



ENGINEERING

COMPUTER STUDIES AND INFORMATION TECHNOLOGIES



Tecnológico
de Monterrey



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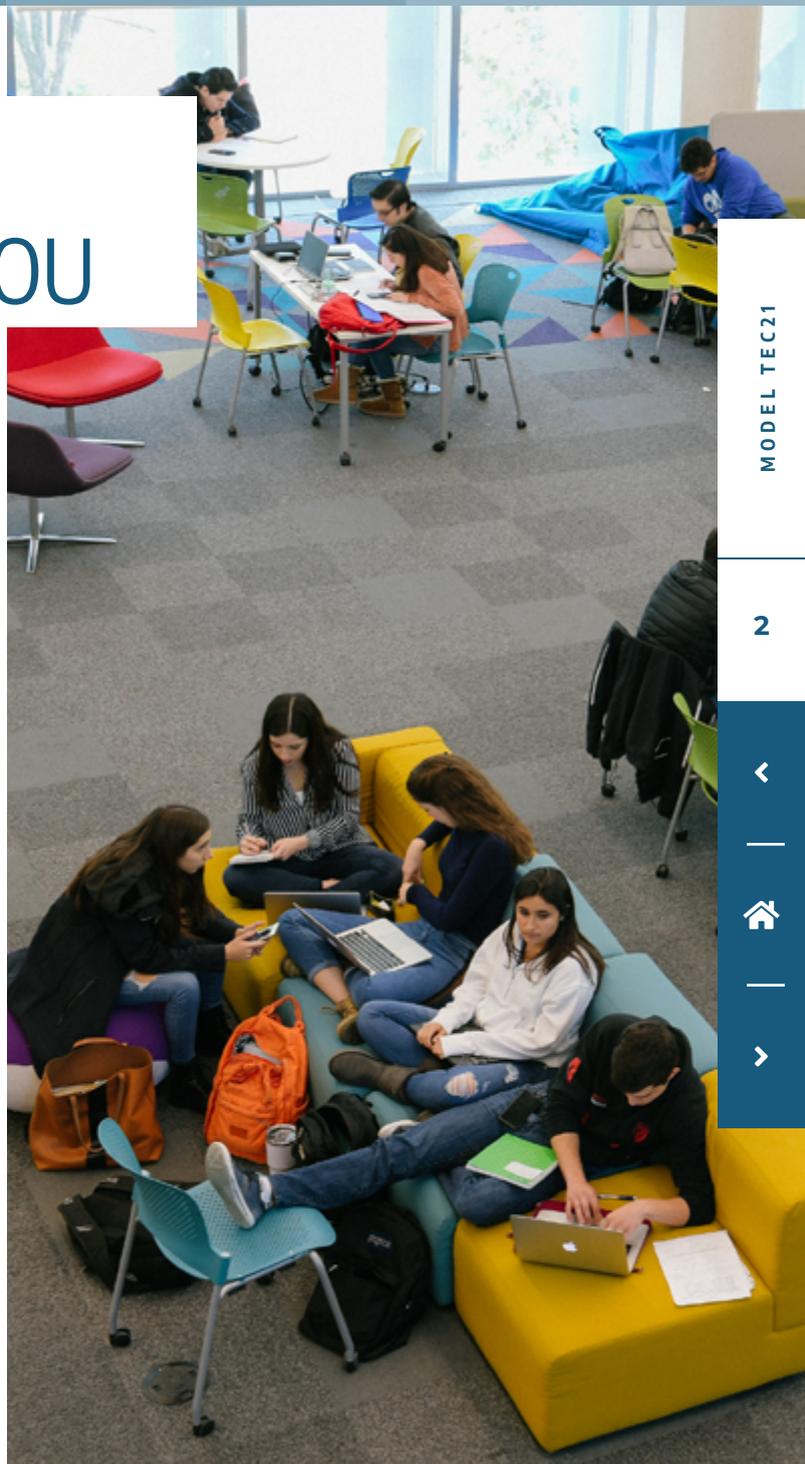
MODEL TEC21 TEC CHALLENGES YOU

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 Engineering 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.

