



COURSE: ADVANCED PHYSICS		
DEGREE: TELECOMMUNICATIONS TECHNOLOGIES ENGINEERING	YEAR: 3rd	TERM: 2ND

La asignatura tiene 29 sesiones que se distribuyen a lo largo de 14 semanas. Los laboratorios pueden situarse en cualquiera de ellas. Semanalmente el alumnos tendrá dos sesiones, excepto en un caso que serán tres

WEEKLY PLANNING									
WEEK	SESSION	DESCRIPTION	GROUPS (mark X)		SPECIAL ROOM FOR SESSION (Computer class room, audio-visual class room)	Indicate YES/NO If the session needs 2 teachers	WEEKLY PROGRAMMING FOR STUDENT		
			LECTURES	SEMINARS			DESCRIPTION	CLASS HOURS	HOME WORK HOUR S (Max. 7h week)
1	1	1.1 Introduction to wave optics - Nature of light. Electromagnetic spectrum - Wave parameters. Energy and Intensity. Poynting's vector - Wave Equation of EM Field. Solutions - Light Propagation in free media - Introduction to wave phenomena	X				-Reading of the corresponding chapters in the proposed literature - Study and personal work on the lecture, including proposed bibliography.	1,66	4

1	2			X			<ul style="list-style-type: none"> - Proposed exercises solving - Exposition of projects and problem solving -Participation in discussions and debates 	1,66	
2	3	1.2 Superposition of light waves <ul style="list-style-type: none"> - Same and Different Frequency. - Phase and group velocity. Beats - Stationary Waves - Pulses, wave packets and trains. - Coherence in wave optics. Spatial and Temporal - Extended Sources 		X			<ul style="list-style-type: none"> - Reading of the corresponding chapters in the proposed literature - Study and personal work on the lecture, including proposed bibliography. 	1,66	
2	4			X			<ul style="list-style-type: none"> - Proposed exercises solving - Exposition of projects and problem solving -Participation in discussions and debates 	1,66	4
3	5	1.3 Interference and interferometers <ul style="list-style-type: none"> - Constructive and Destructive Interference - Contrast, Visibility. - Interference by Wavefront Division. Young`s slit - Interference by Division of Amplitude. Thin Films - Interferometers. Michelson 		X			<ul style="list-style-type: none"> - Reading of the corresponding chapters in the proposed literature - Study and personal work on the lecture, including proposed bibliography. 	1,66	
3	6			X			<ul style="list-style-type: none"> - Proposed exercises solving - Exposition of projects and problem solving -Participation in discussions and debates 	1,66	
4	7	1.4 Diffraction <ul style="list-style-type: none"> - The Principle of Huygens-Fresnel - Fraunhofer and Fresnel diffraction - Diffraction by single and multiple slits - Optical instruments resolving power. Rayleigh criterion. Airy Disk 		X			<ul style="list-style-type: none"> - Reading of the corresponding chapters in the proposed literature - Study and personal work on the lecture, including proposed bibliography. 	1,66	
4	8			X			<ul style="list-style-type: none"> - Proposed exercises solving - Test, project delivery for evaluation of Part 1. Wave Optics 	1,66	

5	9	2.1 Introduction to Geometrical Optics - Wave propagation: wavefront and Huygens' principle. - Wave propagation: rays - Optical systems and imaging - Imaging by reflection and refraction - Real and virtual images - Total Internal Reflection - Fermat's principle	X				- Reading of the corresponding chapters in the proposed literature - Study and personal work on the lecture, including proposed bibliography.	1,66	
5	10			X			- Proposed exercises solving - Exposition of projects and problem solving (groups) -Participation in discussions and debates	1,66	
6	11	2.2 Mirrors - Imaging by reflection: mirrors. - Flat Mirrors. Equation of distances. Lateral magnification equation - Multiple plane mirrors. - Spherical Mirrors: concave mirror. - Paraxial approximation. Equation of distances. Lateral magnification equation. - Focus of a spherical mirror. - Spherical aberration. - Convex spherical mirrors. - Chief ray tracing. - Applications.	X				- Reading of the corresponding chapters in the proposed literature - Study and personal work on the lecture, including proposed bibliography.	1,66	
6	12			X			- Proposed exercises solving (groups). - Exposition of projects and problem solving -Participation in discussions and debates	1,66	
7	13	2.3 Lenses and prisms - Imaging by refraction. - Refraction at a spherical surface. Paraxial approximation. Distances and lateral magnification equations. - Thin converging lenses. - Paraxial approximation. Distances and lateral magnification equations - Lens foci. Focal length.	X				- Reading of the corresponding chapters in the proposed literature - Study and personal work on the lecture, including proposed bibliography.	1,66	

