



INTERNATIONAL STAFF WEEK
Research and Technology Transfer at ASET
(Algeciras School of Engineering and Technology):
Our experience and cooperation opportunities.



From the 27th to the 31st of May 2024



Algeciras School of Engineering and Technology (ASET)

Escuela Técnica Superior de Ingeniería de Algeciras (ETSIA)

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- Who we are
- Our history
- Location and environment
- Academic programmes
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- Services and facilities

Who we are

ASET



Who we are

A School of Engineering

- Devoted to the ***training of high qualified ENGINEERS***
- Concerned about ***teaching quality and close to students***



- **Civil Eng.:** Bac & Master Programmes
- **Industrial Eng.:** Bac,, Master & Doctorate Programmes



- *VERIFICA Programme: Assessment of official university degrees*
- *Mentoring Programme, Programme of Guidance and Support, etc.*

Who we are

A School of Engineering

- **Integrated** into our industrial environment
- It promotes and develops **Applied research and Tech Transfer**



Dual training agreements with CEPSA and ACERINOX

Students of the Industrial Eng. Master programme are trained in ACERINOX

Redacción LOS BARRIOS

El Campus Bahía de Algeciras informó ayer que en este curso académico 2015/2016 se ha puesto en marcha una experiencia académica novedosa, basada en la formación dual de los alumnos del Máster en Ingeniería Industrial, de la Escuela Politécnica Superior de Algeciras (EPSA), en las instalaciones de Acerinox.

CÁTEDRAS



Universidad de Cádiz



Universidad de Cádiz

Cátedra Acerinox




CÁTEDRA
Telefónica / UCA
Economía Azul y Puertos Inteligentes



Who we are

A School of Engineering

- It bets on **Internationalisation** 
- **Constant enhancement** of human and material resources



- ERASMUS+ (Students, Teaching staff)
- Grants to Latin America , USA
- National mobility programme ...



- New facilities (2006, 2016, 2019...)
- Recruitment of researchers (FPI, FPU, etc.)
- Training /teaching innovation programmes, research and transversal activities for our staff



POLITECNICO
MILANO 1863



Who we are

A School of Engineering

- **Teaching Project for courses in English** (since 2020-21)
- **More than 20 subjects/courses** involved (undergraduate and master levels)
- **~ 220 hours** given in English

Academic course 2023-2024

Undergraduate degree (BEng) in Civil Engineering

Subject (Name in Spanish)	Subject (Name in English)	Code	ECTS	Total hours	Year	Semester	Hours in English			
							Theory	Problems	Lab sessions	Computer Lab sessions
Ferrocarriles	Railways	10617030	6	60	3	1	2	4	2	0
Obras hidráulicas	Hydraulic Works	10617037	6	60	3	1	0	0	0	2
Patología de la Obra Civil	Civil Works Pathology	10617049	6	60	4	2				

Undergraduate degree (BEng) in Industrial Technology Engineering

Subject (Name in Spanish)	Subject (Name in English)	Code	ECTS	Total hours	Year	Semester
Ciencia e Ingeniería de los Materiales	Materials Science and Engineering	10618013	6	60	1	2
Termodinámica	Applied Thermodynamics	10618011	6	60	2	1
Automática	Automatics	10618016	6	60	2	2
Electrónica	Electronics	10618015	6	60	2	2
Mecánica de Fluidos	Fluid Mechanics	10618012	6	60	2	2
Ingeniería Fluidomecánica	Fluid Mechanic Engineering	10621030	6	60	3	1
Ingeniería y Tecnología de Materiales	Materials Science and Technology	10618046	6	60	3	1
Control e Instrumentación de Procesos Químicos	Control and Instrumentation of Chemical Processes	10618084	6	60	4	2
Comunicaciones Electrónicas y Procesado de Datos	Electronic Communication and Data Processing	10618062	6	60	4	2

