



UNIVERSIDAD  
POLITECNICA  
DE VALENCIA



# International Master in Materials and Sensors Systems for Environmental Technologies

***Valencia***

***Stockholm***

***Bologna***



Education and Culture

**Erasmus Mundus**

## UNIVERSITIES

### 1. Universidad Politécnica de Valencia (UPV)

-Valencia (España)

### 2. Università degli Studi di Bologna (UNIBO)

-Bologna (Italia)

### 3. Kungl Tekniska Högskolan (KTH)

- Stockholm (Suecia)



## TEACHING CENTERS



**School of Chemical Science and Engineering  
(KTH)**

**School Studies for Chemical Engineering  
School of Engineering  
(UNIBO)**

**Escuela Técnica Superior de Ingeniería de Diseño  
(UPV)**

### GLOBAL PURPOSE

The overall aim of this master course is to prepare highly-qualified **researchers and professionals** able to manage and control the development and implementation of integrated **solutions to environmental problems of industrial processes**, with **new materials and regulation systems**.

### STUDENT FEES

- **EU students (7000 €)**
- **Third-country students (11000€)**

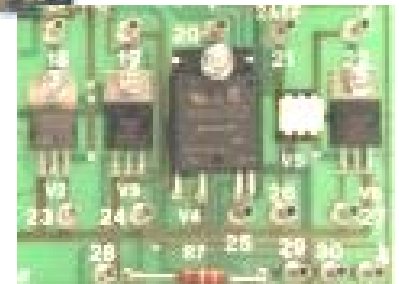
# STRUCTURE

**120 ECTS**

<b>Entrance to University</b>				
<b>Fundamental and profiling courses (54 ECTS)</b>			Languages (6 ECTS)	<b>1<sup>st</sup> year</b> (60 ECTS)
<b>Module FPI</b> Industrial Process Design	<b>Module FPII</b> Materials Science	<b>Module FPIII</b> Sensors Systems		
<b>Change to second University</b>				
<b>Specialisation courses (24 ECTS)</b>			Languages (6 ECTS)	<b>2<sup>nd</sup> year</b> (60 ECTS)
<b>Module SI</b> Industrial Process Design	<b>Module SII</b> Materials Science	<b>Module SIII</b> Sensors Systems		
Optionally: Return to entrance University				
<b>Master Thesis / Industrial Internship</b> (30 ECTS)				

## STUDENTS THAT CAN APPLY

- Technical Industrial Engineers specialized in Electronics
- Technical Industrial Engineers specialized in Industrial Chemistry
- Chemical Engineers
- Materials Engineers
- Chemists
- Industrial Engineers
- Electronic Engineers



# International Master in Materials and Sensors Systems for Environmental Technologies



## DEGREES AWARDED

Name of institution	Title of degree awarded for this Masters Course by this institution	Type of degree awarded	Date and reference of formal approval of degree (Provide details of approval procedures under point 2.5)
<b>Universidad Politécnica de Valencia</b>	International Master in Materials and Sensor Systems for Environmental Technologies	DOUBLE	<b>March 15<sup>th</sup> 2006</b> (General Assembly of the School of Design Engineering) <b>April 17<sup>th</sup> 2007</b> (Rector of the UPV)
<b>Kungl Tekniska Högskolan</b>	Master of Science with major in Chemistry and Chemical Engineering (Specialisation in Polymer Technology)	DOUBLE	<b>2004</b> <b>Revised June 2006</b>
<b>Università di Bologna</b>	Dottore Magistrale in Ingegneria dei Materiali e Sensoristica	DOUBLE	<b>April 17<sup>th</sup> 2007</b> (General Assembly of the School of Engineering)

## MASTER RESPONSIBLES

- **Master coordinator:** Dr. [Amparo Ribes](#), Professor at the Polytechnic University of Valencia, Ph.D. in Chemistry
- **Academic responsible at the Polytechnic University of Valencia:** Dr. [Enrique Ballester](#), Head of the School of Design Engineering at the Polytechnic University of Valencia, Ph.D. in Physics
- **Master responsible at Kungl Tekniska Högskolan:** Dr. [Sigbritt Karlsson](#), Professor and Assistant Dean (Pro dean) and Director of Studies for Chemical Science and Engineering
- **Academic responsible at Kungl Tekniska Högskolan:** [Dr. Sigbritt Karlsson](#)
- **Master responsible at Università di Bologna:** Dr. [Ferruccio Doghieri](#), Professor and Director of Studies for Chemical Engineering at the University of Bologna, Ph.D. in Chemical Engineering
- **Academic responsible at Università di Bologna:** Dr. [Guido Masetti](#), Professor and Dean of the School of Engineering of the University of Bologna, Ph.D. in Electronics Engineering



