Sciences (TOBB ETU Graduate Education Rules And Regulations, Article 5).</p>   |
| <b>Recognition of Prior Learning</b>                               | <p>Acceptance of the students, from other departments or universities, to the biomedical engineering PhD Program is carried out by taking into consideration the provisions of the relevant legislations of the YÖK and within the framework of the principles and quotas determined by the TOBB ETÜ Senate (TOBB ETU Graduate Education - Examination Regulation, Article 32). The courses, in which students have received and completed from any previous higher education institution, can be accepted if it is related with the field of study and with the proposal of the advisor, the recommendation of the related department, and the approval of the Institute's Board of Directors.</p> |

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| <b>Examinations, Assessment and Grading</b>                        | Examinations and evaluations are carried out according to article 34 of TOBB ETÜ Graduate Education - Examination Regulation. At the beginning of each semester, teaching staff announce the type of exams (e.g. quizzes, midterms, final exam), homeworks, practice and other studies in which the students are responsible and their weightings in the semester grades. The dates of the final examinations and the places where the exams are to be held are determined by the Rectorate. At the end students are graded based on the partial grades from those listed above.                         |
| <b>Teaching Style</b>  | Full time education  |
| <b>Graduation Requirements</b>                                     | To graduate from the Biomedical Engineering PhD Program, students have to achieve a minimum of 3.00 out of 4.00 Grade Point Average and has to pass all of the courses in the curriculum with a minimum of BB/G grade (TOBB ETU Graduate Education Rules And Regulations, Article 9, Article 10). A minimum of 120 ECTS credits have to be earned for graduation. In addition, the students have to complete the mandatory seminar education and Doctoral Dissertation within a specified period, following well-defined specifications (TOBB ETU Graduate Education Rules And Regulations, Article 22). |
| <b>Occupational Profiles of Graduated-Employment Opportunities</b> | Graduates of the Biomedical Engineering PhD Program can work in universities, the medical sector including design, production, maintenance and repair of medical devices, medical imaging, signal processing, medical informatics, prosthetic, orthosis and implant manufacturing, tissue engineering, genetic engineering and drug development areas.   |
| <b>Transition to a Upper Degree</b>                                | Graduates of the Biomedical PhD Program can enroll in Postdoctorate Programs.  |

| <b>Program Qualifications</b> |   |
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| <b>1</b>                      | Ability to model and solve scientific and engineering problems by conducting scientific research at academic level.   |
| <b>2</b>                      | Ability to identify, formulate and solve mathematics, science and engineering related problems by associating them with biology.  |
| <b>3</b>                      | Ability to use knowledge and expertise in their PhD field to design novel systems, processes, biomedical devices, products or materials under realistic constraints and conditions to meet specific requirements.   |
| <b>4</b>                      | Ability to design and carry out experiments, to collect data, to analyze and interpret results; ability to make measurements on living systems and collect and interpret data from these measurements; ability to solve problems related with interaction between materials and living systems. |
| <b>5</b>                      | Ability to work individually and in disciplinary/interdisciplinary teams effectively; ability to lead, to take responsibility and to generate novel solutions to complex problems.  |
| <b>6</b>                      | Ability to communicate effectively in Turkish and English through oral, written and visual methods.   |
| <b>7</b>                      | Ability to reach out scientific information resources and access knowledge with consciousness, to monitor developments in science and technology and continuous self-improvement.   |
| <b>8</b>                      | Having knowledge and consulting skill about the research carried out in companies and research centers, sectoral problems and solutions, risk and change management.  |
| <b>9</b>                      | Having conformity with biomedical ethical principles, professional and ethical responsibility.  |
| <b>10</b>                     | Have knowledge about the effects of biomedical engineering applications on health, environment and safety in universal and societal dimensions; awareness of the legal consequences of engineering solutions.   |

