

[GBL103] MEDICAL TECHNOLOGICAL EQUIPMENT

GENERAL INFORMATION

Studies	DEGREE IN BIOMEDICAL ENGINEERING		Subject	Medical Devices
Semester	1	Course	3	Mention / Field of specialisation
Character	COMPULSORY		Language	ENGLISH
Plan	2017	Modality	Adapted Face-to-face	Total hours
Credits	4,5	Hours/week	3.25	58.5 class hours + 54 non-class hours = 112.5 total hours

PROFESSORS

SAENZ DE ARGANDOÑA FERNANDEZ DE GOROSTIZA, ENEKO

 ALONSO GOMEZ, ARRATE

REQUIRED PREVIOUS KNOWLEDGE

Subjects	Knowledge
(No specific previous subjects required)	(No previous knowledge required)

SKILLS

VERIFICA SKILLS

SPECIFIC

GBCE21 - To understand and analyse the operation and specific characteristics of various medical equipment for diagnosis and treatment

GENERAL

GBCG5 - To know how to perform measurements, calculations, valuations, studies, reports, task planning schemes, and other activities pertaining to the field of Biomedical Engineering.

GBCG6 - Ability to work with mandatory specifications, regulations and standards.

CROSS

GBCTR2 - To be able to do their job in cooperative, participatory environments, with awareness of social responsibility.

BASIC

G_CB2 - To be able to apply knowledge to occupational or professional tasks; have the necessary skills to pose and defend arguments, and to solve problems within their field of study

G_CB3 - To be capable of gathering and interpreting relevant data (normally within their field of study) in order to make judgements, reflecting on relevant matters of a social, scientific or ethical nature

LEARNING RESULTS

RG301 Assumes responsibilities in the work team, organizing and planning the tasks to be developed, facing the contingencies and encouraging the participation of its members.

LEARNING ACTIVITIES

Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams

CH	NCH	TH
3 h.	2 h.	5 h.

EVALUATION SYSTEM

Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems

W
100%

MAKE-UP MECHANISMS

(No mechanisms)

CH - Class hours: 3 h.

NCH - Non-class hours: 2 h.

TH - Total hours: 5 h.

RG302 Analyze the intervening variables in the problem and propose actions for a stable situation.

LEARNING ACTIVITIES

Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams

CH	NCH	TH
3 h.	2 h.	5 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	100%	(No mechanisms)
CH - Class hours: 3 h. NCH - Non-class hours: 2 h. TH - Total hours: 5 h.		

RG304 Define the problem, develop the solution and present the conclusions in a efficient manner, arguing and justifying each one of them in writing.

LEARNING ACTIVITIES	CH	NCH	TH
Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams	2,5 h.	1,5 h.	4 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	100%	(No mechanisms)

CH - Class hours: 2,5 h.
NCH - Non-class hours: 1,5 h.
TH - Total hours: 4 h.

RG305 Define the problem, develop the solution and present the conclusions in a efficient manner, arguing and justifying each one of them in spoken form.

LEARNING ACTIVITIES	CH	NCH	TH
Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams	2,5 h.	1,5 h.	4 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	100%	(No mechanisms)

CH - Class hours: 2,5 h.
NCH - Non-class hours: 1,5 h.
TH - Total hours: 4 h.

RGB301 Understand medical equipment used for medical diagnostic, its characteristics and functionalities

LEARNING ACTIVITIES	CH	NCH	TH
Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams	6,5 h.	3,5 h.	10 h.
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	2 h.	5,75 h.	7,75 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	14 h.	7,5 h.	21,5 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
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Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	40%	Individual written and oral tests to assess technical skills of the subject
Individual written and/or oral tests or individual coding/programming tests	60%	

CH - Class hours: 22,5 h.
NCH - Non-class hours: 16,75 h.
TH - Total hours: 39,25 h.

RGB302 Understand medical equipments used for surgery and medical treatments, its characteristics and functionalities

LEARNING ACTIVITIES

	<i>CH</i>	<i>NCH</i>	<i>TH</i>
Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams	6,5 h.	3,5 h.	10 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	5 h.	17,5 h.	22,5 h.

EVALUATION SYSTEM

W

Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	28%
Individual written and/or oral tests or individual coding/programming tests	72%

MAKE-UP MECHANISMS

Individual written and oral tests to assess technical skills of the subject

CH - Class hours: 11,5 h.
NCH - Non-class hours: 21 h.
TH - Total hours: 32,5 h.

RGB303 To know the technological equipment used in life support and rehabilitation, their characteristics and functionalities

LEARNING ACTIVITIES

	<i>CH</i>	<i>NCH</i>	<i>TH</i>
Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams	6,5 h.	3,5 h.	10 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	7 h.	5,75 h.	12,75 h.

EVALUATION SYSTEM

W

Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	40%
Individual written and/or oral tests or individual coding/programming tests	60%

MAKE-UP MECHANISMS

Individual written and oral tests to assess technical skills of the subject

CH - Class hours: 13,5 h.
NCH - Non-class hours: 9,25 h.
TH - Total hours: 22,75 h.

CONTENTS

IMAGE BASED DIAGNOSTIC TECHNOLOGIES

X RAY

CAT

MRI

ULTRASOUND

PET

PET-CT

SWALLOWABLE MEDICAL DEVICES

VISION BASED TECHNOLOGIES COMPARATIVE COST

ENDOSCOPY (in surgery)

ANALYTICAL BASED DIAGNOSTIC TECHNOLOGIES

BIOCHEMISTRY

HEMATOLOGY

MICROBIOLOGY

OTHER DIAGNOSTIC TECHNOLOGIES

ELECTROCARDIOGRAPH (ECG)

ELECTROENCEPHALOGRAPH (EEG)

ELECTROMYOGRAPHY (EMG)

CAPNOGRAPH

BLOOD PRESSURE

PULSE

RESPIRATION RATE

TEMPERATURE

PULSE OXIMETRY

BLOOD GLUCOSE LEVEL

SURGERY

ELECTROSURGERY

ENDOSCOPY

ROBOTIC SURGERY

ANESTHESIA UNITS

HEART-LUNG MACHINE

LASER IN SURGERY

MEDICAL TREATMENT

RADIOTHERAPY/RADIATION THERAPY (LINAC)

BRACHYTHERAPY

CHEMOTHERAPY

HEMODIALYSIS

HIGH INTENSITY FOCUSED ULTRASOUND (HIFU)

THERAPEUTIC ULTRASOUND (LITHOTRIPSY)

INTENSIVE CARE & LIFE SUPPORT

INTENSIVE THERAPY UNITS

DEFIBRILLATOR

PACEMAKER

INFUSION/PERFUSION PUMP

CARDIOPULMONARY RESUSCITATION TROLLEY

INCUBATORS

REHABILITATION and ASSISTIVE

ACTIVE/PASSIVE EXERCISER

STANDING AND BALANCING EQUIPMENT

BALANCE/EQUILIBRIUM REHABILITATION

WALKING REHABILITATION

STATIC AND DYNAMIC POSTURAL CONTROL TRAINER

ISOKINETIC SYSTEM

UPPER EXTREMITY REHABILITATION

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources

Subject notes
Technical articles
Topic related web quires
Class presentations
Video projections

Bibliography

. Biomedical Engineering Libro Health Care Systems, Technology and Techniques
Biomedical Sensors and Measurement
Introduction to biomedical engineering
Biomedical Engineering Systems and Technologies