



POLITÉCNICA

SCHOOL OF INDUSTRIAL ENGINEERING 175 ANNIVERSARY (2025)



INDUSTRIALES
ETSII | UPM



Facts and figures

Studies

4500

Students

3

Grade Programs

1

Master's Degree in Industrial Engineering

13

Postgraduate Masters

1st

Ranking El Mundo Best School to Study
Industrial Engineering in Spain

1st

Degrees more demanded and with the highest
cut-off notes in Spain

1st

Leader in employability of the Community of
Madrid, second at national level and 94
worldwide according to the prestigious QS
world index

- 1000

Labour practices per year

250

Companies to perform Internships

ABET

Titles accredited by the ABET American
Certification

EUR-ACE.

Titles accredited by the European stamp of
international quality in engineering EUR-ACE

AUDIT

AUDIT Certification of Implementation of
Internal Quality Management System



Facts and figures

Studies - International

25

Double Titulation Agreements with Universities
Around the World

+167

Target universities of student mobility

400

ETSII students enjoy International Mobility
every year

1st

First destination of International Students at
the UPM

R+D+i

300

Research Projects

5

Research Centres and Institutes

29

Research groups

40

PhD Thesis on average presented each
year

BACHELOR DEGREES

BACHELOR DEGREE in INDUSTRIAL ENGINEERING is the most general of all the different types of engineering.

Industrial Engineering embraces many sectors: energy, mechanics, electronics, robotics, electrical engineering, manufacturing, industrial chemistry and the environment, organisation and materials.

The average entry grade for the BS in Industrial Engineering is the highest in Spain.

BACHELOR DEGREE in CHEMICAL ENGINEERING

BACHELOR DEGREE in ORGANISATION ENGINEERING



Over 2400 students apply every year for the Bs in Industrial Engineering degree.

Only 400 are admitted

MASTER DEGREES

MASTER DEGREE IN INDUSTRIAL ENGINEERING

- Automation and Robotics
- **Nuclear Science and Technology**
- Economy and Innovation Management
- Industrial Electronics
- Acoustic Engineering
in Industry and Transport
- Environmental Engineering
- **Energy engineering**
- Organisation Engineering
- Electrical Engineering
- Mechanical Engineering
- Chemical Engineering
- Earthquake Engineering: Soil and
Structure Dynamics
- Laser technology

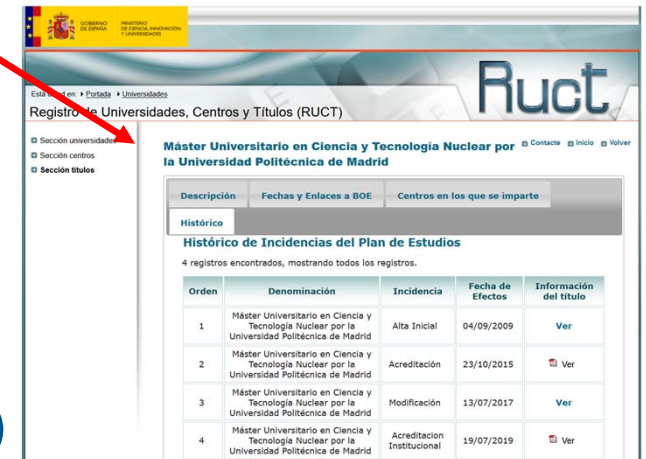


PhD PROGRAMS

- PhD in Automation and Robotics
- PhD in Electrical and Electronic Engineering
- PhD in Mechanical Engineering
- PhD in Organisation Engineering
- PhD in Environmental Engineering, Chemical and Materials
- **PhD in Sustainable Renewable and Nuclear Energies**
- EUROPEAN DOCTORATE in Industrial Management
- PhD in Economy and Innovation Management



- Taught since 2006 as an adaptation of the courses of the doctoral program of the same name
- Coordinated by the Department of Energy Engineering (Nuclear Area)
(<https://din.industriales.upm.es/>)
- Official status [Link of the degree to the Register of Universities, Centres and Degrees (RUCT)]
- 200+ graduates until February 2025
- High percentage (+70%) of alumni research or work in the nuclear sector (and CSN)
- It gives direct access to the Doctoral Programme "Sustainable, Nuclear and Renewable Energy"
(<http://enerdoc.industriales.upm.es/index.php/es/>)



