**Course Description Form**

|  |
| --- |
| 1. Course Name:
 |
| Modern Medical Equipment  |
| 1. Course Code:
 |
| WBM-52-02  |
| 1. Semester / Year:
 |
| 2nd Semester / 2024 |
| 1. Description Preparation Date:
 |
|  19/3/2024 |
| 1. Available Attendance Forms:
 |
| Weekly (Theoretical) |
| 1. Number of Credit Hours (Total) / Number of Units (Total)
 |
| 45 Hrs. Theoretical / 2 Unit |
| 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
 |
| **Course Objectives** | 1. Identify the medical devices implanted in the human body
2. How to design the part to be implanted in the human body According to the nature of the planting
3. Learn about open heart surgeries and pulmonary resuscitation
4. How to use the artificial heart, its benefits and harms
5. Knowledge of manufactured heart valves
6. Study the dialysis process and how to use artificial kidneys
 |
| 1. Teaching and Learning Strategies
 |
| **Strategy** | To make the student able to understand the working principle of the modern medical device 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
 |
| **Week**  | **Hours**  | **Required Learning Outcomes**  | **Unit or subject name**  | **Learning method**  | **Evaluation method**  |
| 1 | 3 | Identifying prosthetic organs | Artificial Organs and Prosthetic Devices | Theoretical | Daily test and oral questions |
| 2 | 3 | Learn how to perform open heart surgery | Heart-Lung Machine | Theoretical | Daily test and oral questions |
| 3 | 3 | Identify the types of blood pumps | Peristaltic Head Pump | Theoretical | Daily test and oral questions |
| 4 | 3 | Know the requirements for designing medical pumps | Major Design Considerations | Theoretical | Daily test and oral questions |
| 5 | 3 | Study of the artificial heart and its supporting devices | Artificial Hearts and Ventricular Assist Devices (VADs) | Theoretical | Daily test and oral questions |
| 6 | 3 | Identify the causes of heart failure during surgery | Heart Failure | Theoretical | Daily test and oral questions |
| 7 | 3 | Know the basics about the artificial heart | AbioCor Artificial Heart, and Basic Components | Theoretical | Daily test and oral questions |
| 8 | 3 | Identifying the artificial kidney and the dialysis process | Artificial Kidney and Dialysis System | Theoretical | Daily test and oral questions |
| 9 | 3 | Learn how to calculate the time required for the blood filtration process | Prediction of Time required for dialysis, and Diffusion. | Theoretical | Daily test and oral questions |
| 10 | 3 | Study the rules of blood filtering | Role of Ultrafiltration | theoretical | Daily test and oral questions |
| 11 | 3 | Study of the dialysis machine | Hemodialysis Machine | Theoretical | Daily test and oral questions |
| 12 & 13 | 3 | Pacemaker study | Artificial Pacemakers | theoretical | Daily test and oral questions |
| 14 | 3 | Learn how to install medical electrodes | Pulse Generator, Pacing Leads and Electrodes, Sensing Circuits | Theoretical | Daily test and oral questions |
| 15 | 3 | Study of electrical circuits related to modern medical equipment | Timing Circuits, Power Source, Telemetry Circuit, and Programmers | Theoretical | Daily test and oral questions |
| 1. Course Evaluation
 |
| 1- Weekly exams2- Monthly exams3- Participations inside the class4-Ppresent the seminars |
| 1. Learning and Teaching Resources
 |
| Required textbooks (curricular books, if any) | Introduction to Biomedical Engineering, Joseph D. Bronzino, 3rd Ed. 2012, Academic Press. |
| Main references (sources) | 1. Introduction to Biomedical Engineering, Joseph D. Bronzino, 3rd Ed. 2012, Academic Press.
2. Medical Devices and Systems, Joseph D. Bronzino, 1st Ed. 2006, CRC, Taylor & Francis.

The Biomedical Engineering Handbook, Joseph D. Bronzino, 4th Ed. 2015, CRC Press. |
| 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 |