

Undergraduate technology degree

BIOLOGICAL ENGINEERING

1. Course Objectives

The Biological Engineering DUT prepares, in four semesters, for the positions of qualified technician and assistant engineer, while enabling to carry on studying in various fields.

The technological training leading to the Biological Engineering DUT meets two objectives:

- Immediate integration into the world of work
- Possibility to carry on further studies

Biological Engineering graduates have a broad spectrum of knowledge and skills enabling them to access intermediate occupations (INSEE definition) and to find jobs in varied fields connected to the chosen option:

- Agronomy;
- Biological and Biochemical Analyses – BBA;
- Dietetics;
- Environmental Engineering – EE;
- Agrifood and Biological Industries - ABI

Qualified technicians in Biological Engineering fulfill their activities in production, analysis, and control, in the field of consultancy and research and development, which requires gaining the same basic skills and knowledge for all options. However, the fields of activity differ depending on the Biological Engineering DUT option selected, and the knowledge and skills which are specific to the option. Depending on the Biological Engineering option selected, the fields of activity for graduates, which are defined in paragraphs 2.b.1 to 2.b.5, are as follows:

- **Agronomy option:** animal or plant production or service.
- **Biological and Biochemical Analyses option:** human and animal health, pharmaceutical, cosmetics, biotechnologies. The Biological Engineering DUT - Option Biological and Biochemical Analyses - is included in the list of required degrees for the hiring of a technician in a medical biology, hospital, or food laboratory. This is about working in the field of health.
- **Dietetics option:** human health, institutional catering. Graduates who select this option are health professionals.
- **Environmental Engineering option:** analysis and treatment of pollution; environment management.
- **Agrifood and Biological Industries option:** analysis and production in the fields of agrifood, pharmaceutical, cosmetics and biotechnologies.

The program goes as follows:

- During semester 1 and in part during semesters 2 to 4, cross-disciplinary courses, common to all options.
- During semester 2 and semesters 3 and 4, specific courses on the “core knowledge”, depending on the chosen option.

2. Activities and Skills Tables

Being autonomous and multi-skilled are the main assets of the Biological Engineering graduates, who can advance to a higher level with additional training courses.

a. **Basic system of reference of activities and skills, common to the different options of the Biological Engineering DUT (Code GB)**

Basic activities and skills which are common to all options are detailed in the table below:

BASIC ACTIVITIES AND SKILLS IN BIOLOGICAL ENGINEERING

ACTIVITIES (CODE GB)	SKILLS (BEING ABLE TO)
GB1. MAKING AND CONDITIONING SAMPLES	<ul style="list-style-type: none">• Make samples in compliance with current regulations and type of samples
GB 2. RECEPTION AND PROCESSING OF SAMPLES	<ul style="list-style-type: none">• Check compliance of samples and implement their pre-analytical treatment.
GB 3. MAKING ANALYSES	<ul style="list-style-type: none">• Identify and analyze the risks associated with analyses and implement preventive measures.• Organize the work space in accordance with hygiene and safety rules and the techniques being used.• Prepare materials, reagents, and culture media.• Perform calibration tests of materials.• Perform metrology operations.• Adapt gestures to the specificities of the technique.• Identify and characterize problems and implement corrective measures.
GB 4. IMPLEMENTATION OF A PRODUCTION	<ul style="list-style-type: none">• Prepare and start production• Assess the good course of the various stages.• Perform corrective actions.
GB 5. RECEPTION, TREATMENT AND FILING OF DATA. MAKING USE OF RESULTS.	<ul style="list-style-type: none">• Use, in a reasoned manner, the appropriate tools of Biocomputing• Make use of data and express them in the form of usable results ; assess their meaning and coherence• Report abnormal results.• Integrate data in exploitation systems.• Apply confidentiality rules

GB 6. PLANNING OF ACTIVITIES AND MANAGEMENT OF RESSOURCES

- Evaluate the needs in materials and consumables by taking into account their conditions of preservation; manage stocks.
- Calculate the cost price of the activity, compare it with a budget and analyze the differences.
- Plan, prepare and carry out common maintenance of equipment.
- Manage and file documentation resources.
- Take part in a project and manage it.

GB 7. PERFORMING MEASURES AND RECORDINGS RELATING TO QUALITY (ACCREDITATION PROCESS)

- Apply the process of continuous improvement of quality (validation of analytical methods, periodical elaboration and revision of procedures, audits, identification of non -conformity and implementation of corrective measures, traceability)

GB 8. EVALUATION OF ALL PROFESSIONAL HAZARDS AND IMPLEMENTATION OF PREVENTIVE MEASURES

- Put into practice normative and regulation documents as well as principles of quality, hygiene and safety.
- Identify and analyze risks; put into practice preventive and corrective measures.

GB 9. PROFESSIONAL WATCH AND IMPROVEMENT OF ITS PRACTICE.

- Identify and analyze the documentation resources (publications, standards, regulation texts) and databases.
- Make a scientific and technological watch.
- Identify training needs.

GB 10. ACTIONS IN FAVOUR OF SUSTAINABLE DEVELOPMENT.

- Identify, within the framework of one's activities, actions pertaining to sustainable development (social equity, environment and economical efficiency)

GB 11. CONSULTANCY, TRAINING OF PROFESSIONALS, FUTURE PROFESSIONALS, AND USERS.

- Organize and carry out activities of information and consultancy
- Market products or equipment and provide consultancy.
- Look for new clients and keep a clients list.
- Take part in the supervision of trainees.

GB 12. COMMUNICATION AND INFORMATION

- Write and communicate (orally, in writing) professional documents, possibly in English.
 - Cooperate with the players, professional and institutional networks and structures of the field of activity.
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b. System of reference of activities and skills specific to each option of the Biological Engineering *DUT*

Agronomy (Code A) option

Agronomy consists in a scientific approach of issues arising from agriculture, the latter using techniques to harness parts of the rural space in order to produce goods (vegetal or animal) and services (landscape) useful to man.

Biological Engineering graduates – Option Agronomy – are trained to work in companies and organizations of research and development in the agricultural field: farms, agri-food, technical institutes, management, and banking services. To that respect, they participate in the dissemination of techniques and innovations relating to “products” (foodstuffs, vegetal raw materials, breeding...), inputs (seeds, fertilizers, animal food...), equipment (machines, digital tools, imaging...) and management (accounting management, communication, marketing...).

They give advice to and help producers in the implementation of new methods of production, integrating a better management of natural spaces (environment protection). They play a part in the planning and management of farms. In the institutions in charge of local and intercity development (local government, associations), they take part in the setting-up of individual or collective projects (feasibility, technique...). In primary processing industries (slaughterhouses, processing of vegetables...), they assess the quality of the raw material with a view to their transformation, which must adhere to the “Hygiene pack” (European regulation on the hygiene of human and animal feeding). As partners in the certification process, they follow up and establish the traceability of these products. In research laboratories (INRA, CNRS, technical institutes, agricultural industries, animal experimentation, biotechnologies...), they carry out experimentations with a view to improving animal and vegetal productions and the quality of products.

The qualified technician in Biological Engineering – Option Agronomy – can also be invested in development and production in the field of agro chemistry (fertilizers, phytopharmaceutical products), seeds and selection. They may also work as technical salespersons, which is why they must be open to the world of trade and aware of communication techniques.

