

**Ministry of Higher Education and Scientific Research**

**Scientific Supervision and Scientific Evaluation Apparatus**

**Directorate of Quality Assurance and Academic Accreditation**

**Accreditation Department**

**Academic Program and Course Description Guide Academic Program and Course Description Guide**

**Academic Program and Course Description Guide**

**2024**

**Introduction:**

The educational program is a well-planned set of courses that include procedures and experiences arranged in the form of an academic syllabus. Its main goal is to improve and build graduates' skills so they are ready for the job market. The program is reviewed and evaluated every year through internal or external audit procedures and programs like the External Examiner Program.

The academic program description is a short summary of the main features of the program and its courses. It shows what skills students are working to develop based on the program's goals. This description is very important because it is the main part of getting the program accredited, and it is written by the teaching staff together under the supervision of scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the subjects and paragraphs of the previous guide in light of the updates and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (annual, quarterly), as well as the adoption of the academic program description circulated according to the letter of the Department of Studies T 3/2906 on 3/5/2023 regarding the programs that adopt the Bologna Process as the basis for their work.

In this regard, we can only emphasize the importance of writing an academic programs and course description to ensure the proper functioning of the educational process.

**Concepts and terminology:**

**Academic Program Description**: The academic program description provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

**Course Description**: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the students to achieve, proving whether they have made the most of the available learning opportunities. It is derived from the program description.

**Program Vision:** An ambitious picture for the future of the academic program to be sophisticated, inspiring, stimulating, realistic and applicable.

**Program Mission:** Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions.

**Program Objectives:** They are statements that describe what the academic program intends to achieve within a specific period of time and are measurable and observable.

**Curriculum Structure:** All courses / subjects included in the academic program according to the approved learning system (quarterly, annual, Bologna Process) whether it is a requirement (ministry, university, college and scientific department) with the number of credit hours.

**Learning Outcomes:** A compatible set of knowledge, skills and values acquired by students after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

**Teaching and learning strategies:** They are the strategies used by the faculty members to develop students’ teaching and learning, and they are plans that are followed to reach the learning goals. They describe all classroom and extra-curricular activities to achieve the learning outcomes of the program.

**Academic Program Description Form**

**University Name: University of Baghdad**

**Faculty/Institute: AL-Khwarizmi College of Engineering**

**Scientific Department: Biomedical Engineering**

**Academic or Professional Program Name: B.Sc**

**Final Certificate Name: ..............**

**Academic System: Quarterly**

**Description Preparation Date: 28/3/2024**

**File Completion Date: 28/3/2024**

**Signature:**

**Head of Department Name:**

**Date:**

**Signature:**

**Scientific Associate Name:**

**Date:**

**The file is checked by:**

**Department of Quality Assurance and University Performance**

**Director of the Quality Assurance and University Performance Department:**

**Date:**

**Signature:**

**Approval of the Dean**

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| 1. **Program Vision** |
| **The scientific department seeks to present academically, scientifically, and even practically in the local and international arena. The reliability of scientific laboratories is within national standards first and international standards second. Apply advanced studying and teaching systems and keeping updated with the latest developments in this field, especially e-learning. Furthermore, studying recent experiences in education and working on apply them in line with the changing standards of scientific and practical requirements. Planning to build postgraduate studies with high standard quality by preparing material requirements from laboratories and others and the scientific needs of researchers, in addition to researchers and supervisors who own a distinguished research line and global scientific publication.** |

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| 1. **Program Mission** |
| **he most critical thing that Biomedical Engineering department seeks is to simulate the real need of the medical engineering community in all its various departments; private and governmental sections. This simulation of the changing need is through changing and developing the curricula in line with the different variables, starting from the changing need to the different technological leaps in the fields of medical sciences. Communicating with this kind of variables and achieving its impact on the graduate engineer is the main reason that motivates the department to open up to the outside world by communicating with the latest updated developments in medical sciences by participating in international seminars and conferences, besides holding various workshops and several student activities.** |

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| 1. **Program Objectives** |
| **Graduate an engineer who is distinguished by his scientific and practical knowledge of engineering applications in all health and medical fields; In addition, he will have distinct knowledge that gives him the ability to design, develop, maintain, and operate modern medical devices in a way that contributes to the scientific and medical movement. Also, he will be able to conduct research related to the medical and life aspect. Graduate an engineer who can apply advanced diagnostic and therapeutic concepts related to modern engineering techniques in the medical field. Preparing engineering staff with a good medical background to enable them to communicate with all parties of the medical community to enhance and enrich the requirements of the Iraqi Ministry of Health for this specialty. Participate in the development of this rare specialty in the Arab countries. Work to intensify the use of computers in all medical fields by updating and developing existing software and invent new computer systems primarily directed to support the doctors in performing their diagnostic and therapeutic mission by using advanced methods.Preparing a scientific engineering personality that can communicate with the requirements of the labor market either the private or government sectors in medical engineering field.** |

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| 1. **Program Accreditation** |
| N/A |

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| 1. **Other external influences** |
| N/A |

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| 1. **Program Structure** | | | | |
| **Program Structure** | **Number of Courses** | **Credit hours** | **Percentage** | **Reviews\*** |
| **Institution Requirements** |  |  |  |  |
| **College Requirements** |  |  |  |  |
| **Department Requirements** |  |  |  |  |
| **Summer Training** |  |  |  |  |
| **Other** |  |  |  |  |

\* This can include notes whether the course is basic or optional.

