

SHAKE THE FUTURE.



# ENGINEERING PROGRAMME

**SPECIALISATION**

**PROPULSION AND TRANSPORT**  
SPRING SEMESTER

# MARINE PROPULSION

PROPULSION AND TRANSPORT, ENGINEERING PROGRAMME SPECIALISATION  
SPRING SEMESTER

*Professor: David CHALET*

## Objectives

The objective of this course is to introduce the specificity of naval propulsion devices.

## Course contents

The first part of the course presents a list of different systems dedicated to naval propulsion (sail, internal combustion engine, nuclear) and their application depending on the ship type. There will be a focus on marine diesel engines and their application in the naval field.

The second part of the course presents the power transmission on a ship and different types of propulsion devices (wheels, propellers, hydrojets etc). This part concludes with practical applications and a visit by a marine diesel manufacturer.

## Course material

Ship Resistance and Propulsion: Practical Estimation of Propulsive Power (Google Digital book)  
Anthony F. Molland, Stephen R. Turnock, Dominic A. Hudson  
Cambridge University Press, 8 August 2011

## Keywords

Marine propulsion, propulsion devices, systems

## Links with other programmes

Applied Thermodynamics, Internal Combustion Engines

LANGUAGE	ECTS CREDITS	LECTURES	TUTORIALS	LABO	PROJECT
French	3	30 hrs	0 hrs	0 hrs	0 hrs

# PROJECT 2

PROPULSION AND TRANSPORT, ENGINEERING PROGRAMME SPECIALISATION  
SPRING SEMESTER

*Professor: David CHALET*

## Objectives

The objective of this project is to give students the possibility to solve a real problem. Several projects will be offered to students (projects defined in collaboration with companies will be preferred).

## Course contents

## Course material

## Keywords

Projects in propulsion

## Links with other programmes

Applied thermodynamics, Combustion and pollutant emissions, Turbomachinery, Internal combustion engines, Gas dynamics, Energy management in automotive applications, Aeronautical propulsion, Automotive propulsion, Marine propulsion

LANGUAGE	ECTS CREDITS	LECTURES	TUTORIALS	LABO	PROJECT
French	2	0 hrs	0 hrs	0 hrs	48 hrs

# SPACE PROPULSION

PROPULSION AND TRANSPORT, ENGINEERING PROGRAMME SPECIALISATION  
SPRING SEMESTER

*Professor: Georges SALAMEH*

## Objectives

The objective is to add a specialization to the units used in space propulsion (with lectures by engineers from SNECMA Moteurs Fusée).

## Course contents

- Propulsive systems with liquid propellants,
- Details of rocket stage aiding propulsion Pressurization Reservoirs,
- Interface and stage optimization problems,
- Application to launcher dimensioning (ARIANE 5),
- Turbopumps,
- Propulsive chambers.

## Course material

## Keywords

Space propulsion, Thrust, Cryogenic Propellants

## Links with other programmes

Applied thermodynamics, Turbomachinery, Combustion and pollutant emissions, Gas dynamics

LANGUAGE	ECTS CREDITS	LECTURES	TUTORIALS	LABO	PROJECT
French	3	28 hrs	0 hrs	0 hrs	2 hrs

# RAILWAY ENGINEERING

PROPULSION AND TRANSPORT, ENGINEERING PROGRAMME SPECIALISATION  
SPRING SEMESTER

*Professor: Thierry JASZAY*

## Objectives

The objective of this course is to study the materials used for railways, but also the constraints associated with this type of transport.

## Course contents

After a general presentation on the railways in the world, a presentation of the different materials and traction modes (internal combustion engine, electric, etc) will be given. The benefits and drawbacks will be analysed. Practical implementation will be carried out including dynamic modeling level of the vehicle. Propulsion and braking elements will also be covered.

## Course material

## Keywords

Railway, braking, high-speed lines, urban transport

## Links with other programmes

Internal combustion engines

LANGUAGE	ECTS CREDITS	LECTURES	TUTORIALS	LABO	PROJECT
French	3	30 hrs	0 hrs	0 hrs	0 hrs

# PRACTICAL WORK IN PROPULSION

PROPULSION AND TRANSPORT, ENGINEERING PROGRAMME SPECIALISATION  
SPRING SEMESTER

*Professor: David CHALET*

## Objectives

Application of various courses in the Propulsion specialisation.

## Course contents

Some examples of applications:

- combustion in a boiler / fan
- heat exchangers
- turbine / fuel cell
- nozzles
- engine filling and emptying / gearboxes
- internal combustion engine study
- spark-ignition engine
- diesel engine

## Course material

## Keywords

thermodynamic, combustion, internal combustion engine, heat exchangers, turbomachinery, nozzles

## Links with other programmes

Applied thermodynamics, Combustion and pollutant emissions, Turbomachinery, Internal combustion engines, Gas dynamics, Energy management in automotive applications

LANGUAGE	ECTS CREDITS	LECTURES	TUTORIALS	LABO	PROJECT
French	3	0 hrs	0 hrs	32 hrs	0 hrs