



## ENERGIE NUCLÉAIRE

### NUCLEAR ENERGY

Lecturers: **Anne-Segolene CALLARD**

| Lecturers : 16.0 | TC : 0.0 | PW : 0.0 | Autonomy : 0.0 | Study : 12.0 | Project : 0.0 | Language : FR

#### Objectives

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Nuclear energy represents a great technological and economic area, covering multidisciplinary skills and various jobs (project management, engineering, safety, ...). This module, that favours an industrial approach aims to give students both scientific and technical training in the various fields of nuclear energy. A wide part will be devoted to the study of current nuclear power reactors. This course will also provide an overview of the solutions to answer nuclear safety and people protection. It will be largely provided by experts in the field (Framatome, EDF).

**Keywords :** Nuclear reactors, nuclear power plants, nuclear safety.

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#### Programme

Basis of nuclear physics.  
Basis of neutronics.  
Reactor kinetics.  
Current nuclear reactor plants: Operation and control.  
Nuclear safety.  
Fuel cycle.  
Materials for nuclear engineering.

#### Learning outcomes

- Identify the scientific, economic and environmental challenges of nuclear power.
- Explain the neutron cycle in a thermal neutron reactor and the concept of criticality
- Explain the principles of operation of a PWR
- Understand and explain nuclear safety issues

#### Independent study

**Objectifs :** Study on future generation nuclear reactors.

**Méthodes :** Team work and oral restitution

#### Core texts

John R. LAMARSH, *INTRODUCTION TO NUCLEAR ENGINEERING*, Addison Wesley Publishing company, 2013  
Paul BONCHE *LE NUCLÉAIRE EXPLIQUÉ PAR DES PHYSICIENS*, EDP Sciences, 2002  
Jacques LIGOU *INTRODUCTION AU GÉNIE NUCLÉAIRE*, Presses polytechniques et universitaires romandes, 1997

#### Assessment

Score = 60% knowledge + 40% know-how  
Knowledge score = final exam  
Know-how score = BE mark (work + oral restitution)