



الجمهورية الجزائرية الديمقراطية
الشعبية
République Algérienne
Démocratique et Populaire
وزارة التعليم العالي والبحث العلمي
Ministère de l'Enseignement
Supérieur
et de la Recherche Scientifique

Ecole Nationale
Supérieure de
Technologie des
Systèmes
Autonomes



STATE ENGINEER TRAINING PROGRAM

Academic year: 2025/2026

Institution

National Higher School of Autonomous Systems Technology

Domain	Field	Specialty
<i>Science and Technology</i>	<i>Control Engineering</i>	<i>Robotics and Autonomous Systems Design</i>



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اللجنة البيداغوجية الوطنية
لميدان العلوم و التكنولوجيا
Comité Pédagogique
National du Domaine
Sciences et Technologies



عرض تكوين مهندس دولة

المؤسسة

المدرسة الوطنية العليا لتكنولوجيا الأنظمة المستقلة

الميدان	الفرع	التخصص
علوم وتكنولوجيا	الاية	تصميم الروبوتات والأنظمة الذاتية المستقلة

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Training Context and Objectives

1-Overview

The ‘Robotics and Autonomous Systems Design’ engineering degree is a comprehensive 5-year program designed to equip students with the technical expertise and interdisciplinary skills needed to design, develop, and deploy advanced robotic and autonomous systems. The program aims to provide a strong foundation in control, mechanical, electrical, and computer engineering, while emphasizing the integration of artificial intelligence, and machine learning into real-world applications. Students will gain hands-on experience in designing intelligent systems, together with programming autonomous functionalities, and integrating sensors and actuators for perception and action. The curriculum focuses on fostering innovation, problem-solving, and project management skills, preparing graduates to tackle complex challenges in industries such as manufacturing, transportation, and smart cities. Additionally, the program emphasizes ethical considerations, regulation, safety standards, and the societal impact of autonomous technologies, ensuring that graduates are not only technically proficient but also socially responsible. By combining theoretical knowledge with practical experience, the program aims to produce engineers capable of leading the development of cutting-edge robotic and autonomous systems that address global challenges and drive technological advancement.

2. Significance of the Proposed Program

Given the accelerating pace of technological innovation and the growing reliance on automation and robotics, there is a strong need for engineers with expertise in designing and optimizing robotic systems, autonomous machines, and integrated control systems. The proposed 5-year program in Robotics and Autonomous Systems Design will address this demand by equipping students with a comprehensive set of skills in automation, systems control, robotics, artificial intelligence, and the necessary foundational engineering knowledge.

3. Vision for the Training Program

3.1 Mission Statement

The mission of the Robotics and Autonomous Systems Design program is to cultivate a new generation of engineers proficient in designing, implementing, and optimizing automated and autonomous systems across diverse applications. The program will focus on the integration of systems engineering principles with advanced robotics technologies to create innovative solutions for real-world challenges.

3.2 Strategic Vision

3.2.1. Prepare Students for the new Industrial era

Industry 4.0, the current trend of automation and data exchange in manufacturing technologies, relies heavily on robots and autonomous systems. This program will position graduates as key

players in shaping and driving forward Industry 4.0 technologies, ensuring they are well-versed in cutting-edge automation, robotics, and control systems.

3.2.2. Hands-On Learning and Practical Training

The program will emphasize practical experience through labs, projects, and internships, ensuring students not only learn theoretical concepts but also apply them to real-world scenarios. Collaboration with industry partners, research centers, and startups will be a core feature, allowing students to engage in cutting-edge RAS research and product development.

3.2.3. Multidisciplinary Approach

Robotics and autonomous systems design requires knowledge in multiple fields: electrical and mechanical engineering, computer science, machine learning, control theory, and sensor integration. This multidisciplinary approach will enable students to gain expertise in designing and optimizing complex systems that involve hardware and software components.

3.2.4. Promote Ethical and Sustainable Engineering

As robotics and autonomous systems have a direct impact on society, it is crucial that students understand the ethical and social implications of their designs. The program will incorporate courses on the societal impact of automation, safety, privacy concerns, and sustainable development, ensuring that graduates approach technological challenges with a responsible and human-centered mindset.

3.2.5. Innovation and Research

The program will foster innovation through research-oriented projects, encouraging students to explore emerging technologies like swarm robotics, bio-inspired robotics, and machine learning-based control systems. Students will be exposed to a variety of research methodologies to push the boundaries of existing technologies and develop the next generation of autonomous systems.

