



BROWARD COMMUNITY COLLEGE

COURSE OUTLINE

LAST REVIEW: 2007-2008

(i.e. 2003-2004)

NEXT REVIEW: 2012-2013

(i.e. 2008-2009)

STATUS: A

(A, I, D)

COURSE TITLE: Aircraft Electrical Systems

COMMON COURSE NUMBER: AMT 1260

CREDIT HOURS: 3

CONTACT HOUR BREAKDOWN

(per 16 week term)

CLOCK HOURS: 100

(Voc. Course ONLY)

Lecture: **45**

Lab: **55**

Clinic:

Other:

PREREQUISITE(S): None

COREQUISITE(S): None

PRE/COREQUISITE(S): None

COURSE DESCRIPTION *(750 characters, maximum):* The student will have a knowledge of the operation, repair, inspection, and service of small and large aircraft electrical systems using schematic diagrams and training panels. Subject areas will include combined AC and DC circuits, inverters, AC motors, DC motors, maintenance and inspection of lighting systems, and circuit troubleshooting. Diodes and transistors as used in aircraft will be taught. Student fee charged.

General Education Requirements – Associate of Arts Degree (AA), meets Area(s): Area

General Education Requirements – Associate in Science Degree (AS), meets Area(s): Area

General Education Requirements – Associate in Applied Science Degree (AAS), meets Area(s): Area

UNIT TITLES

1. Aircraft Electrical System Components
2. Airframe Electrical Wiring, Controls, Switches, Indicators, and Protective Devices
3. Alternating Current and Direct Current Electrical Systems

ASSESSMENT:

Please provide a brief description *(250 characters maximum)* that details how students will be assessed on the course outcomes.

1. **Quizzes, Test, and/or Final Exam (cumulative/comprehensive);**
2. **Selected faculty may assess homework, projects, class participation/attendance, and/or extra credit projects.** Upon successful completion of this course, the students should be able to operate, repair, inspect, and service small and large aircraft electrical systems.



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UNITS

Unit 1 Aircraft Electrical System Components

General Outcome:

- 1.0 The student shall:** The students should be able to repair aircraft electrical system components.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 1.1** Use a "growler" in generator and motor armature inspection and repair.
- 1.2** Check the condition of shunt and compound generator field circuits.
- 1.3** Locate and use overhaul information for electrical equipment.
- 1.4** Describe the procedures for correcting generator brush arcing.
- 1.5** Dress or turn the commutator surface of a motor or generator armature.
- 1.6** Flash a generator field.
- 1.7** Describe the effect of changes in speed and load on generator output.
- 1.8** Describe the function of a commutator in a direct current electric motor.
- 1.9** Seat new or replacement generator brushes.
- 1.10** Explain the effect of incorrect generator brush spring tension on generator operation.
- 1.11** Describe the methods of reducing armature reaction in aircraft generators.
- 1.12** Describe the operating principles of carbon-pile voltage regulators.



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- 1.13 List the design factors that determine the number of cycles-per-revolution an alternating current generator will produce.
- 1.14 Determine the speed (r.p.m.) of an electric motor.
- 1.15 Explain the basic principles of generators.
- 1.16 List the factors that affect the torque produced by an electric motor.
- 1.17 Describe the methods used to protect armature shafts from overloads.
- 1.18 Describe the speed and load characteristics of series, compound, and shunt-wound motors.
- 1.19 Describe the means employed to control current and voltage output of aircraft generators.
- 1.20 Describe the methods used to control output frequency and voltage of alternating current generators.
- 1.21 Explain the general operating characteristics of vibrator-type current and voltage regulators.
- 1.22 Describe the purpose and operation of reverse-current cutout relays in generator control circuits.
- 1.23 Describe the basic internal electrical circuits of series, compound and shunt-wound generators.
- 1.24 Describe the operating principles of magnetic clutches and brakes commonly used with electric motors.
- 1.25 Explain the purpose and operation of reversible electric motors.



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Unit 2 Airframe Electrical Wiring, Controls, Switches, Indicators and Protective Devices

General Outcome:

- 2.0 The student shall:** The students should be able to install, check and service airframe electrical wiring, controls, switches, indicators and protective devices.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 2.1 Describe the purpose, applicability and operation of electrical fuses and circuit breakers.
- 2.2 Install and wire electrical switches.
- 2.3 Splice wiring in aircraft electrical systems.
- 2.4 Describe the characteristics of high-tension and low-tension electrical wiring.
- 2.5 Describe the purpose, applicability and use of electrical wiring terminal strips.
- 2.6 Explain the criteria for selecting aluminum and copper electrical cables.
- 2.7 Replace terminals on aircraft aluminum and copper electrical cables.
- 2.8 Determine the current-carrying capacity of an electrical circuit.
- 2.9 Describe the installation and maintenance of open wiring electrical systems.
- 2.10 Install electrical wiring in conduits.
- 2.11 Describe the method of protecting electrically operated emergency systems from accidental actuation.
- 2.12 Describe the strength requirements for electrical cable terminals.



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- 2.13 Select and install electrical bonding jumpers.
- 2.14 Describe the installation requirements for electrical junction boxes.
- 2.15 Describe the characteristics of single-wire electrical systems.
- 2.16 Explain the special requirements an electrical bonding jumper must meet if it is required to carry a ground load for a unit of electrical equipment.
- 2.17 Describe the purpose of shielding electrical wiring and equipment.
- 2.18 Explain the use of quick-disconnect electrical plugs and sockets.
- 2.19 Describe the purpose of static wicks or discharges.
- 2.20 Describe the American Wire Gauge (A.W.G.) system of designating electrical wire sizes.



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Unit 3 Alternating Current and Direct Current Electrical Systems

General Outcome:

- 3.0 The student shall:** The students should be able to inspect, check, troubleshoot, service and repair alternating current and direct current electrical systems.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 3.1 Show the results of short or open circuits in a generator control circuit.
- 3.2 Describe the effect of sticking points in a reverse-current cutout relay.
- 3.3 Explain the cause and effect of solenoid switch chatter.
- 3.4 Describe the installation and circuit requirements for anticollision light systems.
- 3.5 Explain the cause and effect of solenoid switch chatter. Show the installation and circuit requirements for position lights.
- 3.6 Describe the method of providing direct current for battery charging on aircraft that operate only alternating current generators.
- 3.7 Explain the common methods of controlling output current and voltage of compound direct current generators.
- 3.8 Describe the operating principles and characteristics of inverters.
- 3.9 Determine the output frequency of an alternating current generator.
- 3.10 Describe the operating principles and characteristics of rectifiers.



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- 3.11 Describe the method of providing alternating current in aircraft that operate only direct current generators.
- 3.12 Explain the electrical device usually used to convert alternating current to a lower or higher voltage without a change in frequency.
- 3.13 Describe the operating principles and characteristics of electrical induction coils.
- 3.14 Describe the operating principles and characteristics of transformers.
- 3.15 List the advantages of using alternating current in aircraft.