Master degree (MEng) in Roads, Canals and Ports Engineering / Civil Engineering

Subject (Name in Spanish)	Subject (Name in English)	Code	ECTS	Total hours	Year	Semester	Hours in English			
							Theory	Problems	Lab sessions	Computer Lab sessions
Sistemas Ferroviarios	Railway Systems	663107	5	50	2	1	3	0	0	0
Patología de la Construcción	Construction Pathology	663304	4,5	45	2	2	8	0	0	0

Master degree (MEng) in Industrial Engineering

Subject (Name in Spanish)	Subject (Name in English)	Code	ECTS	Total hours	Year	Semester	Hours in English			
							Theory	Problems	Lab sessions	Computer Lab sessions
Diseño Electrónico	Electronic Design	662007	5	50	2	1	15	0	0	0
Metalogeografía y Tecnología de Materiales	Metal Technique and Materials Technology	662408	5	50	2	2	20	0	0	0

Master degree (MEng) in Renewable Energies and Energy Efficiency

Subject (Name in Spanish)	Subject (Name in English)	Code	ECTS	Total hours	Year	Semester	Hours in English			
							Theory	Problems	Lab sessions	Computer Lab sessions
Parques Eólicos	Wind Farms	664105	2	20	1	2	1	0	0	0
Smart Grids	Smart Grids	664106	2	20	1	2	1	0	0	0
Integración de las Energías Renovables en la Red Eléctrica	Integration of Renewable Energies to the Electricity Grid	663305	2	20	1	2	1	0	0	0

Master degree (MEng) in Occupational Risk Prevention

Subject (Name in Spanish)	Subject (Name in English)	Code	ECTS	Total hours	Year	Semester	Hours in English			
							Theory	Problems	Lab sessions	Computer Lab sessions
Ruido y Vibraciones en el Ambiente Laboral	Noise and Vibrations in the Labour Environment	661204	2	20	1	2	6	0	0	0



