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

المدرسة الوطنية العليا لتكنولوجيا الأنظمة المستقلة
NATIONAL HIGHER SCHOOL OF AUTONOMOUS SYSTEMS TECHNOLOGY

STATE ENGINEER TRAINING PROGRAM

Academic year: 2025/2026

Institution
National Higher School of Autonomous Systems Technology

Domain	Field	Specialty
Science and Technology	***Automatique***	***Unmanned Systems Navigation and Control***

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اللجنة البيداغوجية الوطنية لميدان العلوم و التكنولوجيا

Comité Pédagogique National du Domaine Sciences et Technologies

عرض تكوين
مهندس دولة

السنة الجامعية: 2025/2026

المؤسسة
المدرسة الوطنية العليا لتكنولوجيا الأنظمة المستقلة

الميدان	الفرع	التخصص
علوم وتكنولوجيا	الية	الملاحة والتحكم في الأنظمة غير المأهولة

Content

I. Training Context and Objectives

1- Background and Strategic Vision of the Training program

The National Higher School of Autonomous Systems Technology offers a three-year engineering program in Unmanned Systems Navigation and Control for students who have completed their preparatory cycle. This initiative aligns with the institution's mission to develop modern, rigorous engineering programs that respond to current technological needs.

The curriculum was designed in collaboration with academic and industrial partners to ensure both theoretical relevance and practical application. It integrates fundamental electronics principles with specialized knowledge in autonomous systems creating a comprehensive educational framework that prepares graduates for diverse professional paths.

This program is part of a coherent academic structure that includes complementary specializations in autonomous systems technologies:

- Unmanned Systems Navigation and Control (present program)
- Autonomous Embedded Systems Engineering
- Robotics and Autonomous Systems Design

The educational approach emphasizes balanced development of theoretical understanding and practical skills through laboratory work, project-based learning, and industrial internships. The program directly supports Algeria's strategic objectives for technological advancement and economic diversification while maintaining alignment with international standards.

2- Admission Requirements

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

3- Program Objectives

The **Unmanned Systems Navigation and Control (USNC)** specialty is designed to equip engineers with comprehensive expertise in designing, developing, and operating unmanned systems across diverse environments, including terrestrial, aerial, and marine domains. The primary objective of this field is to ensure engineers are proficient in the intricate principles of navigation, control, and security of uncrewed vehicles. This encompasses mastering technologies like GPS, sensors, machine learning, and real-time decision-making systems to enable autonomy and adaptability in unmanned operations.

USNC professionals are trained to tackle complex challenges such as autonomous maritime drones, aerial drones for agriculture, and swarm robotics for coordinated tasks. This specialization emphasizes the integration of cutting-edge technologies; ensuring unmanned systems can operate safely and effectively in dynamic, real-world conditions. Graduates will be prepared to contribute to diverse sectors such as agriculture, defense, search-and-rescue missions, and environmental monitoring, pushing the boundaries of autonomous operations and technological innovation.

4- Targeted skills and Profiles

The **Unmanned Systems Navigation and Control (USNC)** specialty is aimed at developing highly skilled engineers who possess a diverse set of competencies required to excel in the rapidly evolving field of unmanned systems. The targeted profiles of graduates in this specialty include experts capable of designing, programming, and deploying autonomous systems in a variety of environments, such as terrestrial, aerial, and marine.

Targeted Profiles:

1. **Autonomous System Designer**: These professionals are adept at conceptualizing and developing unmanned systems with integrated navigation and control capabilities. They possess the technical know-how to create robust systems that can operate in dynamic and challenging environments.
2. **Robotics Engineer**: Skilled in the application of robotics principles, these engineers specialize in the development and deployment of swarm robotics, ensuring seamless cooperation among multiple unmanned systems to complete complex tasks autonomously.
3. **Aerial and Maritime Drone Specialist**: With a focus on specific types of unmanned systems, these engineers are proficient in the operation and

management of drones designed for agricultural, environmental, or defense applications, mastering both aerial and underwater vehicle technologies.

4. **Control Systems Engineer**: These engineers are experts in the design of control algorithms that ensure accurate and stable behavior of unmanned systems, even in unpredictable conditions.
5. **Security Expert in Unmanned Systems**: Engineers with a focus on the cybersecurity of unmanned systems, ensuring the safety of data, communications, and operations, as well as safeguarding against potential threats in autonomous operations.

