Study Plan

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

1st Year - 1st Semester

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

1st Year - 2nd Semester

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

Program Contents

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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 (FIS13017O)

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 (FIS13018O)

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 (FIS13019O)

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 (FIS13020O)

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 (FIS13021O)

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 (FIS13022O)

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 (FIS13023O)

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 (FIS13024O)

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 (FIS13025O)

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.