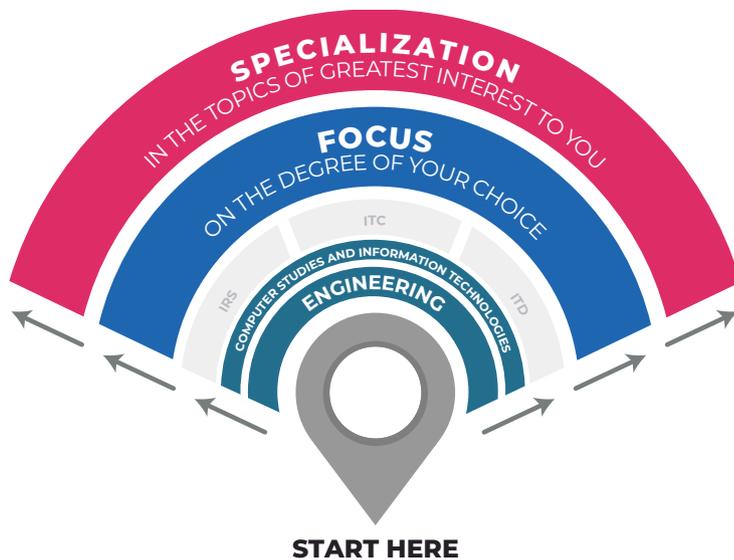


YOU USED TO CHOOSE A DEGREE, NOW YOU CHOOSE A PATH

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 Engineering - Computer Studies and Information Technologies.

ENGINEERING A NEW GENERATION

Look back and you will see that humanity's great advancements are linked to the development of science and technology. This is also true today, since we are living in an era of access to and application of knowledge that is moving at lightning speed. Professional engineers continue to play a fundamental role in the construction of a world that rewrites and reinvents to generate wellbeing, enhance coexistence between people and safeguard our relationship with the environment.

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 program addresses, from its own environment, society's enormous challenges, which require solutions backed by technology-based knowledge.

The integration of technology in every facet of our daily activities is becoming increasingly common. In addition, information, software and robotics have contributed to improving our quality of life. Therefore the Computer Studies and Information Technologies track, within the area of Engineering, groups together the degrees that generate value through the development of applications the design and programming of smart devices, and the strategic integration of information technologies.



The Computer Studies and Information Technologies track groups together the following degrees:

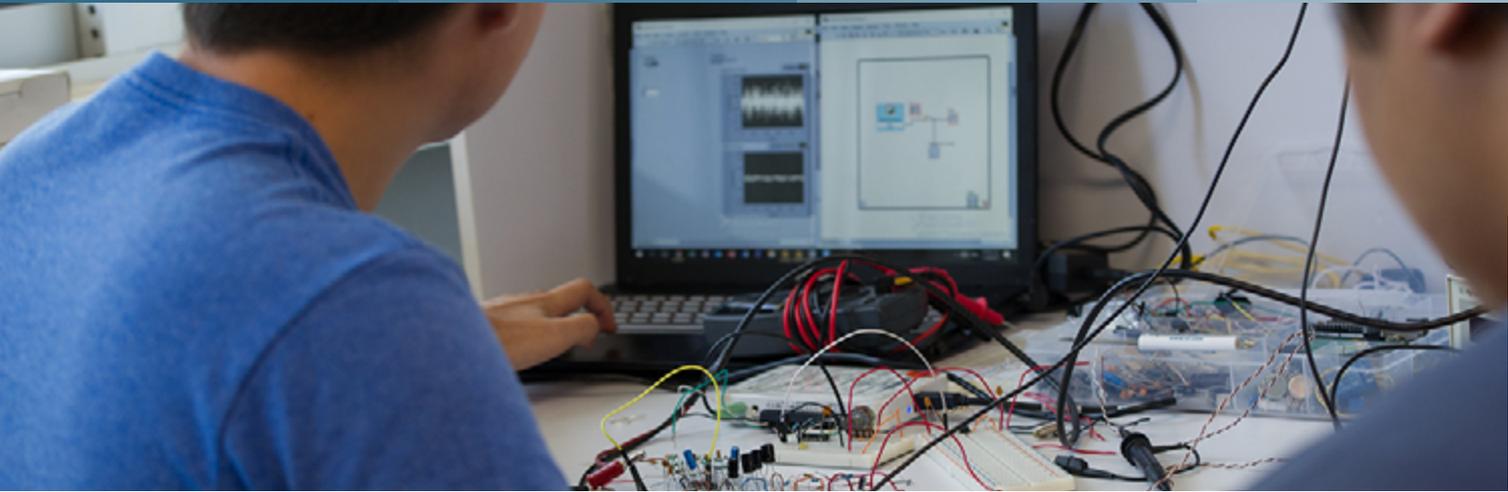
- IRS** B.S. in Robotics and Digital Systems
- ITC** B.S. in Computer Science and Technology
- ITD** B.S. in Digital Business Transformation



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.



