



ENGINEERING

BIOENGINEERING
AND CHEMICAL PROCESSES



Tecnológico
de Monterrey





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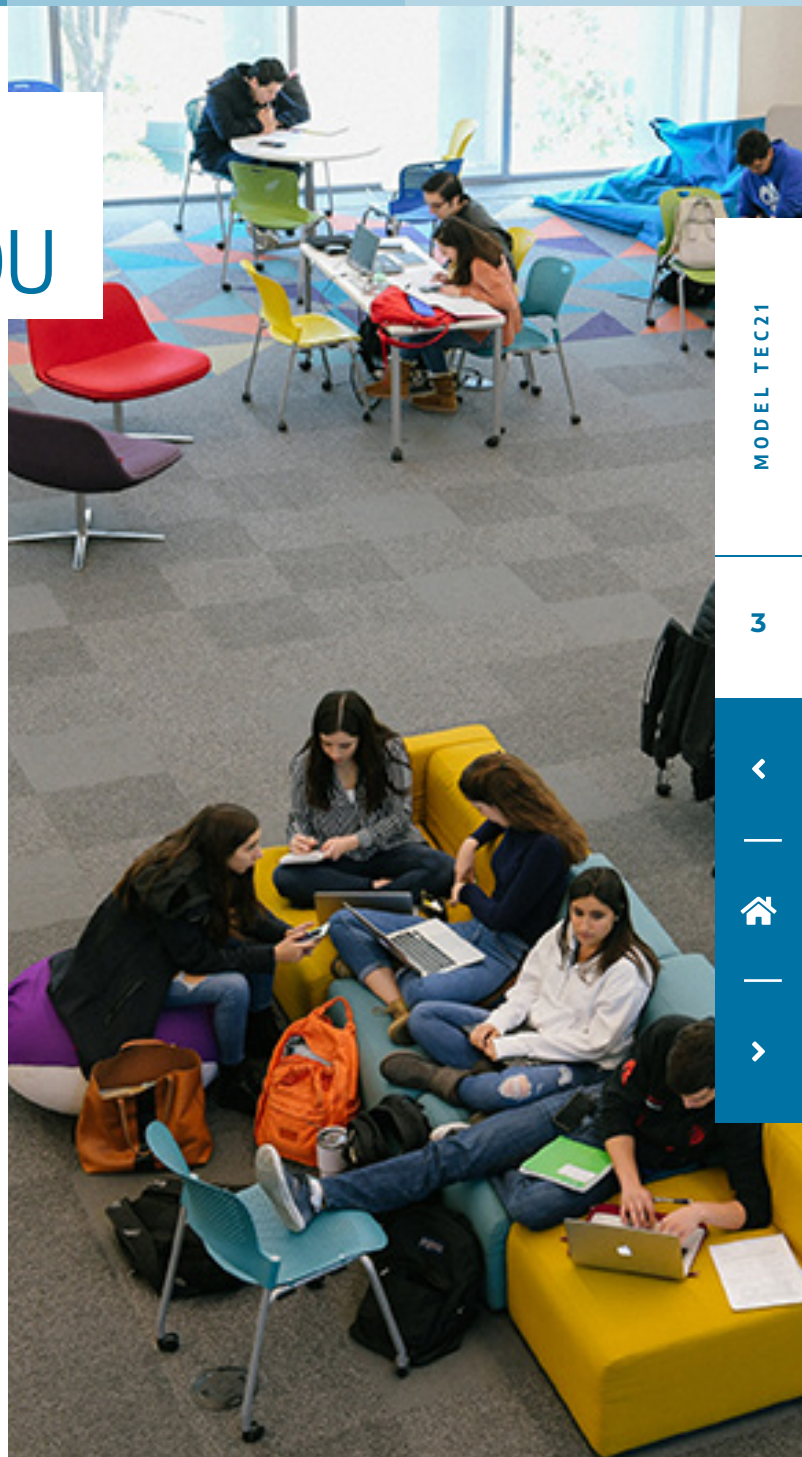
MODEL TEC21 TEC CHALLENGES YOU

Our **challenge-based educational model** develops the competencies that will enable you to face up to the opportunities and challenges of the 21st century creatively and strategically.

With an education that will accompany you throughout your life, our aim is for you to be aware of the needs of the environment, acquire a systemic vision of problems and develop the capacity to solve them.

Right from the first semester, you will be participating in activities to develop your ability to identify opportunities, find resources, take risks and recover from failure.

In addition, **the model empowers you** to make more decisions about your university studies as you progress, in order to **develop a unique profile**.





WHAT IS A CHALLENGE?

A challenge is an opportunity to learn something new and reinforce what you already know. To solve it, you need to apply yourself, investigate and interact in the “real world”. You won’t be on your own: you will have a set of personal and technological resources and tools, as well as the advice of faculty who will accompany you throughout the process. Its resolution implies a certain degree of difficulty and a duration that will awaken your interest and enthusiasm and produce a sense of achievement.

COMPETENCIES THAT MAKE YOU UNIQUE

What are the characteristics of Tec-educated leaders?

At Tecnológico de Monterrey, we have defined, after consulting leaders from diverse sectors and employers, seven competencies that all our students should possess. Regardless of which degree you are studying, the educational model anticipates that you will develop them through diverse challenges, courses and activities related to your university experience. They are:

1. **Self-knowledge and management**
2. **Innovative entrepreneurship**
3. **Social intelligence**
4. **Commitment to ethics and citizenship**
5. **Reasoning for complexity**
6. **Communication**
7. **Digital transformation**

These seven competencies, together the **knowledge, skills, attitudes and values related to the area of Social Sciences and your degree**, will be your letter of introduction and your passport in the professional world.

STEP-BY-STEP RECORD OF YOUR LEARNING

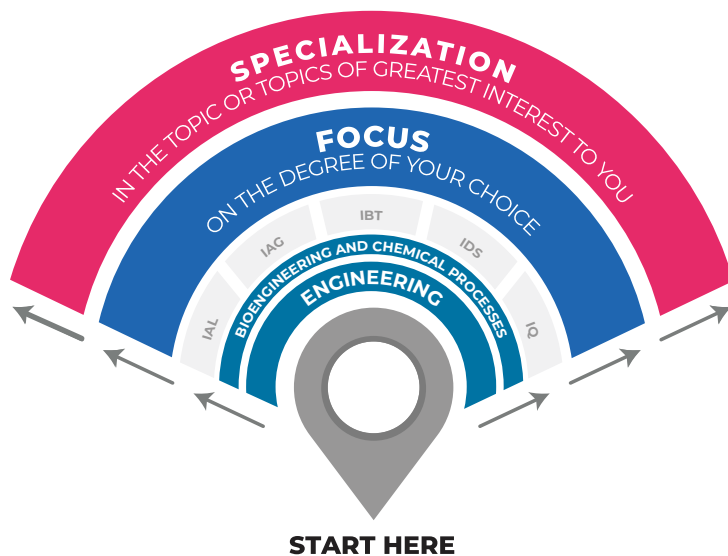
While you are at university, you will keep a record in your competency file of the degree of progress you have made and the supporting evidence. Taking responsibility for creating this file will, from this very moment, be extremely useful when you join the workforce.

YOU USED TO CHOOSE A DEGREE, NOW YOU CHOOSE A PATH

Your curriculum will be a non-linear educational, dynamic and flexible experience. You will enjoy **more time and more elements** to know and mature your degree choice, as well as to **discover and capitalize all the opportunities** you have to personalize your degree program.

