Universidad Carlos III de Madrid

COURSE: PHYSICS		
DEGREE: COMPUTER ENGINEERING	year: 1st	SEMESTER: 1st

WEEKLY PROGRAMMING

WEEK	SESSION	DESCRIPTION	GROUPS LECTURES	GROUPS LECTURES	GROUPS	Special room for session (computer classroom, audio-visual classroom … (*)	WEEKLY PROGRAMMING FOR STUDENT DESCRIPTION	DESCRIPTION	HORAS TRABJO Semana Máximo 7 H
0	1	**T1. A review of kinematics and dynamics.** - Kinematics: Uniform motion and motion with uniform acceleration. - Dynamics: Newton's laws - Work. - Kinetic energy and the Work-Energy theorem. - Potential energy and conservative forces. - Fundamental interactions	X				- Reading of the corresponding chapters in the proposed literature. - Study and personal work on the lecture (i.e. searching additional information, etc)	1,66	5
0	2								

1	3	**T1 (cont.)** **T2. Atoms and solids.** - Electric charge. - The atomic structure of matter. The electron. The atomic nucleus: protons and neutrons. - The Bohr model. The electron energy levels. - Revised atomic models. Quantum numbers. The Pauli exclusion principle. - Solids. Ionic, covalent and metallic bonds. - Energy levels in solids. The conduction and valence bands. - Insulators, conductors and semiconductors. - Charge carriers in semiconductors: electrons and holes - Intrinsic and extrinsic semiconductors .	X				- Reading of the corresponding chapters in the proposed literature. - Study and personal work on the lecture (i.e. searching additional information, etc)	1,66	5
1	4			X			- Solve the proposed exercises. - Participation in discussions and activities	1,66	
2	5	**T2 (cont.)**	X				- Reading of the corresponding chapters in the proposed literature. - Study and personal work on the lecture (i.e. searching additional information, etc)	1,66	5
2	6			X			- Solve the proposed exercises. - Participation in discussions and activities	1,66	
3	7	**T3. Coulomb's law. Electric field.** - Interaction between two electric charges. Coulomb's law. - Electric field due to a point charge. The superposition principle. - Electric field lines.	X				- Reading of the corresponding chapters in the proposed literature. - Study and personal work on the lecture (i.e. searching additional information, etc)	1,66	5
3	8			X			- Solve the proposed exercises. - Participation in discussions and activities	1,66	

4	9	**T3 (cont.)**	X				- Reading of the corresponding chapters in the proposed literature. - Study and personal work on the lecture (i.e. searching additional information, etc)	1,66	5
4	10			X			- Solve the proposed exercises. - Participation in discussions and activities	1,66	
5	11								6
5	12	**T4. Gauss' law.** - Uniformly charged distributions and charge densities. - Electric flux. - Gauss' law. - Gauss's law as a tool for the calculation of electric fields.		X			- Reading of the corresponding chapters in the proposed literature. - Study and personal work on the lecture (i.e. searching additional information, etc)	1,66	
6	13	**T4 (cont.)** **T5. Electric potential.** - Electrostatic work. - Potential difference between two points. Electric potential. - Potential due to a point charge. The superposition principle. - Electrostatic energy. Conservation of energy.	X				- Reading of the corresponding chapters in the proposed literature. - Study and personal work on the lecture (i.e. searching additional information, etc)	1,66	6
6	14			X			- Solve the proposed exercises. - Participation in discussions and activities	1,66	
7	15	**T5 (cont.)**	X				- Reading of the corresponding chapters in the proposed literature. - Study and personal work on the lecture (i.e. searching additional information, etc)	1,66	5
7	16			X			- Solve the proposed exercises. - Participation in discussions and activities	1,66	

8	17	**T6. Conductors.** - Conductors and insulators. Conductors in electrostatic equilibrium. - Properties of conductors in electrostatic equilibrium: Electric field and potential inside the conductor. Charge distributions. Electric field and potential at the surface. - Conductors and cavities. Electric shielding.	X				- Reading of the corresponding chapters in the proposed literature. - Study and personal work on the lecture (i.e. searching additional information, etc)	1,66	5
8	18			X			- Solve the proposed exercises. - Participation in discussions and activities	1.66	
9	19	**T6 (cont.)** **T7. Capacitors and dielectrics** - Capacitor. - Definition of capacitance. Capacitance of a parallel plate capacitor. - Parallel and serial capacitors. - Energy stored in a capacitor. - Capacitors with dielectrics. Dielectric constant. Dielectric breakdown.	X				- Reading of the corresponding chapters in the proposed literature. - Study and personal work on the lecture (i.e. searching additional information, etc)	1,66	5
9	20			X			- Solve the proposed exercises. - Participation in discussions and activities	1,66	
10	21	**T7 (cont.)**	X				- Reading of the corresponding chapters in the proposed literature. - Study and personal work on the lecture (i.e. searching additional information, etc)	1,66	5
10	22			X			- Solve the proposed exercises. - Participation in discussions and activities	1,66	
11	23	**T8. Electric current and electric circuits.** - Electric current. Intensity and current density. - Ohm's law. Resistance. Electrical conductivity.	X				- Reading of the corresponding chapters in the proposed literature. - Study and personal work on the lecture (i.e. searching additional information, etc)	1,66	5

		T9. Magnetic forces and magnetic fields. - Introduction to the magnetism. - Magnetic field. The Lorentz force on a point charge. - Charged particles moving inside a magnetic field. - Magnetic forces on a current-carrying wire. Magnetic torques. Magnetic moment of a coil. - Magnetic fields due to currents. - Ampère's law.							
11	24			X			- Solve the proposed exercises. - Participation in discussions and activities	1,66	
12	25	**T9 (cont.)**	X				- Reading of the corresponding chapters in the proposed literature. - Study and personal work on the lecture (i.e. searching additional information, etc)	1,66	5
12	26			X			- Solve the proposed exercises. - Participation in discussions and activities	1,66	
13	27								
13	28			X			- Solve the proposed exercises. - Participation in discussions and activities	1.66	2
14	29								
14	30	**T10. Semiconductor devices.** - The pn junction. Semiconductor diodes. Characteristic curve. - Optoelectronic devices: LED, laser diode, photodiode. - Bipolar transistors. Transistor as an amplifier or switch. - Field effect transistors. The MOSFET transistor. - Applications: description of logical gates; memory cells.		X			- Reading of the corresponding chapters in the proposed literature. - Study and personal work on the lecture (i.e. searching additional information, etc)	1,66	4

15									
15				X					
		LAB: Measurements and uncertainties (**)		X	LAB 4.SB014 .SB024. SB03		- Reading of the guideline document. - Data acquisition - Analysis of results - Preparation of the report.	1,66	3
		LAB: Instrumentation (**)		X	LAB 4.SB014 .SB024. SB03		- Reading of the guideline document. - Data acquisition - Analysis of results - Preparation of the report.	1,66	3
		LAB: Electric and magnetic phenomena (**)		X	LAB 4.SB014 .SB024. SB03		- Reading of the guideline document. - Data acquisition - Analysis of results - Preparation of the report.	1,66	3
		LAB: Electric and magnetic phenomena (**)		X	LAB 4.SB014 .SB024. SB03		- Reading of the guideline document. - Data acquisition - Analysis of results - Preparation of the report.	1,66	3
SUBTOTAL								**50 + 85 = 135**	
		Assessment							15
TOTAL								**150**	

(*) Dates of the test exams are provisional.
(**) Dates of the lab sessions are provisional.