



Study Plan

School: School of Sciences and Technology
Degree: *** TRANSLATE ME: Pós-Graduação ***
Course: *** TRANSLATE ME: Tecnologia Aeronáutica (cód. 671) ***

1st Year - 1st Semester

Component code	Name	Scientific Area Field	ECTS	Duration	Hours
FIS13016O	Fundamentals of Aeronautics	*** TRANSLATE ME: ***	6	Semester	156
FIS13017O	Materials and Technologies	*** TRANSLATE ME: ***	6	Semester	156
FIS13018O	Structures in Aeronautics	*** TRANSLATE ME: ***	6	Semester	156
FIS13019O	Computer Aided Design	*** TRANSLATE ME: ***	6	Semester	156
FIS13020O	Computer Aided Manufacturing	*** TRANSLATE ME: ***	6	Semester	156

1st Year - 2nd Semester

Component code	Name	Scientific Area Field	ECTS	Duration	Hours
FIS13021O	Robotics	*** TRANSLATE ME: ***	6	Semester	156
FIS13022O	Automation	*** TRANSLATE ME: ***	6	Semester	156
FIS13023O	Supervision and control systems in aeronautics	*** TRANSLATE ME: ***	6	Semester	156
FIS13024O	Aeronautics Production Management	*** TRANSLATE ME: ***	6	Semester	156
FIS13025O	Regulations, Quality and Safety	*** TRANSLATE ME: ***	6	Semester	156

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Fundamentals of Aeronautics (FIS13016O)

- 1 - A brief history of aviation.
- 2 - Airplane morphology: constituent parts, functions and geometry.
- 3 - Forces and movements: weight; lift; drag; traction. Aircraft movements and control surfaces.
- 4 - Mass and balance.
- 5 - Propulsion: aircraft engines; fuel system; APU unit.
- 6 - Flight control and systems (flight control, hydraulics, landing gear).
- 7 - Main flight instruments: Six Instruments; Pitot / Static system and gyroscopic instruments.



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Materials and Technologies (FIS130170)

- 1 - Materials for aeronautics.
- 2 - Metallic materials: characteristics and properties; alloys for aeronautics. Thermal treatments.
- 3 - Composite materials: characteristics and properties; carbon fibre-reinforced polymeric-matrix. Manufacturing technologies.
- 4 - Special processes: sealing; anodizing; painting.
- 5 - Corrosion and fatigue in aeronautical materials.
- 6 - Mechanical tests and non-destructive tests.

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Structures in Aeronautics (FIS130180)

1. Fundamentals of elasticity theory
2. Structural instability: Columns and thin plates
3. Structural components of an aircraft and imposed loads
4. Structural analysis of aircraft components

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Computer Aided Design (FIS130190)

- 1 - CAD / DMU: solid modeling, surface modeling; assembly (applications using Catia, Part Design modules, Sheetmetal Design, Assembly Design, Generative Drafting and Generative and Shape Design). Modeling of aerodynamic surfaces and typical structural parts.
- 2 - CAE / FEM: fundamentals of the finite element method; structural analysis of aeronautical components. Module Catia V5-Analysis & Simulation.

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Computer Aided Manufacturing (FIS130200)

- CNC / CAM: Manual CN programming for turning and milling.
CAM programming in Catia V5 of 2, 3 and multi-axis parts.
Specification of strategies and parameters and machining.

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Robotics (FIS130210)

- 1) Manipulator robots. Classification and components of a robot.
- 2) Mathematical models of typical joints. Kinematics and linear transformations: direct kinematics and inverse kinematics.
- 3) Robot Dynamics.
- 4) Robot Control: independent joint-, work space, gripper position and force.
- 5) Robotic sensors: position/speed, proximity, force/torque, artificial vision sensors.
- 6) Equipment for industrial vision. Digital signal processing. Filtering. Textures and form classification. Introduction to pattern recognition.
- 7) Artificial vision in industrial automation controlled by PLC. Practical implementations with Siemens VS-710.

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Automation (FIS130220)

- 1) Industrial logic components: pneumatic, electric and electronic.
- 2) Programmable automation. Basic components: CPU, sensors and actuators.
- 3) Automatic Systems: Combinatory and sequential. Design of sequential systems using GRAFCET.
- 4) Implementation of automatic systems with com PLC Siemens S7-300. LAD-programming.



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Supervision and control systems in aeronautics (FIS130230)

- 1) Local Control and Remote Control. Communication in distributed systems. Local industrial networks. Wireless networks.
- 2) Co-operation in GRAFCET multiple process. Master/slave control chains.
- 3) Industrial network Siemens-Profibus.
- 4) Industrial network Siemens-ethernet.
- 5) Introduction to the supervision and control systems (SCADA). Applications with the SCADA Siemens WinCC.
- 6) The NI systems of data acquisition, control and supervision. Applications with NI Labview.

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Aeronautics Production Management (FIS130240)

- 1) The Production Function and Maintenance Function.
- 2) The production cycle; production planning in the company.
- 3) Stock management; classification ABC.
- 4) Logistics chain management in manufacturing.
- 5) Aeronautical production: examples and applications.

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Regulations, Quality and Safety (FIS130250)

- 1 - Aeronautical Regulation. Regulatory organizations (ICAO, JAA, EASA, FAA, ANAC, NAA (s)).
- 2 - EASA: Regulation Base and Initial and Continuous Airworthiness Regulations.
- 3 - Quality management systems: ISO 9001; Standard EN 9100. Integration of environmental management systems and SST.
- 4 - Verification of the production process (FAI). Process Control. Additional checks.
- 5 - Environmental assessment. Environmental planning and monitoring.
- 6- Occupational safety and health management.