The model is comprised of **three stages** and, from the first semester, you will experience educational units (courses and blocks) that have clearly defined, individual and collaborative project- and task-oriented competency development objectives (knowledge, skills, attitudes and values). In the “blocks”, you will be tackling challenges connected to reality, working collaboratively with the support of a group of faculty who will guide your learning and, at the end, evaluate your competencies together with you and your peers.

These challenges, apart from being attractive, are comprehensive experiences, since they will drive you and your peers to observe reality, map situations, diagnose problems, reflect, dialogue and confront ideas on theories and techniques to solve these problems, while experiencing, designing and producing prototypes and solutions, within a reflective, applicative dynamic in which you can take risks and make mistakes and adjustments to achieve the objective.



- 3 Give a personal touch to your degree program through specialization within or outside your discipline.
- 2 Develop the competencies relevant to your degree through more focused courses and challenges.
- 1 Acquire the basic knowledge of your area, through courses and challenges related to degrees from the area of Bioengineering and Chemical Processes.

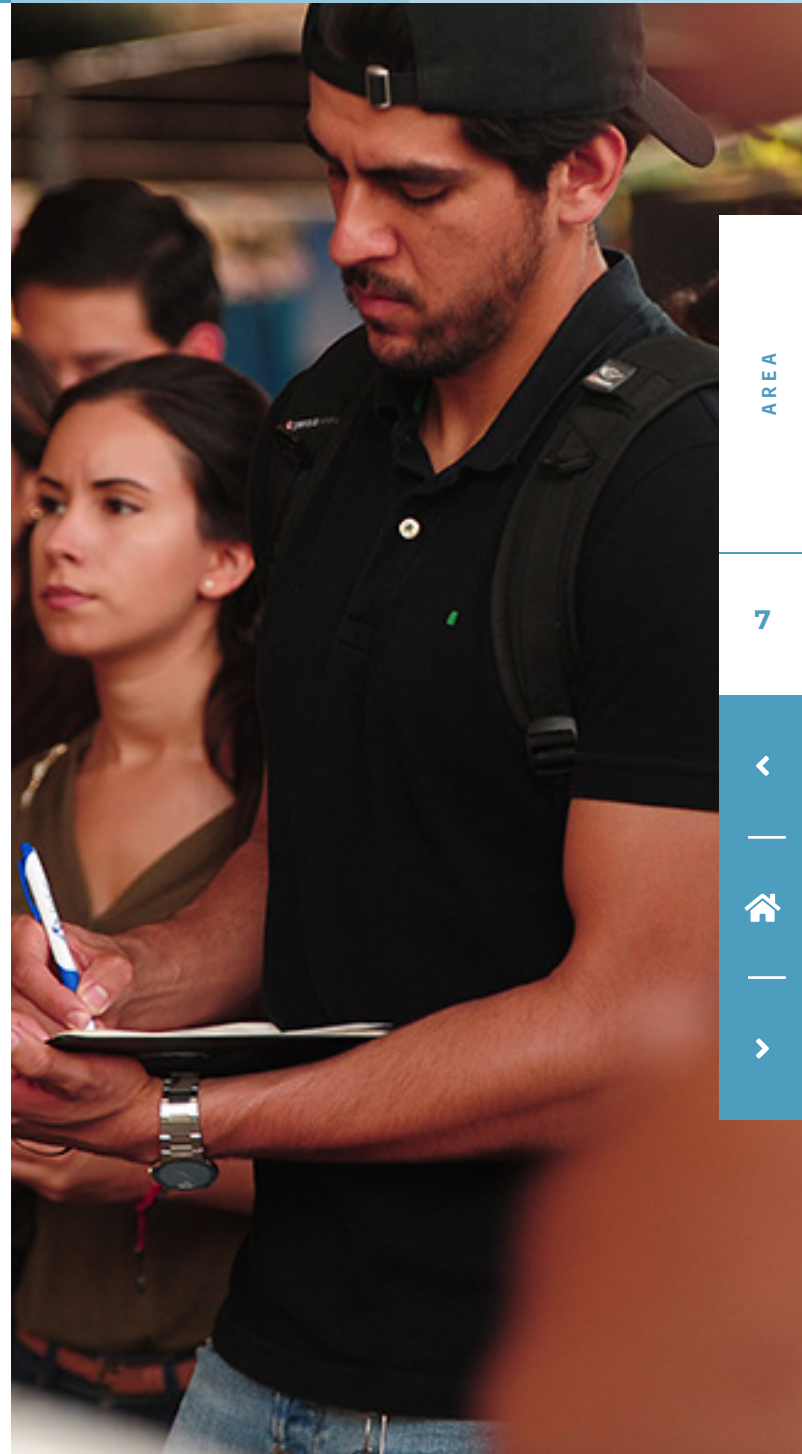
ENGINEERING

A NEW GENERATION

We are living in a time when access to and the application of knowledge is moving at lightning speed, a reality driven largely by engineering professionals.

Engineers trained at Tec have a renewed profile and a forward-looking vision. You will find them grouped together in four tracks or lines of development: Computer Studies and Information Technologies; Innovation and Transformation; Bioengineering; and Chemical Processes and Applied Science. Each track addresses, from its own environment, society's enormous challenges, which require solutions backed by technology-based knowledge.

The Bioengineering and Chemical Processes track is comprised of degree that develop students' competencies for the sustainable appropriation, manipulation and transformation of matter and energy, in order to develop the innovative products and processes required to tackle society's current challenges in the areas of food, energy, the environment, healthcare and quality of life.



The area of Bioengineering and Chemical Processes groups together the following degrees:

- IAL** B.S. in Food Engineering*
- IAG** B.S. in Agricultural Biosystems Engineering*
- IBT** B.S. in Biotechnology Engineering*
- IDS** B.S. in Sustainable Development Engineering*
- IQ** B.S. in Chemical Engineering*



LEARNING THROUGH TEC WEEKS

TEC Weeks, an intensive pause for your comprehensive growth.

Every semester will be interspersed with Tec Weeks, specifically aimed at purposefully developing your competencies for life, such as social intelligence, commitment to ethics and citizenship, communication and entrepreneurship, among others. The better you know yourself, the more you will grow.



IAL

B.S. IN FOOD ENGINEERING

Honoring nature through transformation

The food industry is undergoing unimaginable changes: in the near future, scientists will be exploring new sources of protein and other nutrients and the reuse of byproducts will be the norm, as will 3-D printing of foods. Other forms of production, preservation, storage and distribution will be required. As a Food Engineer, you will play the leading role in history

Food engineers will graduate from Tec de Monterrey with the following competencies:

- Develop foods that will contribute to the treatment and prevention of chronic-degenerative diseases and obesity, respecting consumers' culture and the regulations in effect.
- Assess the efficiency of food preservation and transformation processes based on the principles of sustainability.
- Evaluate the safety of food preservation and transformation processes, in accordance with current national and international standards.
- Design foods for an individual according to dietary restrictions or needs related to special requirements or genetic factors.

WHICH SPECIALIZATIONS ARE AVAILABLE TO YOU?

The educational model enables you to personalize your graduate profile. During the specialization stage, consider a focus based on your post-graduation plans. Tec offers you the means to achieve this through diverse concentrations.

