1. Course Name:	
Medical Diagnostic Instrumentation I	
2. Course Code:	
MIE31201	
3. Semester / Year:	
Semester	
4. Description Preparation Date:	
1-12-2025	
5. Available Attendance Forms:	
Weekly (Theory: 2 hours, practically: 2 hours)	
6. Number of Credit Hours (Total) / Number of Units (Total)	
Theory: 30 Hours **Practically: 30 hours** **Total: 60 hours** **Total Units: 7** **Total student workload: 179 hours**	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Haneen Dheyaa Jabbar **Email: Haneen.dheyaa@muc.edu.iq**	
8. Course Objectives	
Course Objectives	The module aims: 1. To generate a grounding knowledge base for the students, which allows them to understand the technology and principles applied in a medical environment. 2. To understand the nature of physiological signals and how they can be acquired, analysed, and visualised. 3. To provide a grounding in the theory of biomedical measurement systems, including sensors, signal conditioning methods, measurement techniques, patient interfacing, and instrumentation used in biomedicine. 4. To introduce students to design strategies of biomedical devices. 5. To develop prototypes of medical instruments in an accompanying laboratory session. 6. To demonstrate how modern biomedical instruments combine traditional instrumentation techniques and technological innovation, including software presentation and analysis of data. 7. To be able to enter a wide range of medical-related industries, clinical environments or professional biomedical research programs.
9. Teaching and Learning Strategies	

Strategies	The learning and teaching strategies employed in this module can vary depending on the specific course. However, here are some common strategies that may be used with this course: **Teaching methods include:** • lectures • seminars • tutorials • lab experiments • design assignments • industrial visits • professional training • a variety of projects **Assessment:** Methods of assessment include a combination of: • coursework • group project reports • lab reports • written exams

6. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**Th.:2 Pr.: 2**	Fundamentals of medical instrumentation.	Fundamentals of Medical Instrumentation. Introduction to the Medical Diagnostic Instrumentation Laboratory.	Lect. Lab.	Exam
2	**Th.:2 Pr.: 2**	Bioelectric signals and electrodes.	Bioelectric Signals and Electrodes, Physiological Transducers, Recording System. Biomedical signal recorders (ECG).	Lect. Lab.	Quiz
3	**Th.:2 Pr.: 2**	Biomedical signal recording systems.	Biomedical Recorders (ECG, EMG, EEG, EOG, VCG, PCG, etc.).	Lect.	Homework

			Biomedical signal recorders (ECG).	Lab.	
4	**Th.:2 Pr.: 2**	Respiratory measurement and oximetry.	Respiratory System Measurements, Respiration Monitoring and Apnea Detection, and Oximeters. Biomedical signal recorders (EMG, EEG, ERG, EOG).	Lect. Lab.	Exam
5	**Th.:2 Pr.: 2**	Patient monitoring system concepts.	Patient Monitoring Systems, Coronary Care Unit (CCU). Equipment for patient monitoring systems (CCU) and ambulatory monitoring instruments.	Lect. Lab.	Quiz
6	**Th.:2 Pr.: 2**	Arrhythmia and ambulatory monitoring.	Arrhythmia and Ambulatory Monitoring Instruments. Equipment for fetal monitoring systems.	Lect. Lab.	Homework
7	**Th.:2 Pr.: 2**	Midterm examination assessment.	**Mid-term Exam**	Lect. & Lab.	Exam
8	**Th.:2H Pr.: 2H**	Fetal monitoring and endoscopy.	Foetal Monitoring Instruments/Systems. Blood Flow and Cardiac Output Measurements and Devices. Endoscopy. Equipment for cardiac output measurements & for blood flow measurement, and for Endoscopy.	Lect. Lab.	Quiz
9	**Th.:2H Pr.: 2H**	Advanced vision testing instruments.	Advanced Vision and Eye Testing Instruments. Advanced vision and eye testing instruments (Ophthalmoscopy, Retinoscopy, Ocular tonometry, Slit lamp, Optical Coherence Tomography, etc.).	Lect. Lab.	Homework
10	**Th.:2H Pr.: 2H**	Ophthalmic diagnostic testing systems.	Advanced Vision and Eye Testing Instruments. Advanced vision and eye testing instruments (continued).	Lect. Lab.	Exam
11	**Th.:2H Pr.: 2H**	Pulmonary function testing system.	Pulmonary Function System. Pulmonary function testing equipment (Spirometer, Body	Lect. Lab.	Quiz

			plethysmograph, Pulmonary gas analyzer, Blood gas analyzer, Pulse oximeter, etc.).		
12	**Th.:2H Pr.: 2H**	Pulmonary function data interpretation.	Pulmonary Function System.	Lect. Lab.	Homework
13	**Th.:2H Pr.: 2H**	Diagnostic audiology equipment.	Equipment for Diagnostic Audiology and Hearing Tests. Diagnostic audiology equipment (ABR, AOE, Audiometers, Tympanometry, Hearing aid fitting systems, Balance testing equipment, etc.).	Lect. Lab.	Exam
14	**Th.:2H Pr.: 2H**	Patient safety and regulations.	Patient Safety, Regulations, and Safety Measures. Diagnostic audiology equipment (continued).	Lect. Lab.	Quiz
15	**Th.:2H Pr.: 2H**	Course revision and integration.	Recap and Final Assessments: Review of the Entire Syllabus, Revision Sessions, and Preparation for Final Exam.	Lect. & Lab.	Homework

7. Course Evaluation

The grade distribution is as follows:
Formative Assessment: Quizzes 10 marks, Assessments 10 marks, projects / Lab. 15 marks, report 5 marks, midterm exam 10 marks, Final exam 50 marks.

8. Learning and Teaching Resources

Required textbooks	1. Khandpur , R. S. (1990). Handbook of Biomedical Instrumentation, Tata McGraw-Hill Publishing Co. 2. Joseph D. Bronzino (2006). The Biomedical Engineering Handbook, 3rd. Edition. Germany: Taylor & Francis.
Recommended Texts	1. Press.Joseph D. Bronzino (2006). Medical Devices and Human Engineering. (2017). United Kingdom: CRC Press. 2. Khandpur, R. S. (2004). Biomedical Instrumentation: Technology and Applications. India: McGraw Hill LLC. 3. Brown, J. M., Carr, J. J. (2001). Introduction to Biomedical Equipment Technology. India: Prentice Hall.

Course Description Form

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