



Universidad Tecnológica  
de Pereira

Facultad de  
Ciencias Empresariales

# Master's degree in Operations Research and Statistics






SNIES CODE:279

QUALIFIED REGISTRATION: Resolution No. 08020 / May 24, 2018 with validity of 7 years.

-High Quality Reaccreditation: Resolution Number 015864 of August 25, 2021 valid until 2027.

-EUR-ACE Re-Accreditation of October 2022 valid until August 2026: agency authorized by the European Network for Accreditation of Engineering

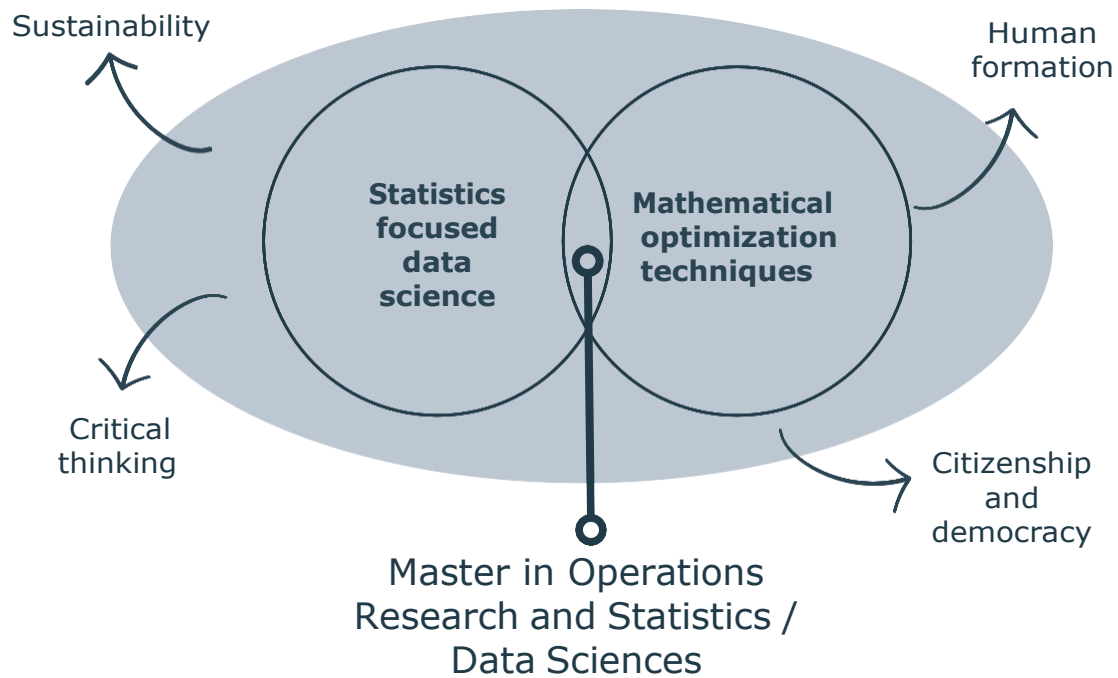
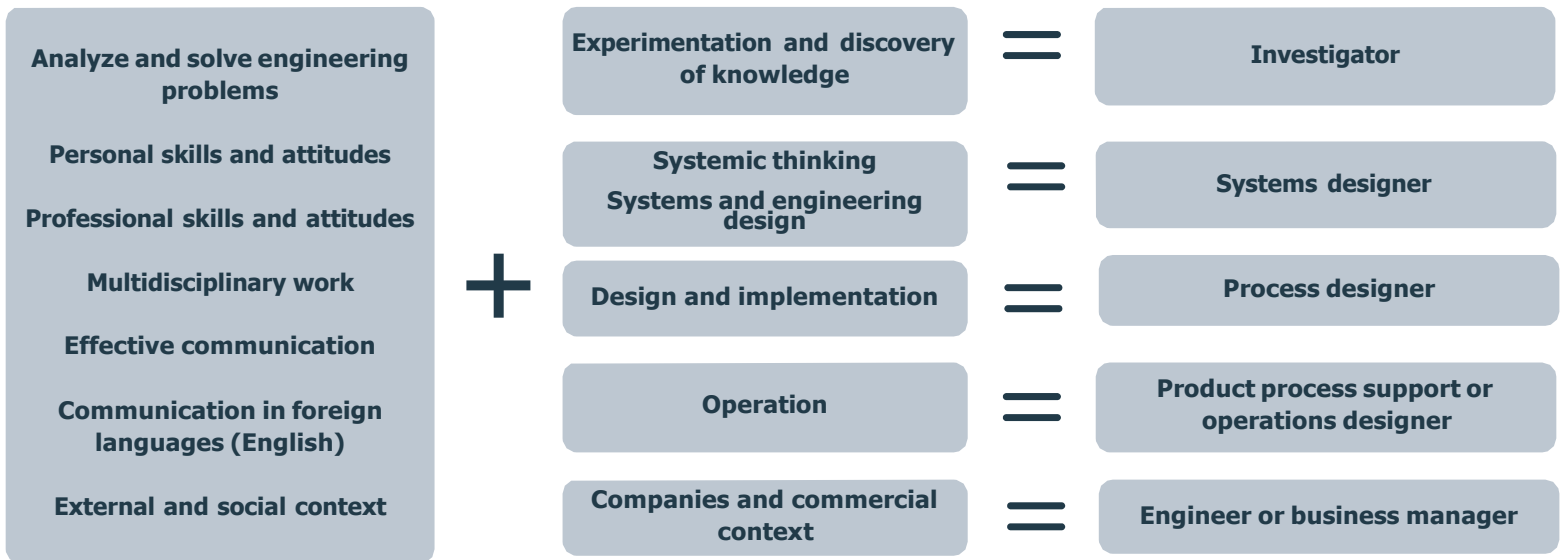
## More program reports