4. Admission requirements:

Candidates for this engineering program are students from the National Higher School of Autonomous Systems Technology who have successfully completed their preparatory cycle. Selection is based on merit ranking, according to the overall average marks of the two preparatory years subject to places availability. Admission to the Robotics and Autonomous Systems Design specialty follows the institution's internal progression protocols.

5. Program objectives:

Upon Completion of the Program, the student should be able to:

- **Design and Development of Robotic Systems:** Ability to design, build, and integrate hardware and software for robotic and autonomous systems.
- **Programming and AI Expertise:** Proficiency in coding (Python, C++, ROS) and applying AI/ML techniques for perception, decision-making, and control.
- **Control Systems and Automation:** Mastery of control theory and algorithms for stable and efficient system operation.
- **Sensor Integration and Data Processing:** Skills in using sensors (e.g., LiDAR, cameras) and processing data for real-time decision-making.
- **Simulation and Modeling:** Experience with simulation tools to test, validate, and optimize robotic systems.
- **Interdisciplinary Problem-Solving:** Ability to combine mechanical, electrical, and software engineering principles to solve complex challenges.
- **Project Management and Teamwork:** Skills in managing projects, collaborating in teams, and delivering results in multidisciplinary environments.
- **Ethics and Safety Awareness:** Understanding of ethical considerations and safety standards in robotics and autonomous systems.

6. Targeted profiles and Competencies:

6.1 Targeted Profiles:

1. Robotics Engineers: Capable of designing and developing intelligent robotic and autonomous systems.

2. Industry-Ready Professionals: Aspiring engineers seeking to lead projects in sectors like manufacturing, healthcare, and smart technologies.

6.2 Targeted Competencies:

1. Robotics System Design: Skills in designing, integrating, and optimizing hardware and software for autonomous systems.

2. AI and Programming Expertise: Proficiency in coding (Python, C++, ROS) and applying AI/ML for perception, decision-making, and control.

3. Interdisciplinary Integration: Ability to combine mechanical, electrical, and software principles to create cohesive robotic solutions.

4. Problem-Solving and Innovation: Strong analytical and creative skills to develop cutting-edge solutions for real-world challenges.

5. Project Management: Experience in planning, executing, and managing multidisciplinary robotics projects.

6. Ethics, regulation and Safety: Understanding of ethical, regulation, safety, and societal implications of autonomous technologies.

7. Regional and national employability prospects

This engineering degree offers strong employability prospects across the entire national territory. Indeed, the field of robotics and artificial intelligence opens doors to research centers, academia and research (Ph.D.), and is at the heart of many SMEs, PMIs, and multinational corporations, whether in design offices or management roles.

Among others, opportunities can be found in:

- **Chemical and petrochemical industries.**
- **Steel and metallurgy industries.**
- **Mechanical engineering and automotive industries.**
- **Hydraulic industries and seawater desalination.**
- **Processing, textile, and manufacturing industries.**
- **Food processing industries.**
- **Pharmaceutical industries.**
- **Healthcare sector.**
- **Construction materials industries.**
- **Electrical energy production and distribution sector.**
- **Renewable energy sector.**
- **Agriculture.**

8.- Bridges to other specialties

Robotics and automation intersect with various other specialties in the field. By providing flexible pathways, the RASD program not only prepares students for careers in robotics but also equips them with specialized skills to work in related fields, driving innovation across industries like healthcare, manufacturing, and AI-driven automation. These bridges will empower graduates to become versatile engineers, ready to tackle complex challenges in the emerging world of intelligent systems.

The RASD program can offer bridges to the following disciplines:

1. Artificial Intelligence (AI) and Machine Learning (ML)
2. Electrical and Electronics Engineering
3. Mechanical Engineering
4. Computer Science and Software Engineering
5. Biomedical Engineering
6. Data Science and Big Data
7. Cybersecurity.

9. Program monitoring indicators

These points can be used to assess the success and adaptation of the program to the needs of the job market and students.

Professional integration rate

This rate measures the proportion of graduates who have found employment within six months of completing the program. It helps assess the program's effectiveness in preparing students for the job market.

Student preferences for the proposed program

This indicator measures the demand and interest in the program by tracking the number of applications or choices made by students to pursue the offered track.

Feedback from companies hosting interns

Feedback from companies that have hosted interns from the program is essential for evaluating the quality of students' skills and performance in a professional context.

Feedback from companies hiring graduates from the program

Companies that have hired graduates from the program provide valuable feedback on how well students are prepared to integrate into the workforce and meet industry needs.

Feedback from students at the end of the program

Feedback from students at the end of their studies helps assess their overall satisfaction with the program, the relevance of the curriculum, and the practical and theoretical skills they have acquired.

