

		BOT SYSTEMS					
	GENERAL IN						
Studies DEGREE IN IND ENGINEERING		Subject	?				
Semester 2 Character COMPULSORY	Course 3	Mention / Field of specialisation					
Plan 2022	Modality Face-to-face	Language	EUSKARA/CAS	STELL	ANO		
Credits 4,5	Hours/week 3.47		62.5 class hour hours	rs + 50	non-c	lass hours	s = <u>112.5</u>
	2030 AGEN	DA GOALS					
		SSORS					
ELKOROBARRUTIA LETON	A, XABIER REQUIRED PREVIO	OUS KNOWLEDO	E				
Subje			Know				
THEMATICS II CHANICAL PHYSICS		(N	o previous kno	wledge	e requi	red)	
MPUTER FOUNDATIONS	LEARNING						
ARNING RESULTS	LLARNING			кс	sк	AB	ECTS
R309 - To know the principles and	d applications of robotic systems y projects specific to their specialt				x	-	3,78 0,4
nt-garde, demonstrating the abil	the SDGs - to acquire and/or application of the split to work in multidisciplinary team						
TR2 - To express information, id erent manner, orally and in writir	eas and the arguments that suppo ng, based on quality information, s	rt them in an orderly, o	clear and		x		0,32
nerent manner, orally and in writin arces, using inclusive and non-dis	eas and the arguments that suppo ng, based on quality information, s scriminatory language	rt them in an orderly, o	clear and		x	Total:	0,32 4,5
RTR2 - To express information, id nerent manner, orally and in writir	eas and the arguments that suppo ng, based on quality information, s scriminatory language	rt them in an orderly, o	clear and		x	Total:	·
RTR2 - To express information, id herent manner, orally and in writin irces, using inclusive and non-dis <i>Knowledge or Content / SK: Skills / AB:</i> IAEE LEARNING RESULTS IA102 - Knowledge and comprehe	eas and the arguments that suppo ng, based on quality information, s scriminatory language	rt them in an orderly, o elf-made or obtained f	clear and rom different ng disciplines of	f their s			4,5
RTR2 - To express information, id herent manner, orally and in writin urces, using inclusive and non-dis Knowledge or Content / SK: Skills / AB: IAEE LEARNING RESULTS IA102 - Knowledge and comprehe cessary to acquire the rest of the IA104 - Analysis in engineering: T evant analytical, calculation and IA105 - Analysis in engineering: T	eas and the arguments that suppong, based on quality information, secriminatory language <i>Abilities</i> ension: Knowledge and comprehener competencies of the degree, inclu The ability to analyse complex proceexperimental methods in a suitable The ability to identify, formulate and calculation and experimental methods	rt them in an orderly, o elf-made or obtained f nsion of the engineerir uding notions of the lat ducts, processes and s e way; and correctly in d solve engineering pro	clear and rom different ng disciplines of est advances. ystems in their terpret the resu oblems in their	field of Ilts of s special	special f study such ar lity; ch	ity, at the r; choose nalyses. oose and	4,5 level and appl apply
RTR2 - To express information, id terent manner, orally and in writin trees, using inclusive and non-dis Knowledge or Content / SK: Skills / AB: IAEE LEARNING RESULTS A102 - Knowledge and comprehe cessary to acquire the rest of the A104 - Analysis in engineering: T evant analytical, calculation and A105 - Analysis in engineering: T equately established analytical, c vironmental, economic, and indu A106 - Engineering projects: Abil bocesses and systems of their spectronmental, economic and indus	eas and the arguments that suppong, based on quality information, siscriminatory language <i>Abilities</i> ension: Knowledge and comprehene competencies of the degree, inclu The ability to analyse complex proc experimental methods in a suitable The ability to identify, formulate and calculation and experimental methors strial restrictions. lity to project, design and develop estality, which meet the established strial aspects, as well as selecting a	rt them in an orderly, o elf-made or obtained f nsion of the engineerir uding notions of the lat ducts, processes and s e way; and correctly in d solve engineering pro ods; and acknowledge complex products (par d requirements, includi and applying appropria	Interpret the result of the importances the importances the importances the importances the importances the importances the project methes	field of lts of s special of soc s, finish of the s nods.	special f study such ar lity; ch cial, he	ity, at the r; choose nalyses. oose and ealth and s oducts, etc	4,5 level and appl apply safety, c.),
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professional life independently.

