

AVT - AVIATION TECHNOLOGY (AVT)

AVT 1003 Aviation Mathematics and Physics (3-1-3)

Covers mathematical and physical concepts that are essential for engineers in the field of aircraft maintenance. Basics of the following topics are covered: arithmetic, algebra, geometry, matter, statics; kinetics; dynamics; fluid dynamics; thermodynamics; optics; wave motion and sound. Learn the essentials of math and physics needed for basic aircraft maintenance courses.

Prerequisites: MTH 0103

AVT 2003 Gas Turbine Engine (2-2-3)

Covers basic fundamentals of gas turbine engines and its types. Identification of the engine major sections, systems and its components and to include fuels and lubricants. The course also covers the standard practices in Powerplant installation and procedure in engine monitoring and ground operation.

Prerequisites: AVT 1003

AVT 2013 Aeroplane Aerodynamics, Structures and Systems (1-6-3)

Covers basic information on civil Aeroplane systems for engineers in the field of Aircraft Maintenance. Aeroplane systems cover the range of airframe, electrical and avionic topics that support understanding of modern Aeroplane systems. Students will also complete aircraft maintenance on Aeroplane systems using a range of tools, in accordance with relevant aircraft manuals.

Prerequisites: AVT 2303

AVT 2103 DC Electrical Fundamentals (2-5-3)

Examine the construction and use of electrical components used in aircraft DC electrical circuits and systems. Construct, operate and test DC circuits using a range of instruments, in accordance with relevant circuit diagrams in aircraft maintenance manuals. Learn the essentials of DC electricity needed for further electrical courses.

AVT 2113 AC Electrical Fundamentals and Electrical Machines (2-5-3)

Analyze the behavior of electrical components in AC circuits. Examine the construction and use of electrical machines to move, control and provide power to aircraft systems. Construct, operate and test AC circuits using a range of tools and instruments, in accordance with relevant aircraft technical publications. Enhance understanding of various aircraft electrical systems for operation and maintenance.

Prerequisites: AVT 2103

AVT 2203 Workshop Practices and Safety (2-5-3)

Introduces aircraft and workshop safety according to aviation standards. Covers the required working practices and know the appropriate safe aviation operations. Special topics include precautions to take when working with electricity, gasses, especially oxygen, oils and chemicals. Discuss instruction and remedial actions to be taken in the event of a fire or accident. Essentials of workshop knowledge including engineering drawings, fits and clearances, tool control, workshop equipment operation, workshop standards are all taught.

AVT 2213 Aircraft Materials (2-5-3)

Explore aircraft material properties and how these influence basic aircraft structural design and repair techniques. Topics taught in this course include ferrous and nonferrous materials, composites and non-metallic materials as well as hardness, tensile and fatigue testing and corrosion. Learn material handling and understand the reason for selection of materials and their properties.

Prerequisites: PHY 1103

AVT 2223 Aircraft Hardware (2-4-3)

Explore the basic components, fasteners, rivets, locking devices, pipes, unions, bearings, transmissions and control cables and how these influence basic design and maintenance. Provide the rationale behind using special devices and tools. Learn about sheet metal and materials handling along with welding and brazing.

AVT 2233 Maintenance Procedures and Abnormal Events (2-5-3)

Covers maintenance procedures such as aircraft weight and balance, handling, jacking, storage, inspection, disassembly and repair techniques. Examine re-fueling, de-fueling, ground power requirements, safety procedures. Examine concepts on reliability theory and non-destructive testing because of abnormal events such as lightning strikes, heavy landings and flight turbulence. Realize the impacts of these abnormal events on maintenance, scheduling and operation.

Prerequisites: AVT 2203

AVT 2243 Electrical Wiring Standards and Practices (2-5-3)

Covers electrical wiring and interconnect system (EWIS) of a modern aircraft. Examine cables, loom construction and interconnect ability, connector types, pins, plugs sockets, as well as current and voltage ratings. Discover the operation, function and use of avionic test equipment, along with soldering and inspection techniques. Experiment codes and parameters for constituent parts.

Prerequisites: AVT 2103

AVT 2253 Workshop Practices and Safety for Avionics (2-5-3)

Learn aircraft and workshop safety according to aviation standards. Understand the required working practices and know the appropriate safe aviation operations. Special topics include precautions to take when working with electricity, gasses, especially oxygen, oils and chemicals. Discuss instruction and remedial actions to be taken in the event of a fire or accident. Essentials of workshop knowledge including engineering drawings, fits and clearances, tool control, workshop equipment operation, workshop standards are all taught.

