

			11h00 - 12h30	18.1.A12	Session 12	Thermodynamics 12.1 Introduction to Thermodynamics. 12.2 Thermodynamics: concept and definitions. 12.3 Equilibrium States. Quasistatic processes and reversible processes. 12.4 Work. 12.5 Temperature. Ideal gases. 12.6 Definition of temperature. 12.7 Thermometry. Ideal gas scale. 12.8 Thermal coefficients: expansion and isothermal compressibility.
	09/07/2019	Getafe	9h00 - 10h30	18.1.A12	Session 13	13.1 First principle. Experiment of Joule and statement of Helmholtz. 13.2 Internal energy: energy state equation 13.2 Internal energy: energy state equation. 13.3 Heat. Heat capacities and specific heats. Heat and work sources. 13.4 Phase Changes. 13.5 Application to ideal gases. 13.6 Diagrams PV and PT.
			11h00 - 12h30	18.1.A12	Session 14	14.1 Second principle. Statement of Kelvin-Planck. Thermal engines. 14.2 Clausius theorem. Refrigerating machines. Irreversibility. 14.3 Carnot Cycle. Carnot Theorem. Consequences 14.4 Cycles with ideal gases. 14.5 Entropy. 14.6 Theorem of Clausius. 14.7 Diagrams T-S. Entropy in ideal gases. 14.8 Entropy in irreversible processes. Entropy balance.
	10/07/2019	Leganés	9h00-9h30		Bus transfert Leganés	
			9h30 - 11h30	LAB4.S.B01/B02/B03	Laboratory 5	2 groups of 24 students in two laboratories
			11h45-13h15	LAB4.S.B01/B02/B03	Tutorship	
			13h15		Bus transfert Getafe	
	11/07/2019	Leganés	9h00-10h00		Bus transfert Leganés	
			10h00-12h00	LAB4.S.B01/B02/B03	Laboratory 6	2 groups of 24 students in two laboratories
			12h00 - 13h00		Bus transfert Getafe	
	12/07/2019	Getafe	9h00-11h15	17.0.05	Final Exam Physics I	

Break	13/07/2019	Toledo	8h30 - 18h30		Day Trip	
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Physics II					Room	
Week 1	15/07/2019	Getafe	9h00 - 10h30	18.1.A12	Session 1	Electric Charge, Force & Fields: Coulomb's Law 1.1 Electromagnetic Interaction. 1.2 Electric Charge. Charge is quantized. Charge is conserved. The Coulomb's Law. 1.3 The electric field E, definition and graphical representation: Electric Field lines. 1.4 The superposition principle. The Electric field due to a system of point charges. 1.5 Charge density. The Electric field due to a continuous charge distribution.
			11h00 - 12h30	18.1.A12	Session 2	Electric Potential. Gauss's Law 2.1 Line integral of E. Electrostatic potential energy. Energy of a point charge arrangement. 2.2 Electric Potential (Voltage), definition and graphical representation: Equipotential Surfaces. 2.3 The electric Flux. 2.4 Gaussian surfaces, Gauss's Law for Electricity. 2.5 Application of the Gauss's Law for the calculation of electric fields. 2.6 Charge distributions of sufficient symmetry.
	16/07/2019	Getafe	9h00-10h30	18.1.A12	Session 3	Conductors, Dielectrics, Capacitance, Energy of the Electric Field 3.1 Conductors, Dielectrics and Semiconductors. 3.2 Electric field in the presence of conductors. 3.3 Electric field in the presence of dielectrics. 3.4 Permittivity of a dielectric medium. Dielectric breakdown. 3.5 Capacitance. The storage of electrical energy. Capacitors. Equivalent capacitance.
			11h00 -12h30	18.1.A12	Session 4	Electric Current & Ohm's law, Resistance, Circuits 4.1 Electric current and the motion of charges. 4.2 Ohm's law. Conductivity. Resistivity. Resistance. 4.3 Power dissipation and Joule's law. 4.4 Combination of resistors. Circuits. Kirchoff's rules.
	17/07/2019	Leganés	9h00-9h30		Bus transfert	
			9h30-11h30	LAB4.S.B01/B02/B03	Laboratory 1	2 groups of 24 students in two laboratories
			11h45-13:15	LAB4.S.B01/B02/B03	Tutorship	
			13h15		Bus transfert	
	18/07/2019	Getafe	9h00 - 10h30	18.1.A12	Tutorship (Compulsory)	
			11h00-12h15	17.0.05	Midterm Exam 1	
Week 2	22/07/2019	Getafe	9h00 - 10h30	18.1.A12	Session 5	The Magnetic Field. Magnetic forces 5.1 The magnetic field B. Gauss's law for magnetism. 5.2 The Lorentz force. The motion of electrically charged particles in a Magnetic Field. 5.3 Force on a current-carrying conductor in an external Magnetic field. 5.4 Magnetic dipole moment. Effects of field B on a magnetic dipole.