CAREER FIELD

On graduating from Food Engineering, you will be able to work in diverse areas of an organization, such as:

- Fresh food preservation and processed food production
- Innovation and development of beverages and food products
- Quality assurance and production line supervision
- Design of food safety systems
- Administration, logistics and sales in food, beverage and additive processing companies, and in firms that design and build packaging and packing equipment and services
- Food engineering consultancy
- Research centers

Consult the concentrations this degree offers:

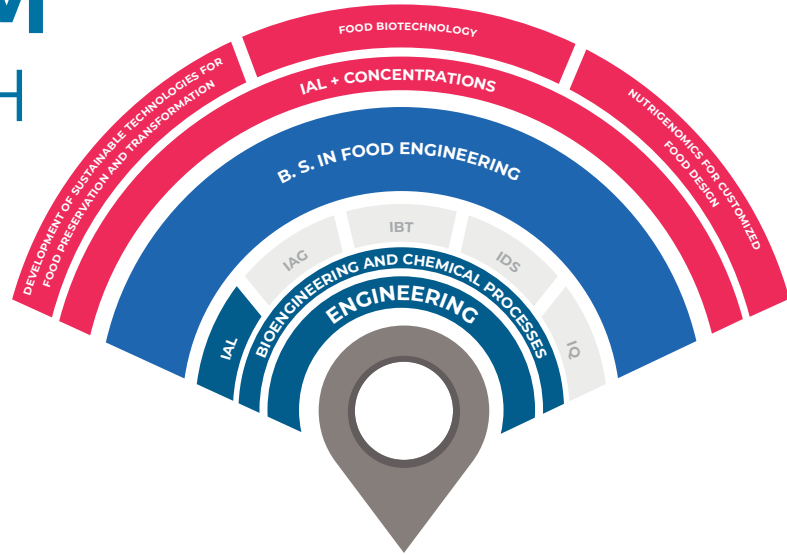


IS THIS RIGHT FOR YOU?

If you are interested in the food industry, experimental engineering as a space for creativity and innovation, and would like to contribute to people's wellbeing, this could be your path.

CURRICULUM

CHOOSE YOUR PATH



DEGREES

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What you need to know about each stage of your curriculum:

Exploration

1. You will open your competency file and add to it throughout your degree program.
2. You will learn the foundations of the area of Engineering - Bioengineering and Chemical Processes.
3. You will participate in fundamental and exploration challenges from the area of Engineering - Bioengineering and Chemical Processes, interacting with peers from different degree programs.
4. You will study general education courses, selecting them from a collection.
5. You will participate in a challenge that integrates all the competencies to be developed in this phase.

Focus

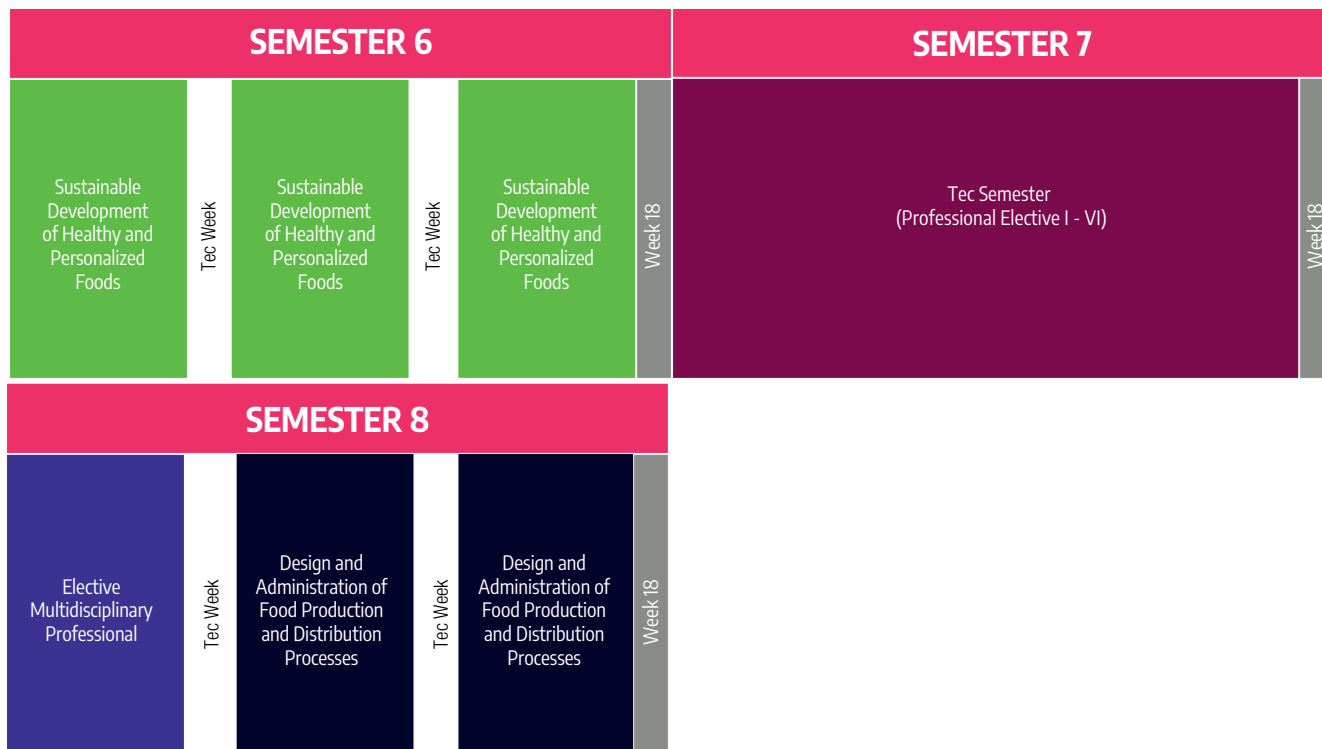
1. You will acquire the core competencies of your degree, in other words, those that distinguish it.
2. You will participate in more focused challenges to reinforce what you have learned and broaden your basic knowledge.
3. You will have the elements to decide whether to deepen your knowledge or diversify and, subsequently, build your specialization plan.
4. The Tec Weeks, challenges and overall university experiences will enrich your file.

Specialization

1. You have decided whether to diversify or delve further into your degree, by choosing a concentration, a modality, an internship stay, to mention just a few of your options. The Tec Semester is a flexible-time space to get started.
2. You will develop the competencies related to your specialization, increasingly connected to your passions, interests and plans.
3. If you decided to opt for a concentration, on graduating you will obtain a professional concentration certificate.

