

[MMA102] TISSUE ENGINEERING AND REGENERATIVE MEDICINE

GENERAL INFORMATION

Studies	MASTER'S DEGREE IN BIOMEDICAL TECHNOLOGIES		Subject	?
Semester	1	Course	1	Mention / Field of specialisation
Character	COMPULSORY		Language	ENGLISH
Plan	2023	Modality	Face-to-face	Total hours 70.6 class hours + 41.9 non-class hours = 112.5 total hours
Credits	4,5	Hours/week	3.92	

PROFESSORS

ZABALA EGUREN, ALAITZ
AGINAGALDE UNANUE, MAIALEN
BURUAGA LAMARAIN, LOREA

REQUIRED PREVIOUS KNOWLEDGE

Subjects	Knowledge
FUNDAMENTALS OF MEDICINE AND BIOMATERIALS	(No previous knowledge required)

LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
MMRA18 - Understanding the techniques and uses of tissue engineering and regenerative medicine in accordance with the professional codes and ethics of engineering			x	3,16
MMRA26 - To apply the knowledge acquired and your problem-solving skills in new, little-known or changing environments within broader (or multidisciplinary) contexts related to your area of study		x		1,08
MMRA28 - To communicate your conclusions and the knowledge and ultimate reasons that support them to specialized and non-specialized audiences in a clear and unambiguous way		x		0,26
Total:				4,5

KC: Knowledge or Content / SK: Skills / AB: Abilities

SECONDARY LEARNING RESULTS

RMM103 [!] Conocer y comprender las distintas estrategias y métodos para implementar y optimizar la ingeniería de tejidos desde un punto de vista ingenieril

LEARNING ACTIVITIES

	CH	NCH	TH
Personal study and flexible development of concepts and subjects using active dynamics, to foster more meaningful learning	6 h.	3,5 h.	9,5 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	27,6 h.	16,6 h.	44,2 h.
Practical work in workshops and/or laboratories, individually and/or in teams	6 h.	3,5 h.	9,5 h.

EVALUATION SYSTEM

	W
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	15%
Presentation and defence of exercises, case studies, computer practical work, simulation practical work, laboratory practical work, term projects, end of degree project, master's thesis, challenges and problems	15%
Individual written and/or oral tests or individual coding/programming tests	70%

MAKE-UP MECHANISMS

Individual written and/or oral tests or individual coding/programming tests

Comments: If the score of the exam is lower than 4, this evaluation item will be evaluated in its entirety (%100) with the score of the exam.

CH - Class hours: 39,6 h.

NCH - Non-class hours: 23,6 h.

TH - Total hours: 63,2 h.

RMM104 [!] Conocer el state of the art, la legislación y ética envuelta en la ingeniería tisular y medicina regenerativa.

LEARNING ACTIVITIES		CH	NCH	TH
Personal study and flexible development of concepts and subjects using active dynamics, to foster more meaningful learning		,5 h.	,3 h.	,8 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects		2,3 h.	1,4 h.	3,7 h.
Practical work in workshops and/or laboratories, individually and/or in teams		,5 h.	,3 h.	,8 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	15%	Individual written and/or oral tests or individual coding/programming tests		
Presentation and defence of exercises, case studies, computer practical work, simulation practical work, laboratory practical work, term projects, end of degree project, master's thesis, challenges and problems	15%			
Individual written and/or oral tests or individual coding/programming tests	70%			
Comments: : If the score of the exam is lower than 4, this evaluation item will be evaluated in its entirety (%100) with the score of the exam.				
CH - Class hours: 3,3 h.				
NCH - Non-class hours: 2 h.				
TH - Total hours: 5,3 h.				

RMM105 [!] Conocer y comprender los diferentes tipos celulares que se pueden utilizar en la medicina regenerativa, sus roles, así como las ventajas e inconvenientes del uso de cada uno de ellos.

LEARNING ACTIVITIES	CH	NCH	TH
Personal study and flexible development of concepts and subjects using active dynamics, to foster more meaningful learning		4 h.	4 h.
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	3 h.		3 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	3,5 h.		3,5 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
Presentation and defence of exercises, case studies, computer practical work, simulation practical work, laboratory practical work, term projects, end of degree project, master's thesis, challenges and problems	40%	Individual written and/or oral tests or individual coding/programming tests
Individual written and/or oral tests or individual coding/programming tests	60%	

Comments: If the score of the exam is lower than 4, this evaluation item will be evaluated in its entirety (%100) with the score of the exam.