## TEACHING STAFF

The academic staff is constituted by **105** teachers:

**46** teachers in Valencia,

**30** teachers in Stockholm

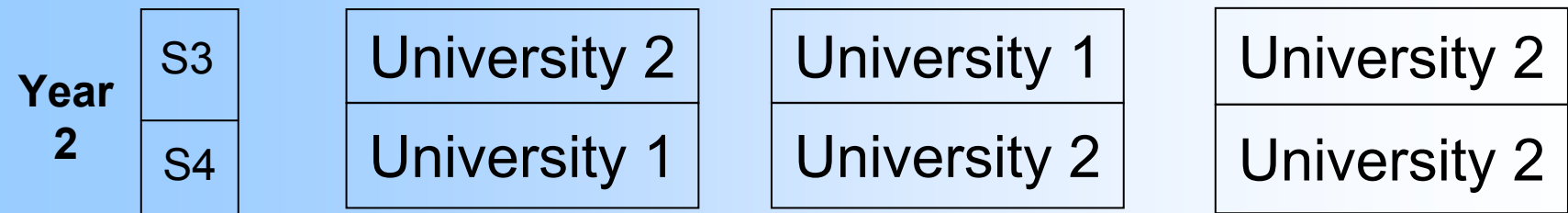
**29** teachers in Bologna.

# International Master in Materials and Sensors Systems for Environmental Technologies



## MASTER ORGANIZATION

Bachelor Sc.



Master Sc.

# MASTER SUBJECTS

Corresponding to

**Universidad Politécnica de Valencia (UPV)**  
**Valencia, Spain**



UNIVERSIDAD  
POLITECNICA  
DE VALENCIA



Universidad Politécnica de Valencia (UPV), Valencia, Spain

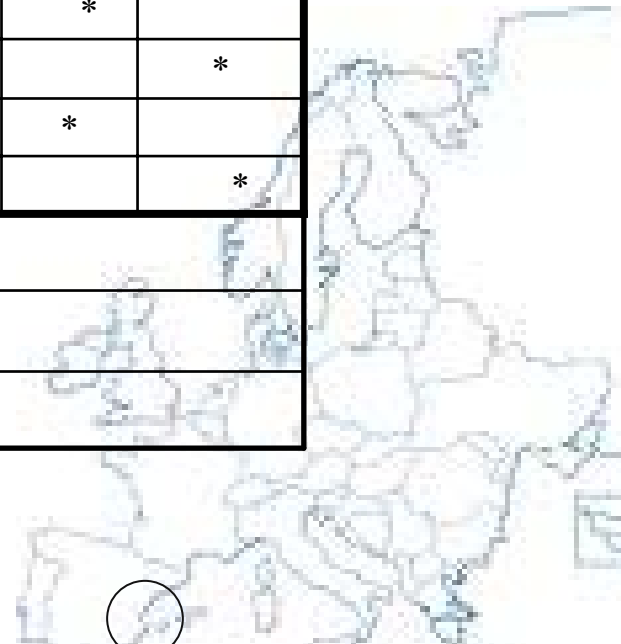
1<sup>st</sup> Year (1<sup>st</sup> and 2<sup>nd</sup> Semester)

<b>MFI – Industrial Process Design</b>	ETCS-CP	Winter	Summer
Numerical Calculus	4	*	
Mathematical Methods for Engineering	4		*
Advanced Analytical Techniques	4		*
Engineering Thermodynamics.	5	*	
Phase and Chemical Equilibria	4		*
Advanced Organic Chemistry	4	*	
Development and Management of R&D Projects	3		*

**MFII – Material Science**

**MFIII – Sensors Systems**

**Languages**



Universidad Politécnica de Valencia (UPV), Valencia, Spain

1st Year (1st and 2nd Semester)