IRS

B.S. IN ROBOTICS AND DIGITAL SYSTEMS

The intelligence behind machines

Since the Industrial Revolution, we have witnessed how humans have incorporated machines more and more into their daily lives. This upward trend continues with the presence of robots in industrial, service and human-support sectors. We need more young people who are willing to work on new electronic and robotic devices, in order to continue to create solutions for the good of society.

Robotics and Digital Systems Engineers will graduate from Tec de Monterrey with the following competencies:

- Develop embedded systems that meet quality, security and performance standards.
- Develop the intelligent components that make it possible for robots to be autonomous with adaptation capabilities to solve problems.
- Create hardware and software interfaces that enable intelligent interaction between digital devices and/or humans.
- Create intelligent robotic systems for general and specific use to facilitate tasks in uncertain environments and under strict security and performance standards.

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 Robotics and Digital Systems, you will be able to work in diverse areas of an organization, such as:

- Design and implementation of digital systems
- Development of intelligent robot components
- Desarrollo of embedded systems for specific applications
- Creation of interfaces for intelligent interaction between digital devices and/or humans
- New technology research and development centers
- Systems management and/or consulting
- Development of intelligent digital robot systems

To see the latest version of the curriculum visit:



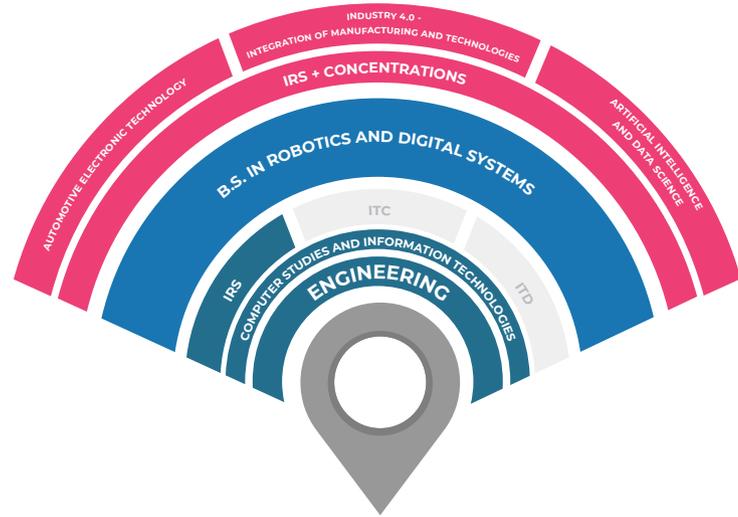
tec.mx/irs

IS THIS RIGHT FOR YOU?

If you are passionate about finding out how things work in order to innovate and create new technologies, and you like mathematics and physics, then this is the place for you.

