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| Module Title: | Instrument and Autopilot Systems |
| Language of Instruction: | English |
| Credits: | 5 |
| NFQ Level: | 7 |
| Module Delivered In | No Programmes |
| Teaching & Learning Strategies: | Lectures will be delivery using PowerPoint, handouts and interactive learning techniques. |
| Module Aim: | To give the student the competency and skills set for automatic flight control systems on aircraft. |
| Learning Outcomes | |
| <i>On successful completion of this module the learner should be able to:</i> | |
| LO1 | Describe and analyse the operation of the different types of air and gyro instruments used on an aircraft |
| LO2 | Describe and explain the operation of the flight controls on an aircraft and their function as part of the overall autopilot control system |
| LO3 | Describe the principle of operation of an aircraft autopilot system and explain how the inner and outer interfaces operate as part of the overall automatic flight control system for the aircraft |
| LO4 | Discuss the basics of open and closed loop control systems in relation to autopilot systems |
| Pre-requisite learning | |
| Module Recommendations <i>This is prior learning (or a practical skill) that is recommended before enrolment in this module.</i> | |
| No recommendations listed | |
| Incompatible Modules <i>These are modules which have learning outcomes that are too similar to the learning outcomes of this module.</i> | |
| No incompatible modules listed | |
| Co-requisite Modules | |
| No Co-requisite modules listed | |
| Requirements <i>This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.</i> | |
| No requirements listed | |

Module Content & Assessment

Indicative Content

Instrument Systems (ATA 31)

Classification; Atmosphere; Terminology; Pressure measuring devices and systems; Pitot static systems; Altimeters; Vertical speed indicators; Airspeed indicators; Machmeters; Altitude reporting/alerting systems; Air data computers; Instrument pneumatic systems; Direct reading pressure and temperature gauges; Temperature indicating systems; Fuel quantity indicating systems; Gyroscopic principles; Artificial horizons; Attitude Indicator; Horizontal Situation Indicator; Turn and Slip Indicator, Turn Coordinator; Slip indicators; Directional gyros; Ground Proximity Warning Systems; Compass systems; Direct Reading; Remote Reading; Flight Data Recording systems; Electronic Flight Instrument Systems; Instrument warning systems including master warning systems and centralised warning panels; Stall warning systems and angle of attack indicating systems; Vibration indication systems. HUMS, Other aircraft system identification Glass cockpit, MEMS sensors

Flight Controls (ATA 27)

Primary controls: aileron, elevator, rudder; spoiler; Trim control; Active load control; High lift devices; Lift dump, speed brakes; System operation: manual, hydraulic, pneumatic; Artificial feel, Yaw damper, Mach trim, rudder limiter, gust locks. Stall protection systems System operation: electrical, fly by wire, Digital servos and applications

Autoflight (ATA 22)

Fundamentals of automatic flight control including working principles and current terminology; Command signal processing; Modes of operation: roll, pitch and yaw channels; Yaw dampers; Stability Augmentation System in helicopters; Automatic trim control; Autopilot navigation aids interface; Autothrottle systems. Automatic Landing Systems: principles and categories, modes of operation, approach, glideslope, land, go-around, system monitors and failure conditions. Communications (ATA 23) VHF radio systems, Air traffic control systems Navigation Systems (ATA 34) ADF, VOR, GPS landing systems, UAV autoflight technology

| Assessment Breakdown | % |
|----------------------------------|--------|
| Continuous Assessment | 10.00% |
| Practical | 20.00% |
| End of Module Formal Examination | 70.00% |

Continuous Assessment

| Assessment Type | Assessment Description | Outcome addressed | % of total | Assessment Date |
|-----------------|---|-------------------|------------|-----------------|
| Examination | Students will sit a number of written examinations during the module. | 1,3,4 | 10.00 | Week 26 |

No Project

Practical

| Assessment Type | Assessment Description | Outcome addressed | % of total | Assessment Date |
|-----------------------------|--|-------------------|------------|-----------------|
| Practical/Skills Evaluation | The student will complete a number practical assignments during the module and write a report on each assignment | 1,2,3,4 | 15.00 | n/a |
| Practical/Skills Evaluation | The student will complete a test during the module | 1,2,3 | 5.00 | n/a |

End of Module Formal Examination

| Assessment Type | Assessment Description | Outcome addressed | % of total | Assessment Date |
|-----------------|--|-------------------|------------|-----------------|
| Formal Exam | The written examination, at the end of the module, will evaluate the extent of the student's knowledge of the learning outcomes. | 1,2,3,4 | 70.00 | End-of-Semester |

SETU Carlow Campus reserves the right to alter the nature and timings of assessment

Module Workload

| Workload: Full Time | | |
|----------------------------|------------------|--|
| <i>Workload Type</i> | <i>Frequency</i> | <i>Average Weekly Learner Workload</i> |
| Lecture | Every Week | 2.50 |
| Practicals | Every Week | 1.00 |
| Independent Learning | Every Week | 2.00 |
| Total Hours | | 5.50 |