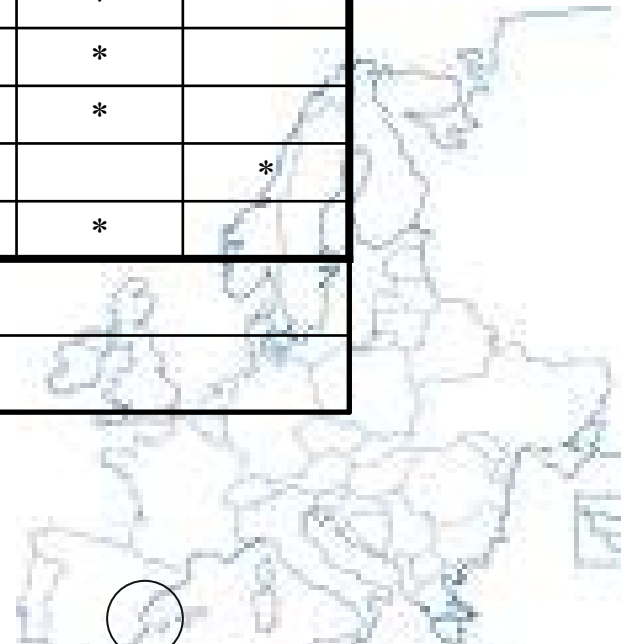
**MFI – Industrial Process Design**

**MFII – Material Science**

	ETCS-CP	Winter	Summer
Numerical Calculus	4	*	
Mathematical Methods for Engineering	4		*
Fundamentals and Properties of Materials	5	*	
Advanced Inorganic Chemistry	4	*	
Characterization of Materials	6	*	
Thermal analysis	4		*
Material Degradation and Solid Waste Management	6	*	

**MFIII – Sensors Systems**

**Languages**



Universidad Politécnica de Valencia (UPV), Valencia, Spain  
1st Year (1st and 2nd Semester)

MFI – Industrial Process Design

MFII – Material Science

**MFIII – Sensors Systems**

	ETCS-CP	Winter	Summer
Numerical Calculus	4	*	
Mathematical Methods for Engineering	4		*
Electrochemistry	4	*	
Electronic Instrumentations	6	*	
Analogical Electronic Systems	4	*	
Digital Electronic Systems	6	*	
Virtual Sensors	5		*
Sensors and electronics	5		*
Data acquisition systems	5		*
Chemical basis for chemical sensing	4		*

Languages



# International Master in Materials and Sensors Systems for Environmental Technologies

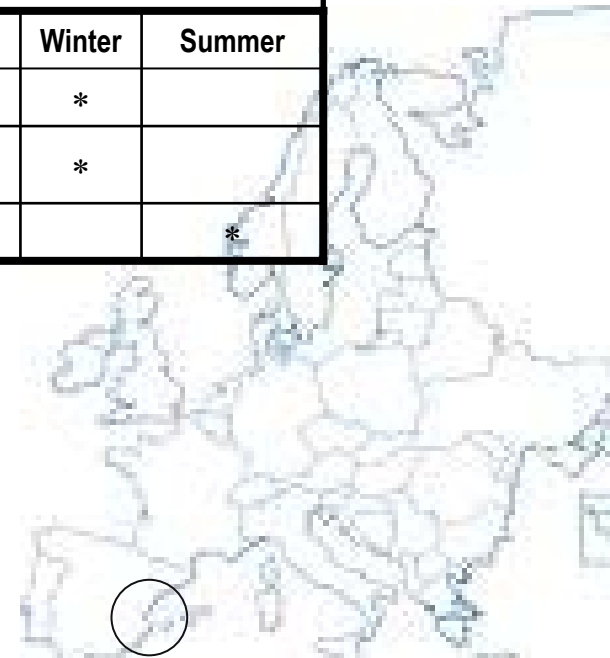


## Courses

Universidad Politécnica de Valencia (UPV), Valencia, Spain

1st Year (1st and 2nd Semester)

MFI – Industrial Process Design			
MFII – Material Science			
MFIII – Sensors Systems			
<b>Languages</b>	ETCS-CP	Winter	Summer
Spanish language and culture (foreign students only)	3	*	
Second language (Italian or Swedish or English)	3	*	
Technical English	3		*



