

# Master of Electronics, Electrical Energy, Automatic Information Processing and Instrumentation for Engineer Studies

**Master** of Science, Technology, Health  
Electronics, Electrical Energy, Automatic **Honours**  
Information Processing and Instrumentation for Engineer **Studies**



*The Information Processing and Instrumentation for Engineer Master's course is part of the main framework for sustainable development science and engineering.*

## Objectives

The Master of Electronics, Electrical Energy and Automatic is designed to provide students with the foundations required for their future careers and to train executives and jobseekers to work in a range of fields in companies and/or research laboratories of all sizes and research sectors (public or private) in the subjects of electronics, electrical energy and automatic. Electric industries especially involved in production, transport, electrical energy distribution and/or transformation, component and electronic circuit designers, aeronautics, aerospace, automobile, land and maritime transport, renewable energy, sustainable development, health, electric and electronic system assemblers, home automation, robotics, power-to-heat, lighting... the pharmaceutical industry, chemical and petrochemistry industry.

**Information Processing and Instrumentation for Engineer studies trains** senior science executives in develop information processing algorithms for the industry. For example, they are able to suggest innovative solutions for fault detection in the aeronautics, automobile, railway, energy and production industries.

## Who's it for?

### Target audience

### Skills

The course is designed to provide students with knowledge of advanced information processing techniques applied to engineering sciences: mechanical, electrical, energy, biomechanical etc.

The focus is on advanced techniques in instrumentation and data processing to improve the competitive and innovative aspects of current and future businesses.

Aside from the frame of reference for sector skills, course aims to improve:

- > skills in managing a research and/or development project successfully
- > critical thought and the ability to identify/justify research avenues
- > operational management skills
- > ability to clearly and concisely, in written and oral form, convey the suggested methods, final results and knowledge gained

## Entry requirements

- > Prepare your Master application
- > Application terms

In first year:

- > have a Bachelor of Engineering Science
- > have a Bachelor in science and technique (mathematics, physics, chemistry, biology etc.) or a more technology-focused degree (mechanics, EEA, IT etc.)
- > have met criteria to move up to the second year of engineering school be it with French or equivalent foreign qualifications (or 4th year of engineering school for schools with incorporated preparation).

In second year:

- > automatically for students who have passed both Master of Information Processing and Instrumentation for Engineer semesters in the 1st year
- > on review for all other applications

## Skills

The course is designed to provide students with knowledge of advanced signal processing techniques applied to engineering sciences: mechanical, electrical, energy, biomechanical etc.

The focus is on advanced techniques in instrumentation and data processing to improve the competitive and innovative aspects of current and future businesses.

Students develop innovation and creativity skills by producing instrumentation and signal processing algorithms embedded in electronic DSP cards.

Aside from the frame of reference for sector skills, the research course aims to improve:

- > skills in managing a research and/or development project successfully
- > critical thought and the ability to identify/justify research avenues
- > skills in terms of operational and research project management
- > ability to clearly and concisely, in written and oral form, convey the suggested methods, final results and knowledge gained

# What's next?


## Prospects

- > Instrumentation and signal processing research engineer in the following industries: aeronautics, automobile, railway, energy, health, civil engineering, mechanical construction, electrical construction
- > Teaching
- > Consultant engineer

## Course


Higher education

Master 1




**OFFRE DE FORMATION**  
**Master 1 Électronique, Énergie Électrique, automatique**  
**Parcours Traitement de l'Information et Instrumentation pour l'Ingénieur**  
**Centre Universitaire Roannais - Université Jean Monnet, Saint-Etienne**


M1 - SEMESTRE 7		Volumes horaires prévisionnels		
Intitulés des UE et des éléments pédagogiques	Crédits	Enseignements en présentiel		
		CM	TD	TP
UE 1 Systèmes linéaires, approche d'état	3	12	9	9
UE 2 Analyse numérique	3	18		12
UE 3 Electronique pour l'ingénieur	3	27	24	9
UE 4 Traitement du signal	6	27	24	9
UE 5 Systèmes de production et de conversion de l'énergie électrique	6	36	18	6
UE 6 Capteurs et Instrumentation	3	14	4	12
UE 7 Anglais	3		30	
UE 8 Projet Professionnel	3			
Total par étudiant	30			
M1 - SEMESTRE 8				
UE 1 Analyse de données	5			
Statistiques pour l'aide à la décision	3	10	10	
Data mining	2	10	10	
UE 2 Traitement du signal et outils	5			
Modélisation en Traitement du Signal	3	10	10	
Outils numériques	2	10	10	
UE 3 Ingénierie des systèmes informatiques	4			
Programmation et Acquisition	2	5	10	10
Gestion de projets informatiques	2	10	10	
UE 4 Anglais	2		20	
UE 5 Connaissance de l'entreprise	2	4	10	
UE 6 Projet Professionnel	12			
Stage en entreprise				
Total par étudiant	30			



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Membre de  
UNIVERSITÉ DE LYON



UNIVERSITÉ  
JEAN MONNET  
SAINT-ETIENNE

## Master 2



### OFFRE DE FORMATION

Master 2 Électronique, Énergie Électrique, automatique

Parcours Traitement de l'Information et Instrumentation pour l'Ingénieur

Centre Universitaire Roannais - Université Jean Monnet, Saint-Etienne

M2 - SEMESTRE 9	Crédits	Volumes horaires prévisionnels		
		Enseignements en présentiel		
		CM	TD	TP
UE 1 Anglais	3		20	
UE 2 Diagnostic des systèmes	6			
Diagnostic des systèmes mécaniques	3	10	10	
Diagnostic des systèmes électriques	3	10	10	
UE 3 Analyse vibratoire et acoustique	3	10	10	
UE 4 Outils de la maintenance	3	10	10	
UE 5 Modélisation des systèmes	6			
Modélisation des systèmes mécaniques	3	10	10	
Modélisation des systèmes électriques	3	10	10	
UE 6 Traitement du signal	6			
Identification des systèmes et séparation de sources	3	10	10	
Analyse temps fréquence	3	10	10	
UE 7 Insertion professionnelle	3			
Total par étudiant	30			
M2 - SEMESTRE 10				
UE Stage	30			
Stage en Laboratoire ou en R&D				
Total par étudiant	30			



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Sandwich course

### Semester 7

	Credits	Weighting	Lecture	Tutorial	Practical
Module 1 Linear systems, state method	3	1	12	9	9
Module 2 Digital analysis	3	1	18		12
Module 3 Electronic for engineer	3	1	27	24	9
Module 4 Signal processing	6	2	27	24	9
Module 5 Systems	6	2	36	18	6

for the production and conversion of electrical energy					
Module 6 Sensors and Instrumentation	3	1	14	4	12
Module 7 English	3	1		30	
Module 8 Professional project	3	1			

### Semester 8

	Credits	Weighting	Lecture	Tutorial	Practical
Module 1 Data analysis	5	2			
Decision-making statistics	3		10	10	
Data mining	2		10	10	
Module 2 Signal processing and tools	5	2			
Modelling in Signal Processing	3		10	10	
Digital tools	2		10	10	
Module 4 IT systems engineering	4	2			
Programming and Acquisition	2		5	10	10

IT project management	2		10	10	
Module 5 English	2	1		20	
Module 6 Business knowledge	2	1	4	10	
Module 7 Professional project	12	4			
Company project	2				
Apprenticeship	10				

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