

# Graduate Studies

## - Majors

The department of Industrial Engineering and Management (IEM) offers two research-oriented Master's degree (M.Sc.) majors in "Industrial Engineering" and in "Information Systems". In both those majors, students may choose to submit research theses, supervise by IEM faculty members. The IEM department also offers a practice-oriented Master's degree major in "Industrial Management".

**The Industrial Engineering** major offers five tracks:

- **The Production and Operations Systems** track emphasizes the acquisition of additional knowledge in the areas of production management, quantitative techniques and advanced industrial engineering topics for analysis, design, control, improvement and development of production and service systems.
- **The Statistics and Quantitative Methods** track emphasizes the acquisition of additional knowledge in the theory of statistics, including mathematical statistics, biostatistics, econometrics, quality control and data mining. The students will learn to incorporate their knowledge in Industrial Engineering with the advanced statistical tools in order to be able to design experiments and analyze them, as well as do their own research. The students acquires methodological tools and practical training in using advanced statistical software programs. Graduates are prepared for applied careers in industry as well as research.
- **The Intelligent Systems** track presents a growing scientific and technological domain aiming to develop systems that would resemble problem-solving and learning capabilities of the human brain. By its very nature, this program is multidisciplinary and interconnected with knowledge-based systems, expert systems, artificial neural networks, hybrid intelligent systems, fuzzy logic techniques, genetic algorithms and evolutionary computing, intelligent agents and multi-agent systems, knowledge discovery and data mining, machine learning, cognitive modeling, knowledge representation and management, planning and spatial & temporal reasoning. This program trains students to become researchers and also assume applied careers in analysis, development, design and control of production systems, transportation and intelligent systems, in internet systems as well as other intelligent facilities in the future. The objective of the program is to train students understand and design systems using intelligence for

interaction with the world, so that computer control systems can be more autonomous and more available.

- **The Human Factors Engineering (Ergonomics)** track trains students as researchers who are able to integrate knowledge about human abilities and limitations with engineering methods to improve man's interface with the built-up environment and tools. The objective is to prepare professionals and researchers who can conduct research as well as plan and create advanced technological systems.
- **The Road Safety** track trains students to become researchers and professionals in traffic safety and associated issues, like traffic systems, effects and limitations of driving environments, the effects of advanced technological facilities and products, and human factors engineering on the roads.

**The Information Systems major** trains students for research or professional positions as experts specializing in certain managerial, operational, and/or technological aspects of IS, and combine their expertise with management abilities. IS graduates acquire knowledge that enables them to address diverse aspects related the fast-progressing multidisciplinary IS field that manufacturing and service organizations confront, like operations (production, automation), management (strategies, policies, decision-making, finance and human resource management), and technology (hardware, networks and software).

**The Data Science and Business Analytics (DSBA)** concentration focuses on the management, analysis and presentation of data toward gaining knowledge and insights on organizations, their business environment, and the various processes that they manage. DSBA studies cover a plethora of relevant techniques, tools and technologies from knowledge domain such as “Big Data”, Applied Statistics, Machine Learning, Business Intelligence, Data Mining, Knowledge Management, and Data Visualization. The DSBA concentration is available to students who join the Information Systems major or the Statistics and Quantitative Methods track under the Industrial Engineering major.

**The industrial Management major** trains Bachelor-degrees graduates in Engineering, Natural Sciences and Economics who wish to enhance and enrich their managerial and professional skills in technology-rich environments. The program offers advanced courses in various IEM-related fields such as Production and Operations Management, Finance, Accounting, Information Systems, and R&D and Project Management.