# International Master in Materials and Sensors Systems for Environmental Technologies

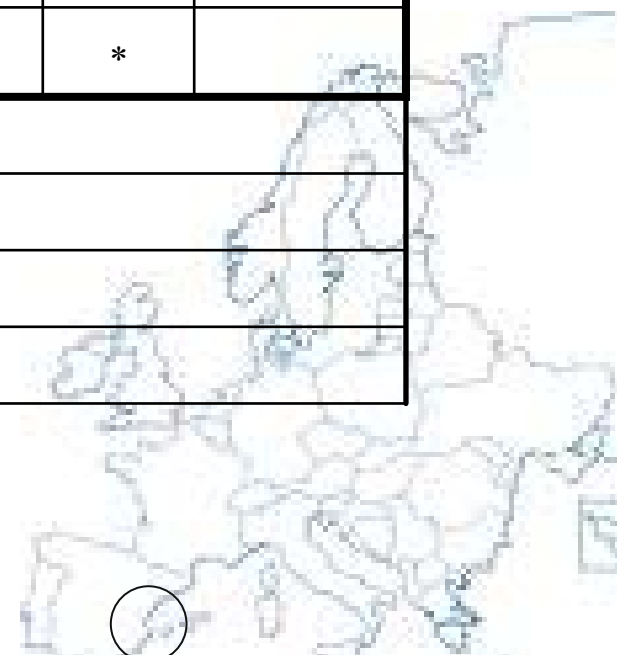


## Courses

Universidad Politécnica de Valencia (UPV), Valencia, Spain

2nd Year (3rd and 4th Semester)

<b>MSI – Industrial Process Design</b>	ETCS-CP	Winter	Summer
Exergetic Analysis	4	*	
Estimation of Gases and Liquids Properties	4		*
Fuel Cells Technology	4		*
Risks Analysis and Security, Legislation and Documentation	3	*	
<b>MSII – Material Science</b>			
<b>MSIII – Sensors Systems</b>			
<b>Languages</b>			
<b>Master Thesis / Training projects</b>			

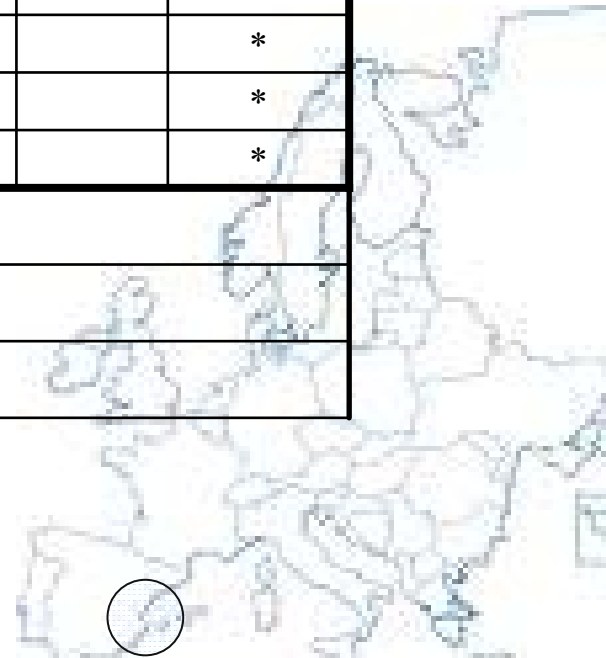




Universidad Politécnica de Valencia (UPV), Valencia, Spain

2<sup>nd</sup> Year (3<sup>rd</sup> and 4<sup>th</sup> Semester)

<b>MSI – Industrial Process Design</b>			
<b>MSII – Material Science</b>	ETCS-CP	Winter	Summer
Advanced metallic, composite and alloys materials	4	*	
Technology of Polymeric Materials	4	*	
Ceramic Technology	4		*
Liquid crystals and supramolecular chemistry.	3		*
Nanostructured Materials	2		*
<b>MSIII – Sensors Systems</b>			
<b>Languages</b>			
<b>Master Thesis / Training projects</b>			



Universidad Politécnica de Valencia (UPV), Valencia, Spain  
2<sup>nd</sup> Year (3<sup>rd</sup> and 4<sup>th</sup> Semester)

Courses

MSI – Industrial Process Design

MSII – Material Science

**MSIII – Sensors Systems**

	ETCS-CP	Winter	Summer
Fuzzy logic for sensors	2	*	
Biosensors technology	4	*	
Sensors for Industrial Networks	3		*
Automated programmable	4	*	
Smart sensors	4		*
Electrochemical and Optical Sensors	3	*	
Sensors for environmental applications	3		*
Sensors for Food Technology Applications	3		*
Sensors for Clinical Diagnosis	4		*

