MIP-L

Master in Engineering with specialization in Quality Systems ar Productivity

(Edition 2025)

First Trimester

Code	Name	CL	L	U	CA	S	UDC
EM4003	Transversal Pathways I	2.5	0	9	2	12	3
IN5158	Production Management and Smart Factories	2.5	0	9	2	12	3
MA4021	Statistics and Data Analytics	2.5	0	9	2	12	3
		7.5	0	27	6	36	9

Second Trimester

Code	Name	CL	L	U	CA	S	UDC
IN4079	Quality and Competitiveness in the Digital Age	2.5	0	9	2	12	3
IN4080	Smart Supply Chain	2.5	0	9	2	12	3
IN5159	Intelligent Systems of Statistical Process Control	2.5	0	9	2	12	3
		7.5	0	27	6	36	9

Third Trimester

Code	Name	CL	L	U	CA	S	UDC
EM4004	Transversal Pathways II	2.5	0	9	2	12	3
OP5100	Elective I	2.5	0	9	2	12	3
OP5101	Elective II	2.5	0	9	2	12	3
		7.5	0	27	6	36	9

Fourth Trimester

Code	Name	CL	L	U	CA	S	UDC
IN5160	Capstone Project in Quality and Productivity I	2.5	0	9	2	12	3
OP5102	Elective III	2.5	0	9	2		
OP5103	Elective IV	2.5	0	9	2		
		7.5	0	27	6	12	3

Fifth Trimester

Code	Name	CL	L	U	CA	S	UDC
IN5161	Capstone Project in Quality and Productivity II	2.5	0	9	2	12	3
OP4049	Transdisciplinary Elective	2.5	0	9	2		
OP5104	Elective V	2.5	0	9	2		
		7.5	0	27	6	12	3

Academic credits

CL The letter "CL" indicates the number of class-hours per week.

L The letter "L" indicates the number of laboratory-hours per week.

U The letter "U" represents the equivalent time in courses lasting 15 weeks (semester) and 12 weeks (trimester), of weekly work that the student dedicates to the course to meet its objectives. They include the "class hours", as well as the time dedicated to the student's independent work.

CA The letters "CA" represents the number of semester credit hour of the course.

S Semanas de duración

UDC Load Units

Program Outcomes

Justification

- Organizations demand professionals with specialized knowledge in the areas of quality and productivity systems engineering to improve processes in order to be competitive and offer better services to their customers. Although quality management initiatives have been implemented for decades, it is necessary to have professionals to give continuity and update them due to the constant changes in customer requirements and the increase of direct and indirect competition that affect the competitiveness of the company. On the other hand, technological changes have increased in recent years, so it is necessary to reconfigure the processes to adapt them to the technological and digital transformation that is being experienced in the world to improve productivity.

- Thus, MIP seeks to transform professionals specialized in methodologies and knowledge of quality and productivity systems, aligned to the new trends that are emerging in the business environment, such as Industry 4.0 and digital transformation, through highly specialized courses and postgraduate studies.

- As a complement to these needs, students in this graduate program will develop communication and leadership skills that will allow them to work in multidisciplinary teams, expressing clearly and concisely, visually, verbally and in writing, their needs and initiatives to members of their team or other work teams or customers to find creative and innovative solutions that improve the competitiveness of the company.

- Likewise, the MIP, contemplates in its program international certifications with partners of universities and organizations recognized worldwide and that complement the professional development and competencies of its students, to perform better in their area of work.

- As part of the program the student must participate in the solution of a capstone project. In this project the student will have to apply the knowledge and competencies acquired and promoted by the program.

- Finally, it is important to emphasize that this program will be preparing and training highly specialized professionals, either to face and solve real problems within a large company, or to implement innovative ideas in SMEs, but in any case, in support of the technological, competitive and economic development of the country and Latin America.

Program Objectives

The master's degree in engineering with Specialization in Quality and Productivity Systems aims to train professionals with the skills and knowledge to:

- Organize the participation of the human element and to use or create new approaches to improve quality and productivity in manufacturing or service organizations. As well as the ability to promote the strategic and efficient participation of organizational and technological resources.