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# MIOE GRADUATE PROFILE



# Presents **operations research methodologies** and **statistics** to apply them in the search for solutions optimal solutions to **problems** specific to **engineering** and **society**

-Postgraduate program approved in its beginning by Resolution No. 00018 of September 1986.

-Renewal of Qualified Registration for 7 years according to Resolution No. 08020 of May 24, 2018.

-High Quality Accreditation according to Resolution No. 14012 of December 11 July 2016 from the Ministry of National Education for four years.

The Master's degree began in the first semester of 1987, and is offered in the city of Pereira. During this trajectory it has been consolidating itself as the only Master's program in the country that addresses operations research as a central object of study together with the study of multivariate statistical analysis techniques.

It offers professionals a deepening of their training in order to lead research processes and the application of mathematical techniques of operations research and multivariate statistics, on all fronts of performance of human activity, engineering, administration and academia.

**SNIES code:** 279.

**Qualified Registration:** Resolution 08020 of May 24, 2018 for 7 years.

**High Quality Reaccreditation:** Resolution Number 015864 of 25 August 2021 valid until 2027.

**EUR-ACE ReAccreditation:** agency authorized by the European Network for Accreditation of Engineering

## Program objectives

The Master's Degree in Operational and Statistical Research has established its objectives in correspondence with the Institutional Educational Project (PEI) and the Mission of the University, complying with the national standard and in coherence with the needs of the region, employers and those interested in the program.

**OP1.** Analyze and combine knowledge and techniques of statistics and mathematical optimization under sustainable approaches, with the aim of making informed decisions, essential to address current and future challenges in academic and business environments.

**OP2.** Identify effective tools and approaches for the use of organizational resources in order to optimize their processes, combining operations research and statistical practices, which allow improving efficiency, optimizing decision making, forecasting trends and maintaining competitiveness. in an increasingly complex and data-driven market.

**OP3.** Analyze and extract various significant insights from multivariate statistical approaches, both qualitative and quantitative, to simultaneously examine multiple variables or factors in a data set, with the aim of obtaining

more complete and profound information about the relationships and patterns between them, applied in different fields, such as scientific research, engineering, economics, medicine, among others.

**OP4.** Integrate operations research and statistics to promote a more complete and robust approach, in order to address investigative challenges by considering operational efficiency, as well as the uncertainty inherent in data and processes under a framework that contemplates ethical rigor, moral and scientific.

**OP5.** Promote human dimensions that allow for the generation of participatory spaces for dialogue and reflection with a sustainable approach, which contribute to the training of professionals capable of addressing challenges in a comprehensive and responsible manner.



### Master's Degree in

Operational Research and Statistics



2 years



### Schedule

Friday 6:00 p.m. to 10:00 p.m.

Saturdays 8:00 a.m. to 2:00 p.m.



### Number of Credits

54



### Admission

By cohorts



**7.3 SMMLV** (Minimum Monthly Legal Wage in Colombian Pesos)

## Our mission

Prepare graduates to be leaders in solving complex problems in a wide range of industries, using sound quantitative approaches based on efficient data analysis. By integrating Operations Research and Data Science, the program seeks to empower professionals to drive innovation, efficiency and sustainable growth in an increasingly interconnected and data-driven world.

## Learning outcomes

Program learning outcomes, unlike program objectives, are directly related to the student and their achievements. They are evaluable and often observable (or their consequences are, for example, through what a student knows and can demonstrate through activities that require certain knowledge). Learning outcomes are statements of what a student is expected to know, understand and/or be able to do at the end of a learning period. In the learning results, the subject of the action, the protagonist, the person responsible is the student.

