



POLITÉCNICA

INTERNATIONAL
CAMPUS OF
EXCELLENCE

COORDINATION PROCESS OF
LEARNING ACTIVITIES
PR/CL/001

ingeniería
diseño
industrial

E.T.S. de Ingeniería y Diseño
Industrial

ANX-PR/CL/001-01

LEARNING GUIDE

SUBJECT

565005808 - Art, Technology And Society

DEGREE PROGRAMME

56DD - Grado Ingeniería En Diseño Industrial Y Desarrollo De Producto

ACADEMIC YEAR & SEMESTER

2025/26 - Semester 1

Index

Learning guide

1. Description.....	1
2. Faculty.....	1
3. Skills and learning outcomes	2
4. Brief description of the subject and syllabus.....	4
5. Schedule.....	8
6. Activities and assessment criteria.....	11
7. Teaching resources.....	13
8. Other information.....	14

1. Description

1.1. Subject details

Name of the subject	565005808 - Art, Technology And Society
No of credits	3 ECTS
Type	Optional/elective
Academic year of the programme	Fourth year
Semester of tuition	Semester 7
Tuition period	September-January
Tuition languages	English
Degree programme	56DD - Grado Ingeniería en Diseño Industrial y Desarrollo de Producto
Centre	56 - E.T.S. De Ingeniería Y Diseño Industrial
Academic year	2025-26

2. Faculty

2.1. Faculty members with subject teaching role

Name and surname	Office/Room	Email	Tutoring hours *
Oscar Oliver Santos Sopena (Subject coordinator)	A -105	oscar.santos.sopena@upm.es	Sin horario. TBA or by appointment

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

3. Skills and learning outcomes *

3.1. Skills to be learned

C.13.1. - Conocimiento para el desarrollo de competencias profesionales y académicas (soft skills) para el ejercicio de la ingeniería y el diseño desde un punto de vista humanístico. TIPO: Conocimientos o contenidos.

CE16 - Conocimientos básicos y aplicación de tecnologías medioambientales y sostenibilidad. Nivel: Conocimiento TIPO: Competencias

CE17 - Conocimiento adecuado del concepto de empresa, marco institucional y jurídico de la empresa. Organización y gestión de empresas. Nivel: Conocimiento TIPO: Competencias

CE27 - Capacidad para realizar individualmente y presentar y defender ante un tribunal universitario un ejercicio consistente en un proyecto en el ámbito de las tecnologías específicas de la Ingeniería en Diseño Industrial y Desarrollo de Producto, de naturaleza profesional, en el que se sinteticen e integren las competencias adquiridas en las enseñanzas. Nivel: Aplicación TIPO: Competencias

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. Nivel: Aplicación TIPO: Competencias

CE8 - Conocimiento de la gestión y metodología del diseño. Técnicas de creatividad e innovación. Nivel: Conocimiento TIPO: Competencias

CG10 - Creatividad. Nivel: Síntesis TIPO: Competencias

CG2 - Poseer la capacidad para diseñar, desarrollar, implementar, gestionar y mejorar productos, sistemas y procesos, usando técnicas analíticas, computacionales o experimentales apropiadas. Nivel: Aplicación TIPO: Competencias

CG3 - Aplicar los conocimientos adquiridos para identificar, formular y resolver problemas en contextos amplios, siendo capaces de integrar los trabajando en equipos multidisciplinares. Nivel: Análisis, Síntesis TIPO: Competencias

CG4 - Comprender el impacto de la ingeniería en el medio ambiente, el desarrollo sostenible de la sociedad y la

importancia de trabajar en un entorno profesional y responsable. Nivel: Análisis, Síntesis TIPO: Competencias

CG5 - Comunicar conocimientos y conclusiones, de forma oral, escrita y gráfica, a públicos especializados y no especializados de modo claro y sin ambigüedades. Nivel: Análisis, Síntesis TIPO: Competencias

CG6 - Poseer las habilidades de aprendizaje que permitan continuar estudiando a lo largo de toda la vida para un desarrollo profesional adecuado. Nivel: Aplicación TIPO: Competencias

CG7 - Incorporar las TIC y las tecnologías y herramientas de la Ingeniería en Diseño Industrial y Desarrollo de Producto en sus actividades profesionales. Nivel: Aplicación TIPO: Competencias

CG8 - Capacidad de trabajar en un entorno bilingüe (inglés y castellano). Nivel: Aplicación TIPO: Competencias

CG9 - Organización y planificación de proyectos y equipos humanos. Trabajo en equipo y capacidad de liderazgo. Nivel: Aplicación TIPO: Competencias

H.16. - Adquirir conciencia y asumir las implicaciones sociales, de salud y seguridad, ambientales, económicas e industriales de la práctica de la ingeniería. TIPO: Habilidades o destrezas.

