

Course: 2023 / 2024 - Course planning

Goi Eskola Politeknikoa Escuela Politécnica Superior

		[GB.]2(01] BIOI	MATERIALS				
		GEN	ERAL INI	ORMATION				
Studies	DEGREE IN BIC	MEDICAL ENGINEERI	NG	Subject	BIOMATERIAL	3		
Semester	1	Course 2		Mention / Field of				
Character	COMPULSORY			specialisation				
Plan	2022	Modality Face	e-to-face	Language	EUSKARA			
Credits	3	Hours/week 3.03	1	Total hours	54.5 class hours	s + 20.5 non	-class ho	ours = <u>75 -</u>
					<u>hours</u>			
			PROFES	SSORS				
GOMEZ SA	AGARZAZU, MIRI	EN						
GARITAON	IAINDIA URIBE, (GARAZI						
URIBE AZH	KARRETA, MAITA	ANE						
		REQUIRED) PREVIC		GE			
	Subj	ects			Knowl	edge		
(No	o specific previou	s subjects required)		(1	Vo previous knov	vledge requi	ired)	
		LE	ARNING	RESULTS				
ARNING RESI	JLTS					кс ѕк	AB	ECTS
R206 - To knov	v the properties o	f biomaterials for correct	use in Bion	nedical Engineering	problems	x		2,6
coming aware (of respect for hum	an rights and fundamen	ar specialty	and of gradual comp nd analyzing and ass	sessing the	*		0,10
pact of the prop	osed solutions or	n the SDGs - to acquire a	and/or apply	basic, advanced an	d /or			
ant-garde, dem	onstrating the abi	lity to work in multidiscip	linary team	s and/or undertake fu	urther studies			
RTR2 - To expres	ess information, id	deas and the arguments	that suppor	t them in an orderly.	clear and	x		0,24
nerent manner,	orally and in writi	ing, based on quality info	ormation, se	If-made or obtained	from different			
urces, using inc	clusive and non-di	iscriminatory language						
•		, , ,						
-		, , ,					Total:	3
: Knowledge or Col	ntent / SK: Skills / AB:	Abilities SECONDA	ARY LEA	RNING RESULT		forzar las a	Total:	3
RG3290 [!] Pr cnologías pro prendiz	ntent / SK: Skills / AB: roponer los obje ropias de su espe	Abilities SECONDA tivos y la planificación cialidad,- que en ocasi	ARY LEA de un proy ones llegar	RNING RESULT recto que le permita n a la vanguardia de	TS a adquirir y/o re el conocimiento	forzar los c y definir t	Total: -	3 entos de ntegía de
: Knowledge or Co. RGB290 [!] Pr ecnologías pro prendiz LEARNING AC	ntent / SK: Skills / AB: oponer los objet pias de su espe CTIVITIES	Abilities SECONDA tivos y la planificación cialidad,- que en ocasi	ARY LEA de un proy ones llegar	RNING RESULT recto que le permita n a la vanguardia de	TS a adquirir y/o re el conocimiento CH	forzar los c y definir u NCH	Total: onocimie ina estra Ti	3 entos de ttegía de
: Knowledge or Con RGB290 [!] Pr ecnologías pro prendiz LEARNING AC Development a projects/work e individually and	ntent / SK: Skills / AB: roponer los obje pias de su espe CTIVITIES nd writing of reco xperience/challer l/or in teams	Abilities SECONDA tivos y la planificación cialidad,- que en ocasi rds, reports, presentation nges/case studies/experi	de un proy ones llegar	RNING RESULT recto que le permita n a la vanguardia de sual material, etc. on stigations carried our	TS a adquirir y/o re el conocimiento CH 1 h. t	forzar los c y definir u NCH 1 h.	Total: onocimie ina estra Ti 21	3 entos de tegía de H
: Knowledge or Con RG3290 [!] Pr conologías pro prendiz LEARNING AC Development a projects/work e individually and EVALUATION	ntent / SK: Skills / AB: Toponer los objet opias de su espe CTIVITIES Ind writing of reco xperience/challer I/or in teams SYSTEM	Abilities SECONDA tivos y la planificación cialidad,- que en ocasio ords, reports, presentation nges/case studies/experi	de un proy ones llegar	RNING RESULT recto que le permita n a la vanguardia de sual material, etc. on stigations carried our	TS a adquirir y/o re el conocimiento CH 1 h. t ANISMS	forzar los c y definir t <u>NCH</u> 1 h.	Total: onocimie ina estra Tr 21	3 entos de ttegía de H
