

## RENEWABLE ENERGY ENGINEERING

### OBJECTIVE

Train engineers capable of implementing solutions based on taking advantage of the use of clean technologies and develop projects with low environmental impact. To do this, the renewable energy engineering will design, plan and manage equipment and systems in the areas of energy efficiency, industrial energy efficiency and alternative fuels, to contribute to sustainable development, with quality and respect for the environment, within an ethical and humanistic framework.

### DESIRABLE STUDENT PROFILE:

The desirable traits expected from the new applicant are:

- Facility for mathematics, physics and chemistry.
- Interest in the environment.
- Ability to analyze and synthesize.
- Ability to observe.
- Study habits.
- Innovative attitude.
- Entrepreneurial attitude.
- Critical and reflexive attitude.

New applicants will be evaluated in the following topics:

- Logical-Mathematical Reasoning.
- Mathematics.
- Verbal reasoning.
- Spanish.
- Information and communication technologies.

In addition, they will be evaluated in the following topics:

- Calculation.
- Physics.
- Mathematics.
- Chemistry.
- English.

### PROGRAM OUTCOME:

Upon completion of the Renewable Energy Engineering program, graduates are expected to have the following set of skills:

#### Abilities:

- Planning of renewable energy-based energy generation systems with an emphasis on specification of the system and selection of equipment to produce energy from renewable sources.
- Application of biomass based energy conversion principles.
- Install, adapt and maintain projects for the use of energy with renewable resources subject to economic and environmental constraints.
- Adaptation of generation systems with renewable energies to traditional distribution systems of electrical energy.
- Install systems and equipment for efficient energy use in industrial applications.
- Techniques of measurement and analysis for industrial processes optimizations.
- Put in place policies and regulations applicable to renewable energies.
- Test the availability and potential of renewable energies according to different applications.

- Analyze the consumption of electric energy to ensure efficiency.
- Select and adapt autonomous systems of support and storage of electrical energy for
- Application of renewable energies in industry, transportation and housing.
- Provide preventive and corrective maintenance.
- Model the behavior of exchange systems and transfer of energy for the optimization of processes.
- Read and write texts specific to the scope of this engineering, in their native language.
- Listen, speak, read and write in intermediate level of English.

**Knowledge:**

- Basics of mathematics, physics and chemistry.
- Analogue and digital electronics.
- Electric power, power electronics and control.
- Generation systems with renewable energies.
- Application of alternative energies, such as biomass, solar thermal, photovoltaic and wind power.
- Principles of fluid dynamics.
- Transfer of heat and energy.
- Modeling of energy systems.
- Basic principles for the production of biofuels and their application.
- Power generation systems interconnected to the grid.
- Basic concepts of energy efficiency of fossil fuels: gas, oil, coal.
- Conventional systems for the use and transformation of energy.
- Energy storage systems and technologies.
- Industrial energy efficiency.
- Instrumentation techniques and electrical measurements.
- Fundamentals of motors and generators.
- Principles of industrial automation.
- Policies and regulations applicable to electricity generation systems from renewable energy sources.
- Socio-economic aspects related to emerging energy technologies.
- English language intermediate level B1.

**Attitudes:**

- Respect for the environment.
- Entrepreneurial spirit.
- Dynamic, practical and creative.
- High sense of responsibility.
- Provision to maintain continuous updating.
- Opening to develop in multidisciplinary teams.
- Act honestly and ethically in the practice of the profession.
- Take part in the solution of community problems related to the generation, use and management of energy.

**Values:**

- Autonomy.
- Social responsibility.
- Pluralism.
- Humanism.
- Quality.

**PROSPECTIVE WORK FIELD:**

The professional renewable energy engineer can work in micro and macro companies, in the public and private sector. He can collaborate either in the general industry, energy generation industry and even government. The graduate may develop subordinate, collaborative and senior management; regardless of the local, regional, national and international setting.

**DURATION:**

Nine semesters.