H.18. - Recoger e interpretar datos y manejar conceptos complejos dentro de su especialidad, para emitir juicios que impliquen reflexión sobre temas éticos y sociales. TIPO: Habilidades o destrezas.

H.19. - Gestionar complejas actividades técnicas o profesionales o proyectos de su especialidad, responsabilizándose de la toma de decisiones. TIPO: Habilidades o destrezas.

H.20. - Comunicar eficazmente información, ideas, problemas y soluciones en el ámbito de ingeniería y con la sociedad en general. TIPO: Habilidades o destrezas.

H.21. - Funcionar eficazmente en contextos nacionales e internacionales, de forma individual y en equipo y cooperar tanto con ingenieros como con personas de otras disciplinas. TIPO: Habilidades o destrezas.

3.2. Learning outcomes

RA27 - Capacidad de defender ideas y puntos de vista indicando pros y contras de las distintas opciones. Actitudes de razonamiento crítico y actuaciones creativas basadas en situaciones abiertas.

RA331 - Utilización y búsqueda de fuentes fiables para la creación de un proyecto

RA333 - Argumentación y defensa conceptual de diseños y creaciones.

* 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.

4. Brief description of the subject and syllabus

4.1. Brief description of the subject

ART, TECHNOLOGY, AND SOCIETY

The main objective of this elective course **is to develop professional and academic competencies (*Soft Skills*) for future engineers and industrial designers from a humanistic approach. These skills will be worked through a balance between practical and theoretical sessions about social, artistic, and technological topics that will encourage the development of creative/critical thinking; the design of projects; the use of artistic tools and methodologies; the implementation of hybrid initiatives of Engineering and Art in the community; and, finally, the prototyping of initiatives for sustainability and Sustainable Development Goals.** Practical sessions will include aspects about impact measurement, the Theory of Change, intercultural/artistic mediation, the role of technology, and the analysis of communities and territories. All these, through actions of scientific dissemination, as well as their communication, ethics, and social responsibility.

We will work on how to transmit scientific and technical information to society and to professionals in an effective

way. From a professional point of view, we will analyze how companies prepare and disseminate information, both inside and outside their environment (internal and external communication). In addition, we will deal with the way to disseminate the results of a project through the artistic and social referents that promote science and to listen to what citizens have to say, and their return to society.

The **learning process** should enable Bachelor's Degree graduates to demonstrate:

- Awareness of the wider multidisciplinary context of engineering;
- Ability to identify, formulate, and solve engineering problems in their field of study; to select and apply relevant methods from established analytical, computational, and experimental methods; to recognize the importance of non-technical societal, health and safety, environmental, economic, and industrial constraints;
- Practical skills for solving complex problems, realizing complex engineering designs, and conducting investigations in their field of study;
- Ability to communicate effectively information, ideas, problems, and solutions with the engineering community and society at large;
- Ability to function effectively in a national and international context, as an individual and as a member of a team and to cooperate effectively with engineers and non-engineers;
- Ability to recognize the need for and to engage in independent life-long learning; and
- Ability to follow developments in science and technology.

The evaluation methodology will consist of individual tasks and a summary of the sessions attended (40%), presentations (40%), and final project (20%). Attendance is mandatory to obtain (80% attendance).

4.2. Syllabus

1. Module 1: Arts + Science; STEAM approaches
 - 1.1. Arts + Education: Design & Art Thinking
 - 1.2. Artistic mediation in Engineering contexts
 - 1.3. Arts + Environmental Culture and Sustainability
 - 1.4. Critical Thinking and STEAM
 - 1.5. Action Research and Citizen Science
 - 1.6. Culture, science, and society
2. Module 2: Scientific & technical dissemination and the media
 - 2.1. Introduction to scientific & technical dissemination in the media
 - 2.2. Scientific-technical communication and its relationship with corporate communication
 - 2.3. The corporate website. Examples (organization of information, social networks, etc.)
 - 2.4. Discursive techniques and strategies
 - 2.5. Communication channels. Use of technology for the communication of Science & Technology
 - 2.6. Transmedia narrative as a communication strategy in Science & Technology
3. Module 3: Sustainability, ethics, and social responsibility
 - 3.1. Defining Social, Economic, and Environmental Sustainability
 - 3.2. Politics, sociology, and sustainable education
 - 3.3. Responsibility and ethics in engineering projects

- 3.4. Measurement and evaluation of the impact of a project and Theory of Change
- 3.5. Communication and Environmental Education and SDG
- 3.6. Acquisition of professional skills and Soft Skills in sustainable environments
- 3.7. Engineering and Design Service-Learning Projects: Case studies of innovation and pedagogical renewal
- 4. Presentation of projects: Conference on Innovation and Service-Learning | Challenge (Glocalization)

