



# 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: Ignition Systems**

**COMMON COURSE NUMBER: AMT 2440**

**CREDIT HOURS: 2**

**CONTACT HOUR BREAKDOWN**

*(per 16 week term)*

**CLOCK HOURS: 84**

*(Voc. Course ONLY)*

Lecture: **37**

Lab: **47**

Clinic:

Other:

**PREREQUISITE(S): None**

**COREQUISITE(S): None**

**PRE/COREQUISITE(S): None**

**COURSE DESCRIPTION** *(750 characters, maximum)*: The successful student will have a knowledge of the operation, repair, inspection, and service of reciprocating and jet power plant ignition systems. The student will be able to overhaul and troubleshoot the various components of each system. 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. Magneto and Ignition Harness
2. Components
3. Reciprocating and Turbine Engine Ignition 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 reciprocating and jet power plant ignition systems.



**UNITS**

**Unit 1 Magneto and Ignition Harness**

**General Outcome:**

- 1.0 The student shall:** The students should be able to overhaul magneto and ignition harnesses.

**Specific Measurable Learning Outcomes:**

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

- 1.1** Describe the construction characteristics of magneto main case housings.
- 1.2** Describe the characteristics and construction materials of magneto pole shoes or coil core extensions.
- 1.3** Explain the purpose and methods of ventilating aircraft magneto housings.
- 1.4** Discuss the materials used in the construction of magneto breaker points.
- 1.5** Describe the purpose and use of "keepers" placed across the poles of a rotating magnet that has been removed from a magneto.
- 1.6** Check the strength of a rotating magnet installed in a magneto.
- 1.7** Time a magneto internally during assembly.
- 1.8** Determine the rotational speed of a magneto when installed on various types of engines.
- 1.9** Describe the purpose and location of condensers in a magneto electrical circuit.
- 1.10** Determine the condition of magneto breaker points by visual indications.
- 1.11** Lubricate a magneto breaker cam.



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- 1.12 Explain the effect of cam-follower wear on pivot and pivotless-type breaker-point assemblies.
- 1.13 Define the meaning of the term "E-Gap Angle".
- 1.14 Describe the characteristics of the rotating magnets commonly used in aircraft magnetos.
- 1.15 Install and adjust breaker points.
- 1.16 Describe the characteristics of cams used in aircraft magnetos to operate the breaker points.
- 1.17 Describe the purpose of setting ignition cables in a plastic insulating material within some ignition harnesses.
- 1.18 Install high-tension ignition cables in a shielded ignition manifold.
- 1.19 Describe the purpose and operation of impulse couplings used with aircraft magnetos.
- 1.20 Explain the results of operating a magneto with a broken impulse coupling spring.
- 1.21 Describe the methods used to secure ignition leads in harnesses and distributor blocks.
- 1.22 Measure breaker point spring tension.



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### Unit 2 Components

#### General Outcome:

- 2.0 The student shall:** The students should be able to repair engine ignition system components.

#### Specific Measurable Learning Outcomes:

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

- 2.1 Describe the purpose and operation of magneto breaker points.
- 2.2 Measure the capacity of a condenser.
- 2.3 Check ignition coil windings for shorts or open circuits.
- 2.4 Locate and use data associated with ignition system components.
- 2.5 Explain the effect of weak magnets on engine operation.
- 2.6 Describe the effect of weak breaker point spring tension on engine operations.
- 2.7 Clean and inspect spark plugs and igniter plugs.
- 2.8 Adjust spark plug electrodes.
- 2.9 List the precautions to observe when working with high-energy ignition systems.
- 2.10 Determine that a distributor is internally timed.
- 2.11 Describe the effect of high resistance in an ignition lead on engine operation.
- 2.12 Describe the function and characteristics of ignition harnesses.
- 2.13 Determine the continuity of ignition wiring.
- 2.14 Describe the construction and operation of a transformer coil for low-tension ignition systems.



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### Unit 3 Reciprocating and Turbine Engine Ignition Systems

#### General Outcome:

- 1.0 The student shall:** The students should be able to inspect, check, service, troubleshoot and repair reciprocating and turbine engine ignition systems.

#### Specific Measurable Learning Outcomes:

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

- 3.1 Describe the purpose of shielding aircraft engine ignition systems.
- 3.2 Describe the purpose and principles of staggered ignition timing.
- 3.3 Install and time an ignition system distributor.
- 3.4 Recognize and interpret basic ignition analyzer patterns.
- 3.5 Describe the purpose and operating principles of spark advance systems.
- 3.6 Explain the effect of using condensers of incorrect capacity in an ignition system.
- 3.7 Describe the operating principles of low-tension ignition systems.
- 3.8 Describe the effect a shorted primary winding in a low-tension ignition coil has on engine operation.
- 3.9 Install and test magneto ignition switches.
- 3.10 Test an ignition harness for electrical leakage.
- 3.11 Describe the purpose and principles of compensated ignition timing.
- 3.12 Explain the operating periods of turbine engine ignition systems.
- 3.13 Describe the results of using a spark plug of incorrect heat range in an engine.
- 3.14 Install and remove spark plugs.



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- 3.15 Define the meaning of "reach" as applied to spark plug design.
- 3.16 Inspect spark plugs for damaged insulation.
- 3.17 Describe the cause and effect of various types of spark plug fouling.
- 3.18 Describe the purpose and operation of an ignition booster system.
- 3.19 Describe the purpose and operation of an induction vibrator.
- 3.20 Install and time a magneto equipped with an impulse coupling.