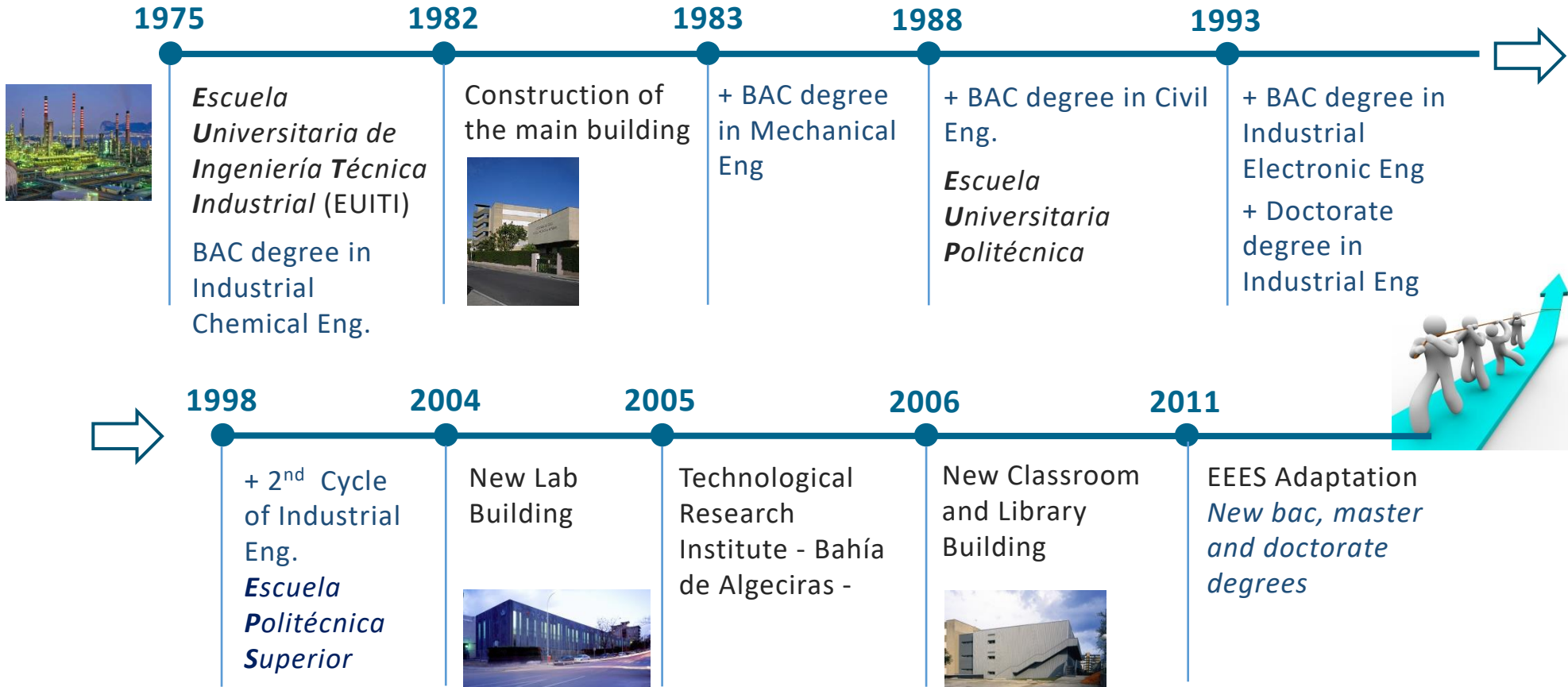
Our history

ASET



Our history

Nearly 50 years of ongoing work and service to society...



Location and environment

SET Algeciras



Location and environment

Privileged location: In the Strait of Gibraltar




Escuela Técnica Superior de Ingeniería de Algeciras

Universidad de Cádiz

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Location and environment

How to get here



Location in Europe

- **By Aeroplane:** Málaga, Seville, Jerez, Gibraltar
- **By car:** Málaga (A-7: 1^{1/2} hours) Granada and Seville (A-381: ~2 hours)
- **By train:** Madrid (~ 5 hours)



'Campo de Gibraltar'



Location and environment

The University of Cádiz and the Bay of Algeciras Campus



- ~ 22500 students
- 4 campuses: **Algeciras**, Cádiz, Jerez, Puerto Real
- 15 Faculties/Schools
- 45 Departments



About 275.000 inhabitants in the region (*Campo de Gibraltar*)

~ 130.000 in Algeciras

~ 2000 students in the campus

Location and environment

Industrial environment

- **Very important industrial site**
 - ✓ A Refinery and petro chemical industries
 - ✓ A Stainless-Steel Factory
 - ✓ Several power plants