RGB290 [!] Price Colored States of Colored State	ntent / SK: Skills / AB: roponer los objet pias de su espe CTIVITIES nd writing of reco xperience/challer /or in teams SYSTEM completion of exic ises, simulation exic projects, challen	Abilities SECONDA tivos y la planificación cialidad,- que en ocasi ords, reports, presentation nges/case studies/experi ercises, case studies, exercises, laboratory ges and problems	de un proy ones llegar ns, audiovis mental inve <u>W</u> 100%	RNING RESULT recto que le permita na la vanguardia de sual material, etc. on stigations carried our MAKE-UP MECH Reports on the co exercises, simulat projects, challenge Observation (tech	a adquirir y/o reel a adquirir y/o reel ch 1 h. t ANISMS mpletion of exercises, la es and problems nical capacity, at	forzar los c - y definir t NCH 1 h. cises, case s boratory exe titude and p	Total:	3 entos de ntegía de h. h. computer erm
Reports on the computer exercises, term H - Class hour CH - Non-clas H - Total hours Reports at the computer exercises term Reports on the computer exercises term CH - Non-clas H - Total hours Reports at the computer exercises term CH - Non-clas H - Total hours Reports at the computer exercises term CH - Non-clas H - Total hours Reports at the computer exercises term CH - Non-clas H - Total hours Reports at the computer exercises term CH - Non-clas CH - Non-clas	ntent / SK: Skills / AB: poponer los objet pias de su esper CTIVITIES nd writing of reco xperience/challer l/or in teams SYSTEM completion of exec ises, simulation e projects, challen rs: 1 h. s hours: 1 h. s: 2 h. Stablecer las resp quipo para el des	Abilities SECONDA tivos y la planificación cialidad,- que en ocasi rds, reports, presentation ges/case studies/experi ercises, case studies, exercises, laboratory ges and problems ponsabilidades de los a sarrollo del proyecto en	de un proy ones llegar ns, audiovis mental inve <u>w</u> 100%	RNING RESULT recto que le permita na la vanguardia de sual material, etc. on stigations carried our MAKE-UP MECH Reports on the co exercises, simulat projects, challenge Observation (tech	CH 1 h. t ANISMS mpletion of exercises, lates and problems nical capacity, all No técnicas adem Martir recursos	forzar los c - y definir u NCH 1 h. Cises, case s boratory exe titude and p titude and p	Total:	3 entos de tregía de h. computer erm on)
RGB291 [!] Proceedings of Contract of Cont	ntent / SK: Skills / AB: opponer los objet opias de su espe CTIVITIES Ind writing of reco xperience/challer /or in teams SYSTEM completion of exc ises, simulation e projects, challen rs: 1 h. s hours: 1 h. s tours: 1 h. stablecer las resp quipo para el des CTIVITIES	Abilities SECONDA tivos y la planificación cialidad,- que en ocasi rds, reports, presentation ges/case studies/experi ercises, case studies, exercises, laboratory ges and problems ponsabilidades de los a sarrollo del proyecto en	de un proy ones llegar ns, audiovis mental inve w 100%	RNING RESULT recto que le permita na la vanguardia de sual material, etc. on stigations carried our MAKE-UP MECH Reports on the co exercises, simulat projects, challenge Observation (tech	CH	forzar los c y definir u NCH 1 h. Cises, case s boratory exe titude and p cuadas para s, aportar ic	Total:	3 entos de tregía de tregía de trearm on)

