



POLITÉCNICA

INTERNATIONAL
CAMPUS OF
EXCELLENCE

COORDINATION PROCESS OF
LEARNING ACTIVITIES
PR/CL/001



E.T.S. de Ingenieros
Industriales

ANX-PR/CL/001-01

LEARNING GUIDE

SUBJECT

55000070 - Computer Aided Design ¿ Cad

DEGREE PROGRAMME

05TI - Grado En Ingeniería En Tecnologías Industriales

ACADEMIC YEAR & SEMESTER

2021/22 - Semester 1

Index

Learning guide

1. Description.....	1
2. Faculty.....	1
3. Prior knowledge recommended to take the subject.....	2
4. Skills and learning outcomes	2
5. Brief description of the subject and syllabus.....	3
6. Schedule.....	7
7. Activities and assessment criteria.....	9
8. Teaching resources.....	11
9. Other information.....	12

1. Description

1.1. Subject details

Name of the subject	55000070 - Computer Aided Design ¿ Cad
No of credits	3 ECTS
Type	Optional
Academic year of the programme	Fourth year
Semester of tuition	Semester 7
Tuition period	September-January
Tuition languages	English
Degree programme	05TI - Grado en Ingeniería en Tecnologías Industriales
Centre	05 - Escuela Técnica Superior De Ingenieros Industriales
Academic year	2021-22

2. Faculty

2.1. Faculty members with subject teaching role

Name and surname	Office/Room	Email	Tutoring hours *
Rosa Maria Scala Hernandez-Vaquero (Subject coordinator)	GIG	rosamaria.scala@upm.es	Sin horario. At any time, sending previously an e-mail to the professor / En cualquier momento, enviando correo previo al profesor.

Jose Maria Cabanellas Becerra	GIG	josemaria.cabanellas@upm. es	Sin horario. At any time, sending previously an e-mail to the professor / En cualquier momento, enviando correo previo al profesor
----------------------------------	-----	---------------------------------	---

* The tutoring schedule is indicative and subject to possible changes. Please check tutoring times with the faculty member in charge.

3. Prior knowledge recommended to take the subject

3.1. Recommended (passed) subjects

The subject - recommended (passed), are not defined.

3.2. Other recommended learning outcomes

- Any previous concept is needed. They will be presented as they are required / No son necesarios conceptos previos. Se presentarán cuando se requieran

4. Skills and learning outcomes *

4.1. Skills to be learned

CE5 - Capacidad de visión espacial y conocimiento de las técnicas de representación gráfica, tanto por métodos tradicionales de geometría métrica y geometría descriptiva, como mediante las aplicaciones de diseño asistido por ordenador.

4.2. Learning outcomes

RA506 - Capacidad para dibujar un conjunto con un programa CAD y el correspondiente plano y despieces utilizando normas ISO.

RA520 - Manejar módulos avanzados de un programa CAD como movimiento o soldadura

RA596 - Capability to manage advanced concepts in a CAD program like variables or motion

RA595 - Capability to design with a CAD program a 3D part, an assembly and the drafts according to standards

* The Learning Guides should reflect the Skills and Learning Outcomes in the same way as indicated in the Degree Verification Memory. For this reason, they have not been translated into English and appear in Spanish.

5. Brief description of the subject and syllabus

5.1. Brief description of the subject

FOR STUDENTS GITI-05TI: THE COURSE IS IN ENGLISH

CAD program : Solid-Edge ST 2021 in English.

Solid-Edge can be installed with Windows 8, 10. If you have a Mac you must install a Virtual Machine

Free educational version you can download from SIEMENS Web Page.

There will be also an introduction to Onshape which works in the cloud.

The concepts involved will be design 3D parts, assemblies and drafts either of a part or an assembly.

Motions in assemblies will be also presented as well as exploded views.

In both cases, videos can be recorded.

Finally, Synchronous Technology will be presented.

PARA LOS ALUMNOS DE GIQ-05IQ Y GIEN-06IE: LA ASIGNATURA SE IMPARTE EN ESPAÑOL

Programa CAD: Solid-Edge ST 2021.

Se puede instalar en Windows 8 y 10. En Mac hay que instalar una máquina virtual.

Hay una versión educacional que se descarga de la página de Siemens.

Se hará una breve introducción a Onshape que trabaja en la nube.

Los conceptos que se presentarán serán diseño de piezas en 3D, conjuntos y planos de una pieza o conjunto

Se introducirá la forma de hacer movimientos en conjuntos y explosionados.

En ambos casos se pueden grabar vídeos.

Se hará una introducción a la Tecnología Síncrona

5.2. Syllabus

1. 2D sketches / Bocetos

1.1. Draw commands (lines, circles, offset, chamfer...) / Comandos de dibujo (líneas, círculos, desplazamiento, acuerdo...)