Feedback from students at the beginning of the program

Feedback from students at the start of their studies helps measure their expectations of the program, their preparedness, and their motivation to engage in this educational path.

Graduate feedback

Long-term feedback from graduates provides insight into the impact of the program on their professional careers, their progression in the field, and the relevance of the skills they gained during their studies.

10 – Human resources available

A : Enrollment Capacity

150 Students (50 per promotion)

B-3 : Comprehensive Summary of Human Resources

Rank	Internal ressource	External ressource	Total
Professeur	4	3	7
MCA	7	2	9
MCB	5	7	12

B-4 : Permanent Support Staff

Rank	Staff
Laboratory Engineer	1
Computer Engineer	1
Administrator	4
Administrative Assistant	2
Total	8

11. Available Material Resources

A- Educational Facilities

The National Higher School of Autonomous Systems Technology provided facilities play a crucial role in supporting students' academic, personal, and professional development. These facilities include well-equipped classrooms, laboratories, and workshops designed to foster hands-on learning and collaboration. A Library with academic resources, study spaces, and digital tools are available to support research and self-directed learning. Additionally, dedicated spaces for practical training, such as labs or engineering workshops, enable students to apply theoretical knowledge in real-world contexts.

Location	Seating Capacity	Number	Total Capacity
Lecture Hall	200	4	800
Tutorial Room	30	15	450
Practical Lab	25	15	375
Library	30	1	30
Reading Rooms	40	2	80
Workshop	10	1	10
Computer Center	40	1	40
Internet Room	40	2	80

B- Educational Laboratories and Equipment:

The National Higher School of Autonomous Systems Technology prioritizes hands-on learning experiences through well-equipped laboratory facilities. These educational environments are designed to support the practical application of theoretical concepts across all specializations offered by the institution.

As a newly established educational institution, the school is currently in the process of acquiring high-quality pedagogical equipment and materials to outfit its laboratories. This ongoing procurement initiative is strategically aligned with the specific requirements of each specialization and the overall educational objectives of the institution.

The equipment acquisition plan has been carefully developed to ensure that all laboratories will be furnished with state-of-the-art technology that meets international standards for engineering education. This deliberate approach to laboratory development reflects the institution's commitment to providing students with relevant, industry-aligned practical experiences that enhance their technical competencies and professional readiness.

Upon completion, these specialized laboratories will create comprehensive learning environments where students can effectively bridge theoretical knowledge with practical application, developing the hands-on skills essential for success in the autonomous systems sector.

- **Electricity Laboratory**

Number of students: 25

N°	Equipement	Quantity	Operational Status
1	Amperemeter	13	Excellent state
2	Galvanometer	02	Excellent state
3	Voltmeter	12	Excellent state
4	Multimeter	05	Excellent state
5	Wattmeter	07	Excellent state
6	Power supply	10	Excellent state
7	Power supply module	06	Excellent state
8	Low-Frequency Generator	06	Excellent state
9	Oscilloscope	10	Excellent state
10	Breadboards	20	Excellent state

- **Physics Laboratory 1**

Number of students: 25

N°	Equipment	Quantity	Operational Status
1	Force tables	01	Excellent state
2	Free Fall	04	Excellent state
3	Simple Pendulum	05	Excellent state
4	Air track	03	Excellent state
5	PasCars	02	Excellent state
6	Torsion pendulum	02	Excellent state
7	Balance of Coulomb	05	Excellent state
8	Electric field strengthmeter	05	Excellent state
9	Tank Rheographic	04	Excellent state
10	Analogic voltmeter	07	Excellent state
11	Analogic Ammeter	07	Excellent state

- **Physics Laboratory 2**

Number of students: 25

N°	Equipment	Quantity	Operational Status
1	Pohl's Pendulum	01	Excellent state
2	Wave Tank/Ripple Tank	01	Excellent state
3	Vibrating String/Cord	01	Excellent state
4	Kundt's Tube	01	Excellent state
5	Light Polarization (Equipment)	01	Excellent state
6	Light Diffraction (Equipment)	01	Excellent state

- **Chemistry Laboratory**

Number of students: 25

N°	Equipment	Quantity	Operational Status
1	Fume hood	01	Excellent state
2	Oven/Incubator	01	Excellent state
3	Distiller	01	Excellent state
4	Ice generator	01	Excellent state
5	Calorimeter	04	Excellent state
6	Heating plates	04	Excellent state
7	Heater with stirrer	01	Excellent state
8	Scale/Balance	02	Excellent state
9	pH meter	04	Excellent state
10	Dosing equipment with pH meter	02	Excellent state
11	Thermometer	15	Excellent state
12	Stopwatch/Timer	06	Excellent state
13	Power supplies for calorimetry	02	Excellent state
14	Voltmeter for calorimetry	02	Excellent state
15	Ammeter for calorimeter	02	Excellent state

