



# 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: Cooling & Exhaust Systems**

**COMMON COURSE NUMBER: AMT 2475**

**CREDIT HOURS: 1**

**CONTACT HOUR BREAKDOWN**

*(per 16 week term)*

**CLOCK HOURS: 26.25**

*(Voc. Course ONLY)*

Lecture: **11.25**

Lab: **15**

Clinic:

Other:

**PREREQUISITE(S): None**

**COREQUISITE(S): None**

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

**COURSE DESCRIPTION** *(750 characters, maximum)*: This course provides the student with an understanding of the need for the various types of engine cooling systems. Gives experience in the inspection, checking, servicing, troubleshooting and repairing of engine cooling systems. This course will also enable the student to comprehend the function of exhaust systems including turbo charging and thrust reversers. The student will gain experience in inspection, checking, troubleshooting, and repairing various types of exhaust systems. 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. Cooling Components
2. Engine Cooling Systems
3. Exhaust Components
4. Engine Exhaust 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 inspect, check, service, troubleshoot and repair engine cooling systems and inspect, check, troubleshoot and repair various types of exhaust systems.



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## UNITS

### Unit 1 Components

#### General Outcome:

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

#### Specific Measurable Learning Outcomes:

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

- 1.1 Explain the attachment of cylinder head baffles.
- 1.2 Describe the material used in the construction of air baffles.
- 1.3 Reprofile cylinder fins.
- 1.4 Describe the effect of valve adjustment on the heat rejection rate of an engine.



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**Unit 2 Engine Cooling Systems**

**General Outcome:**

- 2.0 The student shall:** The students should be able to inspect, check, troubleshoot, service, and repair engine cooling systems.

**Specific Measurable Learning Outcomes:**

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

- 2.1 Describe the operating principles of the cooling system of vertically installed air-cooled helicopter engines.
- 2.2 Explain the effects of excessive heat in an aircraft engine.
- 2.3 Describe the purpose of fins on engine cylinders.
- 2.4 Explain the effect of incorrectly installed baffles on engine operation.
- 2.5 Describe the function and operation of cowl flaps.
- 2.6 Explain the effect of fuel-air ratio on engine cooling.
- 2.7 Describe the purpose and operation of cooling air augmenting systems.
- 2.8 Describe the principles of "pressure baffling" used in cooling aircraft engines.
- 2.9 Describe the precautions necessary during ground operation of aircraft engines.



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### Unit 3 Components

#### General Outcome:

**3.0 The student shall:** The students should be able to repair engine exhaust system components.

#### Specific Measurable Learning Outcomes:

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

- 3.1 Describe the construction characteristics of exhaust augments tubes.
- 3.2 Describe the materials used in exhaust system components.
- 3.3 Explain the technique for cleaning ceramic-coated exhaust pipes.
- 3.4 Detect and repair cracks in stainless steel exhaust pipes.
- 3.5 Describe the methods used to compensate for the unequal expansion rate of exhaust system components.



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### Unit 4 Engine Exhaust Systems

#### General Outcome:

- 4.0 **The student shall:** The students should be able to inspect, check, troubleshoot, service, and repair engine exhaust systems.

#### Specific Measurable Learning Outcomes:

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

- 4.1 Inspect exhaust systems that utilize an exhaust heat exchanger.
- 4.2 Describe the purpose and operating principles of the turbines driven by the exhaust gases of a turbo compound engine.
- 4.3 Describe the function and location of exhaust agumenters.
- 4.4 Explain the cause and effect of "frozen" ball joints in an exhaust system.
- 4.5 Clean and test exhaust-type heating muffs.
- 4.6 Explain the methods for torquing exhaust system clamps.
- 4.7 Describe the purpose and construction of exhaust gas noise suppressors.
- 4.8 Describe the effect of exhaust gas leakage on system components.
- 4.9 Describe the purpose and operation of engine thrust reversers.