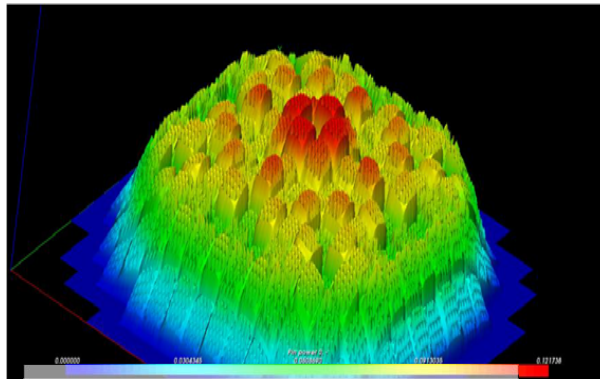
Registro de Universidades, Centros y Títulos (RUCT)

Máster Universitario en Ciencia y Tecnología Nuclear por la Universidad Politécnica de Madrid

Orden	Denominación	Incidencia	Fecha de Efectos	Información del título
1	Máster Universitario en Ciencia y Tecnología Nuclear por la Universidad Politécnica de Madrid	Alta Inicial	04/09/2009	Ver
2	Máster Universitario en Ciencia y Tecnología Nuclear por la Universidad Politécnica de Madrid	Acreditación	23/10/2015	Ver
3	Máster Universitario en Ciencia y Tecnología Nuclear por la Universidad Politécnica de Madrid	Modificación	13/07/2017	Ver
4	Máster Universitario en Ciencia y Tecnología Nuclear por la Universidad Politécnica de Madrid	Acreditación Institucional	19/07/2019	Ver

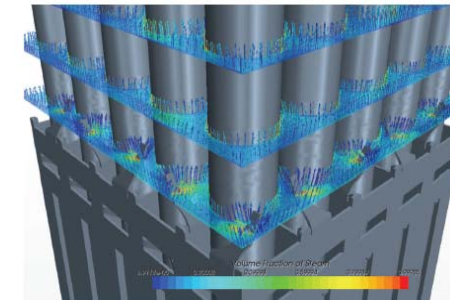
Research Lines (MUCTN-UPM)