			11h00 - 12h30	18.1.A12	Session 6	Magnetic field sources 6.1 The magnetic fields produced by currents. The Biot-Savart Law 6.2 Ampère Law. The calculation of magnetic field of some current-carrying systems 6.3 Magnetism in matter, Magnetization currents, vector magnetization M and vector H . 6.4 Generalization of Ampere's Law 6.5 Magnetic Materials. Introduction to Ferromagnetism
	23/07/2019	Getafe	9h00 - 10h30	18.1.A12	Session 7	The Faraday's Law. 7.1 Electromotive force (EMF). 7.2 EMF induced by temporal variation of a magnetic field. 7.3 Some practical applications. Generators, Motors, Eddy Currents. 7.4 Autoinductance and Mutual Inductance. Inductors. 7.5 Energy stored in an inductor. Energy density related to magnetic field.
			11h00 - 12h30	18.1.A12	Session 8	Electromagnetic waves (EM) and the Maxwell equations 8.1 The Maxwell displacement current. The Ampère-Maxwell's Law. 8.2 The Maxwell equations in integral form. 8.3 Electromagnetic waves. The speed of light. 8.4 Electromagnetic spectrum.
	24/07/2019	Leganés	9h00-9h30		Bus transfert	
			9h30-11h30	LAB4.S.B01/B02/B03	Laboratory 2	2 groups of 24 students in two laboratories
			11h30-13h15	LAB4.S.B01/B02/B03	Tutorship	
			13h15		Bus transfert	
	25/07/2019	Leganés	9h00 - 9h30		Bus transfert	
			9h30-10h45	4.1.E01	Midterm Exam 2	
			11h00-13h00	LAB4.S.B01/B02/B03	Laboratory 3	2 groups of 24 students in two laboratories
			13h00		Bus transfert	
Week 3	29/07/2019	Getafe	9h00-10h30	18.1.A12	Session 9	Waves 9.1 Standing waves. Traveling waves. Wave equation. Simple Waves motion. 9.2 Superposition of waves. 9.3 Periodic waves. 9.2 Plane waves. Reflection and Refraction. 9.4 Superposition. 9.5 Sound and light waves.
			11h00 - 12h30	18.1.A12	Session 10	Optics 10.1 Geometrical optics. 10.2 Mirrors. 10.3 Lenses. 10.4 Optical instruments and aberrations. Magnification power.
	30/07/2019	Getafe	9h00 - 10h30	18.1.A12	Session 11	Interference and Diffraction 11.1 Phase difference and coherence. 11.2 Constructive and destructive interference. 11.3 Two-slit interference pattern. 11.4 Diffraction pattern of a single slit. 11.5 Diffraction and resolution. Fraunhofer and Fresnel diffraction.
			11h00 - 12h30	18.1.A12	Session 12	Waves and particles 12.1 Waves and particles. Wave and particle duality. 12.2 The light: photons and waves. 12.3 The photoelectric effect. 12.4 Wave and particle duality. De Broglie wavelength. 12.5 Matter waves and electrons as a wave.
	31/07/2019	Leganés	9h00-9h30		Bus transfert	
			9h30-11h30	LAB4.S.B01/B02/B03	Laboratory 4	2 groups of 24 students in two laboratories
			12h00-14h00	LAB4.S.B01/B02/B03	Laboratory 5	
			14h00-14h30		Bus transfert	
	01/08/2019	Getafe	9h00 - 10h30	18.1.A12	Tutorship (Compulsory)	
			11h00-12h30	17.0.05	Midterm Exam 3	
Week 4	05/08/2018	Getafe	9h00-10h30	18.1.A12 (tbc)	Session 13	Relativity 13.1 Introduction and Relativity Pre-Einstein 13.2 Einstein's Postulates. 13.3 Lorentz Transformation 13.4 Relativistic effects and paradoxes 13.5 Simultaneity, times dilation, length contraction, clock synchronization 13.6 Relativistic momentum, energy, and mass
			11h00 - 12h30	18.1.A12 (tbc)	Session 14	Nuclear Physics 14.1 Structure of the atom. The atomic nucleus. 14.2 Nuclear stability. Isotopes. 14.3 Radioactivity: alpha, beta and gamma decay. 14.4 Nuclear binding and mass defect. Nuclear fission and fusion. 14.5 Radioactive decay law. Half-life.
	06/08/2019	Getafe	9h00 - 10h30	18.1.A12 (tbc)	Tutorship	
			11h00 - 12h30	18.1.A12 (tbc)	Tutorship (Compulsory)	
	07/08/2019	Getafe	9h30-11h15	17.0.05 (tbc)	Final Exam Physics II	
Departure	08/08/2019		Check out Residence Hall			