| SEMESTER 1 | | | | | | SEMESTER 2 | | | | | | CHOOSE YOUR PROGRAM | | |
|---|--|--|---|---|---|--|--|--|---|---|--|--|---------------------------|---------------------------|
| Elective Course Mathematics and Science | Elective Course Mathematics and Science | Elective Course Mathematics and Science | Elective Course Humanities and Fine Arts | Elective Course Humanities and Fine Arts | Elective Course Humanities and Fine Arts | Elective Course Mathematics and Science | Elective Course Mathematics and Science | Elective Course Mathematics and Science | Elective Course Humanities and Fine Arts | Elective Course Humanities and Fine Arts | Elective Course Humanities and Fine Arts | | CHOOSE YOUR PROGRAM | |
| Computational Thinking for Engineering | Computational Thinking for Engineering | Analysis of the Structure, Properties and Transformation of Matter | Intermediate Mathematical Modeling | Intermediate Mathematical Modeling | Intermediate Mathematical Modeling | Computational Thinking for Engineering | Computational Thinking for Engineering | Analysis of the Transformation of Matter in Chemical Processes | Chemical Experimentation and Statistical Thinking I | Chemical Experimentation and Statistical Thinking II | Analysis of the Transformation of Matter in Chemical Processes | | | CHOOSE YOUR PROGRAM |
| Mathematical Thinking I | Mathematical Thinking I | Modeling Conservation Laws in Bioengineering and Chemical Processes | Physical Experimentation and Statistical Thinking | Chemical Experimentation and Statistical Thinking I | Chemical Experimentation and Statistical Thinking II | Mathematical Thinking I | Mathematical Thinking I | Modeling of Electromagnetic Systems in Bioengineering and Chemical Processes | Modeling of Electrical Systems in Bioengineering and Chemical Processes | Modeling of Electrical Systems in Bioengineering and Chemical Processes | Modeling of Electromagnetic Systems in Bioengineering and Chemical Processes | | | |
| Engineering and Science Modeling | Motion Modeling in Bioengineering and Chemical Process | | Thermodynamic Modeling in Bioengineering and Chemical Processes | Modeling of Electrical Systems in Bioengineering and Chemical Processes | Modeling of Electrical Systems in Bioengineering and Chemical Processes | Modeling of Electrical Systems in Bioengineering and Chemical Processes | Engineering and Science Modeling | | | | | Motion Modeling in Bioengineering and Chemical Process | | |
| Tec Week | | | Week 18 | | | Tec Week | | | Week 18 | | | CHOOSE YOUR PROGRAM | | |
| SEMESTER 3 | | | | | | SEMESTER 4 | | | | | | | CHOOSE YOUR CONCENTRATION | |
| Elective Course Social and Behavioral Sciences | Elective Course Social and Behavioral Sciences | Elective Course Social and Behavioral Sciences | Elective Course Leadership, Entrepreneurship and Innovation | Elective Course Leadership, Entrepreneurship and Innovation | Elective Course Leadership, Entrepreneurship and Innovation | Elective Course Social and Behavioral Sciences | Elective Course Social and Behavioral Sciences | Elective Course Social and Behavioral Sciences | Elective Course Leadership, Entrepreneurship and Innovation | Elective Course Leadership, Entrepreneurship and Innovation | Elective Course Leadership, Entrepreneurship and Innovation | | | CHOOSE YOUR CONCENTRATION |
| Foundation and Interpretation of Molecular Biology | Application of Chemical Analysis | Experimentation in Analytical Chemistry | Sustainable Design of Food Processes | Optimization of Processes and Safety Systems | Food Design through the Analysis of Physicochemical Changes | Foundation and Interpretation of Molecular Biology | Application of Chemical Analysis | Experimentation in Analytical Chemistry | Sustainable Design of Food Processes | Optimization of Processes and Safety Systems | Food Design through the Analysis of Physicochemical Changes | | | |
| Structural Analysis of Organic Molecules and their Properties | Structural Analysis of Organic Molecules and their Properties | Foundation of the Structure and Properties of Biomolecules | Healthy Food Design | Planning of Food Distribution Systems | Feasibility Evaluation of New Products | Structural Analysis of Organic Molecules and their Properties | Structural Analysis of Organic Molecules and their Properties | Foundation of the Structure and Properties of Biomolecules | Healthy Food Design | Planning of Food Distribution Systems | Feasibility Evaluation of New Products | CHOOSE YOUR CONCENTRATION | | |
| Exploration Topic | Application of the Principles of Conservation of Matter in Chemical and Biological Processes | Application of the Principles of Conservation of Energy to Chemical and Biological Processes | | | | Application of the Principles of Conservation of Matter in Chemical and Biological Processes | Application of the Principles of Conservation of Energy to Chemical and Biological Processes | Application of the Principles of Conservation of Energy to Chemical and Biological Processes | | | | | Exploration Topic | |
| Tec Week | | | Week 18 | | | Tec Week | | | Week 18 | | | | CHOOSE YOUR CONCENTRATION | |
| SEMESTER 5 | | | | | | SEMESTER 6 | | | | | | | | CHOOSE YOUR CONCENTRATION |
| Elective Course Ethics and Citizenship | Elective Course Ethics and Citizenship | Elective Course Ethics and Citizenship | Elective Course Ethics and Citizenship | Elective Course Ethics and Citizenship | Elective Course Ethics and Citizenship | Elective Course Ethics and Citizenship | Elective Course Ethics and Citizenship | Elective Course Ethics and Citizenship | Elective Course Ethics and Citizenship | Elective Course Ethics and Citizenship | Elective Course Ethics and Citizenship | CHOOSE YOUR CONCENTRATION | | |
| Administration of Processes and Safety Systems | Application of Sensory Analysis in Food | Simulation of Food Transformation Processes | Simulation of Food Transformation Processes | Simulation of Food Transformation Processes | Simulation of Food Transformation Processes | Administration of Processes and Safety Systems | Application of Sensory Analysis in Food | Simulation of Food Transformation Processes | Simulation of Food Transformation Processes | Simulation of Food Transformation Processes | Simulation of Food Transformation Processes | | | |
| Design of Sustainable Processes | Consumer Analysis and Food Market | Design of Process Management and Safety Systems | Design of Process Management and Safety Systems | Design of Process Management and Safety Systems | Design of Process Management and Safety Systems | Design of Sustainable Processes | Consumer Analysis and Food Market | Design of Process Management and Safety Systems | Design of Process Management and Safety Systems | Design of Process Management and Safety Systems | Design of Process Management and Safety Systems | | CHOOSE YOUR CONCENTRATION | |
| Tec Week | | | Week 18 | | | Tec Week | | | Week 18 | | | | | CHOOSE YOUR CONCENTRATION |

- General education course
- Area exploration course
- Introductory block (CHALLENGE)
- Area exploration block (CHALLENGE)
- Optional block outside the area (CHALLENGE)
- Global area block (CHALLENGE)
- Disciplinary course
- Disciplinary block (CHALLENGE)
- Disciplinary global block (CHALLENGE)
- TEC Semester
- Multi-disciplinary block (CHALLENGE)
- Final global block (CHALLENGE)



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- Final global block (CHALLENGE)



IAG

B.S. IN AGRICULTURAL BIOSYSTEMS ENGINEERING

Sow your future on fertile land

Overpopulation, climate change and natural resource degradation threaten the population's food security, health and wellbeing. As an Agricultural Biosystems Engineer, you will manage food production systems that use cutting-edge sustainability-oriented technologies. Your training will include the development of competencies for managing productive biosystems that capitalize on sustainable and process enhancement technologies to produce goods and services that comply with international quality and safety standards.

Agricultural Biosystems Engineers will graduate from Tec de Monterrey with the following competencies:

- Integrate the components of a productive biosystem, based on sustainability criteria.
- Manage productive biosystems complying with international quality and safety standards.
- Integrate cutting-edge technologies in the area of productive biosystems.
- Evaluate the use of sustainable technologies in productive biosystems to minimize their environmental impact.

WHICH SPECIALIZATIONS ARE AVAILABLE TO YOU?