- **Fluid Mechanics Laboratory**

Number of students: 25

N°	Equipment	Quantity	Operational Status
1	Digital Hydraulic Bench	01	Excellent state
2	Center of Pressure Apparatus	02	Excellent state
3	Falling Sphere Viscometers	02	Excellent state
4	Venturi Tube	01	Excellent state
5	Notch Discharge Apparatus	01	Excellent state

- **Mechanics Laboratory**

Number of students: 25

N°	Equipment	Quantity	Operational Status
1	Materials Testing Apparatus	01	Excellent state

C- Internship and Corporate Training Sites:

Training Sites

Institution	Student Number	Training Duration
SEAAL	10	15 days
SONATRACH	20	15 days
SONELGAZ	20	15 days
MOBILIS	20	15 days
ALGERIE-TELECOM	20	15 days
CDTA	10	15 days
CRTI	10	15 days

D- Personal Workspaces and Information Technology Resources

The institution provides students with a well-equipped library featuring a spacious reading room designed for academic study. High-speed internet connectivity is available throughout all campus facilities, ensuring continuous access to digital resources.

signatures of teachers involved in the course

Semester S1:

Teaching Unit UE	Course (h)	Tutorials (h)	Laboratory works (h)	Total (h) /week	Coeff	Credits	Continuous assignment	Final Exam
Fundamental Teaching Unit								
UEF1.1.1 Mathematics 1	06h00	04h30	00h00	10h30				
Analysis 1	03h00	01h30		04h30	5	5	40%	60%
Algebra 1	01h30	01h30		03h00	4	4	40%	60%
Probability and statistics 1	01h30	01h30		03h00	4	4	40%	60%
UEF1.1.2 Physics sciences 1	04h30	03h00	02h00	09h30				
Physics 1	03h00	01h30	01h00	05h30	5	5	40% (20% Tut+20% Lab)	60%
Chemistry 1	01h30	01h30	01h00	04h00	4	4	40% (20% Tut+20% Lab)	60%
Methodology Teaching Unit								
UEM1.1.1 Engineering tools 1	01h30	03h00	02h30	07h00				
Introduction to Programming	01h30	01h30	01h00	04h00	4	4	40% (20% Tut+20% Lab)	60%
Technical Drawing		01h30		01h30	1	1	40%	60%
Free and Open Source Software			01h30	01h30	1	1	100%	
Cross-Disciplinary Teaching Unit								
UET1.1.1 Human sciences and languages 1	01h30	01h30	00h00	03h00				
General Economy	01h30			01h30	1	1		100%
English 1		01h30		01h30	1	1	40%	60%
Total (h)/week	13h30	12h00	04h30	30h00				
Total / Semester					30	30		

Semester 2:

Teaching Unit UE	Course (h)	Tutorials (h)	Laboratory works (h)	Total (h) /week	Coeff	Credits	Continuous assignment	Final Exam
Fundamental Teaching Unit								
UEF1.2.1 Mathematics 2	06h00	04h30	00h00	10h30				
Analysis 2	03h00	01h30		04h30	5	5	40%	60%
Algebra 2	01h30	01h30		03h00	4	4	40%	60%
Probability and statistics 2	01h30	01h30		03h00	4	4	40%	60%
UEF1.2.2 Physics sciences 2	04h30	03h00	02h00	09h30				
Physics 2	03h00	01h30	01h00	05h30	5	5	40% (20% Tut+20% Lab)	60%
Chemistry 2	01h30	01h30	01h00	04h00	4	5	40% (20% Tut+20% Lab)	60%
Methodology Teaching Unit								
UEM1.2.1 Engineering tools 2	01h30	01h30	02h30	07h00				
Algorithms and data structures	01h30	01h30	01h00	04h00	4	4	40% (20% Tut+20% Lab)	60%
Computer Aided Design			01h30	01h30	1	1	100%	
Discovery Teaching Unit								
UED1.2.1 Engineering	00h00	00h00	01h30	01h30				
Linux Operating System Fundamentals			01h30	01h30	1	1	100%	
Cross-Disciplinary Teaching Unit								
UET1.2.1 Human sciences and languages 2	01h30	01h30	00h00	01h30				
Human Engineering	01h30			01h30	1	1		100%
English 2		01h30		01h30	1	1	40%	60%
Total (h)/week	13h30	10h30	06h00	30h00				
Total / Semester					30	30		