| NQF-HETR PROGRAM QUALIFICATION MATRIX                           |              |  |  | PROGRAM QUALIFICATIONS  |   |   |   |   |   |   |   |   |    |   |   |   |
|---|--------------|--|--|---|---|---|---|---|---|---|---|---|----|---|---|---|
| Program : Biomedical Engineering                                |              |  |  | 1   | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |   |   |   |
| Related NQF-HETR Core Field: Engineering (Academic) - Doctorate |              |  |  |   |   |   |   |   |   |   |   |   |    |   |   |   |
| CORE AREA QUALIFICATIONS  | INFORMATION  | Theoretical - Factual                                    | Understands and applies the basic sciences, mathematics and engineering sciences at a high level.  | X   | X | X | X |   |   | X |   |   |    |   |   |   |
|   |              |  | Has extensive and in-depth knowledge including the latest developments in his / her field.   | X   | X | X | X |   |   | X |   |   |    |   |   |   |
|   | SKILLS       | Cognitive - Applied                                      | Has access to the most up-to-date information in an area and has a high level of competence in the methods and skills required to comprehend them.   | X   | X | X | X | X |   | X | X |   |    | X |   |   |
|   |              |  | Undertakes a comprehensive study that brings innovation to knowledge or technology, develops a new scientific method or technological product / process, or applies a known method to a new field. | X   | X | X | X | X |   | X | X |   |    |   | X |   |
|   |              |  | Deviates and applies basic sciences, mathematics and engineering sciences at a high level.   | X   | X | X | X |   |   | X | X |   |    |   | X |   |
|   |              |  | Has extensive and in-depth knowledge including the latest developments in his / her field.   | X   | X | X | X |   |   | X | X |   |    |   | X |   |
|   |              |  | Perceives, designs, implements and concludes the original research process independently; it manages this process.   | X   | X | X | X | X |   | X | X |   |    |   | X |   |
|   |              |  |  |   |   |   |   |   |   |   |   |   |    |   |   |   |
|   | COMPETENCIES | Ability to work independently and to take responsibility | Contributes to the science and technology literature by publishing the outputs of his academic studies in a prestigious academic setting.  | X   | X | X | X | X |   | X | X | X | X  | X |   |   |
|   |              |  | Undertakes a comprehensive study that brings innovation to knowledge or technology, develops a new scientific method or technological product / process, or applies a known method to a new field. | X   |   |   |   | X |   | X | X |   |    |   |   |   |
|   |              |  | Transfers scientific, technological, social and cultural developments to the assembly with the awareness of scientific impartiality and ethical responsibility.                                    | X   |   |   |   | X |   | X | X |   |    |   |   |   |
|   |              | Learning Competence                                      |  | Perceives, designs, implements and concludes the original research process independently; it manages this process.  | X | X | X | X | X | X | X | X | X  | X | X |   |
|   |              |  |  | Has access to the most up-to-date information in an area and has a high level of competence in the methods and skills necessary to comprehend them.   | X | X | X | X | X | X | X | X | X  | X | X | X |
|   |              |  |  | Undertakes a comprehensive study that brings innovation to knowledge or technology, develops a new scientific method or technological product / process, or applies a known method to a new field.  | X | X | X | X | X | X | X | X | X  | X | X | X |
|   |              |  |  | Contributes to the science and technology literature by publishing the outputs of his academic studies in a prestigious academic setting.   | X | X | X | X | X | X | X | X | X  | X | X | X |
|   |              | Communication and Social Competence                      |  | Makes critical analysis, synthesis and evaluation of ideas and developments in the field of expertise.  | X | X | X | X |   |   | X |   |    |   | X |   |
|   |              |  |  | Communicates effectively with the professionals and the wider scientific and social communities in writing and verbal communication and communicate and discuss advanced written, oral and visual communication using a foreign language at least at the European Language Portfolio C1 General Level.        | X | X | X | X |   |   | X | X |    |   |   | X |
|   |              | Field Specific Competence                                |  | Evaluates scientific, technological, social and cultural developments and conveys the gathering with the consciousness of scientific impartiality and ethical responsibility.   | X | X | X | X | X | X |   |   |    | X | X |   |
|   |              |  |  | Interacts effectively with staff in the field of expertise and wider scientific and social communities in written and oral communication and communicate and discusses advanced written, oral and visual communication using a foreign language at least at the European Language Portfolio C1 General Level. | X | X | X | X | X | X | X |   |    |   | X | X |