The following are the learning outcomes of the program:

**RAP1.** It integrates knowledge of statistics and mathematical optimization with a sustainable approach to make informed decisions that address current and future challenges in academic and business contexts.

**RAP2.** Identify and apply effective operations research and statistical tools and approaches to optimize processes, improve efficiency, make informed decisions, forecast trends, and maintain organizations' competitiveness in a data-driven and ever-changing marketplace.

**RAP3.** Apply multivariate statistical approaches using specialized statistical software to analyze multivariate data sets, interpret complex relationships, extract meaningful insights, and effectively communicate results across different fields of application.

**RAP4.** It integrates operations research and statistics to address investigative challenges in a comprehensive and solid manner, which considers operational efficiency, uncertainty in a rigorous ethical, moral and scientific framework, so as to contribute to compliance with policies to promote research in areas of relevance and high impact.

**RAP5.** It carries out a critical evaluation of scientific articles, using specialized databases at a global level, with the aim of promoting interdisciplinary discussions in the academic environment. This practice will contribute to enrich current knowledge in the research field and strengthen the evolution of your own project by incorporating broad and varied perspectives.

**RAP6.** Create engineering-based designs that use mathematical tools to conceive, plan, simulate, model and supervise all operations that optimize the use of resources based on predefined objectives. These designs incorporate principles of sustainability, social responsibility, citizenship and democracy to guide decisions in a comprehensive and conscious manner.

**RAP7.** It interacts in spaces for dialogue and reflection, where it proposes solutions to current challenges, through its knowledge and the principles of sustainability, social responsibility, with citizen and democratic commitment.

## Our vision

Establish by 2028 to be a pioneering graduate program that transcends the traditional boundaries of Operations Research and Data Science, incorporating a solid focus on advanced research. The program aims to be leaders in the creation of knowledge, as well as in the training of experts and leaders who are at the forefront of transformation in various industries and sectors.

## Graduation Profile

Graduates of the master's degree in Operations Research and Statistics will be able to:

- Integrate knowledge of statistics and mathematical optimization to address current and future challenges in academic and business contexts.
- Identify, apply and communicate operations and statistical research tools and approaches, allowing to optimize processes, improve efficiency and maintain the competitiveness of organizations.
- Apply multivariate statistical approaches using specialized software to analyze multivariate data sets and interpret complex relationships.
- Integrate operations research and statistics to address challenges comprehensively, considering operational efficiency and uncertainty.
- Critically evaluate scientific articles using specialized databases at a global level, contributing to interdisciplinary discussions.
- Create designs based on engineering principles that use mathematical tools to optimize resource utilization and make conscious decisions.
- Participate in dialogue spaces, proposing solutions to current challenges through principles of sustainability, social responsibility, civic and democratic commitment.

## What do you need to belong to the program?

The Master's degree is aimed at professionals who want to deepen

in the ways to optimize the use of resources that a company, institution, or system, in general, uses to make it more competitive, applying models and tools from operations research and multivariate statistics.

## Teachers

The Program has 12 teachers, 10 with a Doctorate or PhD degree and 2 with a master's degree trained in their own academic fields and related to the profile of the master's degree in operational research and statistics. All trained in the field of higher education, committed to supporting students to guide them during the academic process. **To learn more about the profile of our teachers, visit our website:**

Scan me to find out more!



# CURRICULUM

- Integer Linear Programming
- Fundamentals of Discrete and Continuous Simulation
- Metaheuristic Techniques
- Stochastic Optimization
- Data Envelopment Analysis
- Statistical Design of Experiments
- Multivariate Data Analysis

- Multi-objective Optimization
- Discrete Optimization in Vehicle Routing Problem
- Non-Linear Programming Techniques
- Categorical Data Analysis
- Data Exploration Techniques
- Forecasting Techniques and Time Series
- Random Processes

## Leveling Base (Optional)

- Operations research
- Statistics in R
- MatLab

## Base: Degree work

- Research Seminar I
- Research Seminar II
- Degree work

## TRAINING BASE SUBJECTS

## ELECTIVE SUBJECTS

## OTHER SUBJECTS

1

Base formative: ###  
Training base: 12 credits  
créditos

Training base: 9 credits  
Research Seminar I

2

3

Elective I and II  
Research Seminar II

Elective III  
Degree work

4

## SEMIANNUAL ORGANIZATION

**Master's Degree in Operations Research and Statistics**  
Resolution No. 08020 / May 24, 2018, duration 7 years

SNIES 279

**What are you waiting for to get  
new skills and knowledge?**

### More program reports

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### REGISTRATIONS

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