Semester 3:

Teaching Unit UE	Course (h)	Tutorials (h)	Laboratory works (h)	Total (h) /week	Coeff	Credits	Continuous assignment	Final Exam
Fundamental Teaching Unit								
UEF2.1.1 Mathematics 3	03h00	03h00	00h30	06h30				
Analysis 3	01h30	01h30		03h00	3	3	40%	60%
Numerical Analysis 1	01h30	01h30	00h30	03h30	3	3	40% (20% Tut+20% Lab)	60%
UEF2.1.2 Physics sciences 3	03h00	03h00	01h00	07h00				
Physics 3	01h30	01h30	00h30	03h30	4	4	40% (20% Tut+20% Lab)	60%
Chemistry 3	01h30	01h30	00h30	03h30	3	3	40% (20% Tut+20% Lab)	60%
UEF2.1.3 Engineering sciences 1	04h30	04h30	01h00	10h00				
Mechanics of Rigid bodies 1	01h30	01h30		03h00	3	3		
General Electricity	01h30	01h30	00h30	03h30	4	4	40% (20% Tut+20% Lab)	60%
Fluid Mechanics	01h30	01h30	00h30	03h30	3	3	40% (20% Tut+20% Lab)	60%
Methodology Teaching Unit								
UEM2.1.1 Engineering tools 3	01h30	01h30	00h30	03h30				
Advanced Data Structures and Algorithms	01h30	01h30	00h30	03h30	3	3	40% (20% Tut+20% Lab)	60%
Discovery Teaching Unit								
UED2.1.1 Engineering	01h30	01h30	02h00	05h00				
Digital Logic and Combinational Circuits	01h30	01h30	00h30	03h30	3	3		
Cross-Disciplinary Teaching Unit								
UET2.2.1 Human sciences	01h30	00h00	00h00	01h30				
Information, Expression, and Communication Techniques	01h30				1	1		100%
Total (h)/week	13h30	13h30	05h00	32h00				
Total / Semester	225.00			487.50	30	30		

Semester 4:

Teaching Unit UE	Course (h)	Tutorials (h)	Laboratory works (h)	Total (h) /week	Coeff	Credits	Continuous assignment	Final Exam
Fundamental Teaching Unit								
UEF2.2.1 Mathematics 4	03h00	03h00		06h30				
Analysis 4	01h30	01h30		03h00	3	3	40%	60%
Numerical Analysis 2	01h30	01h30	00h30	03h30	3	3	40% (20% Tut+20% Lab)	60%
UEF2.2.2 Physics sciences 4	03h00	03h00	01h00	07h00				
Physics 4	01h30	01h30	00h30	03h30	4	4	40% (20% Tut+20% Lab)	60%
Chemistry 4	01h30	01h30	00h30	03h30	3	3	40% (20% Tut+20% Lab)	60%
UEF2.2.3 Engineering sciences 2	04h30	04h30	01h00	10h00				
Mechanics of Rigid bodies 2	01h30	01h30		03h00	3	3		
General Electronics	01h30	01h30	00h30	03h30	4	4	40% (20% Tut+20% Lab)	60%
Strength of materials	01h30	01h30	00h30	03h30	3	3	40% (20% Tut+20% Lab)	60%
Methodology Teaching Unit								
UEM2.2.1 Engineering tools 3	01h30	01h30	00h30	03h30				
Object-Oriented Programming	01h30	01h30	00h30	03h30	3	3	40% (20% Tut+20% Lab)	60%
Discovery Teaching Unit								
UED2.2.1 Engineering	01h30	01h30	00h30	03h30				
Digital Systems and Sequential Circuits	01h30	01h30	00h30	03h30	3	3	40% Lab (20% Tut+20% Lab)	60%
Cross-Disciplinary Teaching Unit								
UET2.2.1 Human sciences	01h30	00h00	00h00	01h30				
Ethics and deontology or Entrepreneurship	01h30				1	1		100%
Total (h)/week	15h00	13h30	03h30	32h00				
Total / Semester					30	30		

Semester 5 :