5. Schedule

5.1. Subject schedule*

Week	Type 1 activities	Type 2 activities	Distant / On-line	Assessment activities
1	Module 1: Arts + Science; STEAM approaches Introduction Duration: 02:00 Lecture			
2	Arts + Education: Design & Art Thinking Duration: 02:00 Design thinking			
3	Artistic mediation in Engineering contexts Duration: 01:00 Lecture Arts + Environmental Culture and Sustainability Duration: 01:00 Research-based learning			
4	Critical Thinking and STEAM Action Research and Citizen Science Walk&Talk Duration: 02:00 Research-based learning			
5	Culture, science, and society Cultural visit Fundación Telefónica IA + Technology + Society Duration: 02:00 Practice field trip			
6	Module 2: Scientific & technical dissemination and the media Introduction INNOVATION WEEK + EELISA HACKATHON or WALK&TALK Duration: 02:00 Design thinking			
7	Scientific-technical communication and its relationship with corporate communication Duration: 01:00 Problem-solving class The corporate website. Examples (organization of information, social networks, etc.) Duration: 01:00 Cooperative activities			

8	<p>Presentation 1 Duration: 00:00 Additional activities</p> <p>Projects INNOVATION WEEK + EELISA HACKATHON Duration: 00:00 Design thinking</p>			<p>Presentation 1 Group presentation Progressive assessment Presential Duration: 02:00</p>
9	<p>Discursive techniques and strategies Communication channels. Use of technology for the communication of Science & Technology Transmedia narrative as a communication strategy in Science & Technology Duration: 02:00 Cooperative activities</p>			
10	<p>Module 3: Sustainability, ethics, and social responsibility Duration: 01:00 Lecture</p> <p>Defining Social, Economic, and Environmental Sustainability Duration: 01:00 Design thinking</p>			
11	<p>Politics, sociology, and sustainable education Responsibility and ethics in engineering projects Duration: 02:00 Research-based learning</p>			
12	<p>Measurement and evaluation of the impact of a project and Theory of Change Duration: 01:00 Service learning</p> <p>Communication and Environmental Education and SDG Duration: 01:00 Service learning</p>			
13	<p>Acquisition of professional skills and Soft Skills in sustainable environments Duration: 02:00 Service learning</p>			
14	<p>Engineering and Design Service-Learning Projects: Case studies of innovation and pedagogical renewal Duration: 02:00 Service learning</p>			
15	<p>Presentation 2 Duration: 00:00 Additional activities</p> <p>Engineering and Design Service-Learning Projects: Case studies of innovation and pedagogical renewal Duration: 00:00 Service learning</p>			<p>Presentation 2 Group presentation Progressive assessment Presential Duration: 02:00</p> <p>Final project FINAL JOINT PROJECT PROTOTYPING STEAM project Group work Progressive assessment Presential Duration: 00:00</p>

16				<p>Class assignments + course participation Individual tasks and a summary of the sessions attended Other assessment Progressive assessment Not Presential Duration: 00:00</p>
17				<p>Presentation Group presentation Global examination Presential Duration: 01:00</p> <p>Final Exam Problem-solving test Global examination Not Presential Duration: 01:00</p>

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.

6. Activities and assessment criteria

6.1. Assessment activities

6.1.1. Assessment

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
8	Presentation 1	Group presentation	Face-to-face	02:00	20%	5 / 10	CG3 CG5 CG10 CE8 CE16 CE20 C.13.1. H.21.
15	Presentation 2	Group presentation	Face-to-face	02:00	20%	5 / 10	CG3 CG5 CG10 CE8 CE16 CE20 C.13.1. H.21.
15	Final project FINAL JOINT PROYECT PROTOTYPING STEAM project	Group work	Face-to-face	00:00	20%	5 / 10	CG2 CG3 CG4 CG5 CG6 CG7 CG8 CG9 CG10 CE5 CE8 CE15 CE16 CE17 CE20 CE27 C.13.1. H.16. H.18. H.19. H.20. H.21.

16	Class assignments + course participation individual tasks and a summary of the sessions attended	Other assessment	No Presential	00:00	40%	5 / 10	C.13.1.
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6.1.2. Global examination

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
17	Presentation	Group presentation	Face-to-face	01:00	40%	5 / 10	
17	Final Exam	Problem-solving test	No Presential	01:00	60%	5 / 10	

6.1.3. Referred (re-sit) examination

No se ha definido la evaluación extraordinaria.

6.2. Assessment criteria

The evaluation methodology will consist of individual tasks and a summary of the sessions attended (40%), presentations (40%), and the final project (20%). Attendance is mandatory to obtain 80% attendance.