Depending on the working environment, the qualified technician in agronomy must have the “individual certificate in phytopharmaceutical products” (Certiphyto)

Biological Engineering graduates – Option Agronomy – fulfill their activities as qualified technicians, assistant engineers or consultants in the field of service or, animal or plant production in:

- Producers and sanitary defense partnerships,
- Professional body and farming consular,
- Research and development laboratory,
- Technical center of experimentation,
- Sales area (animal feeding, agrosupplies, phytopharmaceutical products),
- Analyses laboratory (soil, water, agricultural products),
- Farm,
- Center for pig insemination (for bovines, sheep or goats, the Insemination Technician Diploma - CAFTI-) is required).
- Primary processing industry

ROME codes:

- *A1301 – Consultancy and technical assistance in agriculture*
- *A1302 - Control and technical diagnosis technique in agriculture*
- *A1407 - Bovine and equine breeding*
- *A1411 - Porcine breeding*
- *A1414 - Horticulture and market gardening*
- *A1416 – Multi-growing, breeding*
- *A1405 – Tree cultivation and wine growing*

- H1210 – Technical intervention in studies, research and development
- K1802 – Local development

ACTIVITIES AND SKILLS SPECIFIC TO THE AGRONOMY OPTION

ACTIVITIES (CODE A)

SKILLS (BEING ABLE TO)

A1. ANIMAL OR VEGETAL PRODUCTION

- Maintain the conditions of good functioning of a
- Production unit.
- Master the main technical routes of cultivated species.
- Carry out a cultivation process.
- Assess the condition of cultivation
- Assess the agronomic parameters of yielding and quality of agricultural products.
- Apply the rules of Certiphyto.
- Oversee the different stages of breeding
- Optimize breeding conditions (infrastructure, feeding, hygiene) by taking into account the
- Quality and Sustainable Development specifications.
- Manipulate animals.
- Carry out sanitary management of animals.
- Oversee the well-being of animals.
- Detect the most common animal and vegetal pathologies.
- Apply a preventive or curative method of the most frequent pathologies.
- Apply the statutory and normative documents concerning the measures of protection of ecosystems.
- Use tools enabling to insure the traceability of raw materials.
- Apply the principles of above-ground, reasoned or organic production systems.
- Use the tools which are the most suitable for cultivation or breeding.
- Manage a farm.

A2. CONSULTANCY IN THE FIELD OF SALES

- Look for new clients.
- Market supplies and provisions to clients.
- Perform a professional watch.
- Inform the client on technological evolutions
- Buy resources produced by clients.
- Keep a list of clients.

A3. CONSULTANCY, IN PARTNERSHIPS OF PRODUCERS AND PROFESSIONAL AGRICULTURAL BODIES

- Carry out a technical follow up of cultivations and/or livestock.
- Contribute to a farm audit; carry out an agro-environmental or technico-economical diagnosis.
- Analyze the organization of the farm, its functioning and insertion in a network.
- Assess the technical routes of cultivated species.
- Suggest solutions for the optimization of livestock or large cultivations management.
- Helping the farmer in making decisions (feeding, sanitary management, reproduction)
- Assess the condition of cultivations and livestock.
- Suggest a preventive or curative method of common pathologies.
- Recommend the systems of production matching the evolution of regulations and societal expectations (organic, reasoned production)
- Participate in the setting up and implementation of projects
- Lead groups of producers.
- Develop and lead new networks.

A4. CARRYING OUT EXPERIMENTATIONS IN TECHNICAL CENTRE

- Participate in varietal creation (improvement of plants) and in crossbreeding (improvement of farm animals)
- Contribute to an experiments plan, from conception to data collection.
- Process and interpret data thanks to appropriate statistical tools
- Apply procedures with a view to approval of products or seeds.

A5. INVOLVMENT IN RURAL AND OUTER-URBAN ENVIRONMENTAL PLANNING

- Identify the components of rural landscape.
 - Get and interpret cartographic data.
 - Draw up maps thanks to dedicated software.
 - Apply legislation which is specific to the protection of the natural environment.
 - Identify the different institutional players.
 - Manage biomasses.
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Biological and Biochemical Analyses (BBA; code B) option

The training course of a professional nature enabling to pass the Biological Engineering DUT – Option Biological and Biochemical Analyses – aims to train multi-skilled qualified technicians and assistant engineers in the field of human health and well-being, of animal health as well as biotechnologies.

Graduates of this option fulfill their activities as qualified technicians or assistant engineers in:

- Laboratory of medical biology (hospital and private)
- French Institute of Blood,
- Laboratory of cellular therapy,
- Laboratory of Medically-Assisted Procreation,
- Laboratory of anatomy and pathological cytology,
- Laboratory of analyses and controls,
- Laboratory of research and development,
- Laboratory or company of biotechnologies,
- Laboratory of analyses in animal health,
- Pharmaceutical industry, parapharmaceutical, cosmetics...

Whether he or she works in a laboratory or a company, the graduate of this diploma has the required technical skills to carry out tests or biological, physico-chemical or biochemical analyses, perform tests of product control and work on animal experimentation in vivo and in vitro. He or she masters the latest analytical techniques applicable to any type of sample.

The Biological Engineering *DUT* – Option Biological and Biochemical Analyses – is on the list of required diplomas for the hiring of a technician in a laboratory of medical biology, hospital or private. This is classified as a health occupation (Art. L.4352-2 of public health code). It is compulsory to have the certificate for taking blood samples (order n°80-987) in order to carry out such samples, and it is often required for working in a laboratory of medical biology. During semester 4, the students can take the theoretical examination of this capacity certificate. Moreover, in order to be authorized to take blood samples, professionals must have the AFGSU (a certificate of being trained for emergency care).

In the pharmaceutical industry or in a research laboratory, having the certificate of animal experimentation (level II) is appreciated during hiring. Students can take it during semester 3 and 4 of the course of study.

ROME Codes:

- *J1302 – Medical analyses*
- *H1210 – Technical intervention in studies, research and development*
- *H1502 - Management and industrial quality engineering*
- *H1503 - Technical intervention in a laboratory of industrial analysis*
- *H2301 - Monitoring equipment and chemical or pharmaceutical production*

ACTIVITIES AND SKILLS SPECIFIC TO THE BBA OPTION

ACTIVITIES (CODE B)

SKILLS (BEING ABLE TO)

B1. CARRYING OUT SAMPLES FOR TESTS OR BIOLOGICAL ANALYSES

- Select material to be used depending on samples to carry out.
 - Apply the rules of hazard prevention.
 - Carry out samples depending on the prescription,
 - Protocols and collected data.
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	<ul style="list-style-type: none"> • Identify emergency situations and take all suitable measures. • Assess technical and statutory conformity of samples, packaging, associated documents and conditions of transmission. • Perform pre-analytical processing of samples.
<p>B2. CARRYING OUT SAMPLES IN A CONTEXT OF HOSPITAL OR INDUSTRIAL HYGIENE</p>	<ul style="list-style-type: none"> • Select material to use for air and surface samples. • Carry out samples and condition them before analysis, in compliance with statutory and normative texts.
<p>B3. USE OF ANALYTICAL TECHNIQUES IN BIOCHEMISTRY, MOLECULAR, MICROBIOLOGICAL, HAEMATOLOGICAL, IMMUNOLOGICAL BIOLOGY, CELL CULTURE... THAT ARE CURRENT AND EMERGING, AND ADAPTED TO HUMAN OR ANIMAL SAMPLES, OR TO SAMPLES CARRIED OUT IN INDUSTRIAL OR HOSPITAL HYGIENE.</p>	<ul style="list-style-type: none"> • Perform analyses in compliance with rules pertaining to quality. • Implement the suitable automated, semi-automated or manual techniques. • Analyze the results. • Perform maintenance operation of machines and equipment.
<p>B4. PREPARATION, QUALIFICATION, DISTRIBUTION AND DELIVERY OF LABILE BLOOD PRODUCTS AND PRODUCTS WITH A THERAPEUTICAL PURPOSE (STEM CELLS)</p>	<ul style="list-style-type: none"> • Assess the technical and statutory compliance of samples and associated documents, of packaging and delivery conditions. • Manage stocks of labile blood products and apply the specific storage and delivery conditions. • Manage biological resource centers.
<p>B5. EXTRACTION, IDENTIFICATION, PRODUCTION OF BIOMOLECULES; STUDY OF THE ACTIVITY OF MOLECULES OF <i>IN VITRO/IN VIVO</i> INTEREST.</p>	<ul style="list-style-type: none"> • Use tools of extraction, purification, characterization of biomolecules. • Use techniques dedicated to biotechnologies and genetic engineering. • Study the activity of biomolecules.
<p>B6. PERFORMING ANALYSES WITHIN THE FRAMEWORK OF THE MAP (MEDICALLY-ASSISTED PROCREATION)</p>	<ul style="list-style-type: none"> • Implement the techniques adapted to the protocol and assess the good course of the process at the different stages. • Adapt gestures to the specificities of the technique and the post and to the level of containment of the environment. • Respect the rules of bioethics.
<p>B7. PREPARATION OF CELLULAR SMEARS AND ORGAN SECTIONING NECESSARY FOR A DIAGNOSIS IN ANATOMY AND PATHOLOGICAL CYTOLOGY.</p>	<ul style="list-style-type: none"> • Apply the different techniques usable in anatomy and in common and pathological cytology. • Assess the quality of results.
<p>B8. MAKING PHARMACOLOGICAL AND TOXICOLOGICAL STUDIES.</p>	<ul style="list-style-type: none"> • Consult the predictive models <i>in silico</i> • Use simulation software dedicated to pharmacology (<i>in virtuo</i> models) • Carry out toxicological analyses within a

