

# Master Aerospace Systems - Navigation and Telecommunications

MASTER IN AEROSPACE ENGINEERING



**Niveau d'étude visé**  
BAC +5



**Diplôme**  
Master (LMD)



**Domaine(s) d'étude**  
Ingénierie des systèmes,  
Systèmes embarqués,  
Traitement du signal,  
Réseaux -  
Télécommunication



**Accessible en**  
Formation initiale, VAE



**Établissements**  
ENAC - Ecole nationale de l'aviation civile

## Présentation

The Master of Science in GNSS, Global Navigation Satellite System, defines a satellite-based system that allows autonomous positioning and navigation of a suitably equipped user everywhere and at all times.

The Master of Science (MSc) in GNSS is a 2-year programme offering advanced education in Satellite-based Positioning and Space Telecommunications.

It aims at training students for the steadily growing GNSS industry.

This international enthusiasm is confirmed by the worldwide development of other global and regional satellite-based navigation systems in Europe, the USA, China, Russia, India and Japan, creating a strong need for experts in this field.

The objective of this MSc in GNSS is to provide students with advanced skills and knowledge in the field of GNSS and its related applications, in order to prepare them to enter the highly dynamic GNSS and GNSS-dependent industry. In addition, the students will have a grounding in telecommunications, as both fields are strongly complementary.

## Objectifs

Global Navigation Satellite Systems (GNSSs) have gained a lot of worldwide attention due to a significant increase in applications using GPS for positioning and navigation (aeronautics, vehicular and pedestrian navigation, location-based services, etc).

## Et après...

### Insertion professionnelle

Career opportunities :

Recent studies have shown that there will be a lack of graduate students to fill the open positions in the GNSS industry in the near future. This MSc in GNSS provides students with a head start in the evolving and growing market of satellite-based navigation and telecommunications.

Hence, graduate students can join:

- large companies,
- SMEs,
- national institutions,
- research laboratories.

## Contact(s)

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### Contacts

#### Responsable pédagogique

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## Infos pratiques

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## Lieu(x)

📍 Toulouse

# Programme

## Année 1

### Semestre 7

	Nature	CM	TD	TP	Crédits
MA414E - Theory of distributions for signal processing	UE	20h	10h		
MA405E - Probability/Statistics	UE	20h	10h		
MA406E - Stochastic Processes	UE	16h	10h		
IP405E - Programming and C language	UE	16h		28h	
MO404E - Electromagnetics	UE	16h	4h		
SP4002E - Signal theory and signal processing	UE	18h	6h	2h	
SP4003E - Digital signal processing	UE	16h	10h	2h	
EE4002E - Analog filtering	UE	10h	6h		
AU408E - Linear servo loop system	UE	10h		6h	
NA402E - Introduction to GNSS and its evolutions	UE	25h		6h	
NA497E - PVT computation project	UE			40h	
LV401 - Culture and language French	UE	28h			
LV406E - Culture and Language - English	UE	26h			
LV409 - Culture and Language - other language	UE	26h			

### Semestre 8

	Nature	CM	TD	TP	Crédits
MO4006E - Antenna and propagation for GNSS	UE	14h	6h		
MO4004E - Propagation Channels Modeling	UE	12h	4h		
SV4010E - Surveillance Principles	UE	28h	8h		
SP4004E - Estimation/Detection	UE	12h	6h		
SP5004E - Kalman Filtering	UE	8h	6h		
AU409E - State Space Modeling, Analysis and Control	UE	14h		4h	
SP4006E - Digital communications	UE	22h	13h	6h	
NA404E - GNSS for Civil Aviation	UE	12h	4h		

NA403E - Differential GNSS Methods	UE	16h		14h
NA406E - Inertial Sensors and Hybridization Techniques	UE	10h	6h	2h
NA4007E - Astrodynamics	UE			
NA491E - Applied project	UE			60h
CP4005E - Course project - Market your Ideas	UE			
CS406E - Introduction to System Engineering and Quality	UE	8h		
CS407E - Project Management	UE	4h	2h	
LV402 - Culture and Language - French	UE	28h		
LV407E - Culture and Language - English	UE	26h		
LV410 - Culture and Language - other language	UE	26h		
DD101E - Climate days change	UE	8h	2,5h	0,5h

## Année 2

	Nature	CM	TD	TP	Crédits
Semestre 9					
	Nature	CM	TD	TP	Crédits
SP5005E - Digital Receivers	UE				
SP5015E - Array signal processing	UE				
SP5002E - Parametric modeling	UE				
SP5009E - Spread Spectrum Techniques	UE	14h	4h		
NA5012E - Concepts Avancés du GNSS : GPS L1 C/A receiver signal processing	UE				
SP514E - Modern Channel Coding	UE	10h	2h		
SP513E - Classical Channel Coding	UE	12h	4h		
SP5007E - Spatial Technology	UE				
AV5002E - Systèmes CNS de bord	UE				
NA5020E - Future GNSS Signals	UE	4h			
NA5021E - High Sensitive Receivers - Urban positioning	UE				
NA5022E - Alternative Positioning	UE				
NA5023E - Business in GNSS	UE				
NA5920E - Projet GPS L1 C/A Receiver	UE	2h		26h	

NA499E - Applied project	UE		
LV501 - Culture and Language - French	UE	28h	
LV504E - Culture and Language - English	UE		
LV411 - Culture and Language - other language	UE	26h	
DD102E - Societal challenges (Masters)	UE		
TX5900 - End of studies project internship / Projet de fin d'études	UE		30