**Course Description Form**

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| 1. Course Name:
 |
| Biomaterial I |
| 1. Course Code:
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| WBM-41-02 |
| 1. Semester / Year:
 |
| Semester 1/ 4th |
| 1. Description Preparation Date:
 |
| 2024-09-19 |
| 1. Available Attendance Forms:
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| presence in the classroom |
| 1. Number of Credit Hours (Total) / Number of Units (Total)
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| 30 Hours / 2 Units |
| 1. Course administrator's name (mention all, if more than one name)
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| Name: Ahmed OdeaEmail:  |
| 1. Course Objectives
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| **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
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| **Strategy** | 1- Classification of biological materials used in medicine and their special requirements2- An understanding of the concept of biocompatibility and methods for testing biomaterials3- A description and explanation of the surfaces of biological materials and the different methods of analysis4- 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
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| **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
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|  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
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| 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 |