Teaching Unit TU	Semester hourly volume (15 weeks / Semester)				Coefficients	Assessment Method	
	Lectures (H)	Tutorials (H)	Laboratory Work (H)	Total (H)		Tutorial/Lab work	Final Exam
Core Teaching Unit (UEF)							
UEF1.1.1	4H30	4H30	3H	12H	8		
Introduction to System Dynamics and Control	1H30	1H30	1H	4H	4	(20% Tut + 20% Lab)	60%
Digital Signal Processing	1H30	1H30	1H	4H	4	(20% Tut + 20% Lab)	60%
Mathematics for Engineers	1H30	1H30	1H	4H	4	(20% Tut + 20% Lab)	60%
UEF1.1.2	3H	3H	2H	8H	12		
Advanced Analog Electronics	1H30	1H30	1H	4H	4	(20% Tut + 20% Lab)	60%
Introduction to Electrical Engineering	1H30	1H30	1H	4H	4	(20% Tut + 20% Lab)	60%
Methodology Teaching Unit (UEM)							
UEM1.1.1	3H	0H	3H	6H	6		
Computational Modeling & Simulation for Engineering Design	1H30	0H	1H30	3H	3	40% Lab	60%
Advanced Technical Design	1H30	0H	1H30	3H	3	40% Lab	60%
UEM1.1.2	1H30	0H	1H	2H30	2		
Sensors and Instrumentation	1H30	0H	1H	2H30	2	40% Lab	60%
Cross-disciplinary Teaching Unit (UET)							
UET1.1.1	1H30	0H	0H	1H30	1		
Introduction to Entrepreneurship	1H30	0H	0H	1H30	1		100%
Discovery Teaching Unit (UED)							
UED1.1.1	1H30	0H	0H	1H30	1		
Basic Principles of Robotics	1H30	0H	0H	1H30	1		100%
Total Semester S1	15H	6H	10H30	31H30	30		

Semester 6

Unité d'Enseignement UE	Semester hourly volume (15 weeks / Semester)				Coefficients	Assessment Method	
	Lectures (H)	Tutorials (H)	Laboratory Work (H)	Total (H)		Tutorial/Lab work	Final Exam
Unité d'Enseignement Fondamentale							
UEF1.2.1	3H	3H	2H	8H30	8		
Introduction to Machine Learning	1H30	1H30	1H	4H	4	(20% Tut + 20% Lab)	60%
Optimization Techniques	1H30	1H30	1H30	4H30	4	(20% Tut + 20% Lab)	60%
UEF1.2.2	4H30	4H30	2H	11H	11		
Microprocessors and Microcontrollers	1H30	1H30	1H	4H	4	(20% Tut + 20% Lab)	60%
Digital Control Systems	1H30	1H30	1H	4H	4	(20% Tut + 20% Lab)	60%
Mechanical Systems	1H30	1H30	0H	3H	3	40% Tut	60%
Unité d'Enseignement Méthodologie							
UEM1.2.1	4H30	0H	3H30	8H	7		
Computer Aided Design (CAD)	1H30	0H	1H30	3H	3	40% Lab	60%
Engineering programming	1H30	0H	1H	2H30	2	40% Lab	60%
Electric Actuators for Robotics	1H30	0H	1H	2H30	2	40% Lab	60%
Unité d'Enseignement Transversale							
UET1.2.1	1H	0H	1H30	2H30	2		
Introduction to UAVs Operations and Regulations	1H	0H	0H	1H	1		100%
Capstone Project I	0H	0H	1H30	1H30	1	100%	
Unité d'Enseignement Découverte							
UED1.2.1	0H	0H	1H30	1H30	2		
Linux Operating System	0H	0H	1H30	1H30	1	100% Lab	
Training Internship I	/	/	/	/	1	100%	
Total Semestre S2	13H	7H30	10H30	31H30	30		

Semester 7:

Unité d'Enseignement UE	Semester hourly volume (15 weeks / Semester)				Coefficients	Assessment Method	
	Lectures (H)	Tutorials (H)	Laboratory Work (H)	Total (H)		Tutorial/Lab work	Final Exam
Unité d'Enseignement Fondamentale							
UEF2.1.1	3H	3H	2H	8H	8		
Nonlinear and optimal control design	1H30	1H30	1H	4H	4	(20% Tut + 20% Lab)	60%
Multi-Physics Modeling of Technological Systems	1H30	1H30	1H	4H	4	(20% Tut + 20% Lab)	60%
UEF2.1.2	4H30	4H30	2H	11H	12		
Robot Motion Planning	1H30	1H30	1H	4H	4	(20% Tut + 20% Lab)	60%
Kinematics, Dynamics and Control of Robot Manipulators	1H30	1H30	0H	3H	4	40% Tut	60%
Power Electronics	1H30	1H30	1H	4H	4	(20% Tut + 20% Lab)	60%
Unité d'Enseignement Méthodologie							
UEM2.1.1	4H30	0H	3H30	8H	6		
Mobile Robotics	1H30	0H	1H	2H30	2	40% Lab	60%
Advanced and Current Trends in Artificial Intelligence,	1H30	0H	1H	2H30	2	40% Lab	60%
Robot Operating System & Computer Tools for Robotics	1H30	0H	1H30	3H	2	40% Lab	60%
Unité d'Enseignement Transversale							
UET2.1.1	1H30	0H	0H	1H30	2		
Marketing and Economy	1H30	0H	0H	1H30	2		100%
Unité d'Enseignement Découverte							
UED2.1.1	1H	0H	1H30	2H30	2		
Sensors for Autonomous Systems	1H	0H	0H	1H	1		100%
Capstone Project II	0H	0H	1H30	1H30	1	100% Lab	
Total Semestre S3	14H30	7H30	9	31H	30		