Nuclear fission research group

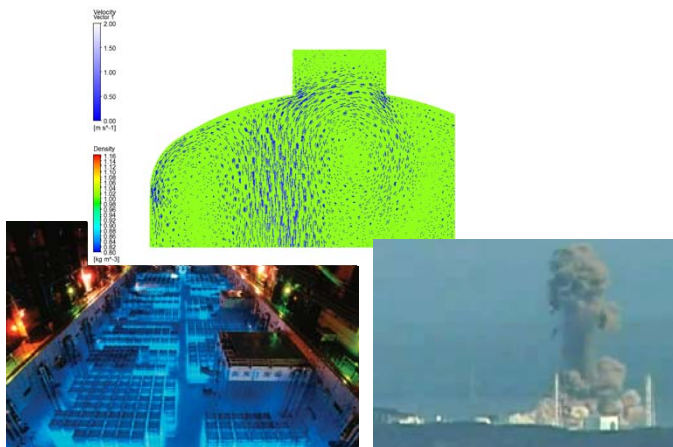


Fission Reactor Physics

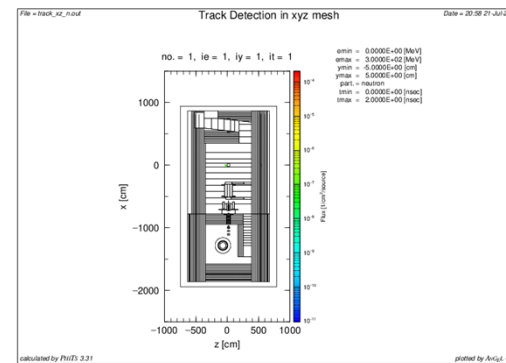
Neutron measurement and detection



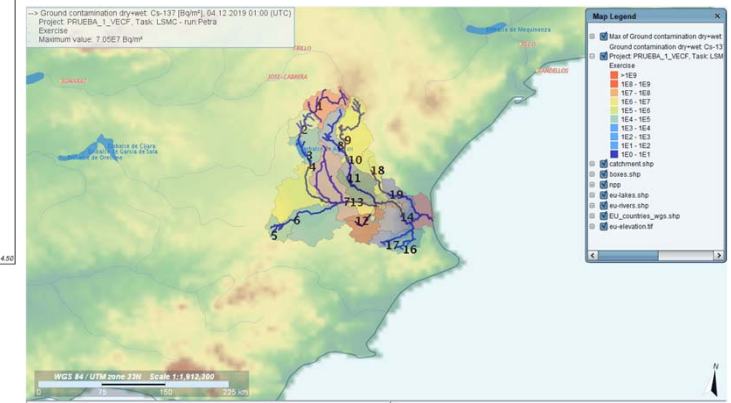
Thermohydraulics and CFD



Nuclear safety. PSA. Severe Accidents



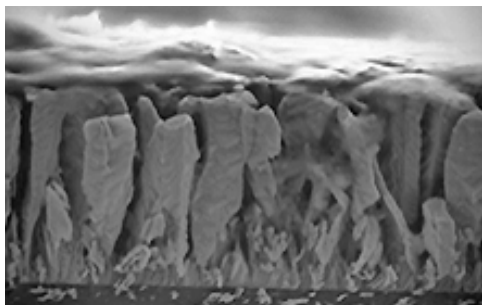
Monte Carlo.
Shielding analysis



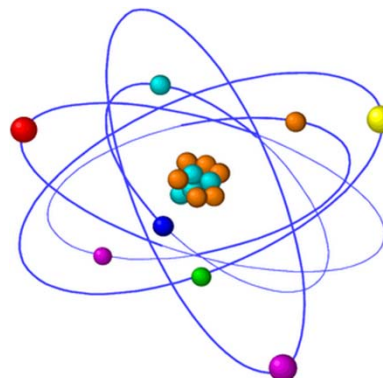
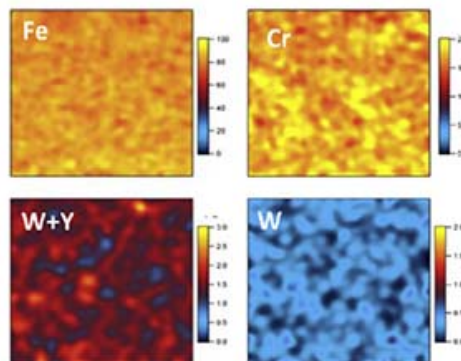
Environmental impact and emergencies

Research Lines (MUCTN-UPM)

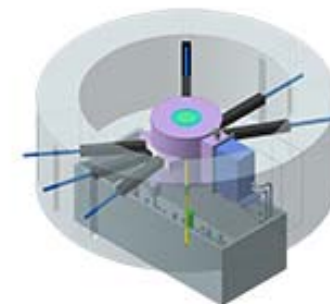
Nuclear fusion research group (and Guillermo Velarde Institute of Nuclear Fusion)