legal or forensic framework.

- Perform analyses in pharmacokinetics.
- Mix in the correct proportions of medicine and toxic substances in biological environments.
- Assess *in vitro/in vivo* the action of xenobiotics.

B9. EXPERIMENTATION ON ANIMALS IN COMPLIANCE WITH THE RULES OF BIOETHICS.

- Manipulate laboratory animals.
- Respect the rules of bioethics.
- Master the techniques pertaining to animal experimentation

B10. IMPLEMENTATION AND USE OF ALTERNATIVE METHODS TO ANIMAL EXPERIMENTATION.

- Respect good laboratory practice depending on the level of containment of the environment.
 - Make and use cell culture as bioassays.
 - Carry out tests *ex vivo*
 - Use the available tools of biocomputing (*in silico* methods...)
 - Apply the various analytical methods and the techniques of cellular imaging.
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Dietetics (Code D) option

The dietician is a health professional. The Biological Engineering DUT – Option Dietetics – enables graduates to work as dietician according to the L4371-6 decree of the public health code.

According to the L4371-1, “We consider that the occupation of dietician concerns any person who gives nutritional advice and, with medical prescription, participates in the nutritional education and re-education of patients suffering from metabolism or food disorders through a personalized dietary assessment and an adequate dietary education. Dieticians contribute to the definition, the evaluation and control of the quality of food served in communities; they also contribute to activities of prevention in public health in the field of nutrition “.

The dietician guarantees quality in dietary care and founds his or her activity on scientific bases. This approach integrates biomedical, socio-economical, psychological, cultural and environmental dimensions to the field of dietary practice. The dietician collaborates with all health professionals (medical and paramedical) and other professionals. He or she works within the framework of a privileged partnership with doctors, and notably with nutritionist doctors.

The dietician works for:

- Healthy or ill individuals, either with a single person or in groups,
- Professionals in catering, agri-food, or in the pharmaceutical industry,
- Medico-social or health professionals.

Dieticians are members of the liberal professions or salaried employees. They can work in:

Private or public health centers, health care and social welfare institutions, local government, catering companies, research and training bodies and other structures (industries, associations, service providers and equipment dealers...)

ROME Codes:

- J1402 – Dietetics
- D1405 – Consultancy in medical information
- H1210 – Technical intervention in studies, research and development.
- K1205 - Information and social mediation

ACTIVITIES AND SKILLS SPECIFIC TO THE DIETETICS OPTION

ACTIVITIES (CODE D)

SKILLS (BEING ABLE TO)

D1. EVALUATION OF A NUTRITIONAL SITUATION ; DIETARY ASSESSMENT AND DIAGNOSIS

- Make a dietary assessment and diagnosis by taking into account nutritional needs, individual context and clinical data, by using suitable reference tools and documents in interaction with the other health staff and the persons involved in dealing with patients.

D2. CARRYING OUT DIETARY CARE

- Devise a dietary care program on the basis of a dietary diagnosis of a person or a group (dietary care program ; nutritional recommendations and operational implementation; identification of
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	<p>characteristics; indications and contraindications of nutritional products; advice within the framework of a medical prescription; assessment and follow up of dietary care)</p> <ul style="list-style-type: none"> • Apply a dietary care program (food intake, menus, dietary programs depending on physiological needs, pathologies and environment; food supplements; support the patient and their family; assess dietary care and re-adjust it if necessary.)
<p>D3. COMMUNICATION AND COORDINATION OF ACTIVITIES IN DIETETICS AND NUTRITION IN COLLABORATION WITH OTHER PROFESSIONALS</p>	<ul style="list-style-type: none"> • Communicate in a context of intervention with an individual or a group of persons and take into account demand, life stories and context (including vital emergency cases, palliative care, extreme dependency...)
<p>D4. IMPLEMENTATION AND FOLLOW UP OF ACTIONS IN QUALITY AND FOOD SAFETY</p>	<ul style="list-style-type: none"> • Participate in the conception of a quality approach and implement it in different professional and statutory contexts (nutritional quality, traceability, good hygiene practice ; HACCP: Hazard Analysis Critical Control Point ; management of circuits ; risk assessment ; nutrivicilance) • Participate in the implementation of a sustainable development approach. • Devise the nutritional strategy and formalize a document of dietary follow up.
<p>D5. LEADING EDUCATIONAL ACTIONS ABOUT HEALTH IN THE FIELD OF NUTRITION AND THERAPEUTIC EDUCATION IN NUTRITION</p>	<ul style="list-style-type: none"> • Lead actions of promotion, prevention and education in health in the field of nutritional education which match the objectives of health policies (analysis of needs and demand; devising actions; identification of necessary means and resources; planning; implementation; assessment) • Devise and lead a nutritional therapeutic education approach, with an individual or a group (dietary diagnosis; personalized project; educational objectives; activities program; sequences; choice of communication tools; planning of learning activities; assessment of acquired skills and suggestions for adjustments.)
<p>D6. TRAINING AND INFORMATION OF PROFESSIONALS AND FUTURE PROFESSIONALS IN THE FIELD OF FOOD AND NUTRITION</p>	<ul style="list-style-type: none"> • Devise and lead information and training interventions
<p>D7. INTERACTION OF THE DIETICIAN WITH THEIR PROFESSIONAL ENVIRONMENT</p>	<ul style="list-style-type: none"> • Know the various players of the professional environment and interact with other professionals in order to foster a continuous and global care of patients.

Environmental Engineering (EE; Code E) option

The Biological Engineering DUT – Option Environmental Engineering – trains for the position of qualified technician, assistant engineer in studies and techniques of environment protection.

The management and study of natural, urban or industrial environments, the analysis and treatment of pollution within companies and communities require professionals with solid technical skills in numerous fields.

Biological Engineering DUT – Option Environmental Engineering – graduates fulfill their activities as qualified technicians, assistant engineers or consultants in:

- Companies,
- Communities,
- Associations,
- Public or private laboratories.

They work in the following fields:

- Analysis and treatment of pollution (chemical, microbiological, physical)
- Treatment and prevention of pollutions (water for consumption, used waters, waste, soil, air),
- Analysis of living systems and their interactions with natural or modified milieus,
- Research and development in the field of pollution treatment.
- They define and carry out analyses and note-taking. They participate in determining the origin of pollutions and implement prevention and treatment techniques of pollution (water, air, soil). They act as eco-consultants.

