

OBJECTIVE

Train professionals with creativity, critical and humanistic thinking to develop, implement and optimize processes, products and services involving the rational and comprehensive utilization of biotic resources, and professionals that are able to function in the areas of engineering and processes, food, biotechnology, environment, helping to improve the standard of living in our country and the world.

PROSPECTIVE UNDERGRADUATE STUDENTS' PROFILE:

The applicant to the Biochemical Engineering career must have the following characteristics:

- Preference for chemical and biological sciences.
- Ability to understand, resolve and infer laws and theories.
- Ability to interact with others.
- Dexterity to perform laboratory precision work.
- Innovation and creativity.
- Interest in research.

GRADUATE STUDENTS' PROFILE:

Skills:

- Design and develop conservation processes, reuse and production of high quality food with a wide vision to propose possibilities of transforming food resources with the least impact to the environment.
- Develop processes and innovate conventional technologies and clean technologies to reduce emissions.
- Redesign, create and propose new processes, bioprocesses, technologies and equipment that increase productivity applicable in various industrial fields.
- Design and develop new biotechnological processes to obtain high-value products.
- Quantify the various processing of materials to generate goods and services.
- Perform scaling of equipment and processes involving the use of different materials to generate high volume production at lower cost.
- Collaborate in the formulation and evaluation of technical and strategic industry projects to develop and optimize bioprocesses.
- Advise on the application of technology in the areas of production, quality control, research and development in the industry.
- Participate in the management of biotic resources processing units for efficient use.
- Develop, adapt, manage, select and optimize industrial processes for the comprehensive use of natural products and foods.
- Perform work reports and research in different areas of knowledge.

Knowledge of:

- Theoretical basis in exact and natural sciences.
- Engineering fundamentals that allow students to design, adapt, manage, scale and innovate processes and equipment involving the use of bio-chemical materials.
- Genetic engineering techniques applied to development research.
- Basis for statistical data analysis and implementation of quality system processes.
- Identification and characterization of microorganisms of industrial use and its application to the production of biomass and/or metabolites.
- Biotechnology principles related to biological processes used for the transformation of biological products and byproducts.
- Fundamentals of Biochemistry and Food Analysis, as well as standards and permissible methods to verify food quality and processes.
- Food technologies related to the processes of handling, storage and preservation of food and products.

- Principles of pharmaceutical technology and industrial processes in the production of medicines and cosmetics.
- Foundations for the development and evaluation of projects for new or established companies.
- Computational tools.
- English language, focusing on reading comprehension in students' area of competence.

Attitudes:

- Environment analysis and criticism.
- Respect and tolerance towards others.

- Negotiating and conciliatory spirit.
- Adaptation to changing contexts.
- Confronting conflict situations.
- Proactive.
- Disposition for teamwork.
- Ethics in professional performance.
- Commitment and social responsibility.

Values:

- Autonomy and social responsibilities.
- Pluralism.
- Humanism.
- Quality.

WORKING FIELD:

The contexts in which these professionals work are both the free exercise of the profession and as associates to public and private, national and international organizations and institutions of any type and size, and in working conditions both of dependence and cooperation of senior management in cutting-edge and difficult areas.

DURATION:

Nine semesters.