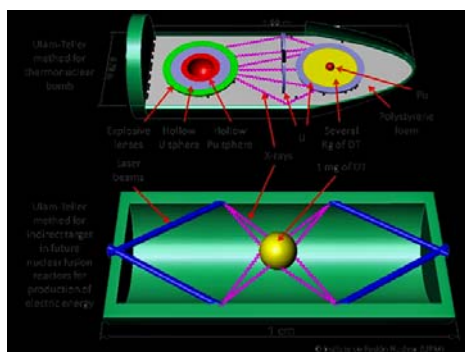
Materials under irradiation



Atomic physics



Neutron sources



Safety and
nonproliferation
studies

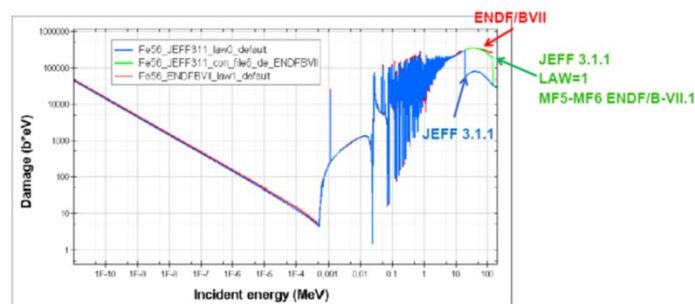
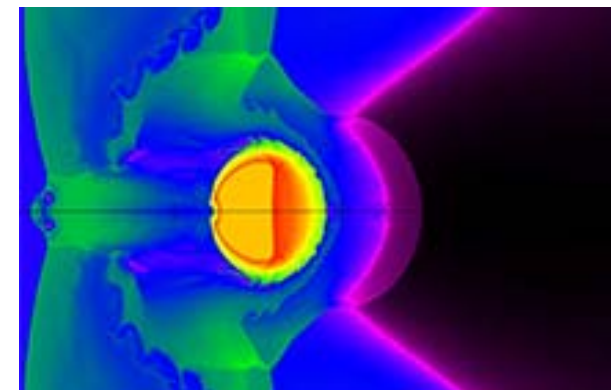


Figure. A comparison of Damage Energy Cross Section for Fe56.
Updated JEFF-3.1.1 with MT5 and MT6 taken from ENDF/B-VII.1

Nuclear data and uncertainties



Computational hydrodynamics.
High-energy plasmas in FCI

Master's Degree Final Project – 12 ECTS

Core Subjects (compulsory) – 18 ECTS

Compulsory practical subjects – 12 ECTS

Optional subjects – 18 ECTS to choose from an offer of 11 subjects (33 ECTS)

Core Subjects (compulsory) – 18 ECTS

Nuclear physics	3 ECTS
Advanced technologies in nuclear reactors	3 ECTS
Energy security	3 ECTS
<i>Nuclear Fusion</i>	3 ECTS
Neutronics	3 ECTS
<i>Partitioning and Transmutation of Radioactive Wastes</i>	3 ECTS

Compulsory practical subjects – 12 ECTS

- These are subjects with a learning methodology based on the CDIO (Conceive, Design, Implement and Operate) scheme.

Nuclear thermohydraulics	3 ECTS
<i>Advanced Numerical Methods</i>	3 ECTS
<i>Materials under Irradiation</i>	3 ECTS
<i>Nuclear Reactor Design - Nuclear Analysis by Monte Carlo Simulation</i>	3 ECTS

Optional subjects – 18 ECTS to choose from an offer of 11 subjects (33 ECTS)

Radiological Protection	3 ECTS
Nuclear Safety: Introduction	3 ECTS
Radiation Technology	3 ECTS
Particle and Radiation Transport Theory	3 ECTS
Fundamentals of Nanosystems	3 ECTS
History of Nuclear Physics and Nuclear Engineering	3 ECTS
<i>Reliability and Risk Analysis</i>	3 ECTS
<i>Nuclear Safety: Nuclear Accident Analysis</i>	3 ECTS
Radioactive waste management	3 ECTS
<i>Radiological Environmental Impact</i>	3 ECTS
<i>Advanced Seminars</i>	3 ECTS