ROME Codes:

- H 1303 – Technical intervention in hygiene-security-industrial environment
- H 1502 - Management and engineering in industrial quality
- H 1503 - Technical intervention in laboratory of industrial analysis
- 2302 - Management and inspection in urban environment
- K 2306 – Overseeing of eco-industrial installation

ACTIVITIES AND SKILLS SPECIFIC TO THE EE OPTION

ACTIVITIES (CODE E)

SKILLS (BEING ABLE TO)

E1. FOLLOW UP OR EXPLOITATION OF A TREATMENT UNIT :

- OF WATERS FOR CONSUMPTION OR RECREATION
- OF USED WATERS

- Master the techniques of physico-chemical or microbiological analyses characteristic of a water treatment unit.
 - Apply the conditions for a good functioning of the unit
 - Participate in the choice and of material used in the treatment of waters
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	<ul style="list-style-type: none"> • Interpret the results and carry out corrective measures in compliance with normative and statutory documents
<p>E2. STUDY AND TREATMENT OF ATMOSPHERIC POLLUTIONS</p>	<ul style="list-style-type: none"> • Detect pollution and master the techniques of analysis of pollutants and environmental pollution. • Apply the techniques of treatment of these pollutions.
<p>E3. PLANNING, MANAGEMENT OF WASTE COLLECTION AND PROCESSING</p>	<ul style="list-style-type: none"> • Define and apply the necessary conditions for a collection that is compliant with the objectives of the community or the company. • Master the analysis techniques characteristic of a waste processing unit • Interpret the results and apply corrective measures for a good operation of the unit in accordance with normative and statutory documents • Participate in communication and lead activities with the public.
<p>E4. FOLLOW UP OR EXPLOITATION OF A UNIT OF SOIL CLEANING-UP</p>	<ul style="list-style-type: none"> • Master the analysis techniques characteristic of a soil • Interpret the results and apply corrective measures for a good operation of the processing unit in accordance with rules and standards.
<p>E5. MANAGEMENT OF NATURAL AREAS</p>	<ul style="list-style-type: none"> • Carry out studies and apply measures for the protection of ecosystems, and the fauna and flora. • Comply with the Certiphyto rules, etc. • Manage activities with the public
<p>E6. ANALYSIS OF THE IMPACT OF POLLUTIONS ON ORGANISMS OR ECOSYSTEMS</p>	<ul style="list-style-type: none"> • Master the techniques of analysis and detection of pollutants found in organisms and milieus. • Participate in eco-toxicological studies and impact studies.
<p>E7. MANAGEMENT OF NATURAL RESOURCES</p>	<ul style="list-style-type: none"> • Master the analysis techniques characteristic of a milieu for the exploitation of a resource (water, biomass, minerals, etc.) • Apply measures for the protection of the resource in accordance with rules and standards. • Analyze biocenosis and their interactions with modified or natural environments: urban, industrial or rural ecosystems.

**E8. CARRYING OUT STUDIES IN QUALITY-
SECURITY- ENVIRONMENT**

- Participate in studies in Quality-Security-Environment in accordance with normative and statutory documents
- Apply the rules of Sustainable Development.

**E9. IMPLEMENTING A POLICY OF
SUSTAINABLE DEVELOPMENT IN A
COMMUNITY OR A COMPANY**

- Participate in the analysis of an organization's operating (community, company) from an economical, social and environmental point of view.
 - Participate in the implementation of measures compatible with sustainable development.
 - Lead activities with the general public.
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Agrifood and Biological Industries option (ABI; Code I)

The Biological Engineering DUT – Option Agrifood and Biological Industries (ABI) enables the graduate to work as a qualified technician or assistant engineer in the agri-food, pharmaceutical, cosmetic, biotechnological and catering fields.

The evolution of the professional environment in these fields requires taking into account new statutory, environmental and organizational constraints in the activities of these technicians.

In this context, ABI graduates are responsible for various technical missions that can relate to food safety, animal health, biotechnologies and the environment.

Graduates of this option fulfill their activities as qualified technicians, assistant engineers or consultants in:

- Companies,
- Service providers or communities,
- Public or private laboratories.

The versatility of technicians enables them to lead missions in:

- Research and Development (taking part in food safety and animal health programs or in the conception of innovating products),
- Analysis and control (use of a variety of laboratory techniques to assess the quality of products),
- Production (manufacturing final products by managing raw materials, waste, equipment and human resources in accordance with the time and cost objectives.
- Quality management: notably, the implementation of the “Hygiene pack” (GBPH, HACCP, traceability, PMS, Hygiene of processes), making audits, hygiene training sessions, managing clients’ complaints, ...

ROME Codes:

- *H1210 – Technical intervention in studies, research and development*
- *H1502 - Management and industrial quality engineering*
- *H1503 - Technical intervention in a laboratory of industrial analysis*
- *H2301 - Managing the equipment of a chemical or pharmaceutical production*
- *H2504 – Team supervision in a processing industry*
- *K1505 - Protection of consumers and trade control*

ACTIVITIES AND SKILLS SPECIFIC TO THE ABI OPTION

ACTIVITIES (CODE I)

SKILLS (BEING ABLE TO)

II. PREPARATION AND IMPLEMENTATION OF APRODUCTION

- Prepare production by planning needs in staff, equipment, and raw materials to meet the manufacturing orders
 - Implement production and make sure objectives of quantity, quality and delays are met
 - Start the production line and adjust the parameters of the process or the needs in staff depending on the flow or quality
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characteristics or the raw material or finished product.

- Intervene in case of breakdowns or failures to ensure first level maintenance
- Participate in the supervision and leading of a team of colleagues to meet the set objectives by having employees adhere to the requirements of traceability, quality, hygiene (good hygiene practice), safety and environment protection (sorting waste...)
- Fill in and use sheets featuring the different indicators (products, production, machines, staff) to adjust the parameters to the production line
- Relay information to the staff
- Participate in the elaboration of production schedules
- Participate in the management of the production line staff

I2. CARRYING OUT ANALYSES WITHIN THE NORMATIVE FRAMEWORK RELATING TO MANUFACTURING OPERATIONS AND/OR PROCESSING OF FOOD PRODUCTS, AND/OR PROCESSING OF BIOLOGICAL PRODUCTS

- Making samples in the context of a sample program.
- Implement the techniques and procedures in physico-chemistry, food microbiology, and sensory analyses.
- Assess the hazards of sanitary toxicity.

I3. IMPLEMENTATION OF AN APPROPRIATE QUALITY POLICY

- Implement the HACCP (Hazard Analysis Critical Control Point) method, which identifies, assesses and masters significant hazards as far as food safety is concerned
 - Use the tools which can ensure traceability from raw material to the finished products and its distribution.
 - Participate in the writing and implementation of GGHP (Guide for Good Hygiene Practice)
 - Draw up control plans (raw materials, finished products manufacturing line and production environment) and records.
 - Update follow-up and circulation of indicators of hygiene, environment and « product » quality.
 - Write the mission statement of suppliers and clients.
 - Manage clients' complaints
 - Participate in the elaboration, implementation and checking of the hygiene and cleaning program.
 - Lead or participate in the leading of training sessions for the staff.
 - Be in charge of the metrological follow up of equipment and measures.
 - Be in charge of waste management in accordance with sustainable development.
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I4. SCIENTIFIC AND TECHNOLOGICAL INNOVATIONS RELATED TO PRODUCTS AND PROCESS

- Do a scientific, technical and statutory watch
- Write and adhere to a mission statement
- Assess the feasibility and cost of a project
- Organize the technical implementation
- Help the person in charge of research and development

I5. EXTRACTION, IDENTIFICATION, PRODUCTION OF BIOMOLECULES AND STUDY OF THEIR ACTIVITY *IN VITRO*/IN *VIVO*, STUDY THE ACTIVITY OF BIOMOLECULES

- Use the tools of production, extraction, purification and characterization of biomolecules.
- Use the techniques dedicated to biotechnologies and genetic engineering.