CURRICULUM

CHOOSE YOUR PATH



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

Exploration

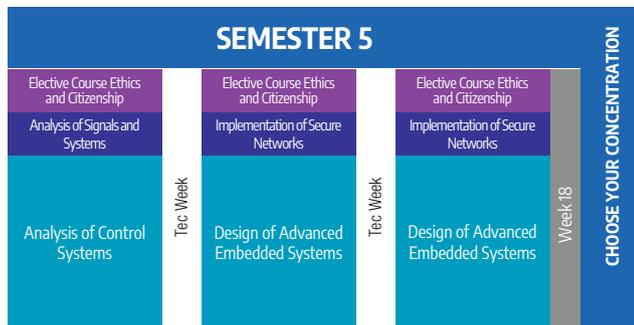
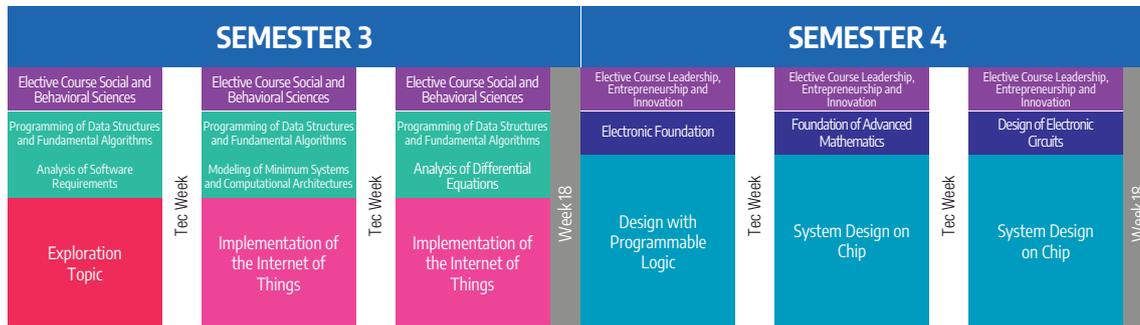
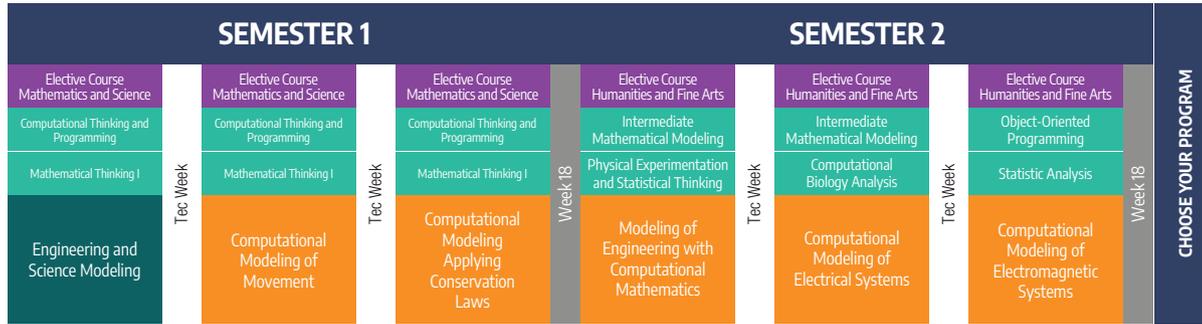
1. You will open your competency file and add to it throughout your degree program.
2. You will learn the foundations of the area of Engineering - Computer Studies and Information Technologies.
3. You will participate in fundamental and exploration challenges from the area of Engineering - Computer Studies and Information Technologies, 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

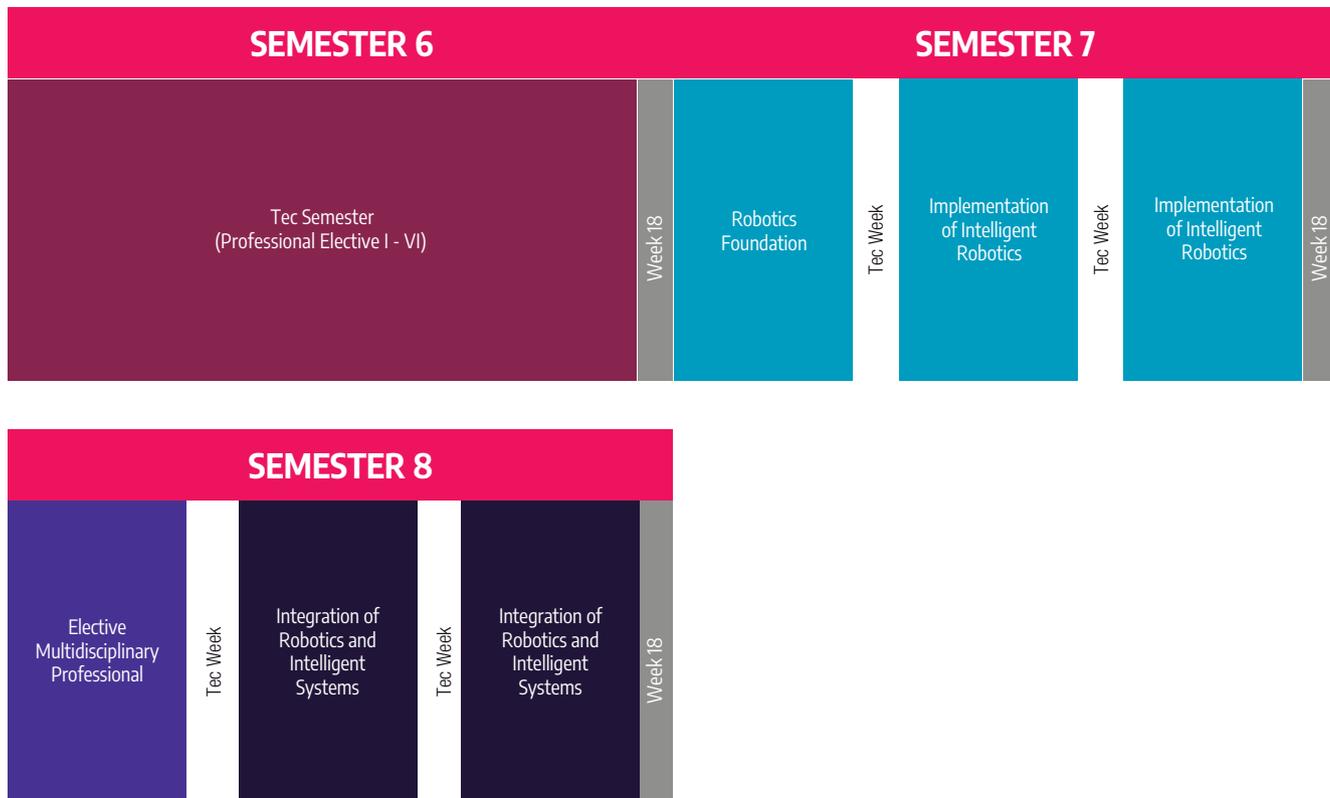
1. You will acquire the core competencies of your degree, in other words, those that distinguish it.
2. You will participate in more focused challenges to reinforce what you have learned and broaden your basic knowledge.
3. You will have the elements to decide whether to deepen your knowledge or diversify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