Semester 8:

Unité d'Enseignement UE	Semester hourly volume (15 weeks / Semester)				Coefficients	Assessment Method	
	Lectures (H)	Tutorials (H)	Laboratory Work (H)	Total (H)		Tutorial/Lab work	Final Exam
Unité d'Enseignement Fondamentale							
UEF2.2.1	4H30	1H30	3H30	9H30	10		
Industrial Automation	1H30	1H30	1H	4H	4	(20% Tut + 20% Lab)	60%
Industrial Robots Control	1H30	0H	1H	2H30	2	40% Lab	60%
Internet Of Things (IOT)	1H30	0H	1H30	3H	4	40% Lab	60%
UEF2.2.2	3H	1H30	3H	7H30	8		
UAV Flight Testing & Operations	1H30	1H30	1H30	4H30	4	(20% Tut + 20% Lab)	60%
Introduction to Materials & Mechanical Manufacturing Processes	1H30	0H	1H30	3H	4	40% Lab	60%
Unité d'Enseignement Méthodologie							
UEM2.2.1	3H	1H30	1H	5H30	5		
Advanced Embedded Systems	1H30	0H	1H	2H30	2	40% Lab	60%
Machine Dynamics	1H30	1H30	0H	3H	3	40% Tut	60%
UEM2.2.2	1H30	0H	1H30	3H	3		
Computational intelligence for Optimization	1H30	0H	1H30	3	3	40% Lab	60%
Unité d'Enseignement Transversale							
UET2.2.1	1H30	0H	0H	1H30	1		
Project management	1H30	0H	0H	1H30	1		100%
Unité d'Enseignement Découverte							
UED2.2.1	3H	0H	0H	3H	3		
Reverse Engineering and Rapid Prototyping	1H30	0H	0H	1H30	1		100%
Introduction to Industry 4.0 and Smart Manufacturing	1H30	0H	0H	1H30	1		100%
Training Internship II	/	/	/	/	1	100%	
Total Semestre S4	16h30	4H30	9H	30H	30		

Semester 9:

Unité d'Enseignement UE	Volume horaire semestriel (15 semaines / semestre)				Coefficients	Assessment Method	
	Lectures (H)	Tutorials (H)	Laboratory Work (H)	Total (H)		Tutorial/Lab work	Final Exam
Unité d'Enseignement Fondamentale							
UEF3.1.1	3H	3H	2H	8H	8		
Advanced Machine Learning for Robotics	1H30	1H30	1H	4H	4	(20% Tut + 20% Lab)	60%
Distributed Systems and Agent-Based Technologies	1H30	1H30	1H	4H	4	(20% Tut + 20% Lab)	60%
UEF3.1.2	4H30	1H30	3H30	9H30	10		
Human-machine, machine-machine Interaction/Collaboration	1H30	0H	1H	2H30	3	40% Lab	60%
Computer vision for robotics	1H30	1H30	1H	4H	4	(20% Tut + 20% Lab)	60%
Real-Time Operating Systems	1H30	0H	1H30	3H	3	40% Lab	60%
Unité d'Enseignement Méthodologie							
UEM3.1.1	3H	1H30	2H	6H30	7		
Marine Robotics	1H30	1H30	1H	4H	4	(20% Tut + 20% Lab)	60%
Data fusion	1H30	0H	1H	2H30	3	40% Lab	60%
Unité d'Enseignement Transversale							
UET3.1.1	3H	0H	0H	3H	2		
Entrepreneurship & Startup Development	1H30	0H	0H	1H30	1		100%
Quality Control	1H30	0H	0H	1H30	1		100%
Unité d'Enseignement Découverte							
UED3.1.1	3H	0H	0H	3H	3		
Service Robotics	1H30	0H	0H	1H30	1		100%
Cybersecurity	1H30	0H	0H	1H30	1		100%
Training Internship III	/	/	/	/	1	100%	
Total Semestre S5	16H30	8.5	12	30	30		

Semester 10:

Internships in companies or research laboratories culminating in a thesis and an oral defense.