CH - Class hours: 6,5 h.

NCH - Non-class hours: 4 h.

TH - Total hours: 10,5 h.

RMM144 [!] <i>Analiza las variables intervinientes en la solución de los problemas y plantea acciones para lograr una situación estable asumiendo responsabilidades en el equipo de trabajo, afrontando contingencias y organizando y planificando tareas.</i>				
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		8,5 h.	5 h.	13,5 h.
EVALUATION SYSTEM	W	MAKE-UP MECHANISMS		

Individual written and/or oral tests or individual coding/programming tests	55%	Observation (technical capacity, attitude and participation)
Co-assessment	5%	
Prototype / Product	40%	

Comments: If the score of the defense is lower than 5, this evaluation item will be evaluated in its entirety (%100) with the score of the defense. A co-evaluation system will be implemented to adjust the score of the student based on his or her participation in the Project.

CH - Class hours: 8,5 h.

NCH - Non-class hours: 5 h.

TH - Total hours: 13,5 h.

RMM145 [!] *Conoce y es capaz de aplicar las herramientas de resolución de problemas en el campo de la Ingeniería Biomédica con iniciativa, toma de decisiones, creatividad y razonamiento crítico.*

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	8,5 h.	5 h.	13,5 h.

EVALUATION SYSTEM

	W
Individual written and/or oral tests or individual coding/programming tests	40%
Co-assessment	5%
Prototype / Product	55%

MAKE-UP MECHANISMS

Observation (technical capacity, attitude and participation)

Comments: If the score of the defense is lower than 5, this evaluation item will be evaluated in its entirety (%100) with the score of the defense. A co-evaluation system will be implemented to adjust the score of the student based on his or her participation in the Project.

CH - Class hours: 8,5 h.

NCH - Non-class hours: 5 h.

TH - Total hours: 13,5 h.

RMM146 [!] *Define el problema, el desarrollo de la solución, así como las conclusiones de manera eficaz, argumentando y justificando cada una de ellas, y haciendo un uso correcto del lenguaje, por escrito y de manera oral.*

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	2,2 h.	1,3 h.	3,5 h.

EVALUATION SYSTEM

	W
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	50%
Presentation and defence of exercises, case studies, computer practical work, simulation practical work, laboratory practical work, term projects, end of degree project, master's thesis, challenges and problems	50%

MAKE-UP MECHANISMS

Observation (technical capacity, attitude and participation)

CH - Class hours: 2,2 h.

NCH - Non-class hours: 1,3 h.

TH - Total hours: 3,5 h.

RMM147 [!] *Define los objetivos, realiza la planificación para su consecución y su seguimiento sistemático coordinando su trabajo con los demás miembros del equipo.*

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 h.	1 h.	3 h.

EVALUATION SYSTEM

W

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

50%

Presentation and defence of exercises, case studies, computer practical work, simulation practical work, laboratory practical work, term projects, end of degree project, master's thesis, challenges and problems

MAKE-UP MECHANISMS

Observation (technical capacity, attitude and participation)

CH - Class hours: 2 h.

NCH - Non-class hours: 1 h.

TH - Total hours: 3 h.

CONTENTS

TISSUE ENGINEERING

L1 Tissue Engineering: Introduction

L2 Scaffolds: Introduction

L3 Biomaterials for tissue engineering

L4 Scaffolds: Fabrication techniques

L5 Ethical issues

L6 Case studies

REGENERATIVE MEDICINE

1.GENERAL CONCEPTS

1.1. Introduction to stem cells

1.2. Cell types

• Therapeutic clonation

• Cellular plasticity

1.3. Tissue sources of stem cells

2. CELLULAR THERAPY

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources

Subject notes
Technical articles
Video projections

Bibliography

<https://ebookcentral.proquest.com/lib/mondragon/detail.action?docID=428772>
<https://www.sciencedirect.com/book/9780123983589/principles-of-tissue-engineering>