3. Courses Tables

a. Courses for semesters 1 et 2

COURSES FOR SEMESTER 1 COMMON TO ALL OPTIONS

TEACHING UNIT (TU)	MODULE REFERENCE (M)	MODULE NAME	COEF. /M	TOTAL COEF. /TU	TOTAL HOURS LECTURES	TOTAL HOURS TUTORIALS	TOTAL HOURS PRACTICAL CLASSES	TOTAL HOURS STUDENT /TU
UE 11 : SCIENTIFIC AND TECHNOLOGICAL BASES	M 1101	Mathematical tools	2	8			20	114
	M 1102	Fundamentals in physics	2		12	10	10	
	M 1103	IT tools	2			10	18	
	M 1104	Adapted teaching	2		6	14	14	
UE 12 : CHEMICAL AND BIOCHEMICAL SCIENCES	M 1201	Fundamentals in general and organic chemistry	3	8	12	20	30	136
	M 1202	Biochemistry	3		22	6	16	
	M 1203	Chemistry and biochemistry analytical techniques	2			14	16	
UE 13 : LIFE SCIENCES	M 1301	General biology and physiology	3	8	24	6	20	128
	M 1302	Cellular biology and physiology	3		14	8	22	
	M 1303	Fundamentals in Microbiology and immunology	2		10	6	18	
UE 14 : COMMUNICATION AND PROJECTS	M 1401	Foreign language 1: English	2	6		16	14	72
	M 1402	Communication skills	2			14	8	

	M 1403	Personal professional project (ppp)	1		4	6	10	
	M 1404	Supervised project (70h)	1					
TOTAL HOURS SEMESTER 1			30	30	104	150	196	450

N.B. According to article 15 of the decree of 3 August 2005, about 10 % of the course should be devoted to pedagogical innovation (« learning the other way »)

b. Courses for semester 2 by option

AGRONOMY (CODE A) OPTION

TEACHING UNIT (TU)	MODULE REFERENCE (M)	MODULE NAME	COEF. /M	TOTAL COEF. /TU	TOTAL HOURS LECTURES	TOTAL HOURS TUTORIALS	TOTAL HOURS PRACTICAL CLASSES	TOTAL HOURS STUDENT /TU
UE 21 : PHYSICS, CHEMISTRY AND BIOCHEMISTRY	M 2101	General and organic chemistry	2,5	7	20	10	20	129
	M 2102	Applied physics	2		10	12	10	
	M 2103	Biochemistry and molecular Biology	2,5		25	6	16	
UE 22 : BIOLOGICAL SCIENCE	M 2201	Microbiology and Immunology	3	7	10	10	32	124
	M 2202	Applied physics and biology	3		10	6	16	
	M 2203	Course of adaptation to the professional world	2		8	18	14	
UE 23A : COURSES SPECIFIC TO THE OPTION AGRONOMY	M 23A01	Global approach of an agrosystem	2	8		16	18	136
	M 23A02	Data analysis applied to agronomy	2		16	18		
	M 23A03	Anatomy Biology applied to agronomy	2		16	18		
	M23A04	Professional practice	2		16	18		
UE 24 : CROSS- DISCIPLINARY COURSES	M 2401	Statistical tools	1	6		20	8	121
	M 2402	Foreign Language 1: English	2		22	18		
	M 2403	Communication Skills	1		18	10		

	M 2404	Personal Professional Project (PPP)	1			9	16	
	M2405	Supervised Project (80h)						
TOTAL HOURS SEMESTER 2			30	30	83	195	232	510
TOTAL HOURS SEMESTER 1+2			60	60	187	345	428	960

N.B. According to article 15 of the decree of 3 August 2005, about 10 % of the course should be devoted to pedagogical innovation ("learning the other way")

BIOLOGICAL AND BIOCHEMICAL ANALYSES (BBA-CODE B) OPTION

TEACHING UNIT (TU)	MODULE REFERENCE (M)	MODULE NAME	COEF. /M	TOTAL COEF. /TU	TOTAL HOURS LECTURES	TOTAL HOURS TUTORIALS	TOTAL HOURS PRACTICAL CLASSES	TOTAL HOURS STUDENT /TU
UE 21 : PHYSICS, CHEMISTRY AND BIOCHEMISTRY	M 2101	General and organic chemistry	2,5	7	20	10	20	129
	M 2102	Applied physics	2		10	12	10	
	M 2103	Biochemistry and molecular Biology	2,5		25	6	16	
UE 22 : BIOLOGICAL SCIENCE	M 2201	Microbiology and Immunology	3	7	10	10	32	124
	M 2202	Applied physics and biology	2		10	6	16	
	M 2203	Course of adaptation to the professional world	2		8	18	14	
UE 23B : COURSES SPECIFIC TO THE OPTION BIOLOGICAL AND BIOCHEMICAL ANALYSES	M 23B01	Microbiology and food hygiene	2	8		16	18	136
	M 23B02	Analysis of organic compounds	2		16	18		
	M 23B03	Physiology Pharmacology	2		16	18		
	M23B04	Professional practice	2		16	18		
UE 24 : CROSS- DISCIPLINARY COURSES	M 2401	Statistical tools	1	6		20	8	121
	M 2402	Foreign Language 1: English	2		22	18		
	M 2403	Communication Skills	2		18	10		
	M 2404	Personal Professional Project (PPP)	1		9	16		
	M2405	Tutored Project (80h)	2					
TOTAL HOURS SEMESTER 2			30	30	83	195	232	510
TOTAL HOURS SEMESTER 1+2			60	60	187	345	428	960

N.B. According to article 15 of the decree of 3 August 2005, about 10 % of the course should be devoted to pedagogical innovation (« learning the other way »)

DIETETICS (CODE D) OPTION

TEACHING UNIT (TU)	MODULE REFERENCE MODULE NAME (M)	MODULE NAME	COEF. /M	TOTAL COEF. /TU	TOTAL HOURS LECTURES	TOTAL HOURS TUTORIALS	TOTAL HOURS PRACTICAL CLASSES	TOTAL HOURS STUDENT /TU
UE 21 : PHYSICS, CHEMISTRY AND BIOCHEMISTRY	M 2101	General and organic chemistry	2,5	7	20	10	20	129
	M 2102	Applied physics	2		10	12	10	
	M 2103	Biochemistry and molecular Biology	2,5		25	6	16	
UE 22 : BIOLOGICAL SCIENCE	M 2201	Microbiology and Immunology	3	7	10	10	32	124
	M 2202	Applied physics and biology	2		10	6	16	
	M 2203	Course of adaptation to the professional world	2		8	18	14	
UE 23D : COURSES SPECIFIC TO THE OPTION DIETETICS	M 23D01	Microbiology and food hygiene	2	8		16	18	136
	M 23D02	Food biochemistry	2		16	18		
	M 23D03	Organization and Management in catering	2		16	18		
	M23D04	Professional practice	2		16	18		
UE 24 : CROSS- DISCIPLINARY COURSES	M 2401	Statistical tools	1	8		20	8	121
	M 2402	Foreign Language 1: English	2		22	18		
	M 2403	Communication Skills	2		18	10		
	M 2404	Personal Professional Project (PPP)	1		9	16		
	M2405	Supervised Project (80h)	2					
TOTAL HOURS SEMESTER 2			30	30	83	195	232	510
TOTAL HOURS SEMESTER 1+2			60	60	187	345	428	960