1.2. Dimension commands / Acotación.

1.3. Relate commands / Comandos de relación.

2. Basic 3D modelling commands / Operaciones básicas de modelado en 3D.

2.1. Extrude, revolve, sweep / Extrusión, revolución, barrido

2.2. Holes, threads / Taladros, roscas.

3. Advanced 3D modelling commands / Comandos para modelar 3D avanzados.

3.1. Thin wall, thin region, fillet, chamfer / Dar espesor, dar espesor en región, bisel, chaflán.

3.2. Rib, web network / Refuerzo, red de refuerzo

4. Design an assembly / Diseñar un conjunto.

4.1. Relationships to assemble a part / Relaciones para montar una pieza en un conjunto.

4.2. Pattern, mirror / Patrón, simetría

4.3. Part in place / Pieza en posición.

4.4. Motors, exploded view / Motores, explosionado

5. Dimension with PMI (Product and Manufacturing Information) / Acotación PMI (Información de producto y fabricación)

6. Drafts / Planos.

6.1. Working and background sheet / Hoja de trabajo. Hoja de fondo.

6.2. Cutting plane, section, broken out view / Plano de corte, sección, rotura

6.3. Dimensions / Acotación.

6.4. Welding symbols and feature control frame / Símbolos de soldadura y tolerancias geométricas.

6.5. Assembly draft, part list and exploded view / Plano de conjunto, lista de piezas y vista explosionada

7. Design with variables / Diseño con variables.

7.1. Relate dimensions in a part with variables / Relación entre dimensiones de una pieza con variables.

7.2. Relationship between parts in an assembly through variables / Relación entre piezas de un conjunto con variables.

7.3. 3D design with dimensions loaded in an Excel sheet / Diseño de una pieza en 3D con medidas mediante una hoja Excel.

8. Synchronous technology / Tecnología síncrona.

8.1. User interface / Interfaz de usuario.

8.2. Example of a part 3D design / Ejemplo de modelado en 3D de una pieza

9. Download standard parts from Web pages / Descarga de piezas normalizadas de páginas Web.

9.1. Traceparts (screws, nuts, circlips...) / Traceparts (tornillos, tuercas, anillos de seguridad...)

9.2. SKF (bearings) / SKF (rodamientos)

10. A CAD program on the cloud: Onshape / Un programa CAD en la nube: Onshape.

10.1. Introduction to Onshape. User interface / Introducción a Onshape. Interfaz de usuario.

10.2. Basic commands. Examples / Comandos básicos. Ejemplos.

6. Schedule

6.1. Subject schedule*

Week	Face-to-face classroom activities	Face-to-face laboratory activities	Distant / On-line	Assessment activities
1	Starting with Solid-Edge. Interface. Sketches / Empezando con Solid-Edge. Interfaz. Bocetos Duration: 02:00 Additional activities			Task done weekly / Tarea semanal. Individual work Continuous assessment Presential Duration: 00:00
2	Basic 3D modelling commands / Operaciones básicas de modelado en 3D. Duration: 00:00 Additional activities			Task done weekly / Tarea semanal Individual work Continuous assessment Presential Duration: 00:00
3	Advanced 3D modelling commands / Comandos para modelar 3D avanzados. Duration: 00:00 Additional activities			Task done weekly / Tarea semanal Individual work Continuous assessment Presential Duration: 03:00
4	Design an assembly / Diseñar un conjunto. Duration: 00:00 Additional activities			Task done weekly / Tarea semanal Individual work Continuous assessment Presential Duration: 03:00
5	Dimension with PMI (Product and Manufacturing Information) / Acotación PMI (Información de producto y fabricación) Duration: 00:00 Additional activities			Task done weekly / Tarea semanal Individual work Continuous assessment Presential Duration: 03:00
6	Drafts of parts and assemblies / Planos de piezas y conjuntos. Duration: 00:00 Additional activities			Task done weekly / Tarea semanal Individual work Continuous assessment Presential Duration: 03:00
7	Practice with an exam of previous year to check the student capabilities / Práctica con un examen del curso anterior para comprobar la evolución del alumno Duration: 00:00 Additional activities			Tarea semanal / Task done weekly Individual work Continuous assessment Presential Duration: 03:00
8	Mid-term evaluation / Control intermedio Duration: 00:00 Additional activities			Mid-Term Evaluation / Control Intermedio Individual work Continuous assessment Presential Duration: 02:00

