**Course Description Form**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1. Course Name: | | | | | | | | |
| Biomaterial I | | | | | | | | |
| 1. Course Code: | | | | | | | | |
| WBM-41-02 | | | | | | | | |
| 1. Semester / Year: | | | | | | | | |
| Semester 1/ 4th | | | | | | | | |
| 1. Description Preparation Date: | | | | | | | | |
| 2024-09-19 | | | | | | | | |
| 1. Available Attendance Forms: | | | | | | | | |
| presence in the classroom | | | | | | | | |
| 1. Number of Credit Hours (Total) / Number of Units (Total) | | | | | | | | |
| 30 Hours / 2 Units | | | | | | | | |
| 1. Course administrator's name (mention all, if more than one name) | | | | | | | | |
| Name: Ahmed Odea  Email: | | | | | | | | |
| 1. Course Objectives | | | | | | | | |
| **Course Objectives** | | | | Biomaterials are used in medical devices and a broad range of health care products. The goal of studying biomaterials is to understand how the body's natural tissues are organized on a compositional, structural, and properties basis | | | | |
| 1. Teaching and Learning Strategies | | | | | | | | |
| **Strategy** | | 1- Classification of biological materials used in medicine and their special requirements  2- An understanding of the concept of biocompatibility and methods for testing biomaterials  3- A description and explanation of the surfaces of biological materials and the different methods of analysis  4- Understand ways to improve biocompatibility and practical aspects of biomedical devices: sterilization, manufacturing, clinical trials and ethical issues.  5- Analysis of permanent and biodegradable agriculture by referring to case studies | | | | | | |
| 1. Course Structure | | | | | | | | |
| **Week** | **Hours** | | **Required Learning Outcomes** | | **Unit or subject name** | | **Learning method** | **Evaluation method** |
| 1 | 2 | | Introduction | | Introduction , History of Biomaterials of Knowledge to Develop Biomaterials , basics of biomaterials , synthesis, characterization, testing, applications | | Lectures presented in PDF format | Daily exams + homework assignments + monthly exams |
| 2 | 2 | | uses of Biomaterials | | uses of Biomaterials, How are biomaterials used in current medical practice, New examples of biomaterials application, classification of biomaterials | | Lectures presented in PDF format | Daily exams + homework assignments + monthly exams |
| 3 | 2 | | Selection of Biomedical materials Evaluation | | Selection of ‎Biomedical ‎materials ‎Evaluation ‎‎(polymers, ‎Metals, ‎Composite ‎Ceramics. ‎Selection ‎parameters for ‎biomaterials. ‎Analysis of ‎the problem; ‎Consideration ‎of ‎requirement; ‎Consideration ‎of available ‎material and ‎their ‎properties ‎leading to. ‎Choice of ‎material.‎ | | Lectures presented in PDF format | Daily exams + homework assignments + monthly exams |
| 4 | 2 | | Subjects are important to Biomaterials | | Subjects are important to Biomaterials science, Bio-ceramics, Types of Bio-ceramics – Tissue Attachment, Nearly Inert Crystalline Bio ceramics. | | Lectures presented in PDF format | Daily exams + homework assignments + monthly exams |
| 5 | 2 | | Porous Ceramics | | Porous Ceramics, Bioactive Glasses and Glass-Ceramics | | Lectures presented in PDF format | Daily exams + homework assignments + monthly |
| 6 | 2 | | Biodegradable Materials, | | Biodegradable Materials, Resorbable Ceramics, Resorbable polymers, Resorbable metals, | | Lectures presented in PDF format | Daily exams + homework assignments + monthly |
| 7 | 2 | | Properties of Biomaterials | | Properties of Biomaterials, Physical Properties, Impact of biomaterial surface physical properties on biological responses, Mechanical Properties of Biomaterials | | Lectures presented in PDF format | Daily exams + homework assignments + monthly |
| 8 | 2 | | Chemical Properties of Bio ceramics | | Chemical Properties of Bio ceramics, Impact of biomaterial surface chemical properties on biological responses, Solubility and Erosion, Leaching of Constituents, Corrosion | | Lectures presented in PDF format | Daily exams + homework assignments + monthly |
| 9 | 2 | | Polymer as Biomaterial | | Polymer as Biomaterial, General Techniques, Materials in Maxillofacial Prosthetic, Latexes, Polyurethane polymers, Acrylic Resins, Resin Teeth for Prosthodontics' Applications | | Lectures presented in PDF format | Daily exams + homework assignments + monthly |
| 10 | 2 | | Polymer as Biomaterial | | synthesis, testing and applications of polymers | | Lectures presented in PDF format | Daily exams + homework assignments + monthly |
| 11 | 2 | | Metals and Alloys | | Metals and Alloys, Stainless Steels, CoCr Alloys, Titanium and its Alloys | | Lectures presented in PDF format | Daily exams + homework assignments + monthly |
| 12 | 2 | | Metals and Alloys | | synthesis, testing and applications of Metals and Alloys | | Lectures presented in PDF format | Daily exams + homework assignments + monthly |
| 13 | 2 | | biomaterials characterization | | biomaterials characterization, Physical and chemical characterizations, Mechanical characterization of biomaterials, Surface characterization of biomaterials | | Lectures presented in PDF format | Daily exams + homework assignments + monthly |
| 14 | 2 | | Corrosion | | Defined and form of corrosion | | Lectures presented in PDF format | Daily exams + homework assignments + monthly |
| 15 |  | | Final exam | |  | |  |  |
| 1. Course Evaluation | | | | | | | | |
|  Daily exams with practical and scientific questions. ‏   Participation scores for difficult competition questions among students   Establishing grades for environmental duties and the reports assigned to them   Semester exams for the curriculum, in addition to the mid-year exam and final exam | | | | | | | | |
| 1. Learning and Teaching Resources | | | | | | | | |
| Required textbooks (curricular books, if any) | | | | | | Biomaterials Science: An Introduction to Materials in Medicine | | |
| Main references (sources) | | | | | | Biomaterials Science: An Introduction to Materials in Medicine | | |
| Recommended books and references (scientific journals, reports...) | | | | | | An Introduction to Tissue-Biomaterial Interactions | | |