The educational model enables you to personalize your graduate profile. During the specialization stage, consider a focus based on your post-graduation plans. Tec offers you the means to achieve this through diverse concentrations.

CAREER FIELD

On graduating, you will be able to work in diverse areas of an organization, such as:

- Leadership and management of agricultural food companies
- Consulting for food production and export firms
- Management of agricultural development centers
- Advisor for advanced production project development
- Owning a technology-based sustainable business
- Research centers
- Productive systems services, input and technology companies
- Financial sector
- Public administration

Consult the concentrations this degree offers:

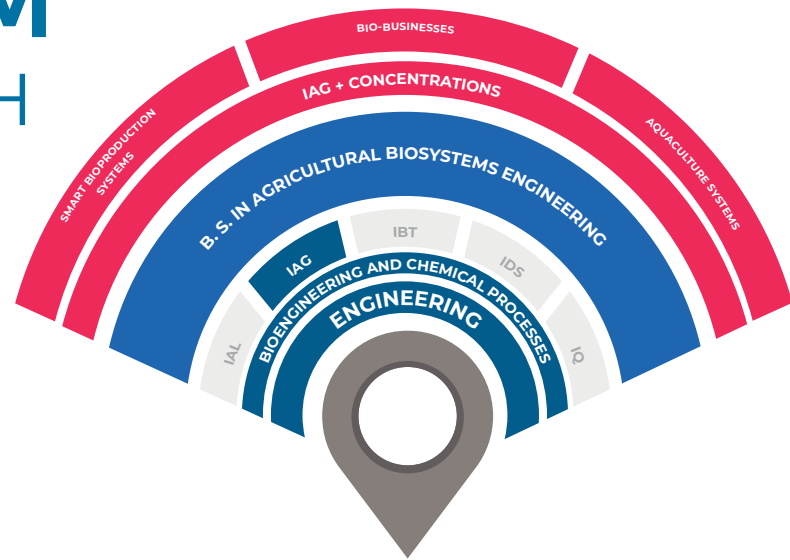


IS THIS RIGHT FOR YOU?

If you are interested in sustainable food production, enjoy working outdoors and want to contribute to people's wellbeing, this could be your path.

CURRICULUM

CHOOSE YOUR PATH



What you need to know about each stage of your curriculum:

Exploration

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3. You will participate in fundamental and exploration challenges from the area of Engineering - Bioengineering and Chemical Processes, interacting with peers from different degree programs.
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5. You will participate in a challenge that integrates all the competencies to be developed in this phase.

Focus

1. You will acquire the core competencies of your degree, in other words, those that distinguish it.
2. You will participate in more focused challenges to reinforce what you have learned and broaden your basic knowledge.
3. You will have the elements to decide whether to deepen your knowledge or diversify and, subsequently, build your specialization plan.
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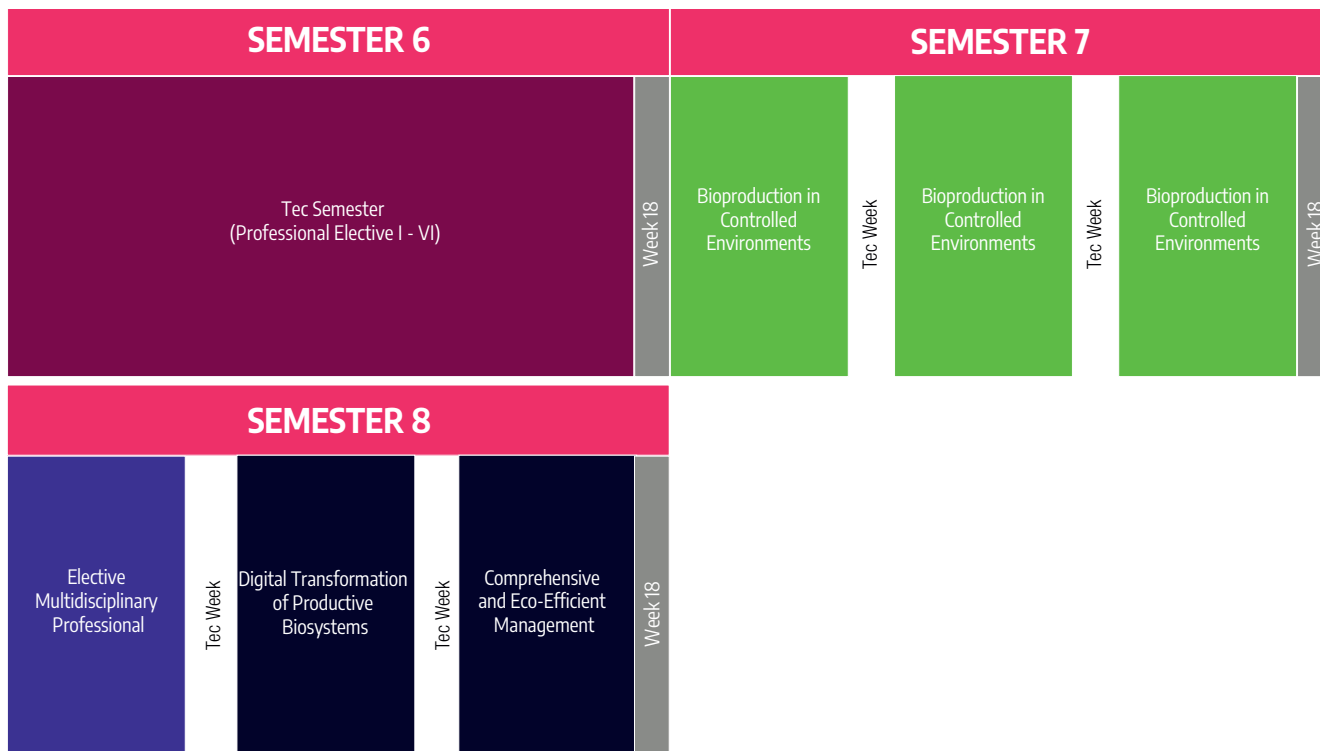
Specialization