N.B. According to article 15 of the decree of 3 August 2005, about 10 % of the course should be devoted to pedagogical innovation (« learning the other way »)

ENVIRONMENTAL ENGINEERING (EE - CODE E) OPTION

TEACHING UNIT (TU)	MODULE REFERENCE MODULE NAME (M)	MODULE NAME	COEF. /M	TOTAL COEF. /TU	TOTAL HOURS LECTURES	TOTAL HOURS TUTORIALS	TOTAL HOURS PRACTICAL CLASSES	TOTAL HOURS STUDENT /TU
UE 21 : PHYSICS, CHEMISTRY AND BIOCHEMISTRY	M 2101	General and organic chemistry	2,5	7	20	10	20	129
	M 2102	Applied physics	2		10	12	10	
	M 2103	Biochemistry and molecular Biology	2,5		25	6	16	
UE 22 : BIOLOGICAL SCIENCE	M 2201	Microbiology and Immunology	3	7	10	10	32	124
	M 2202	Applied physics and biology	2		10	6	16	
	M 2203	Course of adaptation to the professional world	2		8	18	14	
UE 23D : COURSES SPECIFIC TO THE OPTION DIETETICS	M 23E01	Systematics in-depth studies	2	8		16	18	136
	M 23E02	Fluid mechanics and electrical engineering	2		16	18		
	M 23E03	Geoscience	2		16	18		
	M23E04	Professional practice	2		16	18		
UE 24 : CROSS- DISCIPLINARY COURSES	M 2401	Statistical tools	1	8		20	8	121
	M 2402	Foreign Language 1: English	2		22	18		
	M 2403	Communication Skills	2		18	10		
	M 2404	Personal Professional Project (PPP)	1		9	16		
	M2405	Supervised Project (80h)	2					
TOTAL HOURS SEMESTER 2			30	30	83	195	232	510
TOTAL HOURS SEMESTER 1+2			60	60	187	345	428	960

N.B. According to article 15 of the decree of 3 August 2005, about 10 % of the course should be devoted to pedagogical innovation (« learning the other way”)

AGRIFOOD AND BIOLOGICAL INDUSTRIES (ABI - CODE I) OPTION

TEACHING UNIT (TU)	MODULE REFERENCE (M)	MODULE NAME	COEF. /M	TOTAL COEF. /TU	TOTAL HOURS LECTURES	TOTAL HOURS TUTORIALS	TOTAL HOURS PRACTICAL CLASSES	TOTAL HOURS STUDENT /TU
UE 21 : PHYSICS, CHEMISTRY AND BIOCHEMISTRY	M 2101	General and organic chemistry	2,5	7	20	10	20	129
	M 2102	Applied physics	2		10	12	10	
	M 2103	Biochemistry and molecular Biology	2,5		25	6	16	
UE 22 : BIOLOGICAL SCIENCE	M 2201	Microbiology and Immunology	3	7	10	10	32	124
	M 2202	Applied physics and biology	2		10	6	16	
	M 2203	Course of adaptation to the professional world	2		8	18	14	
UE 23I : COURSES SPECIFIC TO THE OPTION ABI	M 23I01	Industrial Engineering	2	8		16	18	136
	M 23I02	Bioproduction	2		16	18		
	M 23I03	Analysis of bio-products	2		16	18		
	M23I04	Professional practice	2		16	18		
UE 24 : CROSS- DISCIPLINARY COURSES	M 2401	Statistical tools	1	8		20	8	121
	M 2402	Foreign Language 1: English	2		22	18		
	M 2403	Communication Skills	2		18	10		
	M 2404	Personal Professional Project (PPP)	1		9	16		
	M2405	Supervised Project (80h)	2					
TOTAL HOURS SEMESTER 2			30	30	83	195	232	510
TOTAL HOURS SEMESTER 1+2			60	60	187	345	428	960

N.B. According to article 15 of the decree of 3 August 2005, about 10 % of the course should be devoted to pedagogical innovation (« learning the other way »)

c. Courses for semesters 3 et 4

Option Agronomy (Code A)

SEMESTER 3 - AGRONOMY

TEACHING UNIT (TU)	MODULE REFERENCE (M)	MODULE NAME	COEF. /M	TOTAL COEF. /TU	TOTAL HOURS LECTURES	TOTAL HOURS TUTORIALS	TOTAL HOURS PRACTICAL CLASSES	TOTAL HOURS STUDENT /TU
UE 31A : AGRO-ECOLOGY	M 31A01	Natural and modified ecosystems	3	9	10	22	24	168
	M 31A02	Genetics applied to agronomy	3		12	20	24	
	M 31A03	Soil-Plants-Climate system	3		12	20	24	
UE 32A : SCIENCES AND TECHNIQUES IN AGRICULTURE	M 32A01	Anatomy-Animal physiology	2,5	8	10	10	12	120
	M 32A02	Vegetal Physiology	2,5		10	10	12	
	M 32A03C*	Biotechnologies Biocomputing tools	3		12	20	24	
UE 33A : GENERAL TRAINING FOR COMPANY WORK	M 33A01C*	Quality-Security Health Sustainable Development Food hygiene	2,5	7	12	20	14	142
	M 33A02C*	Data analysis	2		6	12	18	
	M 33A03C*	Agricultural economy Management Accountancy	2,5		20	22	18	
UE 34A : COMMUNICATION TOOLS FOR PROJECTS	M 34A01	Foreign language 1: English	2	6		15	15	70
	M 34A02	Communication Skills	1			15	10	
	M 34A03	Personal Professional Project (PPP)	1			15		
	M 34A04	Supervised Project (80h)	2			9	16	
TOTAL HOURS SEMESTER 3			30	30	104	201	195	500

C* : complementary module for students seeking immediate employment

N.B. According to article 15 of the decree of 3 August 2005, about 10 % of the course should be devoted to pedagogical innovation (« learning the other way»)

SEMESTER 4 - AGRONOMY

TEACHING UNIT (TU)	MODULE REFERENCE MODULE NAME (M)	MODULE NAME	COEF. /M	TOTAL COEF. /TU	TOTAL HOURS LECTURES	TOTAL HOURS TUTORIALS	TOTAL HOURS PRACTICAL CLASSES	TOTAL HOURS STUDENT /TU
UE 41A : AGRONOMICAL ENGINEERING	M 41A01	From organism to agrosystem	1	10	12	12	12	251
	M 41A02	Integrated management of agrosystems Development plan	2		12	16	20	
	M 41A03	Sustainable Agriculture Organic Agriculture	2		10	14	22	
	M 41A04C*	Agronomy Specific agricultural production	1		9	10	12	
	M 41A05	Animal production	2		12	15	18	
	M 41A06	Vegetal production	2		12	15	18	
UE 42A : ADDITIONAL MODULES FOR COMPANY WORK	M 42A01C*	Legislation Management – Trade	1	8	12	14	18	89
	M 42A02	Foreign language 1 : English	2		10	10		
	M 42A03	Communication skills	2		15	10		
	M 42A04	Supervised Project (70h)	3					
UE 43A : WORK PLACEMENT	M 43A01	Work placement (minimum 10- week final project)	12	12				
TOTAL HOURS SEMESTER 4			30	30	79	121	140	340
TOTAL HOURS SEMESTERS 3 + 4			60	60	183	322	335	840
TOTAL HOURS SEMESTERS 1+2+3+4			120	120	370	667	763	1800

**OF WHICH CROSS-DISCIPLINARY COURSES : 280
FOREIGN LANGUAGE : 120 ; COMMUNICATION SKILLS: 100; PPP : 60
OF WHICH COMPLEMENTARY MODULES 273**

C*: complementary module for students seeking immediate employment

N.B. According to article 15 of the decree of 3 August 2005, about 10 % of the course should be devoted to pedagogical innovation (« learning the other way »)