AVT 2263 Aircraft Materials for Avionics (3-4-3)

Explore aircraft material properties and how these influence basic aircraft structural design and repair techniques. Topics taught in this course include ferrous and nonferrous materials, composites and non-metallic materials as well as hardness, tensile and fatigue testing and corrosion. Learn material handling and understand the reason for selection of materials and their properties.

Corequisites: PHY 1103

AVT 2273 Aircraft Hardware for Avionics (3-4-3)

Develop an understanding of basic components, fasteners, rivets, locking devices, pipes, unions, bearings, transmissions and control cables and how these influence basic design and maintenance. Examine the rationale behind using special devices and tools. Learn about sheet metal and materials handling along with soldering.

AVT 2283 Maintenance Procedures and Abnormal Events for Avionics (2-5-3)

Explore maintenance procedures such as aircraft weight and balance, handling, jacking, storage, inspection, disassembly and repair techniques. Learn about re-fuel, de-fuel, ground power requirements, safety procedures. Examine concepts on reliability theory and non-destructive testing because of abnormal events such as lightning strikes, heavy landings and flight turbulence. Realise the impacts of these abnormal events on maintenance, scheduling and operation.

Prerequisites: AVT 2253

AVT 2293 Electrical Wiring Standards and Practices for Avionics (2-5-3)

Learn the electrical wiring and interconnect system (EWIS) of a modern aircraft. Examine cables, loom construction and interconnect ability, connector types, pins, plugs sockets, as well as current and voltage ratings. Discover the operation, function and use of avionic test equipment, along with soldering and inspection techniques. Experiment codes and parameters for constituent parts.

Prerequisites: AVT 2103

AVT 2303 Aircraft Fundamentals and Basic Aerodynamics (3-1-3)

Learn the aircraft anatomy and study the theory of objects moving through the air. Understand the physics of the atmosphere. Aerodynamics examine the aircraft, the relative wind, and support an understanding of aircraft systems involved in lift, thrust, drag and weight coupled with the theory of flight and flight stability. The science of flight forms a major study and research project based on the application and fundamentals of the equation of flight. This course underpins courses taught later in the systems subjects.

Prerequisites: AVT 1003

AVT 2803 Work Placement I for Aviation (0-30-3)

The work placement course provides an opportunity to assess, in the workplace, the effectiveness of the student's training. It permits the students to put into practice the skills and knowledge they have learned during their studies, where students are placed to experience the work environment in a field related to their major for a duration of 8 weeks with a minimum of 240 contact hours.

Prerequisites: AVT 2902

AVT 2806 Work Placement I for Aviation (0-30-6)

Engage in practical work experience in an environment that develops skills and knowledge. Experience the activities in aviation maintenance, design industry, related aviation industry such as supply and logistics, test and calibration. This initial work placement may be in other engineering fields. Document journal entries explaining placement objectives and critique of the participant attitude, behavior and accomplishment.

Prerequisites: AVT 2902

AVT 2902 Sophomore Design Project (1-3-2)

Explore the preliminary stages of the aircraft design based on a given set of requirements. Learn basics of systems development, component design, modification and design improvement. The formation of a team is required to propose, plan and perform a preliminary aircraft design while working under the mentorship of a faculty or industry engineer. The student team is evaluated on its ability to coordinate efforts to propose the aircraft design criteria, aircraft components, resources, implementation schedule, and estimated cost.

Prerequisites: AVT 2303, AVT 2203, AVT 1003

AVT 3102 Semiconductor Fundamentals (1-3-2)

Learn the fundamentals of semiconductors since all modern aircraft use electronics in various systems within the cockpit, engine and cabin environment. Gain a fundamental understanding of diodes, transistors, and printed circuit boards. Define, describe and analyze some aircraft electronic circuits and complete practical assignments using a range of tools, in accordance with relevant design parameters and test equipment.

Prerequisites: AVT 2113

AVT 3103 Electronic Fundamentals (2-4-3)

Introduces the basic principles of electronics in all aircraft systems within the cockpit, engine and aircraft cabin environment. Explores the fundamentals of electronic circuits including diodes, transistors, integrated circuits, printed circuit boards and servo mechanisms. Covers material electron configuration and electrical properties, analyses of aircraft electronic circuits and complete practical assignments using a range of tools and instruments in accordance with relevant design parameters and test procedures.

Prerequisites: AVT 2103

AVT 3113 Digital Techniques Electronic Instrument Systems (2-5-3)

Explore digital techniques and electronic instrument systems with reference to typical systems arrangement and aircraft cockpit layout. Learn essentials of electronic instrument systems, numbering systems, data conversion, data buses, logic circuits and basic computer structure. Discuss integration of circuits Electronic displays, software management and control. Practical activities include typical electronic-digital aircraft systems and the use of aircraft simulators to interrogate systems faults and functioning of cockpit systems.