INDUSTRIAL AND PORT-LOGISTICS HUB



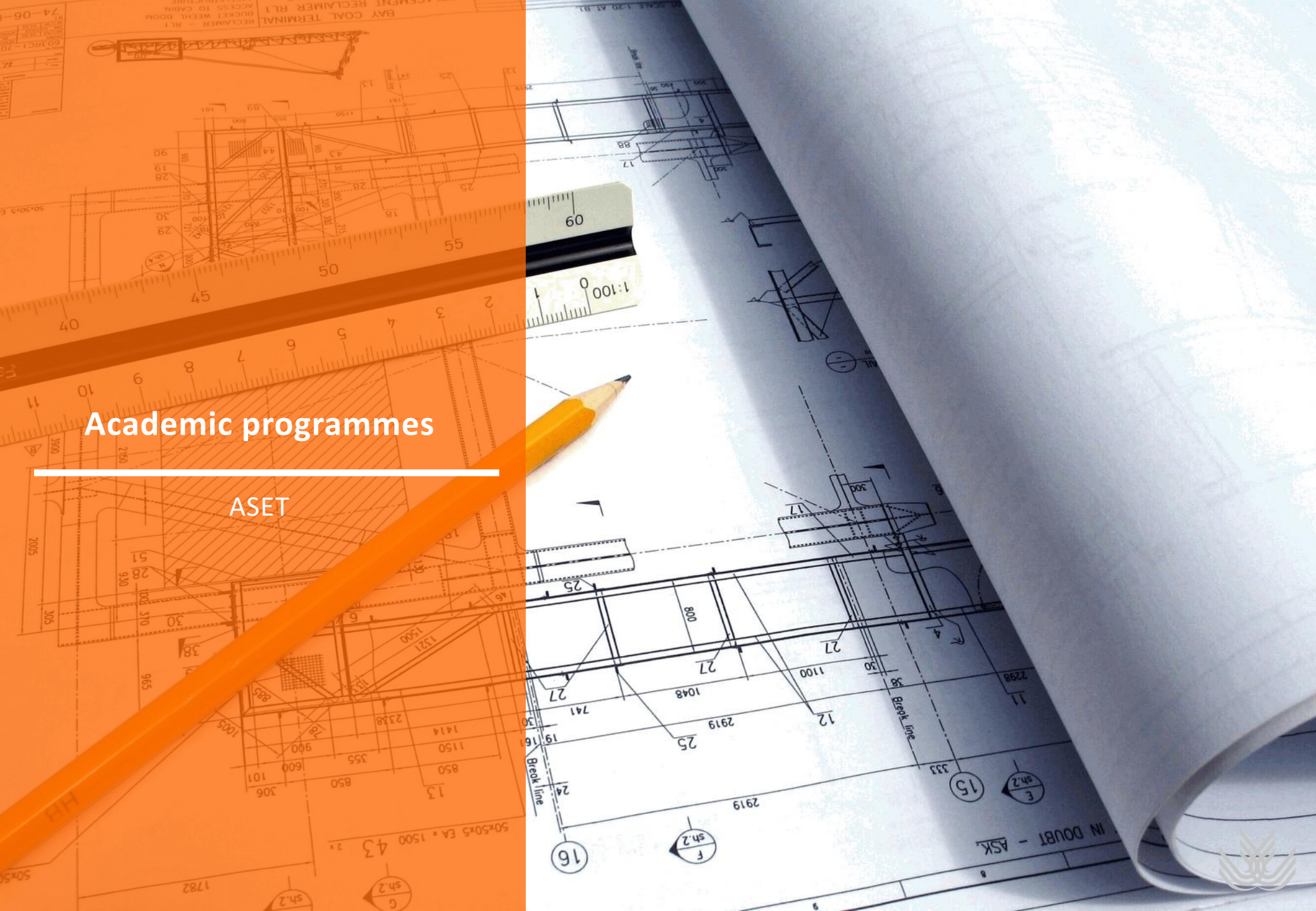
- **Port of Algeciras Bay, 1st Spanish port in container transport**

Location and environment

Our natural environment



- Natural Parks (*Los Alcornocales, ...*)
- Unspoiled beaches (*Costa de la Luz - Tarifa*)
- Very close to *Costa del Sol, Granada and Seville*



Academic programmes

ASET



Academic programmes

We teach Engineering

4 years
(240 ECTS)

■ BAC DEGREE IN CIVIL ENGINEERING

- *Civil Works/ Hydrology / Transport and Urban Services*

2 years
(120 ECTS)

■ MASTER IN CIVIL ENGINEERING

- *Civil Engineering in Roads, Canals and Ports*



4 years
(240 ECTS)

■ BAC DEGREES IN TECHNICAL INDUSTRIAL ENGINEERING

- *Industrial Technologies Engineering*
- *Mechanical Engineering / Electrical Engineering / Industrial Electronic Eng.*



2 years
(120 ECTS)

■ MASTER IN INDUSTRIAL ENGINEERING

- *Industrial Eng = Mechanical Eng. + Electrical Eng. + Industrial Electronic Eng. + Chemical Eng.*

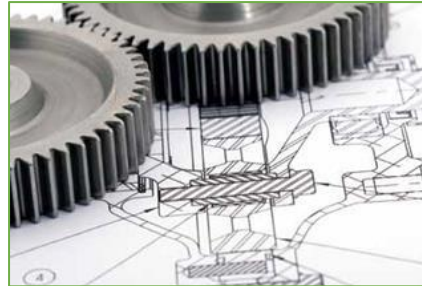


■ DOCTORATE (PhD) IN SUSTAINABLE AND ENERGY ENGINEERING

Academic programmes

Other training programmes

- **MASTER IN RENEWABLE ENERGIES AND ENERGY EFFICIENCY**
(60 ECTS credits = 1 year + Final Project)
- **MASTER IN LABOUR RISK PREVENTION**
(60 ECTS credits = 1 years + Final Project)