Specialization

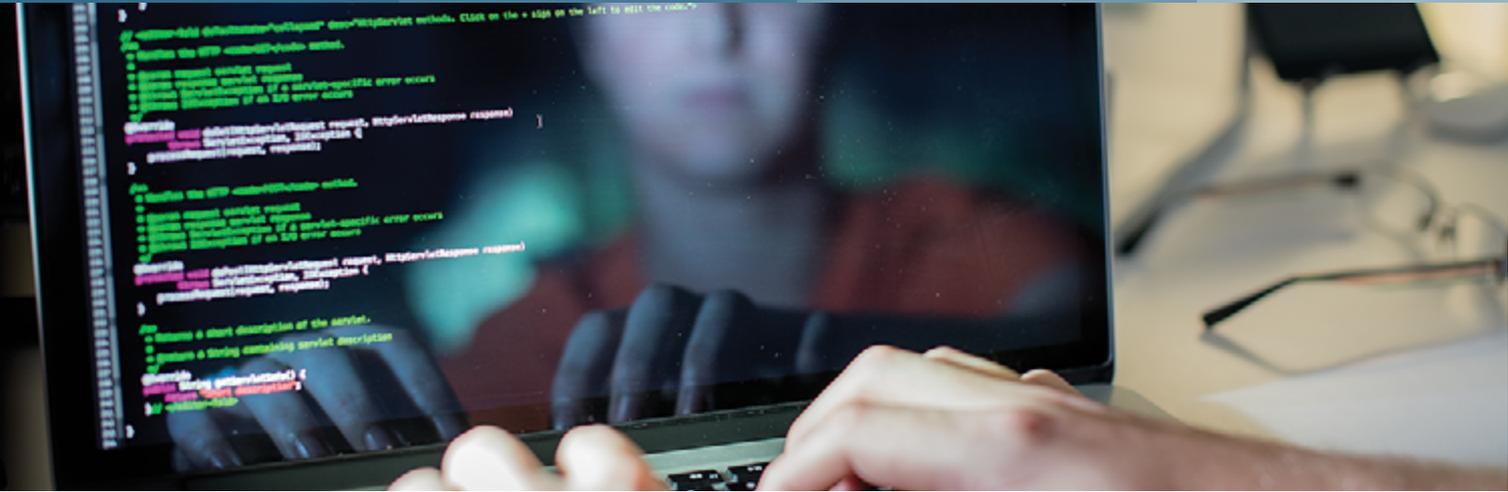
1. You have decided whether to diversify or delve further into your degree, by choosing a concentration, a modality, an internship stay, to mention just a few of your options. The Tec Semester is a flexible-time space to get started.
2. You will develop the competencies related to your specialization, 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.