Key Skills:

- **Advanced Navigation Techniques**: Proficiency in GPS, inertial navigation systems (INS), and other navigation methods, ensuring unmanned systems can operate autonomously in real-world conditions.
- **Control Systems and Algorithms**: Expertise in developing control systems, including the application of PID controllers, state estimation, path planning, and real-time decision-making algorithms.
- **Artificial Intelligence and Machine Learning**: Utilizing AI and ML to enhance the autonomy and adaptability of unmanned systems, enabling them to learn from their environment and optimize their operations.
- **Robotic Systems Integration**: Ability to integrate various components such as sensors, actuators, and communication systems to create effective unmanned vehicles.
- **Cybersecurity for Unmanned Systems**: Knowledge in securing communications, data transmission, and ensuring the safety of unmanned operations from cyber threats.
- **Communication Systems**: Understanding of communication protocols (e.g., GSM, RF, and satellite) to enable reliable interaction between unmanned systems and control stations.

Graduates of this specialty will be equipped with the interdisciplinary knowledge and hands-on experience necessary to innovate and advance unmanned systems technologies, driving the future of autonomous vehicles across various industries.

5- Regional and national employability potential

In Algeria, the Unmanned Systems Navigation and Control (USNC) specialty offers significant regional and national employability potential, as the demand for autonomous systems is growing across various sectors. The country's expanding interest in modern technologies, such as agriculture, defense, environmental monitoring, and oil and gas exploration, presents numerous opportunities for professionals skilled in unmanned systems. Agricultural drones, for example, are increasingly being used to monitor crops, while unmanned aerial vehicles (UAVs) are being adopted for surveillance and security purposes by defense and civil agencies. Additionally, Algeria's strategic location and its investments in maritime and aerospace sectors open up career pathways in both government agencies and private companies. As the country continues to modernize its infrastructure and technological capabilities, the demand for skilled engineers in the field of unmanned systems will only increase, making USNC graduates highly sought after in the local job market.

6- Bridges to other specialties

The Unmanned Systems Navigation and Control Engineer specialty offers strong connectivity with related disciplines, facilitating academic mobility and career development. Students may request transfers to other electrical engineering specializations within Algerian universities.

Our program's comprehensive curriculum creates multiple pathways for graduates. Those wishing to pursue academic careers can seamlessly transition into research teams across various domains, including robotics, artificial intelligence, IoT systems, and control engineering. The foundational knowledge and specialized skills acquired throughout this program prepare students for industry leadership and scholarly advancement in emerging technological fields in Algeria and beyond.

The interdisciplinary nature of Unmanned Systems Navigation and Control naturally creates bridges to specializations in telecommunications, control systems, computer engineering, and power electronics, allowing graduates to pivot their careers according to technological evolution and personal interests.

7- Program monitoring indicators

The Unmanned Systems Navigation and Control Engineering program employs a comprehensive set of key performance indicators to ensure continuous quality improvement and alignment with industry needs. These metrics enable systematic

monitoring of educational outcomes and program effectiveness across multiple dimensions:

Academic Performance Metrics:

- Application rates and selectivity ratios for incoming cohorts
- Program completion rates and graduation statistics
- Average time to graduation and credit accumulation patterns
- Academic performance distribution across core and specialized Lectures

Professional Integration Assessment:

- Employment rate of graduates within six months and one year of program completion
- Sectorial distribution of graduate employment across industries
- Percentage of graduates securing positions in their field of specialization
- Career progression trajectories of Alumni over three and five-year periods

Research and Academic Advancement:

- Number of graduates pursuing doctoral studies
- Research publications stemming from capstone projects
- Participation rates in academic conferences and technical competitions
- Intellectual property development from student projects

Stakeholder Feedback Mechanisms:

- Structured evaluations from current students at mid-program and completion stages
- Alumni satisfaction surveys conducted at one and three years post-graduation
- Employer assessments of graduate preparedness and performance
- Industry partner feedback on curriculum relevance and emerging skill requirements

Partnership Development Indicators:

- Growth in industry partnerships for internships and capstone projects
- Expansion of research collaborations with national and international institutions
- Development of exchange opportunities with partner schools
- Engagement levels with the Algerian innovation ecosystem

The program administration conducts annual reviews of these indicators, enabling data-driven refinement of curriculum content, teaching methodologies, and industry alignment to ensure graduates remain at the forefront of autonomous systems engineering practice in Algeria and beyond.