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| SEMESTER 1 | | | | SEMESTER 2 | | | | CHOOSE YOUR PROGRAM |
|---|--|--|---|---|--|--|---------|---------------------|
| Elective Course Mathematics and Science | Elective Course Mathematics and Science | Elective Course Mathematics and Science | Tec Week | Elective Course Humanities and Fine Arts | Elective Course Humanities and Fine Arts | Elective Course Humanities and Fine Arts | Week 18 | |
| Computational Thinking for Engineering | Computational Thinking for Engineering | Analysis of the Structure, Properties and Transformation of Matter | | Intermediate Mathematical Modeling | Intermediate Mathematical Modeling | Analysis of the Transformation of Matter in Chemical Processes | | |
| Mathematical Thinking I | Mathematical Thinking I | Modeling Conservation Laws in Bioengineering and Chemical Processes | | Physical Experimentation and Statistical Thinking | Chemical Experimentation and Statistical Thinking I | Chemical Experimentation and Statistical Thinking II | | |
| Engineering and Science Modeling | Motion Modeling in Bioengineering and Chemical Process | | Thermodynamic Modeling in Bioengineering and Chemical Processes | Modeling of Electrical Systems in Bioengineering and Chemical Processes | Modeling of Electromagnetic Systems in Bioengineering and Chemical Processes | | | |
| SEMESTER 3 | | | | SEMESTER 4 | | | | |
| Elective Course Social and Behavioral Sciences | Elective Course Social and Behavioral Sciences | Elective Course Social and Behavioral Sciences | Tec Week | Elective Course Leadership, Entrepreneurship and Innovation | Elective Course Leadership, Entrepreneurship and Innovation | Elective Course Leadership, Entrepreneurship and Innovation | Week 18 | |
| Foundation and Interpretation of Molecular Biology | Application of Chemical Analysis | Experimentation in Analytical Chemistry | | Foundation of Productive Biosystems | Integration of Bioproductive Processes | Management of the Productive Biosystem | | |
| Structural Analysis of Organic Molecules and their Properties | Structural Analysis of Organic Molecules and their Properties | Foundation of the Structure and Properties of Biomolecules | | Analysis of Productive Biosystems | Evaluation of Nutrition and Health in Biosystems | Conservation of Natural Resources in Biosystems | | |
| Exploration Topic | Application of the Principles of Conservation of Matter in Chemical and Biological Processes | Application of the Principles of Conservation of Energy to Chemical and Biological Processes | | | | | | |
| SEMESTER 5 | | | CHOOSE YOUR CONCENTRATION | | | | | |
| Elective Course Ethics and Citizenship | Elective Course Ethics and Citizenship | Elective Course Ethics and Citizenship | | | | | | |
| Productivity Evaluation | Advanced Production Management | Application of Metrology in Productive Biosystems | | | | | | |
| Improvement of Biosystems with Genetics and Biotechnology | Development of Control and Automation Elements in Biosystems | Integration of Sustainable Technologies in Biosystems | | | | | | |

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- Final global block (CHALLENGE)

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IBT

B.S. IN BIOTECHNOLOGY ENGINEERING

Science provides solutions

Biotechnology is one of the most transcendent and important scientific fields, since it focuses on the application of technology in processes that use biological systems to create innovative solutions in a wide range of sectors, such as pharmaceuticals, food, healthcare, agriculture, environment, energy, among others. As a Biotechnology Engineer, you will be able to create or modify biotechnological products, services and processes that address the needs of all these sectors, focusing constantly on human and environmental wellbeing.

A Biotechnology Engineer will graduate from Tec de Monterrey with the following competencies:

- Develop technologies and biosystems using biological or molecular data based on the needs of industry and society.
- Design bioreactors with the capacity to support the specific needs of cells in the generation of products of interest.
- Design purification processes for biotechnological products based on market specifications and the principles of sustainability.
- Generate biotechnology knowledge and innovation management strategies aimed at creating and enhancing technology-based products, services or companies.

WHICH SPECIALIZATIONS ARE AVAILABLE TO YOU?

The educational model enables you to personalize your graduate profile. During the specialization stage, consider a focus based on your post-graduation plans. Tec offers you the means to achieve this through diverse concentrations.

Consult the concentrations this degree offers:



tec.mx/ibt

CAREER FIELD

On graduating, you will be able to work in diverse areas, such as:

- Innovation and development of biotechnological products and processes in the pharmaceutical, and food and beverage industries, and the agricultural and environmental sectors
- Quality assurance and production line supervision in the pharmaceutical, and food and beverage industries, and the agricultural and environmental sectors
- Biotechnology-based entrepreneurship in the area of food and beverages, pharmaceuticals, agriculture and the environment
- Technological innovation and development in public and private research centers

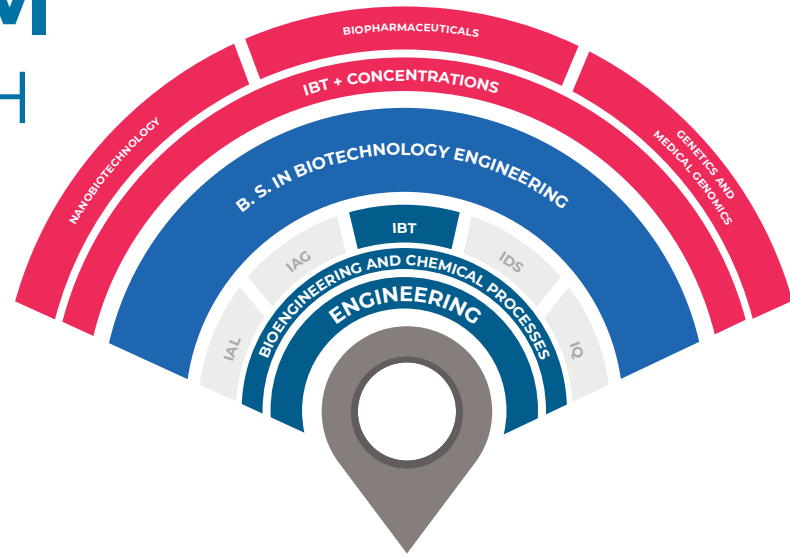
IS THIS RIGHT FOR YOU?

If you want to contribute to the wellbeing of humanity and the planet, and you are also passionate about technology, this could be your path.



CURRICULUM

CHOOSE YOUR PATH



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Exploration

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| Computational Thinking for Engineering | Computational Thinking for Engineering | Analysis of the Structure, Properties and Transformation of Matter | Intermediate Mathematical Modeling | Intermediate Mathematical Modeling | Analysis of the Transformation of Matter in Chemical Processes | | |
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| Elective Course Social and Behavioral Sciences | Elective Course Social and Behavioral Sciences | Elective Course Social and Behavioral Sciences | Elective Course Leadership, Entrepreneurship and Innovation | Elective Course Leadership, Entrepreneurship and Innovation | Elective Course Leadership, Entrepreneurship and Innovation | | WEEK 18 |
| Foundation and Interpretation of Molecular Biology | Application of Chemical Analysis | Foundation of the Structure and Properties of Biomolecules | Analysis and Study of Biosystems | Foundation and Application of Molecular Bases | Foundation and Application of Molecular Bases | | |
| Structural Analysis of Organic Molecules and their Properties | Structural Analysis of Organic Molecules and their Properties | Experimentation in Analytical Chemistry | Preparation of Biotechnological Products | Synthesis of Biofactories | Synthesis of Biofactories | | |
| Exploration Topic | Application of the Principles of Conservation of Matter in Chemical and Biological Processes | Application of the Principles of Conservation of Energy in Chemical and Biological Processes | | | | | |
| SEMESTER 5 | | | CHOOSE YOUR CONCENTRATION | | | | |
| Elective Course Ethics and Citizenship | Elective Course Ethics and Citizenship | Elective Course Ethics and Citizenship | CHOOSE YOUR CONCENTRATION | | | WEEK 18 | |
| Modeling Transport Phenomena | Modeling Transport Phenomena | Modeling Transport Phenomena | | | | | |
| In Vitro experimentation | In Vitro experimentation | Integration of Transfer Operations | | | | | |

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- Final global block (CHALLENGE)



DEGREES

IDS

B.S. IN SUSTAINABLE DEVELOPMENT ENGINEERING

Technologies to support the world

In a world in which industry and society demand more actions, solutions and innovations to improve the quality of life of the current and future generations, there is a growing need for new technologies and strategies that will reduce the impact of human activities on the planet.

A Sustainable Development Engineer will graduate from Tec de Monterrey with the following competencies:

- Design energy processes of diverse scales based on the principles of sustainability.
- Improve productive processes across the value chain, favoring the efficient use of natural and energy resources.
- Evaluate the availability and restitution of natural resources, generating management alternatives that will favor the creation of business models.
- Design innovative corporate sustainability strategies using state-of-the-art methodologies.