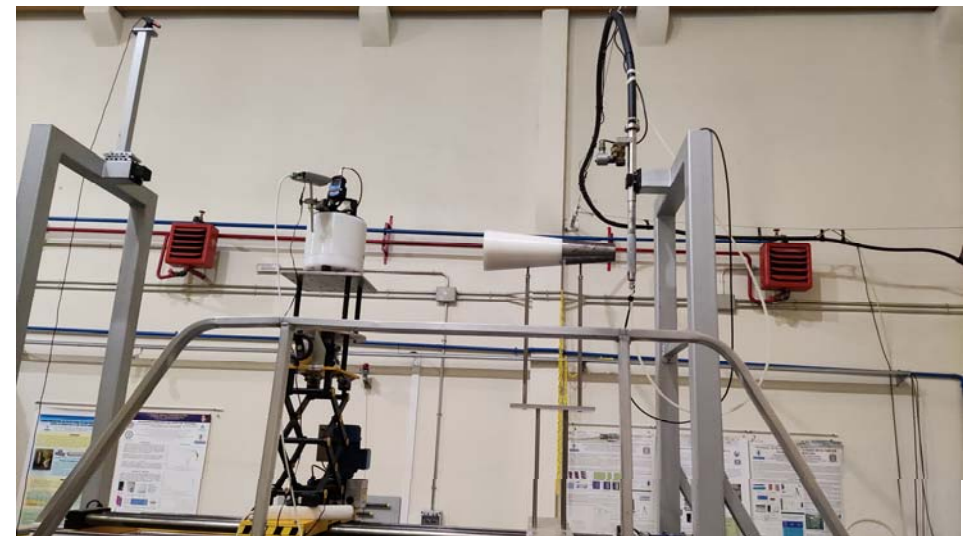
Nombre	Categoría	Nombre	Categoría
CABELLOS DE FRANCISCO, Oscar L.	CU	GONZÁLEZ ARRABAL, Raquel	CU
CASTRO GONZÁLEZ, Emilio	AD	JIMÉNEZ VARAS, Gonzalo	CD
COTELO FERREIRO, Manuel	CD	KOHANOFF, Jorge	CBG
CUERVO GÓMEZ, Diana	TU	OLIVA GONZALO, Eduardo	CRJ
ELORZA TENREIRO, Fco. Javier	CU	PEÑA RODRÍGUEZ, Ovidio Yordanis	TU
FERNÁNDEZ COSIALS, Kevin	CD	QUERAL SALAZAR, José César	TU
GALLEGO DÍAZ, Eduardo F.	CU	RIO REDONDO, Emma del	CD
GARCÍA FERNÁNDEZ, Gonzalo F.	AD	RIVERA DE MENA, Antonio	CD
GARCÍA HERRANZ, Nuria	TU	VÁZQUEZ FERNÁNDEZ-TELLO, Elisa A.	A
GAROZ GÓMEZ, David	CD	VELARDE MAYOL, Pedro	CU

Categoría		Número de profesores
CU	University Full Professor	5
TU	University Professor	4
CD	Associate Professor	6
AD	Assistant Professor [Doctor]	2
A	Assistant Professor	1
CBG	Researcher "Beatriz Galindo"	1
CRJ	Researcher "Ramón y Cajal"	1

- Professors of the UPM, Higher Technical Schools of Industrial, Naval and Mining and Energy Engineers.
- A highly qualified team, backed by decades of research and teaching.
- Teaching staff's CV: University Transparency Portal, or Master's website.

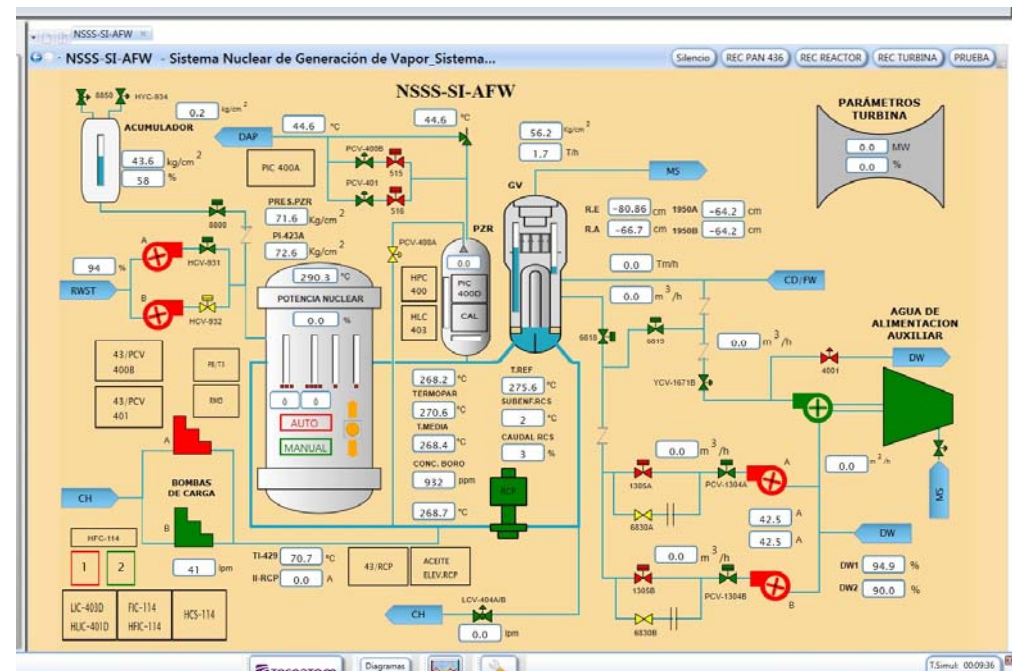
- ***Computer Center***
- ***Nuclear Physics Teaching Laboratory***
- ***Sputtering Coating Manufacturing Laboratory***
- ***Coating Characterization Laboratory***
- ***Nuclear Technology Teaching Laboratory***
- ***Neutron Measurements Laboratory***

