Goi Eskola Politeknikoa | Mondragon Unibertsitatea
Course: 2024 / 2025 - Course planning

[MMC101] ADDITIVE MANUFACTURING

GENERAL INFORMATION

Studies	MASTER'S DEGREE IN BIOMEDICAL TECHNOLOGIES		**Subject**	?
Semester	2	**Course** 1	**Mention / Field of specialisation**	
Character	COMPULSORY			
Plan	2023	**Modality** Face-to-face	**Language**	CASTELLANO
Credits	3	**Hours/week** 2.54	**Total hours**	45.8 class hours + 29.2 non-class hours = **75 total hours**

PROFESSORS

BASKARAN RAZKIN, MAIDER

AZPI-AURREKOETXEA NARBARTE, ION

REQUIRED PREVIOUS KNOWLEDGE

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

LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
MMRA13 - To propose the appropriate additive manufacturing technology for each biomedical engineering problem		x		2,1
MMR-26 - 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		0,72
MMR-28 - 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		0,18
			Total:	**3**

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

SECONDARY LEARNING RESULTS

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	1,3 h.	,7 h.	2 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	50%	Observation (technical capacity, attitude and participation)
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%	

CH - Class hours: 1,3 h.
NCH - Non-class hours: ,7 h.
TH - Total hours: 2 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
Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams	5,5 h.	3,5 h.	9 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
Individual written and/or oral tests or individual	40%	Observation (technical capacity, attitude and participation)

coding/programming tests

Co-assessment	5%
Prototype / Product	55%

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: 5,5 h.
NCH - Non-class hours: 3,5 h.
TH - Total hours: 9 h.

RMM144 [!] *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.*

LEARNING ACTIVITIES	CH	NCH	TH
Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams	5,5 h.	3,5 h.	9 h.

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

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: 5,5 h.
NCH - Non-class hours: 3,5 h.
TH - Total hours: 9 h.

RMM117 [!] *Conoce los beneficios de la fabricación aditiva.*

LEARNING ACTIVITIES	CH	NCH	TH
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	1 h.		1 h.
Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams	2 h.	1 h.	3 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	3 h.	3,4 h.	6,4 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%	Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems

CH - Class hours: 6 h.
NCH - Non-class hours: 4,4 h.
TH - Total hours: 10,4 h.

RMM118 [!] *Selecciona la tecnología de fabricación aditiva dependiendo de la aplicación en tecnologías biomédicas.*

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Goi Eskola
Politeknikoa
Escuela Politécnica
Superior

LEARNING ACTIVITIES	CH	NCH	TH
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	2 h.		2 h.
Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams	15 h.	12,1 h.	27,1 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	9 h.	4 h.	13 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%	Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems

CH - Class hours: 26 h.
NCH - Non-class hours: 16,1 h.
TH - Total hours: 42,1 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	1,5 h.	1 h.	2,5 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	50%	Observation (technical capacity, attitude and participation)
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%	

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

CONTENTS

1 – Introductiion to 3D printing in medicine2 – 3D printing technologies3 – Materials for 3D printing in medicine4 – 3D printing of cells5 – 3D printing in surgical practice6 – 4D printing in medicine

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources	Bibliography
Technical articles Class presentations Video projections	3D Printing in Medicine; Edited by Dr. Deepak M. Kalaskar; Woodhead Publishing; eBook ISBN: 9780081007266; Hardcover ISBN: 9780081007174