Prerequisites: AVT 2103

AVT 3123 Integrated Circuits and Servomechanisms (1-6-3)

Learn the fundamentals of integrated circuits and servo mechanisms. Experience complete practical assignments using a range of tools, in accordance with relevant design parameters and test equipment. Define, describe and analyze aircraft electronic circuits and Servomechanisms.

Corequisites: AVT 3102

AVT 3133 Digital Techniques (1-5-3)

Explore digital techniques relevant to electronic fundamentals. Learn about electronic instrument systems, numbering systems, integration of circuits, electronic displays and software management and control. Practical activities include the use and application of digital devices.

Corequisites: AVT 3123

AVT 3143 Electronic Instrument Systems (2-5-3)

Examine electronic instrument systems, numbering systems, integration of circuits, displays and software management and control. Participants will carry out practical activities which include the use of aircraft simulators and systems to interrogate systems faults and functioning of cockpit systems.

Corequisites: AVT 3133

AVT 3203 Maintenance Practices Workshop (0-9-3)

Examine maintenance practices in a theoretical and practical manner that are essential for engineers and technicians in the field of aircraft maintenance. Learn safety precautions; workshop practices; tools; test equipment; fits and clearances; riveting; maintenance procedures; and material handling. Complete aircraft maintenance activities in mechanical-aircraft workshops using a range of tools, in accordance with relevant aircraft manuals.

Prerequisites: AVT 2203

AVT 3403 Human Factors (3-1-3)

Explore human factors principles that are essential for engineers in the field of aircraft maintenance. Cover many relevant topics including: human performance and limitations, social psychology, factors affecting performance; physical environment, communication, human error and hazards in the workplace.

Prerequisites: AVT 2902

AVT 3413 Aviation Legislation (3-3-3)

Describes aviation legislation that is essential for technicians and engineers in the field of aircraft maintenance. Provides an overview of the regulatory framework; certifying staff; approved maintenance organizations; commercial air transportation; aircraft certification; continuing airworthiness, and applicable national and international requirements. Learn the essentials of the regulatory body's relevant rules and guidelines.

Prerequisites: AVT 2203

AVT 3503 Aircraft Flight Control and Structures for Avionics (2-5-3)

Learn basic aircraft structures, the theory of flight, and the primary pitch, roll, and yaw functions. Examine high lift devices along with boundary layer controls and the operations of trim tabs, servo tabs, and mass balance devices. Learn about how aircraft structure is affected by stresses and strains induced by flight controls and fail safe criteria. Examine general protection and lightning strike mitigation.

Prerequisites: AVT 2303

AVT 3513 Aircraft Instrument and Lighting for Avionics (2-4-3)

Explore the fundamentals of instrumentation and glass cockpit concepts. Examine pitot static systems, altimeters, speed indicators, compasses, gyroscopic components and other control supporting systems. Learn the on-board maintenance and data monitoring systems along with state of the art interior, exterior and emergency lighting systems.

Prerequisites: AVT 3143

AVT 3603 Propulsion (2-5-3)

Learn engine fundamentals, engine performance and basic components, that are essential for gas turbine operation. Topics covered include: Inlet, compressors, combustion, turbines, engine parts, exhaust, and collective synchronization and operation. Discuss the parameters, limitations and performance. Cover related systems such as fuel, air, ignition and indications.

AVT 3703 Gas Turbine Engine I (3-1-3)

Covers engine fundamentals, engine performance, engine efficiencies and basic components that are essential for gas turbine operation. Examine engine Inlet, compressor, combustion, turbine, exhaust. Engine components and parts are also discussed including bearings, seals, valves and pipes. Cover engine supporting systems such as lubrication and fuel system.

Prerequisites: AVT 2303

AVT 3712 Gas Turbine Engine I Workshop (0-7-2)

Support participants to complete supervised exercises on maintenance of aircraft gas turbine engines using a range of tools, in accordance with relevant aircraft manuals. Examine in detail all requirements for engine maintenance according to aviation standards. Practice all learned relevant theory in a supervised controlled environment.

Corequisites: AVT 3703

AVT 3723 Gas Turbine Engine II (2-6-3)

Examine in detail turbo prop, turbo shaft, auxiliary power units (APU) and Power plant installation. Learn engine subsystems including: reduction gears, engine-propeller controls, over-speed devices and coupling systems. Discuss auxiliary power units (APU): purpose, operation and subsystems. Gain knowledge of fire protection systems, engine storage procedures and engine preservation techniques.