projects/work experience/challenges/case studies/experimental investigations carried out

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Course: 2023 / 2024 - Course planning

individually and/or in teams

EVALUATION SYSTEM					
	<u>W</u>	MAKE-UP MECHANIS	SMS		
	25% 25%	Reports on the comple		cises, case stu	ales, computer
Co-assessment	25%	projects, challenges and problems			1565, 161111
Observation (technical capacity, attitude and participation)	50%	Observation (technical	capacity, at	titude and par	ticipation)
CH - Class hours: 1 h. NCH - Non-class hours: 1 h. TH - Total hours: 2 h.					
RGB293 [!] Redacta y estructura correctamente la men discriminatorio del lenguaje. Para ello, busca y hace uso	noria del o de las f	proyecto, haciendo un iuentes de información	uso correc adecuadas.	to, inclusivo j	/ no
LEARNING ACTIVITIES			СН	NCH	тн
Development and writing of records, reports, presentations projects/work experience/challenges/case studies/experime individually and/or in teams	, audiovis ental inve	sual material, etc. on estigations carried out	2 h.	1 h.	3 h.
EVALUATION SYSTEM	W	MAKE-UP MECHANIS	SMS		
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			
TH - Total hours: 3 h.	con arg	umentos elaborados po	r oí miomo		
inclusivo y no discriminatorio del lenguaje.			CH	s y haciendo i	un uso correcto,
LEARNING ACTIVITIES	oudiovia		CH	NCH	un uso correcto, TH 3b
LEARNING ACTIVITIES Development and writing of records, reports, presentations projects/work experience/challenges/case studies/experime individually and/or in teams	, audiovis ental inve	sual material, etc. on stigations carried out	CH 2 h.	NCH 1 h.	un uso correcto, <u>TH</u> 3 h.
Image: Constraints Image: Constraints Inclusivo y no discriminatorio del lenguaje. LEARNING ACTIVITIES Development and writing of records, reports, presentations projects/work experience/challenges/case studies/experime individually and/or in teams EVALUATION SYSTEM	, audiovis ental inve w	sual material, etc. on stigations carried out MAKE-UP MECHANIS	<u>сн</u> 2 h. SMS	NCH	un uso correcto, TH 3 h.
LEARNING ACTIVITIES Development and writing of records, reports, presentations projects/work experience/challenges/case studies/experime individually and/or in teams EVALUATION SYSTEM 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	, audiovis ental inve <u>w</u> 100%	sual material, etc. on estigations carried out MAKE-UP MECHANIS Observation (technical	CH 2 h. SMS capacity, at	NCH 1 h.	un uso correcto, <u>TH</u> 3 h.

RGB211 [!] Conoce y comprende las propiedades de materiales metálicos, poliméricos cerámicos y compuestos

LEARNING ACTIVITIES	СН	NCH	тн
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.		2,5 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and	25 h.	7,5 h.	32,5 h.

Course: 2023 / 2024 - Course planning

Carrying out exercises and solving problems individually and/or in teams			4 h.	4 h.	8 h.	
Practical work in workshops and/or laboratories, individually and/or in teams			7 h.	2 h.	9 h.	
ALUATION SYSTEM W MAKE-UP M			CHANISMS			
eports on the completion of exercises, case studies, 30% omputer exercises, simulation exercises, laboratory xercises, term projects, challenges and problems		Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems				
dividual written and/or oral tests or individual 70% Individual writt ding/programming tests coding/program			l/or oral tests tests	or individual		
CH - Class hours: 38,5 h. NCH - Non-class hours: 13,5 h. I H - Total hours: 52 h.						
RGB212 [!] Conoce y comprende los fundamentos de	e la cienci	a de los biomateriales	сн	псн	тн	
RGB212 [!] Conoce y comprende los fundamentos de LEARNING ACTIVITIES Development and writing of records, reports, presentatior projects/work experience/challenges/case studies/experir individually and/or in teams	e la cienci ns, audiovia nental inve	a de los biomateriales sual material, etc. on estigations carried out	<u>СН</u> 10 h.	<u>NCH</u> 3 h.	<i>TH</i> 13 h.	
RGB212 [!] Conoce y comprende los fundamentos de LEARNING ACTIVITIES Development and writing of records, reports, presentation projects/work experience/challenges/case studies/experinindividually and/or in teams EVALUATION SYSTEM	e la cienci ns, audiovi: mental inve W	a de los biomateriales sual material, etc. on estigations carried out MAKE-UP MECHAN	<u>СН</u> 10 h.	<u>NCH</u> 3 h.	<i>ТН</i> 13 h.	

CH - Class hours: 10 h. NCH - Non-class hours: 3 h. TH - Total hours: 13 h.

CONTENTS

1. Types of materials:- Metals.- Ceramics.- Polymers.- Compounds.2. Service behaviour- Mechanical charact eristics.3. Biomaterials (POPBL)4. Material selection (POPBL)

LEARNING RESOURCES AND BIBLIOGRAPHY			
Learning resources	Bibliography		
Moodle Platform Lab practical training Subject notes Technical articles Topic related web quires Video projections	Biomaterials Principles and Applications Callister, William D., and David G. Rethwische. Materialen zientzia eta ingeniaritza: hastapenak. Euskal Herriko Unibertsitateko Argitalpen Zerbitzua, 2010. Tilley, Richard JD. Understanding solids: the science of materials. John Wiley & Sons, 2013. Ashby, Michael F., Materials selection in mechanical design, Kidlington, Oxford Butterworth-Heinemann, 2017. http://katalogoa.mondragon.edu/janium-bin/janium_login_opac_re_ln k. pl?grupo=BIOMEDIKOA12&ejecuta=30&_ST		