



# 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: Assembly and Rigging**

**COMMON COURSE NUMBER: AMT 1155**

**CREDIT HOURS: 2**

**CONTACT HOUR BREAKDOWN**

*(per 16 week term)*

**CLOCK HOURS: 65**

*(Voc. Course ONLY)*

Lecture: **20**

Lab: **45**

Clinic:

Other:

**PREREQUISITE(S): None**

**COREQUISITE(S): None**

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

**COURSE DESCRIPTION** *(750 characters, maximum)*: Students will have knowledge of flight theory and factors affecting aircraft in flight. They will explain and compare aircraft design features in subsonic, transonic and supersonic aircraft. They will be able to assemble and rig various aircraft control systems, analyzing and correcting faulty flight characteristics. 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. Rotary Wing Aircraft
2. Fixed Wing Aircraft
3. Alignment of Structures
4. Aircraft Assembly
5. Movable Surfaces
6. Jacking

## 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 assemble and rig various aircraft control systems.



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### UNITS

#### Unit 1 Rotary Wing Aircraft

##### General Outcome:

**1.0 The student shall:** The students should be able to rig rotary wing aircraft.

##### Specific Measurable Learning Outcomes:

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

- 1.1 Describe the condition of flight that a properly rigged aircraft should maintain.
- 1.2 Explain the relationship of thrust and drag of an aircraft during level unaccelerating flight.
- 1.3 Explain the relationship of lift and weight of an aircraft during level unaccelerating flight.
- 1.4 Define the meaning of the term "angle of attack" of an airfoil.
- 1.5 Describe the type of control movement used to induce forward flight in a helicopter.
- 1.6 Explain the movement of an aircraft about its axes during normal flight maneuvers.
- 1.7 Describe the factors affecting stability of an aircraft about its axes.
- 1.8 Describe the methods of maintaining directional control of a helicopter.
- 1.9 Explain the cause and effect of rotor blade stall in helicopters operating at high speeds.
- 1.10 Describe the cause of vertical vibration in a two-blade helicopter rotor system.
- 1.11 List the preparations required prior to rigging.
- 1.12 Describe the method of tracking helicopter main rotor blades.



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### Unit 2 Fixed Wing Aircraft

#### General Outcome:

- 2.0 **The student shall:** The students should be able to rig fixed wing aircraft.

#### Specific Measurable Learning Outcomes:

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

- 2.1 Discuss the condition of flight that a properly rigged aircraft should maintain.
- 2.2 Describe the factors to consider when rigging vertical stabilizer of single-engine, propeller-driven aircraft.
- 2.3 Explain the relationship of thrust and drag of an aircraft during level unaccelerating flight.
- 2.4 Describe the effect of incorrect wing incidence angle.
- 2.5 Describe the effect of dihedral on aircraft stability.
- 2.6 Use wing "wash-in" and "wash-out" to correct aircraft rigging.
- 2.7 Explain the relationship of lift and weight of an aircraft during level unaccelerating flight.
- 2.8 Define the meaning of the term "angle of attack" of an airfoil.
- 2.9 Explain the effect of flaps on aircraft landing speed and approach angle.
- 2.10 Define the meaning of the term "incidence angle" of an airfoil.
- 2.11 Demonstrate the movement of an aircraft about its axes during normal flight maneuvers.
- 2.12 Explain the relation between the center of pressure of a wing and its angle of attack.



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- 2.13 Explain the factors affecting stability of an aircraft about its axes.
- 2.14 Describe usual location of aircraft c.g. in relationship to center of lift.
- 2.15 Explain the changes in lift and drag of the wings when an aircraft is rolled about its longitudinal axis.
- 2.16 Explain the procedure for establishing wing angle of incidence prior to repairing wing attachment fittings.



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**Unit 3 Alignment of Structures**

**General Outcome:**

**3.0 The student shall:** The students should be able to check alignment of structures.

**Specific Measurable Learning Outcomes:**

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

- 3.1** Prepare fuselage for alignment check.
- 3.2** Check alignment of internally braced wing structure
- 3.3** Describe the significance and method of expressing reference positions.
- 3.4** Check alignment of assembled aircraft.



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**Unit 4 Aircraft Assembly**

**General Outcome:**

- 4.0 The student shall:** The students should be able to assemble aircraft.

**Specific Measurable Learning Outcomes:**

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

- 4.1** Explain the methods of safetying aircraft screws, bolts, and nuts.
- 4.2** Assemble, adjust and safety cable turn-buckles.
- 4.3** Describe the correct method of inserting bolts in aircraft fittings.



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### Unit 5 Movable Surfaces

#### General Outcome:

- 5.0 **The student shall:** The students should be able to balance and rig movable surfaces.

#### Specific Measurable Learning Outcomes:

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

- 5.1 Describe the inspection requirements for cable-operated primary flight control systems
- 5.2 Handle and make up control cables.
- 5.3 Explain the corrosion protection requirements of control cables.
- 5.4 Describe the effect of over-tightening control cables.
- 5.5 Explain the relationship between specified movements of the cockpit controls and the control surfaces.
- 5.6 Explain the relation between specified control movements during flight and the movement of the aircraft about its axes.
- 5.7 Discuss the movement of the controls, control surfaces, and the aircraft about its axes during normal flight maneuvers.
- 5.8 Balance control surfaces after repair.
- 5.9 Explain the relationship between specified movements of the trim tab operating device and the trim tab.
- 5.10 Secure the cockpit flight controls in preparation for control surface rigging.
- 5.11 Describe the effect of a worn pulley in a cable-operated control system.
- 5.12 Describe the means used to reduce or prevent control surface flutter.
- 5.13 Explain the purpose and operation of control surface locks.



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- 5.14 Explain the purpose and operation of differential controls.
- 5.15 Explain the purpose and applicability of fair-leads in a cable-operated control system.
- 5.16 Install and rig the cables in a flight control system.
- 5.17 Splice control cables using Nicropress sleeves.
- 5.18 Describe the probable causes of control surface flutter.
- 5.19 Explain the maintenance requirements of control surface trim tab systems.
- 5.20 Explain the purpose of counterweights incorporated into the leading edges of some primary control surfaces.
- 5.21 Explain the purpose and function of "spring tabs" and "servo tabs".
- 5.22 Measure control surface movement and adjust control stops.
- 5.23 Describe the effect of temperature changes on control system cable tension.
- 5.24 Assemble, adjust, inspect, and safety push-pull tub-type flight control systems.
- 5.25 Describe the types and characteristics of cables used in aircraft primary control systems.



**Common Course Number: AMT 1115**

**Unit 6 Jacking**

**General Outcome:**

- 6.0 The student shall:** The students should be able to jack aircraft.

**Specific Measurable Learning Outcomes:**

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

- 6.1** Determine maximum allowable jacking weight.
- 6.2** Describe the use of correct capacity jacks.
- 6.3** Protect aircraft from damage during lifting and lowering operations.
- 6.4** Use ballast when jacking aircraft with engine removed.
- 6.5** Explain the effects of wind when jacking aircraft.