- General education course
- Optional block outside the area (CHALLENGE)
- Tec Semester
- Area exploration course
- Disciplinary course
- Multi-disciplinary block (CHALLENGE)
- Introductory block (CHALLENGE)
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ITC

B.S. IN COMPUTER SCIENCE AND TECHNOLOGY ENGINEERING

The intelligence behind machines

Since the Industrial Revolution, we have witnessed how humans have incorporated machines more and more into their daily lives. This upward trend continues with the presence of robots in industrial, service and human-support sectors. We need more young people who are willing to work on new electronic and robotic devices, in order to continue to create solutions for the good of society.

Computer Science and Technology Engineers will graduate from Tec de Monterrey with the following competencies:

- Solve problems by generating efficient computer algorithms with computer science models and tools.
- Develop software, applying the software engineering process and quality standards.
- Implement cutting-edge computer infrastructure that meets the needs of interconnection, operation and security informatics.

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:

- Software development and design
- Management and/or consulting in computer technologies, information technologies or data security
- Creation of interactive applications using virtual reality and augmented reality
- Videogame programming
- Design and implement computer networks for companies
- Conduct applied research on new technologies in innovation projects

To see the latest version of the curriculum visit:



tec.mx/itc

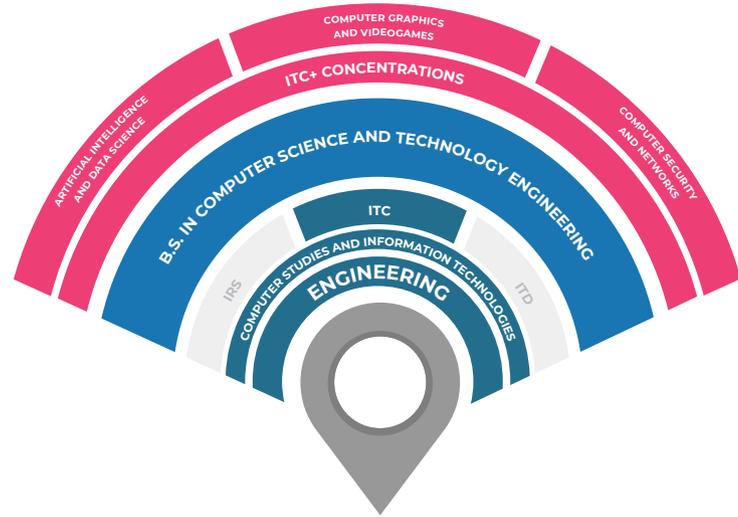
IS THIS RIGHT FOR YOU?

If you are passionate about computers and technology and think about creating new programs, apps or solutions that integrate gadgets, this is your path.



CURRICULUM

CHOOSE YOUR PATH



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

Exploration

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Focus

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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 Humanities and Fine Arts		
Computational Thinking and Programming	Computational Thinking and Programming	Computational Thinking and Programming	Intermediate Mathematical Modeling	Intermediate Mathematical Modeling	Object-Oriented Programming	Object-Oriented Programming		
Mathematical Thinking I	Mathematical Thinking I	Mathematical Thinking I	Physical Experimentation and Statistical Thinking	Computational Biology Analysis	Statistic Analysis	Statistic Analysis		
Engineering and Science Modeling	Computational Modeling of Movement	Computational Modeling Applying Conservation Laws	Modeling of Engineering with Computational Mathematics	Computational Modeling of Electrical Systems	Computational Modeling of Electromagnetic Systems	Computational Modeling of Electromagnetic Systems		
	Tec Week		Week 18				Week 18	

SEMESTER 3				SEMESTER 4			
Elective Course Social and Behavioral Sciences	Elective Course Social and Behavioral Sciences	Elective Course Social and Behavioral Sciences	Elective Course Leadership, Entrepreneurship and Innovation				
Programming of Data Structures and Fundamental Algorithms	Programming of Data Structures and Fundamental Algorithms	Programming of Data Structures and Fundamental Algorithms	Implementation of Computational Methods				
Analysis of Software Requirements	Modeling of Minimum Systems and Computational Architectures	Analysis of Differential Equations	Software Construction and Decision Making	Software Construction and Decision Making	Software Construction and Decision Making	Device Interconnection	
Exploration Topic	Implementation of the Internet of Things	Implementation of the Internet of Things					
	Tec Week		Week 18				Week 18