Academic programmes

Our current doctorate programme (2017)

▪ DOCTORATE (PhD) IN SUSTAINABLE AND ENERGY ENGINEERING

- ✓ Research lines
 - *Energy technologies applied to energy efficiency and renewable energies*
 - *Energy technologies and materials applied to Sustainable Engineering and Industrial Ecology*
- ✓ 20 students every year
- ✓ 5-6 PhD theses/year
- ✓ Teaching languages: Spanish and English
- ✓ International cooperation
- ✓ Linked to industry



ABENGOA RESEARCH



Research

ASET



Research

*Our research groups: **Head of Group** affiliated with ASET*

- **INDUSTRIAL, CONSTRUCTION & DEMOLITION WASTES & CONCRETE (IC&DW C) (N°3)**
Dr. María Dolores Rubio Cintas (mariadolores.rubio@uca.es)
- **STRUCTURAL ENGINEERING & GEOTECHNICS (SE&G) (N°4)**
Dr. Miguel Caparrós Espinosa (miguel.caparros@uca.es)
- **THERMAL ENGINEERING (iiTer) (N°6)**
Dr. Ismael Rodríguez Maestre (ismael.rodriguez@uca.es)
- **COMPUTATIONAL INSTRUMENTATION & INDUSTRIAL ELECTRONICS (ICEI) (N°7)**
Dr. Juan José González de la Rosa (juanjose.delarosa@uca.es)
- **INTELLIGENT MODELING OF SYSTEMS (MIS) (N°8)**
Dr. Ignacio Turias Domínguez (ignacio.turias@uca.es)
- **SUSTAINABLE & RENEWABLE ELECTRICAL TECHNOLOGIES (TESYR) (N°9)**
Dr. Luis Fernández Ramírez (luis.fernandez@uca.es)

Research

*ASET researchers integrated into other research groups: **Head of Group not affiliated with ASET***

- **COMBINATORICS AND OPTIMISATION: APPLICATION OF DISCRETE MATHEMATICAL MODELS (N°1)**
Dr. Ismael González Yero (ismael.gonzalez@uca.es)
- **GEOSCIENCES (N°2)**
Dr. Verónica Ruiz Ortiz (veronica.ruiz@uca.es)
- **COASTAL ENGINEERING (N°5)**
Dr. Antonio Contreras de Villar (antonio.contreras@uca.es)
- **MATERIALS AND NANOTECHNOLOGY FOR INNOVATION (N°10)**
Dr. David Sales Lérica (david.sales@uca.es)

Research



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Innovative ideas at Engineering meet Technology.
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Research lines (I)

Nº3

■ INDUSTRIAL, CONSTRUCTION & DEMOLITION WASTES & CONCRETE (IC&DW C)

- New cement matrices for mortar and concrete
- Design of mortar and nonconventional concrete
- Concrete durability
- Resistance and mechanical properties of mortar and concrete
- Rheology of cement matrices
- Assessment of industrial wastes



Nº4

■ STRUCTURAL ENGINEERING & GEOTECHNICS (SE & G)

- Mechanical analysis and structural modelling of new sustainable materials for construction
- Study of structure-soil interaction. Soil Mechanics, Rock Mechanics, mineral deposits, tectonics, and urban planning
- Structural and geotechnical optimization of infrastructures for sustainability



Research

Research lines (II)

N°6

▪ THERMAL ENGINEERING (iiTer)

- Thermal modelling and simulation of buildings
- Simulation of thermal systems (HVAC, DHW) in buildings
- Renewable energies: Geothermal systems, solar cooling systems, solar DHW systems, etc.
- Building energy labelling
- CFD modelling of thermal systems