Languages

Master Thesis / Training projects



Universidad Politécnica de Valencia (UPV), Valencia, Spain

2<sup>nd</sup> Year (3<sup>rd</sup> and 4<sup>th</sup> Semester)

MSI – Industrial Process Design

MSII – Material Science

MSIII – Sensors Systems

**Languages**

Spanish language and culture (foreign students only)

English for professionals

**Master Thesis / Training projects**

ETCS-CP

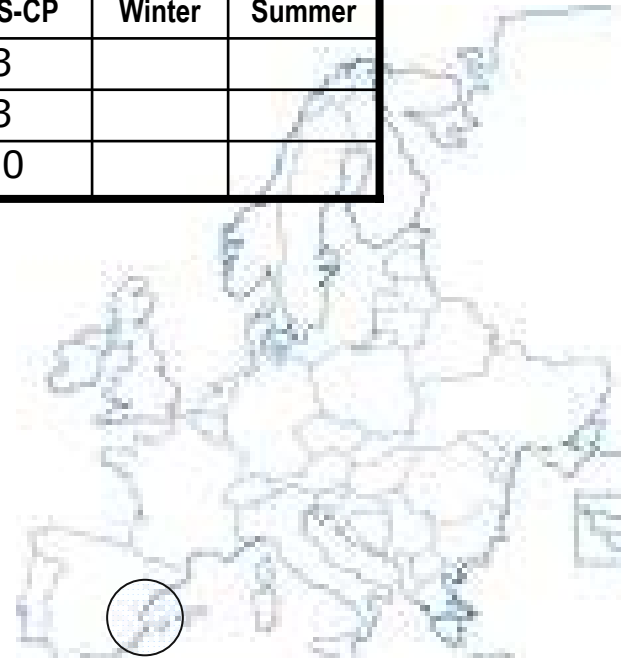
Winter

Summer

3

3

30



# MASTER SUBJECTS

Corresponding to

**Kungl Tekniska Högskolan (KTH)**  
**Stockholm, Sweden**



**Kungl Tekniska Högskolan (KTH), Stockholm, Sweden**

**1<sup>st</sup> Year (1<sup>st</sup> and 2<sup>nd</sup> Semester)**

<b>MFI – Industrial Process Design</b>	ETCS-CP	Winter	Summer
Advanced Mathematics	6		*
Chemical Process Control	6		*
Reaction and Separation Engineering	10.5	*	*
Industrial Energy Processes	7.5	*	
Chemical Engineering	9		*
Process Chemistry	7.5		*
<b>MFII – Material Science</b>			
<b>Languages</b>			



**Kungl Tekniska Högskolan (KTH), Stockholm, Sweden**

**1<sup>st</sup> Year (1<sup>st</sup> and 2<sup>nd</sup> Semester)**

### MFI – Industrial Process Design

### MFII – Material Science

	ETCS-CP	Winter	Summer
Mathematics, extended course	7.5		*
Mechanical Properties of Materials	7.5	*	
Inorganic Materials Chemistry.	7.5		*
Wood Chemistry and Wood Biotechnology	6		*
Fiber Technology	6		*
Polymer Chemistry	7.5	*	
Polymer Physics	6		*

### Languages



**Kungl Tekniska Högskolan (KTH), Stockholm, Sweden**

**1<sup>st</sup> Year (1<sup>st</sup> and 2<sup>nd</sup> Semester)**

**MFI – Industrial Process Design**

**MFII – Material Science**

**Languages**

ETCS-CP

Winter

Summer

Swedish language and culture (foreign students only)

7.5

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Second language (Spanish or Italian or English)