SEMESTER 5			
Elective Course Ethics and Citizenship	Elective Course Ethics and Citizenship	Elective Course Ethics and Citizenship	CHOOSE YOUR CONCENTRATION
Analysis and Design of Advanced Algorithms	Analysis and Design of Advanced Algorithms	Analysis and Design of Advanced Algorithms	
Integration of Computer Security in Networks and Software Systems	Integration of Computer Security in Networks and Software Systems	Modeling of Multi-Agent Systems with Computer Graphics	
	Tec Week		
		Week 18	

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ITD

B.S. IN DIGITAL BUSINESS TRANSFORMATION ENGINEERING

Transforming business with technology

Traditional businesses are transforming and entrepreneurs, with the support of emergent technologies, are finding new ways of enhancing the efficiency and quality of their processes. As a Digital Business Transformation Engineer, you will learn everything you need to know to incorporate technology in diverse industries to ensure that they reach their full potential.

Digital Business Transformation Engineers will graduate from Tec de Monterrey with the following competencies:

- Integrate IT solutions in organizational business processes, consistent with the strategic vision and driving value generation.
- Develop data, information and knowledge flow and governance strategies in an organization, supporting process improvement and strategic decision making.
- Develop digital transformation projects in organizations applying innovative, effective methodologies for managing change and service integration, among others.

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:

- Integrate of IT solutions in business processes
- Development of data and information management strategies in an organization
- Generation of strategies for incorporating digital technologies to create, capture and deliver business value
- Technology and information security management and/or consulting

To see the latest version of the curriculum visit:



tec.mx/itd

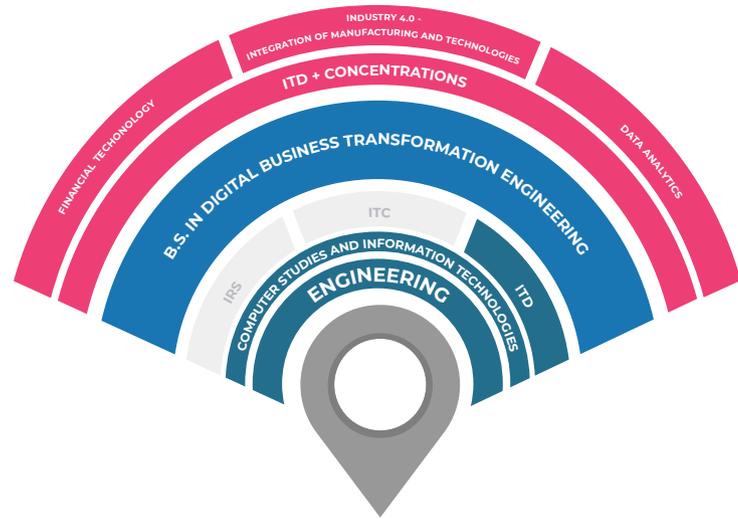
IS THIS RIGHT FOR YOU?

If you have always been drawn to technology and its advancements and would like to learn more about its potential for change in the world of business, you are in the right place.



