

People's Democratic Republic of Algeria Ministry of Higher Education and Scientific Research



Sétif 1 University – Ferhat Abbas

## **Faculty: Sciences**

# Master's Degree in energetic physics and renewable energies



Energetic physics and renewable energies

#### Presentation and objective of the speciality

This program aims to develop high level skills in two specific fields: energetic physics and renewable energies. The training is mainly based on thermodynamics, heat transfer, photovoltaic conversion, combustion, fluid mechanics, semiconductors, etc.

The student will have acquired after this training:

- Theoretical and practical knowledge in fluid mechanics, heat transfer, thermodynamics and semiconductors,

- Photovoltaic energy technology (conversion and storage),

- Thermal energy technology,

- Training in the field of other new energy technologies: wind power, hydrogen and others.

- Application of this knowledge and technologies and its impact on the socio-economic development.

#### Admission requirements:

Students must have a Licence in :

- Fundamental physics
- Energetic physics
- Materials physics
- DES Physics

#### **Career Prospects/Professions:**

- Several national companies such as Sonatrach, Naftal and others are hiring in this field.
- Teaching physics in high school and institution with laboratories are another possibilities for students with this diploma
- Since , the photovoltaic is a growing field, this may offer real opportunities for hiring
- Creation of small companies(start up) is also possible
- Students with this Master are allowed to participate to the exam for entering to a doctorate program in energetic physics and in energetic physics and renewable energies

#### Organization of Studies and Official Duration of the Program:

#### Semester 01

- Advenced fluid mechanics
- Advenced thermodynamics
- Applied quantum mechanics
- Applied numerical methods
- Radiation –matter interaction
- Equipment and detectors
- Discovery units choose a course among : Thin films or Conversion and storage of energy.
- Scientific English 1
- Ethic, deontology and intellectual property

#### Semester02:

- Applied fluid mechanics.
- Physics of semiconductors
- Advanced heat transfer
- Solar field
- Application of Fortran to the characterization of components
- PW Heat transfer
- New and renewable energies
- Scientific english2

#### Semester03:

- Heat and mass exchangers
- Technology of photovoltaic solar cells
- Combustion
- Wind energy
- Fuel cell and hydrogen sector
- Photovoltaic conversion systems
- Ecological housing and energy efficiency
- Scientific English 3

#### Semester04:

• Project: an introductory research work with an internship for subjects that require a practical work in a research center or company, sanctioned by a thesis and a defense.

## **Training Canvas:**

- Advenced fluid mechanics
- Advenced thermodynamics
- Applied quantum mechanics
- Applied numerical methods
- Radiation –matter interaction
- Solar field

### Advanced training modules:

- Physics of semiconductors
- Applied fluid mechanics.
- Advanced heat transfer
- Heat and mass exchangers
- Technology of photovoltaic solar cells
- Combustion
- Wind energy
- Fuel cell and hydrogen sector

## Language of instruction:

French and English

## **Training framework:**

The tables provided in the previous section "Program Overview"

## **Curriculum Highlights:**

This Master's program aims to train competent researchers in physics, particularly in the field of energy physics and renewable energy. Upon completion of the program, graduates will be able to:

- Understand energy conversion systems as well as energy production and transformation systems.
- Master the specifics of solar energy, including conversion and storage, with a focus on the materials and processes used or potentially usable.
- Have expertise in fields related to materials and energy.
- Master techniques for characterization, modeling, and simulation.
- Invest in and create their own business in the field of energy.
- Understand the challenges of sustainable development in terms of energy.

## **Admission Information:**

The current application of Articles 171 and

1023 of Decrees:

- Skills and knowledge acquisition are assessed every six months through continuous assessment and a final exam.
- Progress from the first to the second year is automatic if the student has completed the first two semesters of the training program.
- The student's assessment focuses on, depending on the training program: lectures, practical work, tutorials, and practical internships.

## Coordinator of the Program: Dr. Ghania Azzouzi

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