9	Design with variables / Diseño con variables Duration: 00:00 Additional activities			Task done weekly / Tarea semanal Individual work Continuous assessment Presential Duration: 03:00
10	Advanced concepts in an assembly. Motors and exploded view / Conceptos avanzados en conjuntos. Motores y explotado Duration: 00:00 Additional activities			Task done weekly / Tarea semanal Individual work Continuous assessment Presential Duration: 03:00
11	Synchronous Technology / Tecnología síncrona Duration: 00:00 Additional activities			Task done weekly / Tarea semanal Individual work Continuous assessment Presential Duration: 03:00
12	Download standard parts from Web pages / Descarga de piezas normalizadas de páginas Web Duration: 00:00 Additional activities			Task done weekly / Tarea semanal Individual work Continuous assessment Presential Duration: 03:00
13	Onshape. Introduction / Introducción a Onshape Duration: 00:00 Additional activities			Task done weekly / Tarea semanal Individual work Continuous assessment Presential Duration: 03:00
14	Onshape. Practice / Práctica con Onshape Duration: 00:00 Additional activities			Task done weekly / Tarea semanal Individual work Continuous assessment Presential Duration: 03:00 Final project / Trabajo final Individual work Continuous assessment Not Presential Duration: 00:00 Examen final Problem-solving test Final examination Presential Duration: 02:00
15				
16				
17				

Depending on the programme study plan, total values will be calculated according to the ECTS credit unit as 26/27 hours of student face-to-face contact and independent study time.

* The schedule is based on an a priori planning of the subject; it might be modified during the academic year, especially considering the COVID19 evolution.

7. Activities and assessment criteria

7.1. Assessment activities

7.1.1. Continuous assessment

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
1	Task done weekly / Tarea semanal.	Individual work	Face-to-face	00:00	%	/ 10	
2	Task done weekly / Tarea semanal	Individual work	Face-to-face	00:00	%	/ 10	
3	Task done weekly / Tarea semanal	Individual work	Face-to-face	03:00	3%	/ 10	CE5
4	Task done weekly / Tarea semanal	Individual work	Face-to-face	03:00	3%	/ 10	CE5
5	Task done weekly / Tarea semanal	Individual work	Face-to-face	03:00	3%	/ 10	CE5
6	Task done weekly / Tarea semanal	Individual work	Face-to-face	03:00	3%	/ 10	CE5
7	Tarea semanal / Task done weekly	Individual work	Face-to-face	03:00	3%	/ 10	CE5
8	Mid-Term Evaluation / Control Intermedio	Individual work	Face-to-face	02:00	20%	5 / 10	CE5
9	Task done weekly / Tarea semanal	Individual work	Face-to-face	03:00	3%	/ 10	CE5
10	Task done weekly / Tarea semanal	Individual work	Face-to-face	03:00	3%	/ 10	CE5
11	Task done weekly / Tarea semanal	Individual work	Face-to-face	03:00	3%	/ 10	CE5
12	Task done weekly / Tarea semanal	Individual work	Face-to-face	03:00	3%	/ 10	CE5
13	Task done weekly / Tarea semanal	Individual work	Face-to-face	03:00	3%	/ 10	CE5
14	Task done weekly / Tarea semanal	Individual work	Face-to-face	03:00	3%	/ 10	CE5
14	Final project / Trabajo final	Individual work	No Presential	00:00	45%	5 / 10	CE5

7.1.2. Final examination

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
14	Examen final	Problem-solving test	Face-to-face	02:00	100%	5 / 10	CE5

7.1.3. Referred (re-sit) examination

Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
Examen final	Problem-solving test	Face-to-face	02:00	100%	5 / 10	CE5

7.2. Assessment criteria

GITI-05IT

CONTINUOUS EVALUATION

Weekly exercises: 35%

Mid-term evaluation: 20%

Final project: 45%

ONLY FINAL EVALUATION:

Exam 100%

GIQ-05IQ / GIEN-06IE

EVALUACIÓN CONTÍNUA

Tareas semanales: 35%

Control Intermedio: 20%

Trabajo final: 45%

EVALUACIÓN SOLO PRUEBA FINAL

Examen 100%

8. Teaching resources

8.1. Teaching resources for the subject

Name	Type	Notes
Tutorials for Solid-Edge / Tutoriales de Solid-Edge	Others	Tutorial videos specially recorded for this subject. Available in UPMDrive and Stream/ Vídeos tutoriales específicamente hechos para esta asignatura. Disponibles en UPMDrive y Stream
Resources in Moodle / Recursos en Moodle	Others	Students will have available all needed material for every week task in moodle / El alumno dispondrá de todo el material necesario para el trabajo semanal

9. Other information

9.1. Other information about the subject

GIQ-05IQ / GIEN-06IE (EN ESPAÑOL)

Especialmente para los alumnos de GIEN-06IE indicar que, aunque no tengan formación previa en programas CAD o en Dibujo Técnico, **NO SON NECESARIOS CONCEPTOS PREVIOS.**

Todos los conceptos requeridos se irán presentando paulatinamente a lo largo de la asignatura.