**CURRICULUM**

Program 2013  
Career 44

	<b>CENTER</b>	<b>DEPARTMENT</b>
<b>First Semester</b>		
INTRODUCTION TO ENGINEERING AND RENEWABLE ENERGY SOURCES	ENG. SCIENCE	BIOMEDICAL
ALGEBRA	BASIC SCIENCE	MATHS & PHY
INTRODUCTION TO CHEMISTRY	BASIC SCIENCE	CHEMISTRY
PROGRAMMING LOGIC	BASIC SCIENCE	ELECT. SYST.
OPERATIVE GROUPS	SOC & HUMAN SCI	SICOLOGY
	<b>CENTER</b>	<b>DEPARTMENT</b>
<b>Second Semester</b>		
DIFERENTIAL CALCULUS	BASIC SCIENCE	MATHS & PHY
LINEAR ALGEBRA	BASIC SCIENCE	MATHS & PHY
ELECTROCHEMISTRY	BASIC SCIENCE	MATHS & PHY
PROGRAMING	BASIC SCIENCE	ELECT. SYST.
ENGINEERING AND SOCIETY	SOC & HUMAN SCI	PHYLOSOHY
	<b>CENTER</b>	<b>DEPARTMENT</b>
<b>Third Semester</b>		
INTEGRAL CALCULUS	BASIC SCIENCE	MATHS & PHY
VECTOR CALCULUS	BASIC SCIENCE	MATHS & PHY
KINEMATIC AND STATICS	BASIC SCIENCE	MATHS & PHY
MATERIALS CHEMISTRY	BASIC SCIENCE	CHEMISTRY
LOGICAL CIRCUITS	BASIC SCIENCE	ELECT. SYST.
	<b>CENTER</b>	<b>DEPARTMENT</b>
<b>Fourth Semester</b>		
DIFERENTIAL EQUATIONS AND LAPLACE TRANSFORM	BASIC SCIENCE	MATHS & PHY
ELECTRICITY AND MAGNETISM	BASIC SCIENCE	MATHS & PHY
ELECTRIC CIRCUITS	BASIC SCIENCE	ELECT. SYST.
ALTERNATIVE ENERGY SOURCES	BASIC SCIENCE	BIOCHEM.
ENERGY CONVERSION	BASIC SCIENCE	BIOCHEM.
	<b>CENTER</b>	<b>DEPARTMENT</b>
<b>Fifth semester</b>		
PROBABILITY AND STATISTICS	BASIC SCIENCE	STATISTICS
ELECTRONICS I	BASIC SCIENCE	ELECT. SYST.
MODELING AND DYNAMIC SIMULATIONS	ENG. SCIENCE	ROBOTICS
ELECTRIC ENERGY GENERATION	ENG. SCIENCE	BIOMEDICAL
SCIENTIFIC WRITING	ART & CULTURE	HISP STUDIES
PERSONAL FINANCES		

	<b>CENTER</b>	<b>DEPARTMENT</b>
<b>Sixth semester</b>		
ELECTRONICS II	BASIC SCIENCE	ELECT. SYST.
CONTROL SYSTEMS	ENG. SCIENCE	ROBOTICS
SOLAR THERMAL ENERGY	ENG. SCIENCE	BIOMEDICAL
INDUSTRIAL EMBEDDED SYSTEMS	ENG. SCIENCE	BIOMEDICAL
ETHICS	SOC & HUMAN SCI	PHYLOSOHY
	<b>CENTER</b>	<b>DEPARTMENT</b>
<b>Seventh semester</b>		
INDUSTRIAL ENERGY PROCESSES	ENG. SCIENCE	BIOMEDICAL
SOLAR PHOTOVOLTAIC ENERGY	ENG. SCIENCE	BIOMEDICAL
ENERGY SYSTEMS INSTRUMENTATION	ENG. SCIENCE	BIOMEDICAL
CRITICAL THINKING	SOC & HUMAN SCI	PHYLOSOHY
MANAGEMENT	EC & MANAG SCI	MANAG
	<b>CENTER</b>	<b>DEPARTMENT</b>
<b>Eighth semester</b>		
WIND ENERGY	ENG. SCIENCE	BIOMEDICAL
ENERGY SAVING	ENG. SCIENCE	BIOMEDICAL
ECONOMIC AND FINANCIAL EVALUATION	EC & MANAG SCI	FINANCE
ELECTIVE COURSE I	ENG. SCIENCE	BIOMEDICAL
ELECTIVE COURSE II	ENG. SCIENCE	BIOMEDICAL
	<b>CENTER</b>	<b>DEPARTMENT</b>
<b>Ninth semester</b>		
INTERNSHIP PROJECT	ENG. SCIENCE	BIOMEDICAL

### **DEGREE REQUIREMENTS**

The graduate must adhere to what is established in Chapter XIV of the degree at the technical, technical level superior and bachelor's degree, article 156 of the General Teaching Regulation that states the following:

“Once you have accredited all the subjects and requirements indicated in the curriculum of the level courses technician, technical superior and bachelor, the graduate can request the issuance of his degree in the Department of School Control, after complying with the following elements:

- I.- Have fulfilled the requirements of Social Service, Humanistic Training, Professional Practices and Foreign Languages, defined in institutional programs;
- II.- Check that there is no debit with the Autonomous University of Aguascalientes;
- III.- Have covered the quota established in the plan of taxation to obtain the title; and
- IV.- Have submitted the exit exam.”