8 – Human resources available

A : Enrollment Capacity

150 students (50 per promotion)

B : Academic Supervision Team

B-1 : Internal Supervision

Name	Speciality	Rank	Intervention Type
Mourad ADNANE	**Instrumentation/ Signal Processing**	**Prof**	**Course/Tutorials/Lab**
Kamel BOUDJIT	**Electronics/Embedded Systems**	**MCA**	**Course/Tutorials/Lab**
Tarek CHERIFI	**Electronics/Embedded Systems**	**MCA**	**Course/Tutorials/Lab**
Leila ABBAD	**Electronics/ Networks**	**MCB**	**Course/Tutorials/Lab**
Ahmed ZEGLAOUI	**Mathematics/ Optimization**	**MCB**	**Course/Tutorials/Lab**
Yasmine GUERBAI	**Electronics/AI**	**MCA**	**Course/Tutorials/Lab**
Salaheddine AOUDJ	**Chemistry/Electrochemistry**	**MCA**	**Course/Tutorials/Lab**
Faiza BOUMEDIENE	**Mechanics/Robotics**	**Pr**	**Course/Tutorials/Lab**
Halima LAMMARI	**Mechanics/Robotics**	**MCB**	**Course/Tutorials/Lab**
Abdelkader HAMTTAT	**Mathematics**	**MCA**	**Course/Tutorials/Lab**
Mohamed LAIDI	**Statistics**	**MCA**	**Course/Tutorials/Lab**
Said REZIG	**Mathematics**	**MAA**	**Course/Tutorials/Lab**

Ziane KECHIDI	**Physics/**	**Prof**	**Course/Tutorials/Lab**
Ouassila HIOUAL	**Informatics/AI**	**Prof**	**Course/Tutorials/Lab**

B-2 : External Supervision

Name	Speciality	Institution	Rank	Intervention Type
Mohamed TADJINE	**Control Engineering/Robotics**	**ENP**	**Prof**	**Course/Tutorials/ Lab**
Fouad YACEF	**Control Engineering/Drones**	**CDTA**	**Dr**	**Course/Tutorials/ Lab**
Rabie Riadh BENREZKI	**Navigation and Control**	**CDTA**	**Dr**	**Course/Tutorials/ Lab**
Abdellah KHELLOUFI	**Navigation and Control**	**CDTA**	**Dr**	**Course/Tutorials/ Lab**
Mohamed ZAOUCHE	**Control Engineering/UAS**	**Expert**	**Dr**	**Course/Tutorials/ Lab**

B-3 : Comprehensive Summary of Human Resources

Rank	Internal resource	External resource	Total
Professor	**3**	**1**	**4**
MCA	**6**	**3**	**9**
MCB	**3**	**0**	**3**

B-4 : Permanent Support Staff

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

7 – Available Material Resources

A- Educational Facilities

Location	Seatting 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**
Computing Center	**40**	**1**	**40**
Internet Room	**40**	**2**	**80**

B- Educational Laboratories and Equipment

Laboratory Name : Electricity Lab
Student Capacity: 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

- **Laboratory Name: Physics Lab 1**

Student Capacity: 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
111	Analogic Ammeter	07	Excellent state

- **Laboratory Name: physics Lab 2**

Student Capacity: 25

N°	Equipment	Quantity	Operational Status
01	Pohl's Pendulum	1	Excellent state
02	Wave Tank/Ripple Tank	1	Excellent state
03	Vibrating String/Cord	1	Excellent state
04	Kundt's Tube	1	Excellent state
05	Light Polarization (Equipment)	1	Excellent state
06	Light Diffraction (Equipment)	1	Excellent state

- **Laboratory Name: Chemistry Laboratory.**

Student Capacity: 25

N°	Equipment	Quantity	Operational Status
01	Fume hood	01	Excellent state
02	Oven/Incubator	01	Excellent state
03	Distiller	01	Excellent state
04	Ice generator	01	Excellent state
05	Calorimeter	04	Excellent state
06	Heating plates	04	Excellent state
07	Heater with stirrer	01	Excellent state
08	Scale/Balance	02	Excellent state
09	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

- **Laboratory Title: Fluid Mechanics.**

Student Capacity: 25

N°	Equipment	Quantity	Operational Status
01	Digital Hydraulic Bench	01	Excellent state
02	Center of Pressure Apparatus	02	Excellent state
03	Falling Sphere Viscometers	02	Excellent state
04	Venturi Tube	01	Excellent state
05	Notch Discharge Apparatus	01	Excellent state

- **Laboratory Title: Mechanics Laboratory.**

Student Capacity: 25.