CURRICULUM

CHOOSE YOUR PATH



DEGREES

20

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

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Focus

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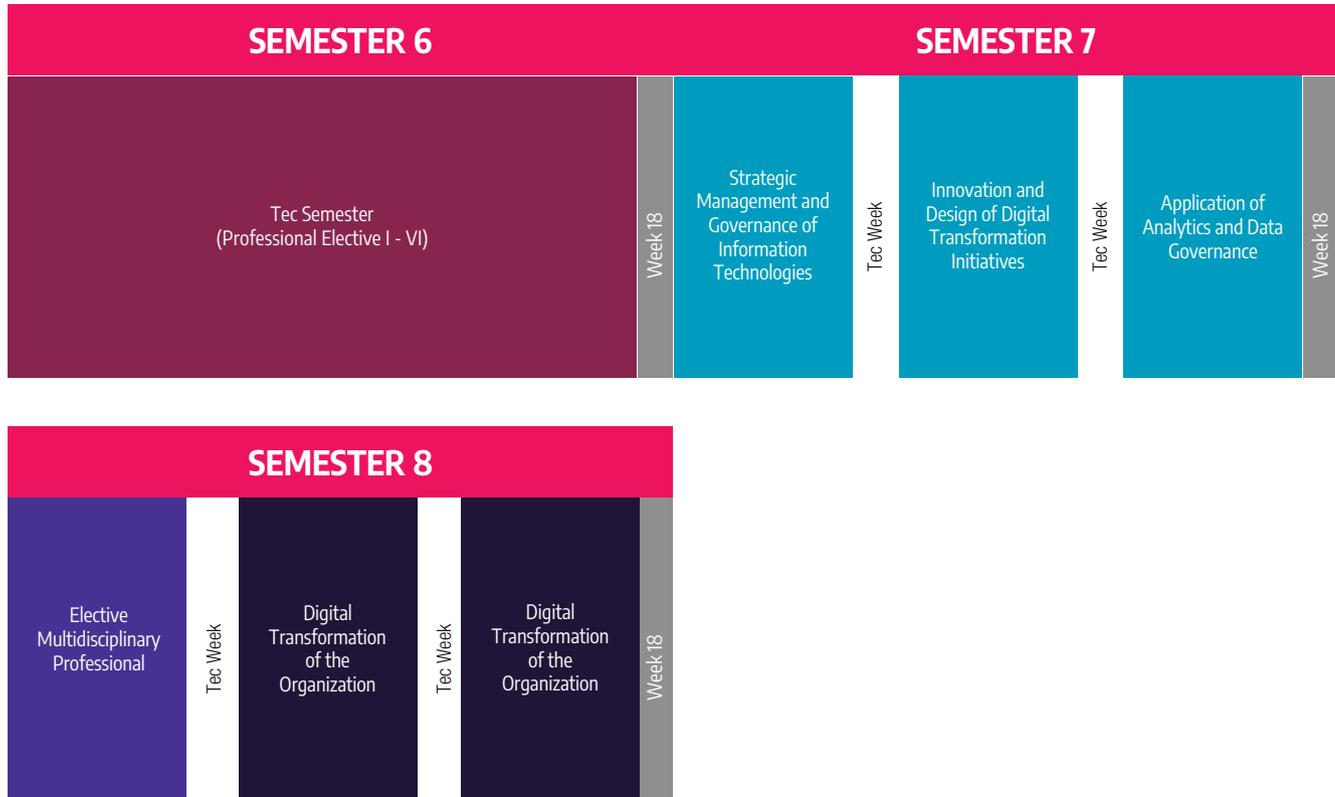
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Tec Week	Tec Week	Tec Week	Week 18	Tec Week	Tec Week	Week 18		

SEMESTER 3				SEMESTER 4			
Elective Course Social and Behavioral Sciences	Elective Course Social and Behavioral Sciences	Elective Course Social and Behavioral Sciences	Elective Course Leadership, Entrepreneurship and Innovation				
Programming of Data Structures and Fundamental Algorithms	Programming of Data Structures and Fundamental Algorithms	Programming of Data Structures and Fundamental Algorithms	Modeling, Structure and Operation of Business	Design of Architectures, Use and Data Management	Project Evaluation and Administration	Project Evaluation and Administration	
Analysis of Software Requirements	Modeling of Minimum Systems and Computational Architectures	Analysis of Differential Equations	Evaluation of Business Architectures	Technology Assessment for Business	Exploration and Interpretation of Data	Exploration and Interpretation of Data	
Exploration Topic	Implementation of the Internet of Things	Implementation of the Internet of Things					
Tec Week	Tec Week	Tec Week	Week 18	Tec Week	Tec Week	Week 18	

SEMESTER 5			
Elective Course Ethics and Citizenship	Elective Course Ethics and Citizenship	Elective Course Ethics and Citizenship	CHOOSE YOUR CONCENTRATION
Implementación de tecnología en los procesos	Análisis del comportamiento y desempeño organizacional	Análisis de las actividades económicas	
Process Design and Business Architectures	Change Management	Analytical Support for Decision Making	
Tec Week	Tec Week	Week 18	

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ENGINEERING

COMPUTER STUDIES AND
INFORMATION TECHNOLOGIES

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		
		IRS	ITC	ITD
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 – Computer Studies and Information Technologies, go to