N°7

▪ COMPUTATIONAL INSTRUMENTATION & INDUSTRIAL ELECTRONICS (ICEI)

- Higher-order statistics and application
- Computational intelligence in measurement systems
- Electrical power quality
- Diagnosis of industrial machines
- Vibration and sound analysis
- Environmental monitoring
- Acoustic emission non-destructive tests



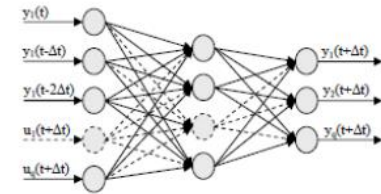
Research

Research lines (III)

N°8

▪ INTELLIGENT MODELING OF SYSTEMS (MIS)

- Application of intelligence techniques and neural networks to Engineering problems
- Prediction of atmospheric pollutants
- Modelling of logistic and transport systems



N°9

▪ SUSTAINABLE & RENEWABLE ELECTRICAL TECHNOLOGIES (TESYR)

- Renewable energies and distributed generation
- Wind power
- Energy storage systems
- Hybrid power systems based on renewable energies and hydrogen for isolated or connected applications
- Application of fuel cells to electric vehicles
- Optimum exploitation of electric grids by using renewable energies and/or distributed generation



Research

Some recent *JCR* papers



Research Group

IC&DW C

SE&G

iiTer

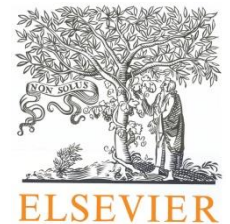
ICEI

MIS

TESYR

Research article

- *Development in Sustainable Concrete with the Replacement of Fume Dust and Slag from the Steel Industry. **Materials**, 2022. DOI: [10.3390/MA15175980](https://doi.org/10.3390/MA15175980)*
- *Ceramics for Building Structures Made from Contaminated Soils: A Fuzzy Logic Intelligence Approach to Circular Mining. **Processes**, 2023. DOI: [10.3390/PR11051512](https://doi.org/10.3390/PR11051512)*
- *Performance analysis of a novel façade-based building integrated photovoltaic-thermal system with phase change material for domestic hot water. **Applied Thermal Engineering**, 2024. DOI: [10.1016/J.APPLTHERMALENG.2023.122321](https://doi.org/10.1016/J.APPLTHERMALENG.2023.122321)*
- *A Graphical method for PQ assessment: EDA tools using traditional indices and Higher-order Statistics. **Renewable Energy and Power Quality Journal**, 2023. DOI: [10.24084/REPQJ21.390](https://doi.org/10.24084/REPQJ21.390)*
- *Air Pollution PM10 Forecasting Maps in the Maritime Area of the Bay of Algeciras (Spain). **Journal of Marine Science and Engineering**, 2024. DOI: [10.3390/JMSE12030397](https://doi.org/10.3390/JMSE12030397)*
- *Control of PV power plants with quasi-Z-source cascaded H-bridge multilevel inverters under failure. **International Journal of Electrical Power and Energy Systems**, 2024. DOI: [10.1016/J.IJEPES.2024.109803](https://doi.org/10.1016/J.IJEPES.2024.109803).*



Research

Some national and international **research projects and patents**



Research Group

IC&DW C

iiTer

ICEI

MIS

TESYR

Projects

- *Experimental and Numerical Analysis of Eco-efficient and Sustainable Ultra-High Performance Concrete.* Generación de Conocimiento. Plan Nacional I+D+i.
- *Integration Of Photovoltaic and Electrochromic Glass in Solar Thermo-electric Energy Generation Devices with Phase Change Materials for Buildings.* Generación de Conocimiento. Plan Nacional I+D+i.
- *Operational Energy and Meteorological Data for Photovoltaic Systems.* Ministerio de Ciencia e Innovación. Retos de la Sociedad. Plan Nacional I+D+i.
- *Hyperspectral Control of Hydrocarbon Spills in Marine and River Waters with Machine Learning.* Ministerio de Economía y Competitividad. [CEIMAR-Control Hiperespectral](#).
- *New Solutions for Microgrid Clusters ([MICROCLUS](#)).* Coordinated research project supported by Ministerio de Ciencia e Innovación, Agencia Estatal de Investigación, FEDER, UE (MCIN/AEI/10.13039/501100011033/ FEDER, UE).