WHICH SPECIALIZATIONS ARE AVAILABLE TO YOU?

The educational model enables you to personalize your graduate profile. During the specialization stage, consider a focus based on your post-graduation plans. Tec offers you the means to achieve this through diverse concentrations.

Consult the concentrations this degree offers:



CAREER FIELD

On graduating from Food Engineering, you will be able to work in diverse areas of an organization, such as:

- Energy sector in areas of energy efficiency, clean technology and renewable energies
- Energy, environmental and natural resource management consulting
- Public and private corporate sustainability sector in the areas of social responsibility and circular economy
- Technological research and development centers

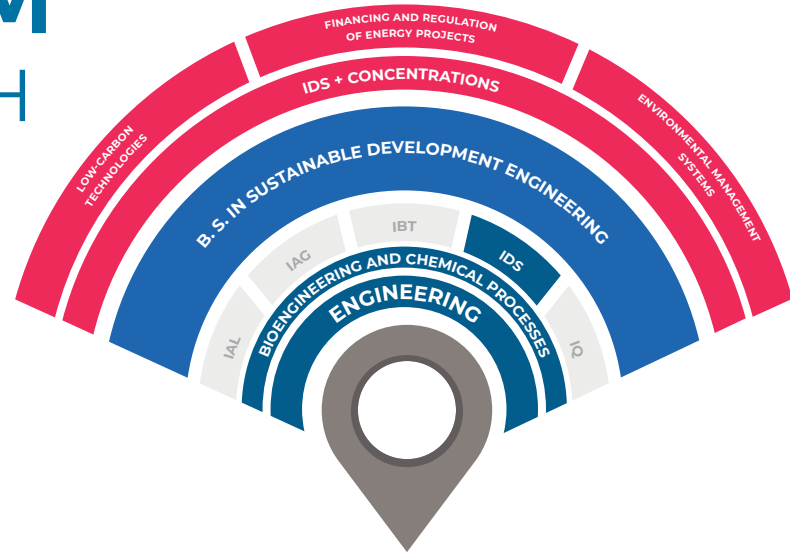
IS THIS RIGHT FOR YOU?

If you are passionate about clean technologies, interested in incorporating innovative solutions to global problems, are environmentally aware and can envisage a prosperous future, then this is the right degree for you.



CURRICULUM

CHOOSE YOUR PATH



What you need to know about each stage of your curriculum:

Exploration

1. You will open your competency file and add to it throughout your degree program.
2. You will learn the foundations of the area of Engineering - Bioengineering and Chemical Processes.
3. You will participate in fundamental and exploration challenges from the area of Engineering - Bioengineering and Chemical Processes, interacting with peers from different degree programs.
4. You will study general education courses, selecting them from a collection. You will participate in a challenge that integrates all the competencies to be developed in this phase.

Focus

1. You will acquire the core competencies of your degree, in other words, those that distinguish it.
2. You will participate in more focused challenges to reinforce what you have learned and broaden your basic knowledge.
3. You will have the elements to decide whether to deepen your knowledge or diversify and, subsequently, build your specialization plan.
4. The Tec Weeks, challenges and overall university experiences will enrich your file.

Specialization

1. You have decided whether to diversify or delve further into your degree, by choosing a concentration, a modality, an internship stay, to mention just a few of your options. The Tec Semester is a flexible-time space to get started.
2. You will develop the competencies related to your specialization, increasingly connected to your passions, interests and plans.
3. If you decided to opt for a concentration, on graduating you will obtain a professional concentration certificate.

| SEMESTER 1 | | | SEMESTER 2 | | | CHOOSE YOUR PROGRAM | |
|---|--|--|---|---|--|---------------------------|---------|
| Elective Course Mathematics and Science | Elective Course Mathematics and Science | Elective Course Mathematics and Science | Elective Course Humanities and Fine Arts | Elective Course Humanities and Fine Arts | Elective Course Humanities and Fine Arts | | Week 18 |
| Computational Thinking for Engineering | Computational Thinking for Engineering | Analysis of the Structure, Properties and Transformation of Matter | Intermediate Mathematical Modeling | Intermediate Mathematical Modeling | Analysis of the Transformation of Matter in Chemical Processes | | |
| Mathematical Thinking I | Mathematical Thinking I | Modeling Conservation Laws in Bioengineering and Chemical Processes | Physical Experimentation and Statistical Thinking | Chemical Experimentation and Statistical Thinking I | Chemical Experimentation and Statistical Thinking II | | |
| Engineering and Science Modeling | Motion Modeling in Bioengineering and Chemical Process | | Thermodynamic Modeling in Bioengineering and Chemical Processes | Modeling of Electrical Systems in Bioengineering and Chemical Processes | Modeling of Electromagnetic Systems in Bioengineering and Chemical Processes | | |
| SEMESTER 3 | | | SEMESTER 4 | | | CHOOSE YOUR CONCENTRATION | |
| Elective Course Social and Behavioral Sciences | Elective Course Social and Behavioral Sciences | Elective Course Social and Behavioral Sciences | Elective Course Leadership, Entrepreneurship and Innovation | Elective Course Leadership, Entrepreneurship and Innovation | Elective Course Leadership, Entrepreneurship and Innovation | | Week 18 |
| Evaluation of Natural Capital and Sustainability Principles | Engineering Modeling Using Dynamic Systems | Engineering Modeling Using Dynamic Systems | Thermodynamic Foundation of Energy Processes | Analysis and Design of Processes Based on Momentum Transfer | Analysis and Design of Processes Based on Heat Transfer | | |
| Structural Analysis of Organic Molecules and their Properties | Structural Analysis of Organic Molecules and their Properties | Analysis of Electrical circuits | Implementation of Resource Management Programs | Implementation of Resource Management Programs | Sizing of Energy Processes | | |
| Implementation of Resource Management Programs | Application of the Integrated Principles of Energy Conversion of Matter in Chemical and Biological Processes | Application of the Sizing Principles of Energy Conversion of Matter in Chemical and Biological Processes | | | | | |
| SEMESTER 5 | | | CHOOSE YOUR CONCENTRATION | | | | |
| Elective Course Ethics and Citizenship | Elective Course Ethics and Citizenship | Elective Course Ethics and Citizenship | CHOOSE YOUR CONCENTRATION | | | | |
| Application of the Principles of Energy Efficiency | Application of the Principles of Energy Efficiency | Analysis of Processes and Circular Economy | | | | | |
| Evaluation of Energy Processes | Evaluation of Energy Processes | Energy Performance Evaluation of Industrial Processes | | | | | |

Navigation icons: back, home, forward

- General education course
- Area exploration course
- Introductory block (CHALLENGE)
- Area exploration block (CHALLENGE)
- Optional block outside the area (CHALLENGE)
- Global area block (CHALLENGE)
- Disciplinary course
- Disciplinary block (CHALLENGE)
- Disciplinary global block (CHALLENGE)
- TEC Semester
- Multi-disciplinary block (CHALLENGE)
- Final global block (CHALLENGE)



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IQ

B.S. IN CHEMICAL ENGINEERING

Action-reaction: that's the formula

We are constantly surrounded by chemical processes that we didn't even know existed. As a Chemical Engineer, you will be responsible for designing, operating and improving chemical processes for producing the materials used in manufacturing the majority of the products we use every day.