Prerequisites: AVT 3703

AVT 3733 Propeller (2-4-3)

Introduces propellers and blade essentials: fundamentals, construction, operation, maintenance, storage and preservation. Examine parts installation, pitch control, synchronization, ice protection, components operation, and system integration. Complete exercises on propellers maintenance using a range of tools and various scenarios in accordance with relevant aircraft manuals.

Prerequisites: AVT 2303

AVT 3803 Work Placement II for Aviation (0-30-3)

The work placement course provides an opportunity to assess, in the workplace, the effectiveness of the student's training. It permits the students to put into practice the skills and knowledge they have learned during their studies, where students are placed to experience the work environment in a field related to their major for a duration of 8 weeks with a minimum of 240 contact hours.

Prerequisites: AVT 3203, AVT 2803

AVT 3806 Work Placement II for Aviation (0-40-6)

Gain relevant engineering experience in an actual working environment to provide an opportunity to develop and apply professional work ethics and practices. Transfer of engineering skills learned at college to the workplace is a major feature of this course.

Prerequisites: AVT 2806, AVT 3203, WPR 0100

AVT 4503 Aircraft Flight Control and Structures (2-5-3)

Introduces aircraft structures, the theory of flight, aerodynamics and flight controls, basics of pitch, roll, yaw, high lift devices along with boundary layer controls and the operations of trim tabs, servo tabs and mass balance devices. Examines aircraft structure: construction, layout, integration and limitations. Covers the effect of stresses and strains induced by flight controls and fail safe criteria on aircraft structure. Examines also general protection and lightning strike mitigation.

Prerequisites: AVT 2303

AVT 4513 Aircraft Conditioning and Oxygen (2-4-3)

Covers the essentials of air-conditioning, and cabin pressurisation systems components such a zone controllers, outflow valves and warning systems/devices, human requirement for oxygen storage and distribution at altitude, and sources of air supply including engine bleed and ground cart. Introduces conditioning, supply system, distribution system, pressurisation system control and relevant safety and warning devices.

Prerequisites: AVT 2223

AVT 4523 Aircraft Electrical Power (3-4-3)

Introduces DC and AC aircraft electrical power including: batteries, generators, inverters, transformers and voltage regulators. Explores external ground power, distribution, regulation and circuit protection, which are integral to the safe operation of commercial aircraft. Gain a thorough analytical understanding of the various relevant fundamental concepts.

Prerequisites: AVT 2103, AVT 2113

AVT 4532 Aircraft Systems Workshop (1-3-2)

Includes a range of aircraft practical activities designed in accordance with aviation Standards. Covers systems interdependency and the aircraft redundancy systems to guarantee the safe conduct maintenance activities. Introduces the selection and use of correct tools, ground support equipment and test equipment.

Prerequisites: AVT 3203

AVT 4543 Aircraft Avionics Systems for Mechanical (3-2-3)

Covers integrated modular avionics system, integration of these systems with the flight deck and maintenance systems, monitoring and control of the total aircraft cabin and environment from an internal and external perspective. Learn monitoring and management of various aircraft systems including: electrical load, fuel system, pressure systems, avionic communication. Provide an overview of Auto Flight, Communications and Navigation systems.

Prerequisites: AVT 3113

AVT 4553 Aircraft Fuel and Passenger Systems (2-4-3)

Covers the details of the fuel system layout, supply options and distribution, indications, cautions and warnings and de-fueling / refueling. Examine Passenger services such as water and waste along with aircraft equipment and furnishings, cargo and cabin emergency equipment.

Prerequisites: AVT 2203

AVT 4563 Aircraft Protection Systems (2-4-3)

Introduces fire and smoke detection systems, warning systems and fire extinguishing systems. Learn about the various fire extinguishers including fixed and portable systems. Explores the various protection-system functional tests.

Prerequisites: AVT 2203

AVT 4573 Aircraft Hydraulic and Landing Gear (3-1-3)

Study the basic system components, distribution, network and safety of hydraulic systems and apply these fundamentals to an undercarriage system during extension and retraction. Examine systems of the wheels, brakes, anti-skid, steering and various relevant components.

Prerequisites: AVT 2203

AVT 4583 Aircraft Instrument and Lighting (2-4-3)

Explore the fundamentals of instrumentation and glass cockpit concepts. Examine pitot static systems, altimeters, speed indicators, compasses, gyroscopic components and other control supporting systems. Learn the on-board maintenance and data monitoring systems along with state of the art interior, exterior and emergency lighting systems.