		Semester Hourly Volume	Coefficients
Internship and Final Year Project	14 Weeks	420 hours	30
Total	14 Weeks	420 hours	30

III - Detailed Syllabus by Subject

III – Detailed program by course subject

Semester 5

Course Subject: Introduction to System Dynamics and Control, **Code:** ISDC
Course Subject: Digital Signal Processing, **Code:** DSP
Course Subject: Mathematics for Engineers, **Code:** MAE
Course Subject: Advanced Analog Electronics, **Code:** AAE
Course Subject: Introduction to Electrical Engineering, **Code:** IEE
Course Subject: Computational Modeling & Simulation for Engineering Design, **Code:** CMSED
Course Subject: Advanced Technical Design, **Code:** ATD
Course Subject: Sensors and Instrumentation, **Code:** SNI
Course Subject: Introduction to Entrepreneurship, **Code:** INE
Course Subject: Basic Principles of Robotics, **Code:** BPR

Semester 6

Course Subject: Introduction to Machine Learning, **Code:** IML
Course Subject: Optimization Techniques, **Code:** OPT
Course Subject: Microprocessors and microcontrollers, **Code:** MPMC
Course Subject: Digital Control Systems, **Code:** DCS
Course Subject: Mechanical systems, **Code:** IMS
Course Subject: Computer Aided Design, **Code:** CAD
Course Subject: Engineering Programming, **Code:** ENGP
Course Subject: Electric Actuators for Robotics, **Code:** EAR
Course Subject: Introduction to UAVs Operations and Regulations , **Code:** UAVOR
Course Subject: Capstone Project I, **Code:** CAP-I
Course Subject: Linux Operating System, **Code:** LOS
Course Subject: Training Internship I, **Code:** TI-I

Semester 7

Course Subject: Nonlinear and Optimal Control Design, **Code:** NLOCD
Course Subject: Multi-Physics Modeling of Technological Systems, **Code:** MPMTS
Course Subject: Robot Motion Planning, **Code:** RMP
Course Subject: Kinematics, Dynamics and Control of Robot Manipulators, **Code:** KDCRM
Course Subject: Power Electronics, **Code:** POWE
Course Subject: Mobile Robotics, **Code:** MOR
Course Subject: Advanced and Current Trends in Artificial Intelligence, **Code:** ACTAI
Course Subject: Robot Operating System & Computer Tools for Robotics, **Code:** ROS-CTR
Course Subject: Marketing and Economy, **Code:** MARE
Course Subject: Sensors for Autonomous Systems, **Code:** SNAS
Course Subject: Capstone Project II, **Code:** CAP-II

Semester 8

Course Subject: Industrial Automation, **Code:** IAUT
Course Subject: Industrial Robots Control, **Code:** IRC
Course Subject: Internet Of Things (IOT), **Code:** IOT
Course Subject: UAV Flight Testing & Operations, **Code:** UAVFTO
Course Subject: Introduction to Materials & Mechanical Manufacturing Processes, **Code:** IMMMP
Course Subject: Advanced Embedded Systems **Code:** AES
Course Subject: Machine Dynamics, **Code:** MADY
Course Subject: Computational intelligence for Optimization, **Code:** CIO
Course Subject: Project management, **Code:** PROM
Course Subject: Reverse Engineering and Rapid Prototyping, **Code:** RERP
Course Subject: Introduction to Industry 4.0 and Smart Manufacturing, **Code:** IISM
Course Subject: Training Internship II, **Code:** TI-II

Semester 9

Course Subject: Advanced Machine Learning for Robotics, **Code:** AMLR
Course Subject: Distributed Systems and Agent-Based Technologies, **Code:** DSABT
Course Subject: Human-Machine, Machine-Machine Interaction/Collaboration, **Code:** MMI
Course Subject: Computer Vision for Robotics, **Code:** CVR
Course Subject: Real-Time Operating Systems, **Code:** RTOS
Course Subject: Marine Robotics, **Code:** MROB
Course Subject: Data fusion, **Code:** DFU
Course Subject: Entrepreneurship & Startup Development, **Code:** ESTART
Course Subject: Quality Control, **Code:** QCN
Course Subject: Service robotics, **Code:** SROB
Course Subject: Cybersecurity, **Code:** CYBER
Course Subject: Training Internship III, **Code:** TI-III