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| 1. **Program Description** | | | | |
| **Year/Level** | **Course Code** | **Course Name** | **Credit Hours** | |
| **2023-2024 / Fifth** |  | **Neural Engineering** | **theoretical** | **practical** |
|  |  |  | **30** | **N/A** |

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| 1. **Expected learning outcomes of the program** | |
| **Knowledge** | |
| Learning Outcomes 1 | **(a) an ability to apply knowledge of mathematics, science, and engineering.**  **(b) an ability to identify, formulate, and solve engineering problems.**  **(c) an ability to communicate effectively.**  **(d) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.** |
| **Skills** | |
| Learning Outcomes 2 | 1. (a) **Understanding the anatomy, physiology, and function of the nervous system, including the brain and peripheral nervous system.** 2. (b) **Comprehensive knowledge of the theoretical foundations of artificial neural networks, including their architecture, functioning, and learning algorithms.** 3. (c) **Acquiring knowledge about using instruments to measure and manipulate neural signals, such as, fMRI (functional magnetic resonance imaging), EEG (electroencephalography), MEG, TMS, FNIRS,…** |
| **Ethics** | |
| Learning Outcomes 3 | **Gaining an understanding of the ethical considerations and regulatory requirements associated with working in the field of neural engineering, particularly when developing medical devices or conducting human research.** |

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| 1. **Teaching and Learning Strategies** |
| **1-Detailed explanation of the scientific material.**  **2- Students’ participation in solving mathematical problems of ANN in the class time.**  **3- Discussion and dialogue about vocabulary related to the topic.** |

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| 1. **Evaluation methods** |
| **Quizes, mid-term exam, assignments and seminar.** |

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| 1. **Faculty** | | | | | | |
| **Faculty Members** | | | | | | |
| **Academic Rank** | **Specialization** | | **Special Requirements/Skills (if applicable)** | | **Number of the teaching staff** | |
| **General** | **Special** |  | | **Staff** | **Lecturer** |
| lecturer | **Biomedical Eng.** | **Biomedical Eng.** |  |  | yes |  |

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| **Professional Development** |
| **Mentoring new faculty members** |
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| **Professional development of faculty members** |
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| 1. **Acceptance Criterion** |
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| 1. **The most important sources of information about the program** |
| * **Neural Engineering, He** * **Neuroengineering, DiLorenzo** * **Principles of Neural Science, Kandel** * **Biological Psychology, Kalat** |

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| 1. Program Development Plan |
| * **By staying updated with the latest developments in the engineering field** * **By Using modern technologies in teaching which have the potential to transform teaching and learning by providing new ways to engage students, individualize instruction, and improve educational outcomes**. |

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| **Program Skills Outline** | | | | | | | | | | | | | | | |
|  | | | | **Required program Learning outcomes** | | | | | | | | | | | |
| **Year/Level** | **Course Code** | **Course Name** | **Basic or optional** | **Knowledge** | | | | **Skills** | | | | **Ethics** | | | |
| **A1** | **A2** | **A3** | **A4** | **B1** | **B2** | **B3** | **B4** | **C1** | **C2** | **C3** | **C4** |
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* **Please tick the boxes corresponding to the individual program learning outcomes under evaluation.**

**Course Description Form**

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| 1. Course Name: | | | | | | | | |
| Neural Engineering | | | | | | | | |
| 1. Course Code: | | | | | | | | |
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| 1. Semester / Year: | | | | | | | | |
| Second semester / 2024 | | | | | | | | |
| 1. Description Preparation Date: | | | | | | | | |
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| 1. Available Attendance Forms: | | | | | | | | |
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| 1. Number of Credit Hours (Total) / Number of Units (Total) | | | | | | | | |
| Weekly 2 hours (Total 30 hours)/ 2 units | | | | | | | | |
| 1. Course administrator's name (mention all, if more than one name) | | | | | | | | |
| Name: Zahraa A. Al-Saffar  Email: znzs\_007@kecbu.uobaghdad.edu.iq | | | | | | | | |
| 1. Course Objectives | | | | | | | | |
| **Course Objectives** | | | | Understand the basic principles of brain anatomy and function  Learn about the principles of neurophysiologic recording and imaging technologies.  Learn about the applications of neural engineering  Understand the current challenges in neural engineering. | | | | |
| 1. Teaching and Learning Strategies | | | | | | | | |
| **Strategy** | | 1-Detailed explanation of the scientific material.  2- Students’ participation in solving mathematical problems of ANN in the class time.  3- Discussion and dialogue about vocabulary related to the topic. | | | | | | |
| 1. Course Structure | | | | | | | | |
| **Week** | **Hours** | | **Required Learning Outcomes** | | **Unit or subject name** | | **Learning method** | **Evaluation method** |
| 1  2  3  4  5  6  7  8  9  10  11  12  13  14  15 | 2  2  2  2  2  2  2  2  2  2  2  2  2  2  2 | |  | | Introduction of neural engineering  Basic principles of brain anatomy  and physiology.  electroencephalogram (EEG) and  MEG.  Brain computer interface (BCI)  Functional megnatic resonance  imaging (fMRI)  Artificial Neural Network (ANN)  ANN design and examples  ANN implementation by Matlab.  Deep brain stimulation    Functional near infrared spectroscopy (fNIRS)  Transcrainal magnetic stimulation  (TMS)  Mid – term exam  Group 1 Students’ Seminar  Group 2 Students’ Seminar  Review all the information given in this course | |  |  |
| 1. Course Evaluation | | | | | | | | |
| Quizes, mid-term exam, assignments and seminar | | | | | | | | |
| 1. Learning and Teaching Resources | | | | | | | | |
| Required textbooks (curricular books, if any) | | | | | | N/A | | |
| Main references (sources) | | | | | |  | | |
| Recommended books and references (scientific journals, reports...) | | | | | | Neural Engineering, He  Neuroengineering, DiLorenzo  Principles of Neural Science, Kandel  Biological Psychology, Kalat | | |
| Electronic References, Websites | | | | | |  | | |