- Contribute to the competitiveness and innovation of your company through the following factors: growth in market share, increased profits, reduced costs and improved user perception.

- Apply new methodologies, improve existing systems and exercise a leadership oriented to the conduction of the change process and its subsequent implementation.

- To have a solid training to develop a management career in areas such as quality, engineering management, statistical engineering, production systems and logistics.

- The master's degree contributes decisively in the development of highly specialized talent, capable of designing, implementing and leading high impact initiatives in the generation of added value in the operations of a manufacturing and/or service organization.

Target Audience

- The master's degree in engineering with Specialization in Quality and Productivity Systems is aimed at professionals in engineering areas and/or profiles that demonstrate mathematical, statistical and innovation skills.

- Applicants are expected to be interested in presenting creative solutions oriented to strategic planning, use of new technologies and their deployment, design, implementation/execution of any productive or quality system in different organizations.

- The program integrates the opportunity with the profile for those who are collaborators or owners of companies, participants of institutions.

Applicant Profile

To enter the Master's Degree in Engineering with a specialization in Quality and Productivity at Tecnológico de Monterrey, the applicant is expected to have:

- Knowledge:
  - Solid knowledge in descriptive and inferential statistics, as well as in multivariate techniques.
  - Knowledge in the principles and practices of quality management, including standards such as ISO 9001, Six Sigma, Lean Manufacturing, among others.
  - Knowledge in continuous improvement and how to implement them in different industrial environments.
  - Basic knowledge in the use of quality tools such as flowcharts, Pareto diagrams, Ishikawa (fishbone) diagrams, FMEA (Failure Mode and Effect Analysis), among others.
  - Solid knowledge of production systems and industrial operations, including production scheduling methods, process design, among others.
- Skills:
  - Project management skills to implement quality and productivity improvements effectively. Knowledge of project management methodologies such as PMBOK (Project Management Body of Knowledge) would be highly desirable.
  - Skills in analytical reasoning and problem solving by analyzing complex data, identifying problems, and proposing effective and innovative solutions.
  - Skills in the use of information and communication technologies, so as to be able to search for data and reports, as well as to use these tools to send and receive valuable information.
  - Critical thinking to analyze and propose work projects.
  - Reading comprehension in English.
  - Ability to communicate ideas clearly and persuasively, both orally and in writing.
- Aptitude
  - Talented, enthusiastic, committed to industrial development; people who have the potential to successfully complete their graduate program and become leaders with entrepreneurial spirit, human sense and internationally competitive.
  - It is highly desirable that the applicant understands the importance of ethics in engineering, especially in areas related to product quality and safety.

Learning Outcomes

Upon completion of the Master's Degree in Engineering with a specialization in Quality and Productivity from Tecnológico de Monterrey, the graduate will be able to:

- Knowledge:
  - Design, administer, evaluate, and improve management systems for service and production areas based on principles and philosophies of quality, innovation, digital transformation, and competitiveness.
  - Design, administer, execute, and evaluate experimental processes that generate tangible solutions for the optimization of operations.
  - Integrally lead the process of continuous improvement, innovation, and digital transformation in the production systems of a company that allow it to be internationally competitive.
  - Design, manage, evaluate, and improve production systems based on contemporary principles and philosophies of intelligent production and manufacturing, supported using statistical tools, data science and process optimization.
- Skills
  - Develop critical thinking for understanding complex problems.
  - Use technology and data to manage continuous improvement processes in organizations.
  - Lead teams and projects in manufacturing and service environments, guiding the implementation of high impact projects.
- Attitudes
  - To be a leader with an entrepreneurial spirit, human sense and internationally competitive.
  - To be an ethical, fair, equitable and socially responsible professional strongly committed to the competitive development of manufacturing and service organizations.

Campus that offer this program

Campus	Number of periods offered	From	Closed for new students
Programas en Línea	Complete	Trimester Sep - Dec 2025	

Last update: 09/May/2024