Option Biological and Biochemical Analyses (BBA - Code B)

SEMESTER 3 - BBA

TEACHING UNIT (TU)	MODULE REFERENCE (M)	MODULE NAME	COEF. /M	TOTAL COEF. /TU	TOTAL HOURS LECTURES	TOTAL HOURS TUTORIALS	TOTAL HOURS PRACTICAL CLASSES	TOTAL HOURS STUDENT /TU
UE 31B : HEALTH SCIENCES	M 31B01	Analytical and medical biochemistry	3	9	19	16	27	164
	M 31B02	Haematology Haemostasis Immunology	3		15	10	24	
	M 31B03	Medical microbiology	3		15	14	24	
UE 32B : BIOTECHNOLOGIES	M 32B01	Physiopathology <i>In vivo</i> pharmacology	3,5	9	20	17	21	164
	M 32B02	Cellular cultures Alternative methods to animal experimentation	2		14	12	21	
	M 32B03	Molecular Biology Genetical engineering Biocomputing tools	3,5		17	18	24	
UE 33B : GENERAL TRAINING FOR COMPANY WORK	M 33B01C*	Automatism Imaging Instrumentation	2	6	10	14	10	102
	M 33B02C*	Data analysis	1,5		14	10	10	
	M 33B03C*	Analytical techniques	2,5		10	14	20	
UE 34B : COMMUNICATION TOOLS FOR PROJECTS	M 34B01	Foreign language 1: English	2	6		15	15	70
	M 34B02	Communication Skills	1			15	10	
	M 34B03	Personal Professional Project (PPP)	1			15		
	M 34B04	Supervised Project (80h)	2					
TOTAL HOURS SEMESTER 3			30	30	120	174	206	500

C*: complementary module for students seeking immediate employment

N.B. According to article 15 of the decree of 3 August 2005, about 10 % of the course should be devoted to pedagogical innovation (« learning the other way »)

SEMESTER 4 - BBA

TEACHING UNIT (TU)	MODULE REFERENCE (M)	MODULE NAME	COEF. /M	TOTAL COEF. /TU	TOTAL HOURS LECTURES	TOTAL HOURS TUTORIALS	TOTAL HOURS PRACTICAL CLASSES	TOTAL HOURS STUDENT /TU
UE 41B : PHARMACEUTICAL AND BIOMEDICAL SCIENCES AND TECHNIQUES	M 41B01	Biochemistry and molecular biology	2,5	10	20	22	26	269
	M 41B02C*	Haematology Immuno-Haematology	2		12	10	18	
	M 41B03C*	Cellular Biology Pathological anatomy	1,5		10	10	18	
	M 41B04C*	Microbiology Parasitology	1,5		10	13	18	
	M 41B05	Pharmacology Toxicology	1,5		10	15	21	
	M 41B06C*	Consolidation course in biochemical and immunological techniques	1		10	8	18	
UE 42B : ADDITIONAL MODULES FOR COMPANY WORK	M 42B01C*	Quality-Hygiene Safety Sustainable*Development	1	8	8	12	71	
	M 42B02	Foreign language 1 : English	2		10	10		
	M 42B03	Communication skills	2		15	10		
	M 42B04	Supervised Project (70h)	3					
UE 43A : WORK PLACEMENT	M 43B01	Work placement (minimum 10-week final project)	12	12				
TOTAL HOURS SEMESTER 4			30	30	80	121	139	340
TOTAL HOURS SEMESTERS 3 + 4			60	60	200	295	345	840
TOTAL HOURS SEMESTERS 1+2+3+4			120	120	387	640	773	1800

OF WHICH CROSS-DISCIPLINARY COURSES : 280
FOREIGN LANGUAGE : 120 ; COMMUNICATION SKILLS: 100; PPP : 60
OF WHICH COMPLEMENTARY MODULES 283

C:* complementary module for students seeking immediate employment

N.B. According to article 15 of the decree of 3 August 2005, about 10 % of the course should be devoted to pedagogical innovation (« learning the other way »)

Dietetics Option (Code D)

SEMESTER 3 - DIETETICS

TEACHING UNIT (TU)	MODULE REFERENCE (M)	MODULE NAME	COEF. /M	TOTAL COEF. /TU	TOTAL HOURS LECTURES	TOTAL HOURS TUTORIALS	TOTAL HOURS PRACTICAL CLASSES	TOTAL HOURS STUDENT /TU
UE 31D : FUNDAMENTALS IN NUTRITION	M 31D01	Physiology and Biochemistry in nutrition	3	9	20	8	14	162
	M 31D02	Food science	3		22	28	14	
	M 31D03	Culinary technologies	3				56	
UE 32D : NUTRITION AND DIETETICS	M 32D01	Needs in nutritional intake	3	9	20	10	10	156
	M 32D02	Physiology Physiopathology in nutrition	3		28	28		
	M 32D03	Diagnosis and dietary care	3			30	30	
UE 33D : GENERAL TRAINING FOR COMPANY WORK	M 33D01C*	Organization Regulations Quality of care Professional code of ethics	2	6	6	14	10	112
	M 33D02C*	Quality-Security-Health Sustainable Development Food hygiene	2		4	20	14	
	M 33D03C*	Organization and management of catering services for communities	2			16	28	
UE 34D : COMMUNICATION TOOLS FOR PROJECTS	M 34D01	Foreign language 1: English	2	6		15	15	70
	M 34D02	Communication Skills	1			15	10	
	M 34D03	Personal Professional Project (PPP)	1			15		
	M 34D04	Supervised Project (80h)	2					
TOTAL HOURS SEMESTER 3			30	30	100	200	200	500

C:* complementary module for students seeking immediate employment

N.B. According to article 15 of the decree of 3 August 2005, about 10 % of the course should be devoted to pedagogical innovation (« learning the other way »)

SEMESTER 4 - DIETETICS

TEACHING UNIT (TU)	MODULE REFERENCE (M)	MODULE NAME	COEF. /M	TOTAL COEF. /TU	TOTAL HOURS LECTURES	TOTAL HOURS TUTORIALS	TOTAL HOURS PRACTICAL CLASSES	TOTAL HOURS STUDENT /TU	
UE 41D : IN-DEPTH STUDY OF NUTRITION AND DIETETICS	M 41D01	Food science and technology	2	10	28	22	6	265	
	M 41D02	Pathology in nutrition	1,5		22	12			
	M 41D03	Dietetic approach in medical care	2			18	38		
	M 41D04C*	Public healthcare Psychosociology : Determining factors in food behaviour	1		6	16	8		
	M 41D05C*	Nutritional and therapeutic individual and group education	1			11	20		
	M 41D06C*	Case studies in nutrition and dietetics	2,5		12	24	24		
UE 42D : ADDITIONAL MODULES FOR COMPANY WORK	M 42D01C*	Data analysis	1	8		10	20	75	
	M 42D02	Foreign language 1 : English	2			10	10		
	M 42D03	Communication skills	2			15	10		
	M 42D04	Supervised Project (70h)	3						
UE 43D : WORK PLACEMENT	M 43D01	Work placement **(minimum 10-week final project)	12	12					
TOTAL HOURS SEMESTER 4			30	30	68	136	136	340	
TOTAL HOURS SEMESTERS 3 + 4			60	60	168	336	336	840	
TOTAL HOURS SEMESTERS 1+2+3+4			120	120	355	681	764	1800	

**OF WHICH CROSS-DISCIPLINARY COURSES : 280
FOREIGN LANGUAGE : 120 ; COMMUNICATION SKILLS: 100; PPP : 60
OF WHICH COMPLEMENTARY MODULES 263**

C*: complementary module for students seeking immediate employment

****** The minimum duration of the final placement is longer than the other options of the Biological Engineering Technical Degree in compliance with the reference frame for professional dieticians

