Co-op Program
ROBOTICS ENGINEERING

The Robotics Engineering program is built with aspiring dynamic professionals in mind. Students are well prepared to tackle the various aspects and challenges of robotic design and project management involving the integration of customized mechanical, electrical and computer components based on the particularity of applications and contexts: human care and assistance, applications in surgery, space exploration, smart vehicles, drones, entertainment, process automation, and household tasks, to name but a few.

Robotics Engineering students don't just learn about robots in a classroom. The program is built on the Engineering Problem and Project based Learning. This framework promotes the autonomy of individual learning and helps to develop teamwork skills through hands-on approach, combining theoretical knowledge with real-world applications.

WHAT OUR STUDENTS CAN DO FOR YOU

Design

- Simulation of automated tasks
- Process automation
- Design of robot cells
- Design of mobile robots
- Design of innovative robotic systems
- Computer-aided design and manufacturing
- Integration of electrical, computer and mechanical systems
- Evaluation, selection and implementation of equipment
- Drafting plans and specifications
- Writing functional and technical requirements
- Integration of cameras and image processing

Management

- Project planning, organization, supervision, control
- Monitoring and supervision
- Administrative follow-up : preparing purchase orders, supplier tracking, etc.
- Coordination of equipment installation
- Project management
- Reports, guides, technical manuals, procedures and training tools

Research and Development

- Identifying and analyzing problems, and interpreting results
- Prototype development
- Test bench installation
- Feasibility and profitability analysis

Production and Maintenance

- Problem study and resolution
- Adding new features to existing applications
- Programming for robots and robotic systems
- Process design and control
- Configuration of electromecanical equipment
- Operation of industrial computer systems
- Inspection and quality control
- Plant engineering and technical support
- Hardware and software testing
- Procedure detailing
- Implementation of preventive maintenance systems

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KNOWLEDGE AND SKILLS

Term	Description
S-1	**Introduction to Robotics Engineering** Designing a mobile robot using existing hardware and software; choice of materials, technical drawings, assembly of electronic and mechanical components, circuit debugging and programming; Agile approach, teamwork.
S-2	**Remote Manipulator System** Industrial robotics, process automation, security in industrial robotics, workplace health and safety risks analysis; static physics of a robotic arm; modeling and simulation; V Model methodology; time and priority management.
S-3	**Mobility** Design of an intelligent vehicle; dynamics, engine sizing, electric energy management; computer architecture; object-oriented programming; project management with cascading methodology; cost estimates, prototype manufacturing; design of experiments.
S-4	**Environment Interaction** Design of a robot to interact with its environment; digital filtering; image processing; calibration of robots; concurrent programming; strength of materials; tools for project management; specifications; introduction to the basics of entrepreneurship: market and needs analysis.
S-5	**Servo Control and Control Systems** Design of a physical interface to control a robot, based on the user experience; servo control; strength of materials (continued); major design project (over 4 terms, for an external client); client management, risk assessment and management, change management, compliance with processes and standards; introduction to economic analysis.
S-6	**Collaboration and Navigation** Automation of complex processes that require the intervention of several robots; communication protocols, onboard systems; trajectory planning; major design project (continued).
S-7	**Specialization**
S-8	

ORGANIZATION OF STUDY (S) AND WORK TERM (W)

1st year			2nd year			3rd year			4th year			5th year
FALL	WIN	SUM	FALL	WIN	SUM	FALL	WIN	SUM	FALL	WIN	SUM	FALL
S-1	S-2	S-3	W-1	S-4	W-2	S-5	W-3	S-6	W-4	S-7	W-5	S-8

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