- 2nd category radioactive facility. Two $^{241}\text{Am-Be}$ neutron sources of 77 and 111 GBq
- 16 x 9 x 8 m room with 9 x 9 x 8 m area, for neutron irradiation
- Cylindrical water tank (diameter 0.9m) for radiation with thermalized neutrons
- Device for Thermal Neutron Irradiation (FANT, Extended Thermal Neutron Source)
- Precision bed for irradiation in air by means of an automatic system of storage, pneumatic transport and positioning of the source



• José Cabrera Classroom (Gas Natural Fenosa – UPM)

- Graphic-Interactive Simulator of the José Cabrera NPP
- Teaching technology of the operation of NPPs.
- Donated by Union-Fenosa through agreement with UPM, in 2008.
- In 2012 the hardware and user interfaces were updated.
- Used for teaching practices and for students' Final Bachelor and Master Thesis





(European Nuclear Education Network: <https://enen.eu/>)

- The UPM is a founding member of ENEN and it is currently chaired by the UPM representative.
- 84 European and non-EU universities and research centres, including CEA (France), SCK-CEN (Belgium), PSI (Switzerland), KIT and FZJ (Germany), JSI (Slovenia), and the EC Joint Research Centre
- Title of "European Master of Science in Nuclear Engineering (EMSNE)" and annual awards for the best doctoral theses in the nuclear field.



<https://snetp.eu/>



European Radiation Dosimetry Group

<https://eurados.sckcen.be/en>



<https://snetp.eu/nugenia/>



<https://snetp.eu/esnii/>



<https://snetp.eu/nc2i/>



<https://eu-neris.net/>

European Platform on
preparedness for nuclear
and radiological
emergency response and
recovery

Home > Courses / study > Masters and Erasmus mundus > Erasmus mundus > MSc in SAfe and REliable Nuclear Applications (SARENA)

MSc in SAfe and REliable Nuclear Applications (SARENA)



ABOUT

TRACK A: RWMD

TRACK B: NROS

FEES AND SCHOLARSHIPS

APPLY

PRACTICAL

FAQ

NEWS

> Programme description

> Coordinators

> Consortium

> Associated partners

> Contact



Co-funded by
the European Union



POLITÉCNICA



Univerza v Ljubljani



<https://www.imt-atlantique.fr/en/study/masters/emjmd/sarena>

- The 2nd semester of SARENA's RWMD itinerary is taught at UPM together with the MUCTN subjects, which are taught in English.
- Started in 2019
- Since then, 44 students from the five continents.

- The UPM MUCTN is a leading master's degree in the Spanish and European nuclear sector.
- Since 2008, it has been training its students to work professionally in companies in the nuclear sector: engineering companies, NPPs, ENUSA, ENSA, ENRESA, nuclear instrumentation manufacturing companies, radiotherapy and nuclear medicine units and others.
- They are also fully qualified to carry out research in national or foreign research centres bodies, as well as in the regulatory body or in international organisations

Graduates from UPM's MUCTN