A Chemical Engineer will graduate from Tec de Monterrey with the following competencies:

- Design chemical processes based on the principles of sustainability in the use of material and energy resources.
- Improve chemical processes through engineering analysis and systemic thinking.
- Integrate technologies in chemical processes based on quality, efficiency and safety parameters.
- Develop business plans in the chemical industry, considering market opportunities.

WHICH SPECIALIZATIONS ARE AVAILABLE TO YOU?

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Consult the concentrations this degree offers:



CAREER FIELD

Thanks to the integral education you will receive in this degree, on graduating you will be able to work in diverse activities:

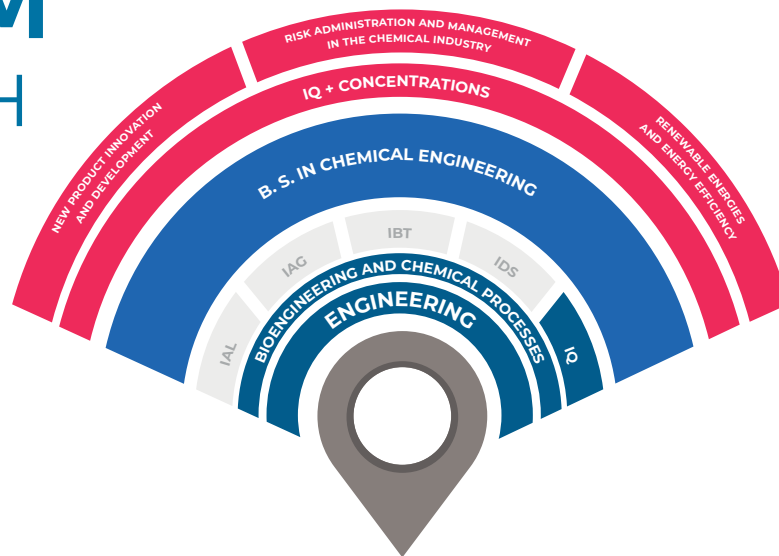
- In the industrial sector industrial, as a process engineer in charge of manufacturing chemical products such as drugs, plastics, fertilizers, food additives, petroleum derivatives, among many others.
- In the design and enhancement of productive processes for the chemical industry.
- As the person responsible for environmental and safety aspects in industry
- In the service sector as a consultant for the application of process technologies and specialized chemical products.
- In the areas of innovation and development in companies from the chemical sector.
- As an entrepreneur, creating your own company in the area of chemical products or specialized technical services for the chemical industry.

IS THIS RIGHT FOR YOU?

If you are curious and analytical, are passionate about fields such as chemistry, physics and informatics, are interested in developing new technological advancements and want to contribute to a sustainable future, this is the degree for you.

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|--|--|--|---|---|---|--|--|---------------------|
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| Mathematical Thinking I | Mathematical Thinking I | Tec Week | Physical Experimentation and Statistical Thinking | Chemical Experimentation and Statistical Thinking I | Chemical Experimentation and Statistical Thinking II | Week 18 | | |
| Engineering and Science Modeling | Motion Modeling in Bioengineering and Chemical Process | | Modeling Conservation Laws in Bioengineering and Chemical Processes | Thermodynamic Modeling in Bioengineering and Chemical Processes | Modeling of Electrical Systems in Bioengineering and Chemical Processes | | Modeling of Electromagnetic Systems in Bioengineering and Chemical Processes | |
| SEMESTER 3 | | | | SEMESTER 4 | | | | |
| Elective Course Social and Behavioral Sciences | Elective Course Social and Behavioral Sciences | Elective Course Social and Behavioral Sciences | Tec Week | Elective Course Leadership, Entrepreneurship and Innovation | Elective Course Leadership, Entrepreneurship and Innovation | Elective Course Leadership, Entrepreneurship and Innovation | Week 18 | |
| Foundation and Interpretation of Molecular Biology | Application of Chemical Analysis | Experimentation in Analytical Chemistry | | Modeling of Processes Based on Transport Phenomena | Modeling of Processes Based on Transport Phenomena | Modeling of Processes Based on Transport Phenomena | | |
| Structural Analysis of Organic Molecules and their Properties | Structural Analysis of Organic Molecules and their Properties | Foundation of the Structure and Properties of Biomolecules | Tec Week | Design of Fluid Flow Systems | Design of Systems for Heat Transfer | Analysis of Integrated Systems of Fluid Flow and Heat Transfer | | |
| Exploration Topic | Application of the Principles of Conservation of Matter in Chemical and Biological Processes | Application of the Principles of Conservation of Energy to Chemical and Biological Processes | | | | | | |
| SEMESTER 5 | | | CHOOSE YOUR CONCENTRATION | | | | | |
| Elective Course Ethics and Citizenship | Elective Course Ethics and Citizenship | Elective Course Ethics and Citizenship | | | | | | |
| Prediction of the Equilibrium of Phases and Chemical Equilibrium Applying Thermodynamics | Prediction of the Equilibrium of Phases and Chemical Equilibrium Applying Thermodynamics | Prediction of the Equilibrium of Phases and Chemical Equilibrium Applying Thermodynamics | | | | | | |
| Design of Separation Processes | Design of Chemical Reactors | Analysis of Integrated Separation and Reaction Processes | Week 18 | | | | | |

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- Disciplinary block (CHALLENGE)
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ENGINEERING

BIOENGINEERING AND CHEMICAL PROCESSES

With the Engineering entry, you have the option of moving throughout your undergraduate studies to the campus that offers the specialization you would like to pursue.

| | Entry Campuses for the area of ENGINEERING | Campuses where you can enter and graduate from the corresponding degrees | | | | |
|------------------|--|--|------------|------------|------------|-----------|
| | | IAL | IAG | IBT | IDS | IQ |
| Aguascalientes | ● | | | | | |
| Chiapas | ● | | | | | |
| Chihuahua | ● | | | ● | | |
| Ciudad de México | ● | | | ● | ● | |
| Ciudad Juárez | ● | | | | | |
| Cuernavaca | ● | | | | ● | |
| Estado de México | ● | | | ● | | ● |
| Guadalajara | ● | | | ● | | |
| Hidalgo | ● | | | | | |
| Irapuato | ● | | | | | |
| Laguna | ● | | | | | |
| León | ● | | | | | |
| Monterrey | ● | ● | | ● | ● | ● |
| Morelia | ● | | | | | |
| Obregón | ● | | | | | |
| Puebla | ● | | | ● | ● | |
| Querétaro | ● | ● | ● | ● | ● | |
| Saltillo | ● | | | | | |
| San Luis Potosí | ● | | | | | |
| Santa Fe | ● | | | | ● | |
| Sinaloa | ● | | | | | |
| Sonora Norte | ● | | | | | |
| Tampico | ● | | | | | |
| Toluca | ● | | | ● | | |
| Zacatecas | ● | | | | | |

UNLEASH YOUR POTENTIAL TO TRANSFORM

At Tecnológico de Monterrey we're looking for students willing to be better for the benefit of others, people with the humility and courage to challenge paradigms, with the ambition to improve, who embrace the most advanced technical knowledge, and with an ethical and humanistic profile, who dare to go forward, more willing to be than to have.

For further information on the degrees from the area of Engineering - Bioengineering and Chemical Processes, go to:

