**Course Description Form**

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| 1. Course Name:
 |
| Medical Instrumentation  |
| 1. Course Code:
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| WBM-41-04 |
| 1. Semester / Year:
 |
| 1st Semester / 2023 2024 |
| 1. Description Preparation Date:
 |
|  19/3/2024 |
| 1. Available Attendance Forms:
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| Weekly (Theoretical & Practical) |
| 1. Number of Credit Hours (Total) / Number of Units (Total)
 |
| 45 Hrs. Theoretical & 30 Hrs. Practical / 3 Units |
| 1. Course administrator's name (mention all, if more than one name)
 |
| Name: Dr. Hayder A. Yousif Email: hayder.ab@uowa.edu.iq |
| 1. Course Objectives
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| **Course Objectives** | The aim of this study is to understand the principle working some laboratory and diagnostic devices that related to pathological analyzes of diseases that effect on the human body, and to diagnose some diseases that related to the heart, brain, or muscle damage. |
| 1. Teaching and Learning Strategies
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| **Strategy** | The student will be able to understand the principle of operation of the Laboratory and Diagnostic Instrumentation and its dealings with the human body, and to graduate engineers specialized in the field of biomedical engineering, which relates to human life with the medical device and work in the medical engineering environment. |
| 1. Course Structure
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| **Week**  | **Hours**  | **Required Learning Outcomes**  | **Unit or subject name**  | **Learning method**  | **Evaluation method**  |
| 1 | 3 | Introduction to laboratory medical devices | Introduction to Medical Instruments | Theoretical & Practical | Daily test and oral questions |
| 2 | 3 | Identifying the bio- electrical signals | Bio-electric signals | Theoretical & Practical | Daily test and oral questions |
| 3 | 3 | The main purpose of using a centrifuge  | Centrifuge (Part 1) | Theoretical & Practical | Daily test and oral questions |
| 4 | 3 |  Principle working , types and method of using the device | Centrifuge (Part 2) | Theoretical & Practical | Daily test and oral questions |
| 5 | 3 | The main purpose of using a blood cell counting device | Blood Cell Counter (Part1) | Theoretical & Practical | Daily test and oral questions |
| 6 | 3 | The principle working and method of using the device. | Blood Cell Counter (Part2) | Theoretical & Practical | Daily test and oral questions |
| 7 | 3 | Identify spectrophotometer and the purpose of its use in the laboratory, in addition to the method of calculating concentrations by knowing the absorbance | Spectrophotometer  | Theoretical & Practical | Daily test and oral questions |
| 8 | 3 | Identify the colorimeter device and the purpose of its use in the laboratory, in addition to knowing the concentrations of the substance through the absorbance percentage | Colorimeter  | Theoretical & Practical | Daily test and oral questions |
| 9 | 3 | Identifying the device and the purpose of its use in the laboratory, in addition to knowing the concentrations of specific elements such as sodium and potassium, according to the required test. | Flame photometer | Theoretical & Practical | Daily test and oral questions |
| 10 | 3 | Learn about heart signals, how they are generated, and how blood is pumped to the body | ECG (Part 1) | Theoretical & Practical | Daily test and oral questions |
| 11 | 3 | Learn about ways to measure cardiac electrical signals by knowing the principle of the device’s operation | ECG (Part 2) | Theoretical & Practical | Daily test and oral questions |
| 12 | 3 | Identify muscle signals and how they are generated | EMG (Part 1) | Theoretical & Practical | Daily test and oral questions |
| 13 | 3 | Learn about methods of measuring muscle electrical signals and how to process them | EMG (Part 2) | Theoretical & Practical | Daily test and oral questions |
| 14 | 3 | Learn about brain signals and how it generate. | EEG (Part 1) | Theoretical & Practical | Daily test and oral questions |
| 15 | 3 | Learn how to record brain signals and how to process them | EEG (Part 2) | Theoretical & Practical | Daily test and oral questions |
| 1. Course Evaluation
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| 1- Weekly exams2- Monthly exams3- Participations inside the class4-present the seminars5- Writing reports |
| 1. Learning and Teaching Resources
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| Required textbooks (curricular books, if any) | Handbook of Biomedical InstrumentationSecond Edition - R S KHANDPUR |
| Main references (sources) | Handbook Of Biomedical Instrumentation3rd Edition933920543X · 9789339205430By R S Khandpur |
| Recommended books and references (scientific journals, reports...) | Standard handbook of biomedical engineering & design - M Kutz |
| Electronic References, Websites | <https://books.google.iq/books/about/Handbook>of\_Biomedical\_Instrumentation.html?idesc=y |