		<ul style="list-style-type: none"> - LensmakerB4s equation. - Diverging thin lenses. - Principal ray tracing - Aberrations. Aberration correction. - Fresnel Lens. - Prisms. - Applications 							
7	14			X				<ul style="list-style-type: none"> - Proposed exercises solving - Exposition of projects and problem solving -Participation in discussions and debates 	1,66
8	15	<p>2.4 Simple optical systems.</p> <ul style="list-style-type: none"> - The human eye: optical properties, - Imaging: The process of accommodation. - Vision defects: myopia and hyperopia. - Correction by lenses. - Correction by laser surgery. - Photographic camera: optical elements: objective, sensor array, aperture, shutter and prism. - Depth of field. 	X				<ul style="list-style-type: none"> - Reading of the corresponding chapters in the proposed literature - Study and personal work on the lecture, including proposed bibliography. 	1,66	
8	16			X				<ul style="list-style-type: none"> - Proposed exercises solving - Test, project submission for evaluation of Part2. GEOMETRICAL OPTICS 	1,66
9	17	<p>3.1 Light-Matter Interaction. Basic phenomena Emission, absorption, reflection, refraction, scattering, luminescence.</p> <ul style="list-style-type: none"> - Electron as oscillator. - The Lorentz model. 	X				<ul style="list-style-type: none"> - Reading of the corresponding chapters in the proposed literature - Study and personal work on the lecture, including proposed bibliography. 	1,66	
9	18			X				<ul style="list-style-type: none"> - Proposed exercises solving - Exposition of projects and problem solving -Participation in discussions and debates 	1,6
10	19	<p>3.2 Emission Scattering and Absorption</p> <ul style="list-style-type: none"> - Emission by a thermal source. - Scattering and absorption cross sections. - Origin of the refractive index. - Optical materials. 	X				<ul style="list-style-type: none"> - Reading of the corresponding chapters in the proposed literature - Study and personal work on the lecture, including proposed bibliography. 	1,6	

10	20			X				- Proposed exercises solving - Exposition of projects and problem solving -Participation in discussions and debates	1,6	
11	21	3.3 The Black Body - Black Body Radiation. Planck's law. - Radiometric and photometric magnitudes. - Radiometry.		X				- Reading of the corresponding chapters in the proposed literature - Study and personal work on the lecture, including proposed bibliography.	1,6	
11	22			X				- Proposed exercises solving - Exposition of projects and problem solving -Participation in discussions and debates	1,66	
12	23	3.4 Radiation sources and detectors - Photodetection. Sources of radiation - Electro-Optical Systems - Example: The infrared camera		X				- Reading of the corresponding chapters in the proposed literature - Study and personal work on the lecture, including proposed bibliography.	1,66	
12	24							- Proposed exercises solving - Exposition of projects and problem solving -Participation in discussions and debates	1,6	
13	25							Evaluation of Part 3. Interaction Light - Matter	1,66	
13										
14										
14										
Subtotal 1									41,66	58
Total 1 (Hours of class plus student homework hours between weeks 1-14)									99.66	

15		Tutorials, handing in, etc							2.33	2
16		Assessment							3	10
17										
18										

	Subtotal 2	5.33	12
Total 2 (<i>Hours of class plus student homework hours between weeks 15-18</i>)		17.33	
TOTAL (<i>Total 1 + Total 2. Maximum 180 hours</i>)		117	