*Art, Technology, Society_

Final project | FINAL JOINT PROYECT PROTOTYPING | STEAM project

2 STEAM presentations

W&T_Walk&Talk

Walk&Talk is an experiential learning methodology that combines walking and collaborative dialogue in public space to foster creativity, critical thinking, and contextual awareness in design and education. Through thematic walks, it addresses key issues such as energy efficiency, urban planning, spatial transformation, accessibility, and other contemporary social and technological challenges.

Technical visits

Collaborative listening and prototyping processes occur between the university, industry, and the third sector, focusing on key degree-related topics within the social and technological innovation framework. These experiences

connect academic learning with real-world challenges, generating applied proposals through active and interdisciplinary methodologies, and strengthening the relationship between university, society, and territory.

7. Teaching resources

7.1. Teaching resources for the subject

Name	Type	Notes
INNOVA HUB ETSIDI	Equipment	https://www.etsidi.upm.es/Escuela/InstalacionesETSIDI/Salas%20de%20usos%20m%C3%BAltiples/INNOVA%20HUB%20ETSIDI
Industrial Design for Human - EELISA - ES NUESTRO	Web resource	https://blogs.upm.es/id4h-eelisa/
EELISA Community Industrial Design4Human ID4H	Web resource	https://community.eelisa.eu/communities/industrialdesign4human-industrial-design-and-innovation-for-sustainable-human-welfare/
EELISA	Web resource	https://eelisa.eu/
TEACHforAmerica. (2010). Diversity, Community & Achievement	Bibliography	https://www.teachforamerica.org/what-we-do/our-impact
Banks, J. A. (1998). Multiculturalism?s Five Dimensions. NEA Today, pp. 1?4.	Bibliography	www.learner.org/workshops/socialstudies/pdf/session3/3.Multiculturalism.pdf
Burnard, P., Colucci-Gray, L., & Cooke, C. (2022). Transdisciplinarity: Re-Visioning How Sciences and Arts Together Can Enact Democratizing Creative Educational Experiences. Review of Research in Education, 46(1): pp. 166-197.	Bibliography	
Eyler, J. & Giles, D. E. Jr. (1999). Where?s the learning in service-learning? San Francisco, C.A.: Jossey-Bass.	Bibliography	

Land, M. H. (2013). Full STEAM ahead: The benefits of integrating the arts into STEM. <i>Procedia Comput. Sci.</i> , 20, pp. 547-552.	Bibliography	
Moon, J. A. (1999). <i>Reflection in learning and professional development: Theory and practice.</i> London, U.K.: Kogan Page Limited, Stylus Publishing Inc.	Bibliography	
Redfield, R. (1953). <i>The primitive World and its Transformations.</i> Ithaca, N.Y.: Cornell University Press.	Bibliography	

8. Other information

8.1. Other information about the subject

ADDENDUM TO THE LEARNING OUTCOMES DECLARATION (RD 822/2021)

The course also contributes to the following abilities:

H.9. - To project, design, and develop complex products (parts, components, finished products, etc.), processes, and systems within their specialty that meet established requirements. This includes being aware of social, health and safety, environmental, economic, and industrial aspects and selecting and applying appropriate design methods, utilizing cutting-edge knowledge when suitable. TYPE: Skills or abilities.

H.16. - To acquire awareness and assume engineering practice's social, health and safety, environmental, economic, and industrial implications. TYPE: Skills or abilities.

H.18. - To collect and interpret data and handle complex concepts within their specialty, to make judgments that involve reflection on ethical and social issues. TYPE: Skills or abilities.

H.19. - To manage complex technical or professional activities or projects within their specialty, taking responsibility for decision-making. TYPE: Skills or abilities.

H.20. - To effectively communicate information, ideas, problems, and solutions in engineering and with society in general. TYPE: Skills or abilities.

H.21. - To function effectively in national and international contexts, individually. TYPE: Skills or abilities.

SUSTAINABLE DEVELOPMENT GOALS

Contribution of the course to the following SDG:

SDG4: Quality Education

Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

SDG5: Gender Equality

Achieve gender equality and empower all women and girls

SDG9: Industry, Innovation and Infrastructure

Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation

SDG10: Reduced Inequality

Reduce inequality within and among countries

SDG11: Sustainable Cities and Communities

Make cities and human settlements inclusive, safe, resilient, and sustainable

SDG12: Responsible Consumption and Production

Ensure sustainable consumption and production patterns

SDG16: Peace and Justice Strong Institutions

Promote peaceful and inclusive societies for sustainable development, provide access to justice for all, and build effective, accountable, and inclusive institutions at all levels

SDG17: Partnerships to Achieve the Goal

Strengthen the means of implementation and revitalize the global partnership for sustainable development.

This course is part of our [INNOVA HUB ETSIDI](#), Service-Learning, STEAM, and EELISA initiatives, and some sessions will be held at this open social innovation and entrepreneurship laboratory/space.