BASIC SCIENCES CENTER

BIOCHEMICAL ENGINEER

SYLLABUS

**PLAN 2012
CARRER 60**

	T	P	C	CENTER	DEPARTMENT
FIRST SEMESTER					
DIFFERENTIAL AND INTEGRAL CALCULUS	3	2	8	BASIC S.	MAT. AND PHY.
GENERAL CHEMISTRY	4	2	10	BASIC S.	CHEMISTRY
ORGANIC CHEMISTRY I	4	2	10	BASIC S.	CHEMISTRY
BIOCHEMISTRY ENGINEERING FUNDAMENTALS	4	0	8	BASIC S.	BCE
BIOTECHNOLOGICAL INVESTIGATION	4	0	8	BASIC S.	BCE
	T	P	C	CENTER	DEPARTMENT
SECOND SEMESTER					
VECTORIAL CALCULUS	2	2	6	BASIC S.	MAT. AND PHY.
ANALYTICAL CHEMISTRY	4	2	10	BASIC S.	CHEMISTRY
ORGANIC CHEMISTRY II	4	2	10	BASIC S.	CHEMISTRY
CELLULAR BIOLOGY	4	2	10	BASIC S.	BIOLOGY
MECHANICS	4	0	8	BASIC S.	MAT. AND PHY.
INTRODUCTION TO BUSINESS FUNCTION	0	4	4	ECO. AND ADM. S.	ADM.
	T	P	C	CENTER	DEPARTMENT
THIRD SEMESTER					
DIFFERENTIAL EQUATIONS	3	2	8	BASIC S.	MAT. AND PHY.
THERMODYNAMICS	5	2	12	BASIC S.	BCE
BIOCHEMISTRY I	4	2	10	BASIC S.	CHEMISTRY
NUMERICAL METHODS	2	3	7	BASIC S.	MAT. AND PHY.
ELECTRICITY AND MAGNETISM	4	1	9	BASIC S.	MAT. AND PHY.
ORGANIC CHEMISTRY III	3	2	8	BASIC S.	CHEMISTRY
	T	P	C	CENTER	DEPARTMENT
FOURTH SEMESTER					
STATISTICS I	3	2	8	BASIC S.	STATISTICS
PHYSICAL CHEMISTRY I	5	3	12	BASIC S.	BCE
BIOCHEMISTRY II	4	3	10	BASIC S.	CHEMISTRY
MATTER AND ENERGY BALANCES	3	2	8	BASIC S.	BCE
INSTRUMENTAL ANALYSIS	4	3	11	BASIC S.	CHEMISTRY
PHARMACEUTICAL TECHNOLOGY I	2	2	7	BASIC S.	BCE
	T	P	C	CENTER	DEPARTMENT
FIFTH SEMESTER					
STATISTICS II	3	2	8	BASIC S.	STATISTICS
GENERAL MICROBIOLOGY	3	3	9	BASIC S.	MICROBIOLOGY
GENETIC ENGINEERING	3	3	9	BASIC S.	CHEMISTRY
UNIT OPERATIONS I	4	2	10	BASIC S.	BCE
PHARMACEUTICAL TECHNOLOGY II	2	3	7	BASIC S.	BCE
PHYSICAL CHEMISTRY II	4	2	10	BASIC S.	BCE
	T	P	C	CENTER	DEPARTMENT
SIXTH SEMESTER					
STATISTICAL QUALITY CONTROL	2	3	7	BASIC S.	STATISTICS
COMPONENTS AND PROPERTIES OF FOOD	4	3	11	BASIC S.	BCE
BIOTECHNOLOGY	4	3	11	BASIC S.	BCE
UNIT OPERATIONS II	4	2	10	BASIC S.	BCE

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PROCESSES AND SYSTEMS ENGINEERING	3	2	8	BASIC S.	MAT. AND PHY.
PROJECTS EVALUATION	2	3	7	ECO. AND ADM. S.	FIN.
	T	P	C	CENTER	DEPARTMENT
SEVENTH SEMESTER					
ENVIRONMENTAL BIOTECHNOLOGY	3	2	8	BASIC S.	BCE
FOOD ANALYSIS I	4	3	11	BASIC S.	BCE
FERMENTATIONS ENGINEERING	3	3	9	BASIC S.	BCE
UNIT OPERATIONS III	4	2	10	BASIC S.	BCE
OPTIONAL PROFESSIONALIZING I EMPHASIS I OR II	3	2	8	BASIC S.	BCE
FOOD PRESERVATION METHODS I	3	2	8	AGR. S.	FOOD TEC.
	T	P	C	CENTER	DEPARTMENT
EIGHTH SEMESTER					
UNIT OPERATIONS IV	4	2	10	BASIC S.	BCE
OPTIONAL PROFESSIONALIZING II EMPHASIS I OR II	3	2	8	BASIC S.	BCE
FOOD PRESERVATION METHODS II	3	2	8	AGR. S.	FOOD TEC.
SERVICES ENGINEERING	0	4	4	BASIC S.	BCE
BIOPROCESSES	5	2	12	BASIC S.	BCE
BIOPROCESSES INSTRUMENTATION AND CONTROL	0	4	4	BASIC S.	BCE
FOOD ANALYSIS II	4	2	10	BASIC S.	BCE
	T	P	C	CENTER	DEPARTMENT
NINTH SEMESTER					
PROFESIONAL ETHICS	2	2	6	SOC. S. AND HUM.	PHILOSOPHY
OPTIONAL PROFESSIONALIZING III EMPHASIS I OR II	4	0	8	BASIC S.	BCE

Optional Professionalizing Subjects in Close Mode

Emphasis I. Food

Emphasis II. Environmental Biotechnology

INSTITUTIONAL PROGRAMS

- Professional Practices
- Social Service
- Tutorials
- Academic Exchange and Mobility
- Foreign Languages Development
- Humanist Training Program

DEGREE REQUIERMENTS

The graduate shall adhere to the provisions in Chapter XIV of the certification at technical, technical upper and bachelor's degree level, article 156 of the Teaching General Regulation that states the following:

“Once accredited all subjects and requirements identified in the syllabus of the careers at technical, technical upper and bachelor's degree level, the graduate may request the issuance of her/his Diploma at the School Control Department, after complying with the following elements:

- I. Having complied with the requirements of Social Service, Humanist Training, Professional Practices and Foreign Languages, as defined in the institutional programs;
- II. Verify there isn't any debt with the Autonomous University of Aguascalientes;
- III. Have covered the fee established in the plan of excises to obtain the Diploma; and
- IV. Have presented the graduation exam.”

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Approved by the Honorable University Council in ordinary session celebrated on December 15th, 2011.