6

\*

Technical English

6

\*

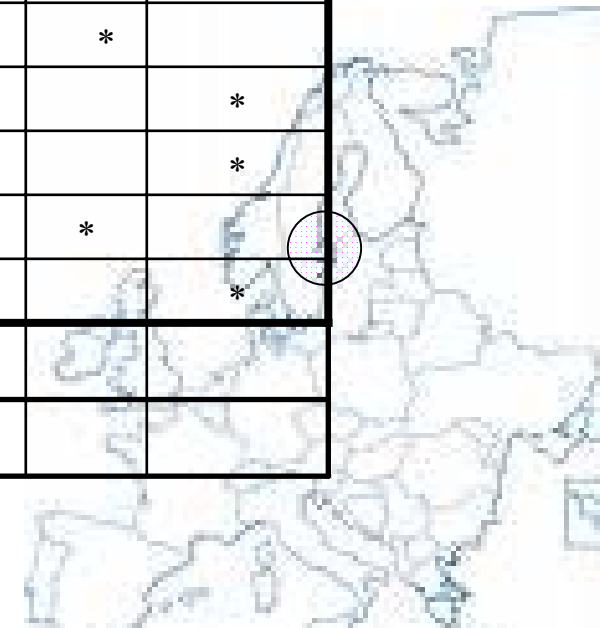
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**Kungl Tekniska Högskolan (KTH), Stockholm, Sweden**

**2<sup>nd</sup> Year (3<sup>rd</sup> and 4<sup>th</sup> Semester)**

<b>MSI – Industrial Process Design</b>	<b>ETCS-CP</b>	<b>Winter</b>	<b>Summer</b>
Organic chemistry, advanced course	13,5	*	*
Chemical Engineering in Fine and Specialty Chemicals	7.5	*	
Analytical Chemistry	6		*
Combustion engines	6	*	
Computational Project in Chemical Engineering	7.5		*
Chemical Engineering, Design Course	15		*
Pulp and paper processes	9	*	
Energy and Environment	6		*
<b>MSII – Material Science</b>			
<b>Languages</b>			





**Kungl Tekniska Högskolan (KTH), Stockholm, Sweden**

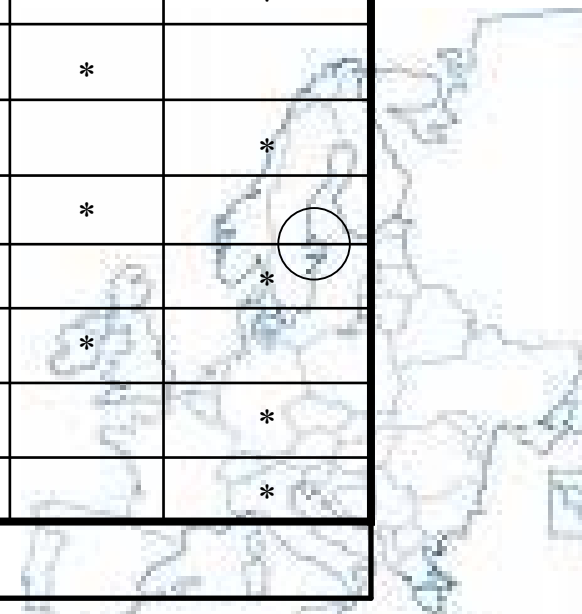
**2<sup>nd</sup> Year (3<sup>rd</sup> and 4<sup>th</sup> Semester)**

### MSI – Industrial Process Design

### MSII – Material Science

	ETCS-CP	Winter	Summer
Biopolymers	7.5		*
Polymeric Materials: Structure and Properties	7.5	*	
Polymer Technology with Cellulose Technology	7.5		*
Mechanical Properties and Testing of Polymers	6	*	
Polymer Process Engineering	7.5		*
Functional Materials	6	*	
Surface Coatings Chemistry	7.5		*
Structural Chemistry	7.5	*	
Processing of Ceramic Materials	6		*
Chemical Dynamics	6		*

### Languages



**Kungl Tekniska Högskolan (KTH), Stockholm, Sweden**

**2<sup>nd</sup> Year (3<sup>rd</sup> and 4<sup>th</sup> Semester)**

**MSI – Industrial Process Design**

**MSII – Material Science**

**Languages**

ETCS-CP

Winter

Summer

Swedish language and culture (foreign students only)