Prerequisites: AVT 3113

AVT 4602 Aircraft Conditioning and Oxygen for Avionics (1-3-2)

Learn the fundamentals of Air-conditioning, and cabin pressurization systems components such as, zone controllers, outflow valves and warning systems/devices, which are closely coupled with the human requirement for oxygen storage and distribution at altitude. Discuss sources of air supply, including engine bleed and ground cart. Understand air-conditioning system i.e. supply system, distribution system, pressurization system control and relevant safety and warning devices.

Prerequisites: AVT 2273

AVT 4613 Aircraft Radio and Navigation Systems (3-5-3)

Learn principles of various communication and navigation systems including: VHF, HF, emergency locator transmitters, recorders, landing systems, Doppler systems and flight director systems. Explore the relationship between frequency, radio transmission waves and propagation. Study flight management systems and modern global positioning via GPS principles. Cover the essential aspects of flight communication, navigation, management and safety related systems.

Prerequisites: AVT 2103

AVT 4623 Aircraft Electrical Power for Avionics (2-4-3)

Explore DC and AC aircraft electrical power including: batteries, generators and voltage regulators. Study ground power, distribution, regulation and circuit protection, which are integral to the safe operation of commercial aircraft. Gain a thorough analytical understanding of the various relevant fundamental concepts.

Prerequisites: AVT 2103, AVT 2113

AVT 4633 Avionics Systems (2-5-3)

Analyse aircraft on board maintenance systems including Central maintenance computers, data loading, electronic library and printing. Study the integration of pneumatic pressurisation and temperature control with cockpit avionics systems. Illustrate crew information systems such as air traffic communication, ground stations, on board electrical management and mechanical systems. Examine all cabin intercommunication and network systems including in-flight entertainment. Identify Passenger services and contrast these with cockpit information systems.

Prerequisites: AVT 3143

AVT 4643 Aircraft Fuel and Passenger Systems for Avionics (2-3-3)

Learn the identification of the system layout, supply options and distribution, Indications, cautions and warnings and de-fueling / refueling. Also examine passenger services such as water and waste along with aircraft equipment and furnishings, cargo and cabin emergency equipment.

Prerequisites: AVT 2253

AVT 4653 Aircraft Radar Systems (2-5-3)

Examine radar and its associated principles of operation and precautions. Learn essentials of radars, radar system components, component locations and operation. Explain radar importance and safe operation.

Prerequisites: AVT 4613

AVT 4663 Aircraft Protection Systems for Avionics (2-4-3)

Explore fire and smoke detection systems, warning systems and fire extinguishing systems. Learn about the various fire extinguishers including fixed and portable systems. Learn about the various protection-systems and their functional tests.

Prerequisites: AVT 2253

AVT 4673 Aircraft Hydraulic and Landing Gear for Avionics (3-4-3)

Explore the basic system components, distribution, network and safety of hydraulic systems and apply these fundamentals to an undercarriage system during extension and retraction. Explain systems of the wheels, brakes, anti-skid, steering and various relevant components.

Prerequisites: AVT 2253

AVT 4683 Aircraft Autoflight Systems (2-4-3)

Learn essentials of automatic flight control including working principles and terminology. Explain the concepts of feedback and inner-outer loops. Explore the interrelationship between the pilot inputs and the aircraft motion sensors feedback to control a flight path.

Prerequisites: AVT 3503

AVT 4883 Introduction to Artificial Intelligence (2-2-3)

The goal of this course is to provide a basic understanding of fundamental AI concepts, investigate common AI techniques and algorithms, and identify AI applications in the aviation industry. The underlying mathematical and programming skills will be presented in this course. Neural networks and machine learning topics are presented with applications in aviation Engineering. The course includes selected laboratory experiments covering the main concepts of the subject.

Prerequisites: MTH 1113, ICT 2013

AVT 4902 Graduation Project I (1-2-2)

Requires the formation of a team to propose, plan and design an engineering project related to aviation. Though guided under the mentorship of faculty or industry engineer, the student team is primarily responsible for the completion of project milestones and course objectives. The team is evaluated on its ability to coordinate efforts to propose the project design criteria, components, resources, implementation schedule, and estimated cost.

Prerequisites: AVT 2902, AVT 3806

AVT 4911 Graduation Project II (0-3-1)

Consists of the implementation, evaluation, and analysis of an engineering design project carried forward from the previous semester. Though guided by faculty, the student team is primarily responsible for the completion of the project milestones and course objectives. Requires the integration and application of technological, organisational, communication, and interpersonal skills by the student team. Accurate analysis, implementation, documentation, and presentation skills form the basis for assessment.

Prerequisites: AVT 4902