ENA122 - Continued training: Ability to stay up to date on science and technology innovations

SECONDAR	RY LEA	RNING RESULTS			
2RGE392 (2 sem)					
			<i></i>	NOU	T 11
LEARNING ACTIVITIES Carrying out/resolving projects/challenges/cases, etc. to pr	rovide solu	tions to problems in		2 h.	3 h.
interdisciplinary contexts, real and/or simulated, individually				2	0.1.1
EVALUATION SYSTEM	W	MAKE-UP MECHANIS	MS		
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	100%	Reports on the comple exercises, simulation e projects, challenges an Comments: - Continue the document.	xercises, lal d problems	boratory exerci	ises, term
CH - Class hours: 1 h. ICH - Non-class hours: 2 h. IH - Total hours: 3 h.					
2RGE893 (2 sem)					
LEARNING ACTIVITIES			СН	NCH	ТН
Development and writing of records, reports, presentations projects/work experience/challenges/case studies/experim individually and/or in teams			2 h.	2 h.	4 h.
EVALUATION SYSTEM	W	MAKE-UP MECHANIS	MS		
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	100%	Reports on the comple exercises, simulation e projects, challenges an Comments: - Continue the document.	xercises, lal d problems	boratory exerci	ises, term
CH - Class hours: 2 h. ICH - Non-class hours: 2 h. 'H - Total hours: 4 h.					
2RGE390 (2 sem)					
LEARNING ACTIVITIES			СН	NCH	TH
Carrying out/resolving projects/challenges/cases, etc. to pr			2 h.	2 h.	4 h.
Carrying outresolving projects/challenges/cases, etc. to pr					
interdisciplinary contexts, real and/or simulated, individually					
interdisciplinary contexts, real and/or simulated, individually EVALUATION SYSTEM	W	MAKE-UP MECHANIS			
interdisciplinary contexts, real and/or simulated, individually		MAKE-UP MECHANIS Observation (technical Comments: Continuou	capacity, at		icipation)



LEARNING ACTIVITIES			СН	NCH	TH
Conducting tests, giving presentations, presenting defend	es, taking	examinations and/or doi			2,5 h.
checkpoints					
Presentation by the teacher in the classroom, in participat procedures associated with the subjects	tory classe	s, of concepts and	40 h.	25 h.	65 h.
EVALUATION SYSTEM	W	MAKE-UP MECHAN			
Individual written and/or oral tests or individual coding/programming tests Comments: - Control point: minimum grade 5.	100%	Individual written and, coding/programming t Comments: - Student retake the exam Fina and retake 75%.	tests ts with less th	an a 5 at the c	
CH - Class hours: 42,5 h. NCH - Non-class hours: 25 h. I'H - Total hours: 67,5 h. RGE322 [!] Diseña, simula, utiliza y programa robots	en aplicac	ciones industriales.			
LEARNING ACTIVITIES			СН	NCH	тн
Carrying out work experience in real environments and w	riting the co	orresponding report	12 h.	15 h.	27 h.
Comments: *Programming and using industrial robots in			ng robot brand	ds as ABB and	Staubli.
EVALUATION SYSTEM	W	MAKE-UP MECHANI	SMS		
Individual written and/or oral tests or individual coding/programming tests Prototype / Product Comments: - PBL project grade: 30% product, 20% tech content of the report and 50% individual technical defense.					
CH - Class hours: 12 h. NCH - Non-class hours: 15 h.					
2RGE394 (2 sem)			СН	NCH	ТН
			<u>СН</u> 2 h.	NCH 2 h.	<i>TH</i> 4 h.
2RGE394 (2 sem) LEARNING ACTIVITIES Development and writing of records, reports, presentation					
2RGE394 (2 sem) LEARNING ACTIVITIES Development and writing of records, reports, presentation projects/work experience/challenges/case studies/experin individually and/or in teams EVALUATION SYSTEM	nental inve	estigations carried out	2 h.	2 h.	4 h.
Development and writing of records, reports, presentation projects/work experience/challenges/case studies/experin individually and/or in teams	nental inve	estigations carried out	² h. ISMS ence of exerci tion practical degree projec	2 h. ises, case stud work, laborato t, master's the	4 h. dies, computer ory practical wor



LEARNING ACTIVITIES			СН	NCH	тн
Carrying out/resolving projects/challenges/cases, etc. to pro- interdisciplinary contexts, real and/or simulated, individually			1 h.	2 h.	3 h.
EVALUATION SYSTEM	W	MAKE-UP MECHANI	SMS		
Observation (technical capacity, attitude and participation)	100%	Observation (technica Comments: Continuo			ticipation)

1. Transformations of coordinate systems in 3D

- 2. Direct kinematics of 6 DoF robots
- 3. Inverse kinematics of 6 DoF robots
- 4. Differential Kinematics.
- 5. Singularities.
- Complementary exercises:
- -Numerical and computational solution of robot kinematics.
- -Simulation of pratical robotic applications.
- -Programming and using industrial robots in the laboratory, using leading robot brands as ABB and Staubli

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources	Bibliography
(No resources)	Mark Spong, Seth Hutchinson, Mathukumalli Vidyasagar, Robot Modeling and Control. 2nd Edition, Willey, 2020,ISBN 978-1-119-52399-4