



COURSE TITLE: INTRODUCTORY ATOMIC AND MOLECULAR PHYSICS		
EUROPEAN MASTER OF SCIENCE IN NUCLEAR FUSION AND ENGINEERING	YEAR: 1st	SEMESTER: 1st

COURSE SCHEDULE									
WEEK	SE-SSION	DESCRIPTION OF THE CONTENTS	GROUP (Tick X)		Indicate if a space different from the classroom is required (laboratory, computer classroom, etc)	Indicate YES/NO if It is a session with two teachers (*)	STUDENT'S WEEKLY SCHEDULE		
			Lecture Class	Practical Class			DESCRIPTION	CLASS HOURS	HOMEWORK HOURS Máximum 7 H
1	1	1. Introduction to quantum mechanics. Theoretical basis of atomic and molecular physics	X				- Reading of proposed topics - Work on the subject, including bibliographic research	1,5	6
1	2		X				- Reading of proposed topics - Work on the subject, including bibliographic research	1,5	
2	3	2. Basic tools of quantum mechanics: wave functions, operators, Schödinger equation, stationary states, uncertainty principle	X				- Reading of proposed topics - Work on the subject, including bibliographic research	1,5	6

2	4			X			<ul style="list-style-type: none"> - Solution of proposed exercises - Presentation of short proposed works - Participation in discussions and debates 	1,5	
3	5	2. (cont.)	X				<ul style="list-style-type: none"> - Reading of proposed topics - Work on the subject, including bibliographic research 	1,5	6
3	6			X			<ul style="list-style-type: none"> - Solution of proposed exercises - Presentation of short proposed works - Participation in discussions and debates 	1,5	
4	7	3. Elementary applications: free particle, particle-in-a-box, harmonic oscillator	X				<ul style="list-style-type: none"> - Reading of proposed topics - Work on the subject, including bibliographic research 	1,5	6
4	8			X			<ul style="list-style-type: none"> - Solution of proposed exercises - Presentation of short proposed works - Participation in discussions and debates 	1,5	
5	9	4. Central forces. Angular momentum. One-electron atom	X				<ul style="list-style-type: none"> - Reading of proposed topics - Work on the subject, including bibliographic research 	1,5	6
5	10			X			<ul style="list-style-type: none"> - Solution of proposed exercises - Presentation of short proposed works - Participation in discussions and debates 	1,5	
6	11	4. (cont.)	X				<ul style="list-style-type: none"> - Reading of proposed topics - Work on the subject, including bibliographic research 	1,5	6
6	12			X			<ul style="list-style-type: none"> - Solution of proposed exercises - Presentation of short proposed works - Participation in discussions and debates 	1,5	
7	13	5. Approximation methods. Variational and perturbational approaches	X				<ul style="list-style-type: none"> - Reading of proposed topics - Work on the subject, including bibliographic research 	1,5	6

7	14			X				<ul style="list-style-type: none"> - Solution of proposed exercises - Presentation of short proposed works - Participation in discussions and debates 	1,5	
8	15	5. (cont.)	X					<ul style="list-style-type: none"> - Reading of proposed topics - Work on the subject, including bibliographic research 	1,5	6
8	16			X				<ul style="list-style-type: none"> - Solution of proposed exercises - Presentation of short proposed works - Participation in discussions and debates 	1,5	
9	17	6. Electrons as identical particles. Spin. Many-electron atoms. Orbitals	X					<ul style="list-style-type: none"> - Reading of proposed topics - Work on the subject, including bibliographic research 	1,5	6
9	18			X				<ul style="list-style-type: none"> - Solution of proposed exercises - Presentation of short proposed works - Participation in discussions and debates 	1,5	
10	19	6. (cont.)	X					<ul style="list-style-type: none"> - Reading of proposed topics - Work on the subject, including bibliographic research 	1,5	6
10	20			X				<ul style="list-style-type: none"> - Solution of proposed exercises - Presentation of short proposed works - Participation in discussions and Debates 	1,5	
11	21	7. Diatomic molecules. Born-Oppenheimer approximation. Introduction to chemical bond and molecular symmetry	X					<ul style="list-style-type: none"> - Reading of proposed topics - Work on the subject, including bibliographic research 	1,5	6
11	22			X				<ul style="list-style-type: none"> - Solution of proposed exercises - Presentation of short proposed works - Participation in discussions and debates 	1,5	
12	23	7. (cont.)	X					<ul style="list-style-type: none"> - Reading of proposed topics 	1,5	6

							- Work on the subject, including bibliographic research		
12	24			X			- Solution of proposed exercises - Presentation of short proposed works - Participation in discussions and Debates	1,5	
13	25	8. Interaction of atoms and molecules with e.m. radiation	X				- Reading of proposed topics - Work on the subject, including bibliographic research	1,5	6
13	26			X			- Solution of proposed exercises - Presentation of short proposed works - Participation in discussions and Debates	1,5	
14	27	8. (cont.)	X				- Reading of proposed topics - Work on the subject, including bibliographic research	1,5	6
14	28			X			- Solution of proposed exercises - Presentation of short proposed works - Participation in discussions and Debates	1,5	
SUBTOTAL								42	+ 84 = 126
15		Support classes, delivery of proposed homework assignments, etc						2	5
16-18		Preparation for the written final exam						2	15
TOTAL								150	

** The responsible lecturer is external to Universidad Carlos III, and will present in the beginning of the course the main characteristics and dates of the continuous evaluation