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

C- Internship and Corporate Training Sites

Training Sites

Institution	Student Number	Training Duration
Mobilis	**20**	15 days
CRTI	**20**	15 days
CDTA	**20**	15 days
DeepMinds	**5**	15 days
Sonatrach	**20**	15 days
SEAAL	**10**	15 days
SONELGAZ	**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 5 :

Unité d'Enseignement UE	Volume horaire semestriel (15 semaines / semestre)					Coefficients	Credits
	Cours (h)	Travaux dirigés (h)	Travaux pratiques(h)	Travail Personnel (h)	Total (h)		
Unité d'Enseignement Fondamentale							
UEF1.1.1	**4**	**3**	**2**	**2**	**11**	**8**	**8**
Linear Control Systems	2	1.5	1	1	5.5	4	4
Embedded Systems Design	2	1.5	1	1	5.5	4	4
UEF1.1.2	**6**	**4.5**	**3**	**3**	**16.5**	**12**	**12**
Advanced Electronics	2	1.5	1	1	5.5	4	4
Instrumentation and Sensors	2	1.5	1	1	5.5	4	4
Digital Signal Processing	2	1.5	1	1	5.5	4	4
Unité d'Enseignement Méthodologie							
UEM1.1.1	**3**	**1**	**3**	**2**	**9**	**6**	**6**
Introduction to Linux	1	0	2	1	4	3	3
Optimization Techniques	2	1	1	1	5	3	3
Unité d'Enseignement Transversale							
UET1.1.1	**1**	**0**	**0**	**1**	**2**	**2**	**2**
Ethics and Safety in AI and Robotics	1	0	0	1	2	2	2
Unité d'Enseignement Découverte							
UED1.1.1	**1.5**	**0**	**0**	**1**	**2.5**	**2**	**2**
Principles of Flight and Aeronautics	1.5	0	0	1	2.5	2	2
Total Semestre S1	**15. 5**	**8.5**	**8**	**9**	**41**	**30**	**30**

Semester 6 :

Unité d'Enseignement UE	Volume horaire semestriel (15 semaines / semestre)					Coefficients	Credits
	Cours (h)	Travaux dirigés (h)	Travaux pratiques(h)	Travail Personnel (h)	Total (h)		
Unité d'Enseignement Fondamentale							
UEF1.2.1	**4**	**2.5**	**2**	**2**	**10.5**	**7**	**7**
State Space Analysis and Control Design	2	1	1	1	5	4	4
Kinematics and Dynamics of Unmanned Systems	2	1.5	1	1	5.5	3	3
UEF1.2.2	**4**	**3**	**2**	**2**	**11**	**6**	**6**
Modeling and Control of Robotic Manipulators	2	1.5	1	1	5.5	3	3
Actuators	2	1.5	1	1	5.5	3	3
Unité d'Enseignement Méthodologie							
UEM1.2.1	**2**	**1**	**3**	**2**	**8**	**6**	**6**
Communication Systems	1	1	1	1	4	3	3
Real Time Operating Systems	1	0	2	1	4	3	3
UEM1.2.2	**2.5**	**1**	**3**	**2**	**8.5**	**6**	**6**
Power Electronics	1.5	1	1	1	4.5	3	3
Introduction to Machine Learning	1	0	2	1	4	3	3
Unité d'Enseignement Transversale							
UET1.2.1	**1**	**0**	**0**	**1**	**2**	**2**	**2**
Regulations and Standards for Unmanned Systems	1	0	0	1	2	2	2
Unité d'Enseignement Découverte							
UED1.2.1	**0**	**0**	**1**	**3**	**4**	**3**	**3**
Capstone Project I	**0**	**0**	**1**	1	2	2	2
Training Internship I	**/**	**/**	**/**	2	2	1	1
Total Semestre S2	**13.5**	**7.5**	**11**	**12**	**44**	**30**	**30**

Semester 7:

Unité d'Enseignement UE	Volume horaire semestriel (15 semaines / semestre)					Coefficients	Credits
	Cours (h)	Travaux dirigés (h)	Travaux pratiques(h)	Travail Personnel (h)	Total (h)		
Unité d'Enseignement Fondamentale							
UEF2.1.1	**5**	**2**	**3.5**	**3**	**13.5**	**9**	**9**
Multivariable Control Systems Design	2	1	1	1	5	3	3
Computer Vision	2	0	1.5	1	4.5	3	3
System Identification	1	1	1	1	4	3	3
UEF2.1.2	**5.5**	**2**	**3.5**	**3**	**14**	**9**	**9**
Fundamentals of Autonomous Navigation	2	1	1	1	5	3	3
Filtering and Recursive Estimation	2	1	1	1	5	3	3
Advanced Embedded Systems Design	1.5	0	1.5	1	4	3	3
Unité d'Enseignement Méthodologie							
UEM2.1.1	**1**	**0**	**2**	**1**	**4**	**3**	**3**
Neural Networks and Deep Learning	1	0	2	1	4	3	3
Unité d'Enseignement Transversale							
UET2.1.1	**1.5**	**1**	**3**	**2**	**7.5**	**5**	**5**
Antennas and Propagation	1.5	1	1	1	4.5	3	3
Mechanical CAD for Robotics	0	0	2	1	3	2	2
Unité d'Enseignement Découverte							
UED2.1.1	**1**	**0**	**1**	**2**	**4**	**4**	**4**
Project Management for Engineers	1	0	0	1	2	2	2
Capstone Project II	0	0	1	1	2	2	2
Total Semestre S3	**14**	**5**	**13**	**11**	**43**	**30**	**30**

Semester 8:

Unité d'Enseignement UE	Volume horaire semestriel (15 semaines / semestre)					Coefficients	Credits
	Cours (h)	Travaux dirigés (h)	Travaux pratiques(h)	Travail Personnel (h)	Total (h)		
Unité d'Enseignement Fondamentale							
UEF2.2.1	**4**	**2**	**2**	**2**	**10**	**6**	**6**
Non Linear Control Systems	2	1	1	1	5	3	3
Optimal Control	2	1	1	1	5	3	3
UEF2.2.2	**5.5**	**2.5**	**4**	**3**	**15**	**9**	**9**
Advanced AI Techniques	1.5	0	2	1	4.5	3	3
Advanced Navigation Systems	2	1.5	1	1	5.5	3	3
Aerodynamics and Hydrodynamics	2	1	1	1	5	3	3
Unité d'Enseignement Méthodologie							
UEM2.2.1	**4**	**1**	**3**	**3**	**11**	**9**	**9**
Human-robot Interaction	1	1	1	1	4	3	3
UAV Flight Testing and Operations	0	0	2	1	3	3	3
Propulsion Systems	3	0	0	1	4	3	3
Unité d'Enseignement Transversale							
UET2.2.1	**1**	**0**	**1**	**1**	**3**	**3**	**3**
Cybersecurity for Unmanned Systems	1	0	1	1	3	3	3
Unité d'Enseignement Découverte							
UED2.2.1	**1.5**	**0**	**2**	**5**	**8.5**	**3**	**3**
Reverse Engineering and Rapid Prototyping	1.5	0	0	1	2.5	1	1
Capstone Project III	0	0	2	2	4	1	1
Training Internship II	/	/	/	2	2	1	1
Total Semestre S4	**16**	**5.5**	**12**	**14**	**47.5**	**30**	**30**

Semester 9:

Unité d'Enseignement UE	Volume horaire semestriel (15 semaines / semestre)					Coefficients	Credits
	Cours (h)	Travaux dirigés (h)	Travaux pratiques(h)	Travail Personnel (h)	Total (h)		
Unité d'Enseignement Fondamentale							
UEF3.1.1	**4**	**1**	**2**	**2**	**9**	**8**	**8**
Advanced UAS Programming	1	1	2	1	5	4	4
Fundamentals of Aerospace Engineering	3	0	0	1	4	4	4
UEF3.1.2	**3.5**	**3**	**2.5**	**2**	**11**	**6**	**6**
Electric Vehicles and Energy Systems	2	1.5	1	1	5.5	3	3
Reinforcement Learning	1.5	1.5	1.5	1	5.5	3	3
Unité d'Enseignement Méthodologie							
UEM3.1.1	**4**	**1**	**1**	**2**	**8**	**6**	**6**
Swarm Robotics and Multi-Agent Systems	1	1	1	1	4	3	3
Unmanned Systems Practical Cases	3	0	0	1	4	3	3
Unité d'Enseignement Transversale							
UET3.1.1	**2**	**0**	**2**	**2**	**6**	**6**	**6**
Biomimetisme and Bio-inspired Robotics	1	0	1	1	3	3	3
Industrial Automation	1	0	1	1	3	3	3
Unité d'Enseignement Découverte							
UED3.1.1	**2**	**0**	**4**	**5**	**11**	**4**	**4**
Training Internship III	**0**	**0**	**0**	2	2	1	1
Capstone Project IV	1	0	4	2	7	2	2
Academic Communication and Research	1	0	0	1	2	1	1
Total Semestre S5	**15.5**	**5**	**11.5**	**13**	**45**	**30**	**30**

Semester 10:

Students complete internships in companies or research laboratories, which conclude with the submission of 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

Course List

Semester 5

Matière: Linear Control Systems **Code:** LCS
Matière: Embedded Systems Design **Code:** ESD
Matière: Advanced Electronics **Code:** ADE
Matière: Instrumentation and Sensors **Code:** INS
Matière: Digital Signal Processing **Code:** DSP
Matière: Introduction to Linux **Code:** ILI
Matière: Optimization Techniques **Code:** OPT
Matière: Ethics and Safety in AI and Robotics **Code:** ESAIR
Matière: Principles of Flight and Aeronautics **Code:** PFA

Semester 6

Matière: State Space Analysis and Control Design **Code:** SSACD
Matière: Kinematics and Dynamics of Unmanned Systems **Code:** KDUS
Matière: Modeling and Control of Robotic Manipulators **Code:** MCRM
Matière: Actuators **Code:** ACT
Matière: Communication Systems **Code:** CSY
Matière: Real Time Operating Systems **Code:** RTOS
Matière: Power Electronics **Code:** POE
Matière: Introduction to Machine Learning **Code:** IML
Matière: Regulations and Standards for Unmanned Systems **Code:** RSUS
Matière: Capstone Project I **Code:** CP-I
Matière: Training Internship I **Code:** TI-I

Semester 7

Matière: Multivariable Control Systems Design **Code:** MCSD
Matière: Computer Vision **Code:** CV
Matière: System Identification **Code:** PID
Matière: Fundamentals of Autonomous Navigation **Code:** FAN
Matière: Filtering and Recursive Estimation **Code:** FRE
Matière: Advanced Embedded Systems Design **Code:** AESD
Matière: Neural networks and Deep Learning **Code:** NNDL
Matière: Antennas and Propagation **Code:** APR
Matière: Mechanical CAD for Robotics **Code:** MCR
Matière: Project Management for Engineers **Code:** PME
Matière: Capstone Project II **Code:** CP_II

Semester 8

Matière: Nonlinear Control Systems **Code:** NCS
Matière: Optimal Control **Code:** OC
Matière: Advanced AI techniques **Code:** AAT
Matière: Advanced Navigation Systems **Code:** ANS
Matière: Aerodynamics and Hydrodynamics **Code:** AH
Matière: Human-robot interaction **Code:** HRI
Matière: UAV Flight Testing and Operations **Code:** UFTO

Matière: Cybersecurity for Unmanned Systems **Code:** CUS
Matière: Reverse Engineering and Rapid Prototyping **Code:** REPP
Matière: Capstone Project III **Code:** CP-III
Matière: Training Internship II **Code:** TI_II

Semester 9

Matière: Advanced UAS Programming **Code:** AUP
Matière: Fundamentals of Aerospace Engineering **Code:** FAE
Matière: Electric Vehicles and Energy Systems **Code:** EVES
Matière: Reinforcement Learning **Code:** REL
Matière: Swarm Robotics and Multi-Agent Systems **Code:** SRMAS
Matière: Unmanned Systems Practical Cases **Code:** USPC
Matière: Humanoid and Bio-inspired Robotics **Code:** HBIR
Matière: Industrial Automation **Code:** INA
Matière: Training Internship III **Code:** TI-III
Matière: Capstone Project IV **Code:** CP-IV
Matière: Academic Communication and Research **Code:** ACR