Universidad Carlos III de Madrid

DENOMINACIÓN ASIGNATURA: GENERACION EOLICA Y FOTOVOLTAICA		
GRADO: INGENIERIA ELECTRICA	CURSO: 4º	CUATRIMESTRE: 1º

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.

			PLANIFICACIÓN SEMANAL DE LA ASIGNATURA						
SEMANA	**SESIÓN**	**DESCRIPCIÓN DEL CONTENIDO DE LA SESIÓN**	GRUPO (marcar X)		Indicar espacio distinto de aula (aula informática, audiovisual, etc.)	Indicar SI/NO es una sesión con 2 profesores	TRABAJO SEMANAL DEL ALUMNO		
			GRANDE	PEQUEÑO			DESCRIPCIÓN	HORAS PRESENCIALES	HORAS TRABAJO (Max. 7h semana)
1	1	**MODULE 1** PHOTOVOLTAIC (PV) SYSTEMS PV 1-Introduction to solar energy 1.1- Solar energy all over the world 1.2-Resource	x			NO		1,66	6

1	2	PV 2. Basic Technology. 2.1- Solar cell. Basic principles and current technology. 2.2- Characteristic of the solar cell. Exercises solar cell, cell temperature.		x		NO	Reading chapter 1, 2 Fundamentals, Technology and Practice Photovoltaics, Konrad Mertens Willey	1,66	
2	3	PV 3. Solar panels 3.1- Solar panels. 3.2-Generators electrical characteristic of photovoltaic solar panels. Varying voltage of the photovoltaic panels. Testing.Characteristic curve with variation of irradiance and cell temperature.	x			NO		1,66	
2	4	Exercises		x		NO		1,66	4
3	5	LABORATORY 1							
3	6	3.3 Architectural integration. 3.4 Solar tracking	x			NO		1,66	
4	7	PV 4-Inverters. 4.1-Types and functions. Performance. 4.2-Regulation		x		NO		1,66	4

						NO			
		4.3- Tracking the maximum power point of photovoltaic generator (MPPT)							
4	8	PV 5- Autonomous photovoltaic systems. 5.1 -Components. Batteries. Charge regulators. Inverters. 5.2- Autonomous photovoltaic systems: and dimensioning schemes.	x			NO		1,66	
5	9	5.3-Sizing exercises depending on the location and energy requirements.		x		NO	Reading chapter 1-10 Planning and Installing Photovoltaic Systems 2008	1,66	
5	10	PV 6. Photovoltaic Systems PV grid connected. 6.1 Schemes 6.2-Photovoltaic systems connected to the grid. Protections.	x			NO		1,66	4
6	11	Exercises		x		NO		1,66	
6	12	6.3-Regulation. 6.4- Sizing with specific software (PVSYST).		x		NO		1,66	4
7	13	PV 7 Net balance.	x			NO		1,66	

		7.1- Schemes 7.2- Characteristics. Examples							
7	14	MODULE 2. WIND POWER WIND 1. Wind Energy. Current status and resources. 1.1- Current status of wind power around the world							
8	15	Exam Module 1		x		NO		1,66	
8	16	1.2- Wind resource. Factors affecting wind production. 1.3-Models of assessing wind potential in a wind site.	x			NO		1,66	4
9	17	WIND 2. Energy Production 2.1- Power curve. Defining FC, HE. 2.2- Basic exercise for energy calculation (programs and web Alwin IDAE) 2.3- Energy calculation; project focused to a wind generator and site (selected by the student)		x		NO		1,66	4

		2.4- Project for a wind park electric energy production.							
9	18	WIND 3. Wind Technology 3.1- Wind turbine. Types. Components: turbine, tower, hub, generator, gearbox, converter, protections.	x			NO		1,66	
10	19	3.2- Wind turbine. Sizing wind generators. 3.3- Wind generators.Miniwind.Wind energy from the sea.		x		NO		1,66	
10	20	3.4- Wind generators. Speed variation associated with the variation of the blade pitch of the turbine. 3.5- Energy calculation as a function of wind	x			NO		1,66	4
11	21	Exercises		x		NO		1,66	
11	22	WIND 4. Wind energy systems connected to the grid . 4.1 Evolution of the control systems: fixed speed and speed. Tracking the maximum power point with maximum efficiency at part load. Speed control systems and power at part load and full load.	x			NO		1,66	4

		4.2- Wind farms.Sizing. Network Attached Project wind farm. Using specific software (RETScreen).							
12	23	LABORATORY 2		x		NO		1,66	
12	24	4-3. Network integration 4.4- Voltage Dips. Stability. Regulations. 4.5-Exercise voltage network nodes	x			NO		1,66	6
13	25	WIND 5. Autonomous wind systems. 5.1-Types and functions. 5.2- Selection. WIND 6. Regulation 6.1-Regulation in the field of renewable energies. 6.2-Spanish case.							
13	26	MODULE 3-Hibrid systems 3.1-Microgrids with photovoltaic generation, wind and accumulation systems. Types and functions. 3.2- Regulations. 3.3- Dimensioning with specific software (Homer Pro).							

14	27	LABORATORY 3						1,66	4
14	28	MODULE 4. SUSTAINABILITY 4.1- Sustainability. 4.2-RREE. Summary by technologies. 4.3- Energy efficiency 4.4-Energy from the sea.						1,66	
8	29							1,66	
							Subtotal 1	**48,33**	
		Total 1 *(Horas presenciales y de trabajo del alumno entre las semanas 1-14)*						104	
15		Recuperaciones, tutorías, entrega de trabajos, etc						6	
16		Preparación de evaluación y evaluación						3	
17									
18									14
							Subtotal 2	9	
		Total 2 *(Horas presenciales y de trabajo del alumno entre las semanas 15-18)*						23	
TOTAL *(Total 1 + Total 2. Máximo 180 horas)*								**117**	