6

\*

English for professionals

6

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# MASTER SUBJECTS

Corresponding to

**Alma Mater Studiorum Università di Bologna (UNIBO)**

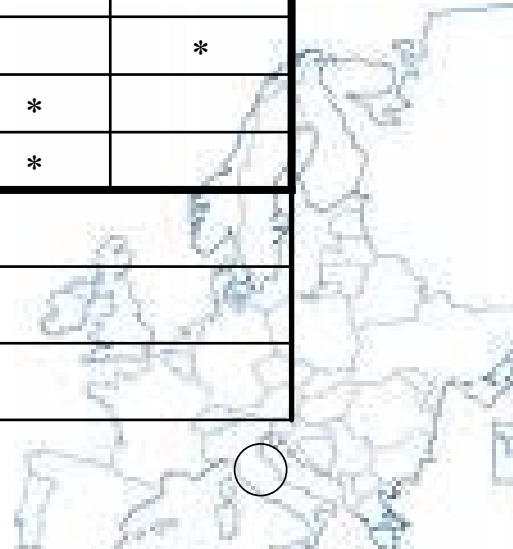
**Bologna, Italy**



**Alma Mater Studiorum Università di Bologna (UNIBO), Bologna, Italy**

**1<sup>st</sup> Year (1<sup>st</sup> and 2<sup>nd</sup> Semester)**

<b>MFI – Industrial Process Design</b>	ETCS-CP	Winter	Summer
Chemical Engineering Thermodynamics	6	*	
Fluid Mechanics and Transport Phenomena	9		*
Design of Process Equipment	9		*
Industrial Chemistry	6	*	
Process Simulation and Control	6		*
Industrial Ecology	6		*
Engineering of Chemical Reactors	3	*	
Loss Prevention in Process Industry)	6	*	
<b>MFII – Material Science</b>			
<b>MFIII – Sensors Systems</b>			
<b>Languages</b>			



Alma Mater Studiorum Università di Bologna (UNIBO), Bologna, Italy

1<sup>st</sup> Year (1<sup>st</sup> and 2<sup>nd</sup> Semester)

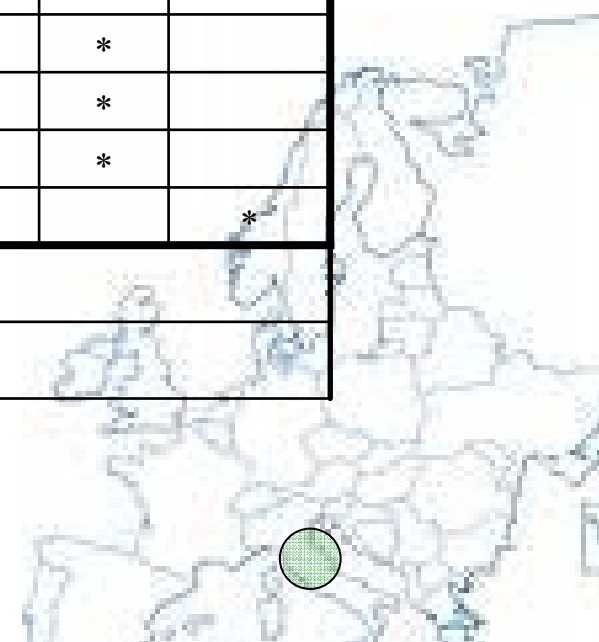
**MFI – Industrial Process Design**

**MFII – Material Science**

	ETCS-CP	Winter	Summer
Materials Science	6		*
Science and technology of composite materials	6	*	
Materials Corrosion and protection	6	*	
Rheology	3	*	
Polymeric materials	3		*

**MFIII – Sensors Systems**

**Languages**



**Alma Mater Studiorum Università di Bologna (UNIBO), Bologna, Italy**

**1<sup>st</sup> Year (1<sup>st</sup> and 2<sup>nd</sup> Semester)**

**MFI – Industrial Process Design**

**MFII – Material Science**

**MFIII – Sensors Systems**

	ETCS-CP	Winter	Summer
Mathematical methods	6	*	
Solid-state electronics	6		*
Analog electronics	6	*	
Digital instrumentation	6		*
Biomedical trasducers	6	*	