N.B. According to article 15 of the decree of 3 August 2005, about 10 % of the course should be devoted to pedagogical innovation (« learning the other way »)

Environmental Engineering option (EE; Code E)

SEMESTER 3 - EE

TEACHING UNIT (TU)	MODULE REFERENCE (M)	MODULE NAME	COEF. /M	TOTAL COEF. /TU	TOTAL HOURS LECTURES	TOTAL HOURS TUTORIALS	TOTAL HOURS PRACTICAL CLASSES	TOTAL HOURS STUDENT /TU
UE 31E : ORIGIN, NATURE AND DETECTION OF POLLUTION CAUSES	M 31E01	Environmental microbiology	3	9	6	14	24	154
	M 31E02	Environmental chemistry	4		10	20	40	
	M 31E03	Noise and noise radiation	2				10	
UE 32E : POLLUTION STUDY AND TREATMENT	M 32E01	Waste management	3	7	10	16	12	127
	M 32E02	Fundamentals in water treatment	2		6	12	22	
	M 32E03C*	Additional technical modules for the analysis of biological environment	2		5	22	22	
UE 33E : ECOLOGY, ECOSYSTEMS, GENERAL COURSE FOR COMPANY WORK	M 33E01	Ecology and monitoring of natural environment	3	8	16	17	36	149
	M 33E02C*	Applied computerized analytical data	2		4	20	6	
	M 33E03C*	Sustainable development	2		4	10	6	
	M 33E04C*	Quality-Security-Health	1		14	16		
UE 34D : COMMUNICATION TOOLS FOR PROJECTS	M 34E01	Foreign language 1: English	2	6		15	15	70
	M 34E02	Communication Skills	1			15	10	
	M 34E03	Personal Professional Project (PPP)	1			15		
	M 34E04	Supervised Project (80h)	2					
TOTAL HOURS SEMESTER 3			30	30	85	212	203	500

C*: complementary module for students seeking immediate employment

N.B. According to article 15 of the decree of 3 August 2005, about 10 % of the course should be devoted to pedagogical innovation (« learning the other way »)

SEMESTER 4 - EE

TEACHING UNIT (TU)	MODULE REFERENCE (M)	MODULE NAME	COEF. /M	TOTAL COEF. /TU	TOTAL HOURS LECTURES	TOTAL HOURS TUTORIALS	TOTAL HOURS PRACTICAL CLASSES	TOTAL HOURS STUDENT /TU
UE 41E : POLLUTION TREATMENT AND ENVIRONMENTAL MANAGEMENT	M 41E01	Environmental management	2	10	16	14		248
	M 41E02	Fundamentals in ecotoxicology and hazards	2		12	12	26	
	M 41E03C*	Additional technical modules in environmental management	1,5		8	20	18	
	M 41E04	Waste treatment Air treatment	1		8	12	6	
	M 41E05	Water treatment and purification	2,5		15	20	28	
	M 41E06C*	Fundamentals in electrical engineering and automation	1		8	13	12	
UE 42E : ADDITIONAL MODULES FOR COMPANY WORK	M 42E01C*	Consolidation course in technology	1	8	8	20	19	92
	M 42E02	Foreign language 1 : English	2			10	10	
	M 42E03	Communication skills	2			15	10	
	M 42E04	Supervised Project (70h)	3					
UE 43E : WORK PLACEMENT	M 43D01	Work placement **(minimum 10-week final project)	12	12				
TOTAL HOURS SEMESTER 4			30	30	75	136	129	340
TOTAL HOURS SEMESTERS 3 + 4			60	60	160	348	332	840
TOTAL HOURS SEMESTERS 1+2+3+4			120	120	347	694	759	1800

**OF WHICH CROSS-DISCIPLINARY COURSES : 280
FOREIGN LANGUAGE : 120 ; COMMUNICATION SKILLS: 100; PPP : 60
OF WHICH COMPLEMENTARY MODULES 255**

C : complementary module for students seeking immediate employment*

N.B. According to article 15 of the decree of 3 August 2005, about 10 % of the course should be devoted to pedagogical innovation (« learning the other way »)

Agrifood and Biological Industries option (ABI; Code I)

SEMESTER 3 - ABI

TEACHING UNIT (TU)	MODULE REFERENCE (M)	MODULE NAME	COEF. /M	TOTAL COEF. /TU	TOTAL HOURS LECTURES	TOTAL HOURS TUTORIALS	TOTAL HOURS PRACTICAL CLASSES	TOTAL HOUR STUDENT /TU
UE 311 : INDUSTRIAL PROCESS ENGINEERING	M 31101	Industrial physics	3	9	13	16	16	153
	M 31102	Unitary operations	3		14	16	20	
	M 31103C*	Consolidation course in technology	3		12	30	16	
UE 321 : BIOTECHNOLOGIES	M 32101	Biochemistry and Physicochemistry for food science	3	9	18	18	20	1258
	M 32102	Microbiology in food science	3		15	16	20	
	M 32103	Consolidation course in biochemistry and physicochemistry	3		18	13	20	
UE 331 : GENERAL TRAINING FOR COMPANY WORK	M 33101C*	Quality- Food hygiene- Security- Sustainable development	1	6	6	10	12	119
	M 33102C*	Data analysis Tools for biocomputing	2		4	15	20	
	M 33103C*	Consolidation course in professional skills	3		10	30	12	
UE 341 : COMMUNICATION TOOLS FOR PROJECTS	M 34101	Foreign language 1: English	2	6		15	15	70
	M 34102	Communication Skills	1			15	10	
	M 34103	Personal Professional Project (PPP)	1			15		
	M 34104	Supervised Project (80h)	2					
TOTAL HOURS SEMESTER 3			30	30	110	209	181	500

C:* complementary module for students seeking immediate employment

N.B. According to article 15 of the decree of 3 August 2005, about 10 % of the course should be devoted to

pedagogical innovation (« learning the other way »)

SEMESTER 4 – ABI

TEACHING UNIT (TU)	MODULE REFERENCE MODULE NAME (M)	MODULE NAME	COEF. /M	TOTAL COEF. /TU	TOTAL HOURS LECTURES	TOTAL HOURS TUTORIALS	TOTAL HOURS PRACTICAL CLASSES	TOTAL HOURS STUDENT /TU
UE 41I : FOOD ENGINEERING AND BIOPROCESSES	M 41I01	Electrical engineering Automation Regulation	1,5	10	12	10	22	260
	M 41I02	Food technology : manufacturing process	2		14	18	26	
	M 41I03C*	General course for company work	1		5	12	8	
	M 41I04	Applied biochemistry and physicochemistry	1			6	24	
	M 41I05	Industrial microbiology and microbial genetics	2,5		20	12	28	
	M 41I06C*	Technological course for company work	2		9	20	14	
UE 42I : ADDITIONAL MODULES FOR COMPANY WORK	M 42I01C*	Quality-Security Health Sustainable Development Management Regulations	1	8	12	23		80
	M 42I02	Foreign language 1 : English	2			10	10	
	M 42I03	Communication skills	2			15	10	
	M 42I04	Supervised Project (70h)	3					
UE 43I : WORK PLACEMENT	M 43I01	Work placement **(minimum 10- week final project)	12	12				
TOTAL HOURS SEMESTER 4			30	30	72	126	142	340
TOTAL HOURS SEMESTERS 3 + 4			60	60	182	335	323	840
TOTAL HOURS SEMESTERS 1+2+3+4			120	120	369	680	751	1800
OF WHICH CROSS-DISCIPLINARY COURSES : 280 FOREIGN LANGUAGE : 120 ; COMMUNICATION SKILLS: 100; PPP : 60 OF WHICH COMPLEMENTARY MODULES 280								