Research

Our present and future

- **Centre for Innovation UCA-SEA**

- ✓ Built in 2023
- ✓ ~ 2000 m²
- ✓ Aim: Administrative support to our research groups in their ordinary activities: transfer of technology, calls of research projects, etc.
- ✓ *New research facilities*
- ✓ *New location for some of the ASET research groups*



Human resources

ASET



Human resources

Some figures... (2023-2024)

- **Teaching staff**

- ✓ **92** (80 % full time; 20% part time)
- ✓ **Full & Assistant Professors: 31** (34 %)

- **Students**

- ✓ **527**
 - ~ 23 % Civil Eng.
 - ~ 77 % Industrial Eng.
- ✓ 162 students in master programmes
- ✓ Student/Teacher Ratio ~ 6

- **Administration & Services**

- ✓ ~ **40** (Caretaker's office, Secretary's office, Maintenance, etc.)



Services and facilities

ASET



Services and facilities

Services and facilities for students



- **Modern facilities:** classrooms and computer labs, AV production room, new auditorium, library, etc.
- **Meeting and study facilities** (ASET is open at nighttime and weekends during exam periods)
- **Free access to thousands of the best scientific journals** (IEEE, ACM, Elsevier, etc.)
- **High quality internet connection. WiFi:** Wireless network everywhere in ASET
- **Laptop computers** (free use)
- **Intranet** (WEBCT, Moddle) for virtual teaching
- **On-line Secretary services, ...**



Services and facilities

Culture and Sports

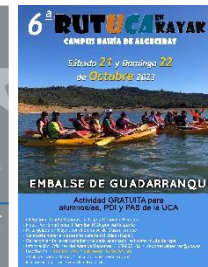
■ Culture Service

- ✓ Campus Cinema
- ✓ Concerts (*Campus Rock*)
- ✓ Theatre
- ✓ Courses / Workshops, etc.



■ Sport Service

- ✓ Agreements with a large number of sport facilities in town.



Services and facilities

Teaching facilities



New Classroom and Library Building

- 30 lecture classrooms (~ 1400 seating capacity)
 - 7 computer classrooms
 - 1 language classroom
 - 2 distance teaching classrooms
 - Library: ~ 350 seats
- (4.000.000 €)



Lab Building

12 new labs (22 in total)
(1.500.000 €)



Services and facilities

Some of our labs



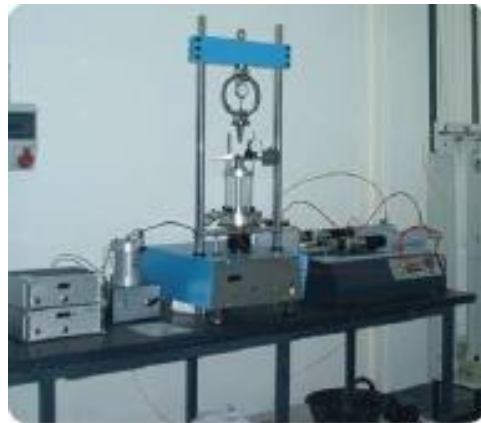
Chemical Eng.



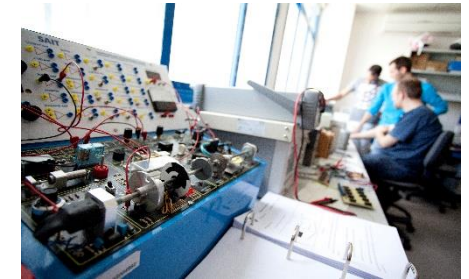
Construction materials



Hydraulic Engineering



Electrical & Electronic Engineering



THANK YOU VERY MUCH



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