**Languages**



**Alma Mater Studiorum Università di Bologna (UNIBO), Bologna, Italy**

**1<sup>st</sup> Year (1<sup>st</sup> and 2<sup>nd</sup> Semester)**

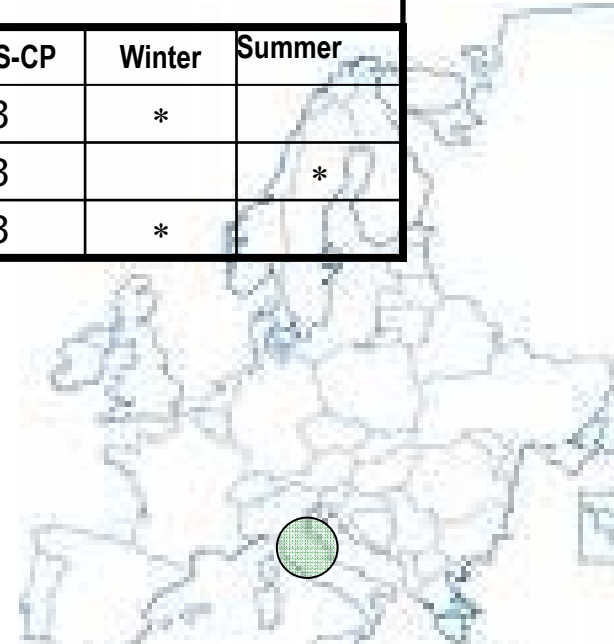
**MFI – Industrial Process Design**

**MFII – Material Science**

**MFIII – Sensors Systems**

**Languages**

	ETCS-CP	Winter	Summer
Italian language and culture (foreign students only)	3	*	
English Language	3		*
Second language (Spanish or Swedish)	3	*	



**Alma Mater Studiorum Università di Bologna (UNIBO), Bologna, Italy**  
**2<sup>nd</sup> Year (3<sup>rd</sup> and 4<sup>th</sup> Semester)**

<b>MSII – Material Science</b>	ETCS-CP	Winter	Summer
Mechanical metallurgy	6	*	
Materials for packaging applications	3	*	
Electrochemical Engineering Principles	6	*	
Ceramic Materials	3	*	
Solid state physical chemistry	6	*	
<b>MSIII – Sensors Systems</b>			
<b>Languages</b>			
<b>Master Thesis / Training projects</b>			





**Alma Mater Studiorum Università di Bologna (UNIBO), Bologna, Italy**

**2<sup>nd</sup> Year (3<sup>rd</sup> and 4<sup>th</sup> Semester)**

<b>MSII – Material Science</b>			
<b>MSIII – Sensors Systems</b>	<b>ETCS-CP</b>	<b>Winter</b>	<b>Summer</b>
Laboratory on chip	6	*	
Solid-state sensors	6	*	
Molecular simulations	6	*	
Technology for security	6	*	
Data communication in sensor network	6	*	
Environmental-monitoring networks	6	*	
<b>Languages</b>			
<b>Master Thesis / Training projects</b>			



**Alma Mater Studiorum Università di Bologna (UNIBO), Bologna, Italy**

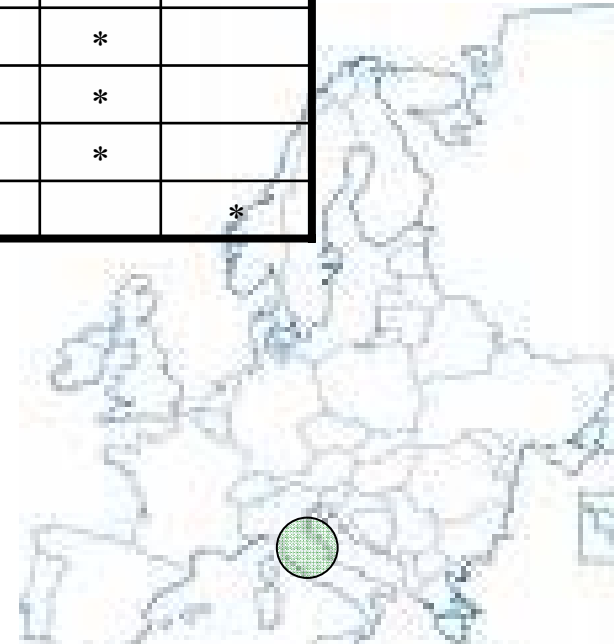
**2<sup>nd</sup> Year (3<sup>rd</sup> and 4<sup>th</sup> Semester)**

**MSII – Material Science**

**MSIII – Sensors Systems**

**Languages**

	ETCS-CP	Winter	Summer
Italian language and culture (foreign students only)	3	*	
English language – advanced level	3	*	
Research and technological policy in the EU	3	*	
<b>Master Thesis / Training projects</b>	30		*





UNIVERSIDAD  
POLITECNICA  
DE VALENCIA



# International Master in Materials and Sensors Systems for Environmental Technologies

**Information / Contact:**

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**[aribes@ter.upv.es](mailto:aribes@ter.upv.es)**