

Course Description Form

1. Course Name:
Biomaterials
2. Course Code:
WBM-41-02
3. Semester / Year:
Second Semester / Fourth Year
4. Description Preparation Date:
27/02/2026
5. Available Attendance Forms:
In-class attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
30 Hours / 2 Credits
7. Course administrator's name (mention all, if more than one name)
Prof. Dr. Ahmed Hadi Abdulameer a.alyasari@uokerbala.edu.iq
8. Course Objectives
Biomaterials are used in medical devices and a wide range of healthcare products. The objective of studying biomaterials is to understand how natural body tissues are organized structurally and in terms of their biological properties.
9. Teaching and Learning Strategies
<ul style="list-style-type: none">• Classification of biological materials used in medicine and their specific requirements.• Understanding the concept of biocompatibility and methods for testing biomaterials.• Description and analysis of biomaterial surfaces and different methods of characterization.• Improving biocompatibility and practical aspects: sterilization manufacturing, clinical trials, and ethical issues.• Analysis of permanent and biodegradable implants through case studies.

10. Course Structure				
Week	Hours	Unit or subject name and required learning outcomes	Learning method	Evaluation method
1	2	Introduction and history of biomaterials; fundamentals; synthesis, characterization, testing, applications.	Lecture notes as pdf	Quizzes and monthly exams
2	2	Applications and classification of biomaterials in medical practice.	Lecture notes as pdf	Quizzes and monthly exams
3	2	Evaluation and selection of biomedical materials (polymers, metals, ceramics, composites).	Lecture notes as pdf	Quizzes and monthly exams
4	2	Important topics in biomaterials; bioceramics and tissue attachment.	Lecture notes as pdf	Quizzes and monthly exams
5	2	Porous ceramics, bioactive glasses, glass-ceramics.	Lecture notes as pdf	Quizzes and monthly exams
6	2	Biodegradable and resorbable materials (ceramics, polymers, metals).	Lecture notes as pdf	Quizzes and monthly exams
7	2	Physical and mechanical properties of biomaterials and their biological effects.	Lecture notes as pdf	Quizzes and monthly exams
8	2	Chemical properties of bioceramics; dissolution, corrosion, leaching.	Lecture notes as pdf	Quizzes and monthly exams
9	2	Polymers as biomaterials; dental and maxillofacial applications.	Lecture notes as pdf	Quizzes and monthly exams

10	2	Synthesis, testing, and applications of polymers.	Lecture notes as pdf	Quizzes and monthly exams
11	2	Metals and alloys; stainless steel, Co–Cr alloys, titanium and its alloys.	Lecture notes as pdf	Quizzes and monthly exams
12	2	Synthesis, testing, and applications of metals and alloys.	Lecture notes as pdf	Quizzes and monthly exams
13	2	Physical, chemical, and mechanical characterization of biomaterials.	Lecture notes as pdf	Quizzes and monthly exams
14	2	Corrosion – definition and forms.	Lecture notes as pdf	Quizzes and monthly exams
15		Final Exam		

11. Learning and Teaching Resources

Required Textbook	Biomaterials Science: An Introduction to Materials in Medicine