

PO 437

1. **Performance:** Explain Aspects of Air Navigation
2. **Conditions:**
 - a. Given:
 - (1) Supervision, and
 - (2) Assistance as required.
 - b. Denied: Nil.
 - c. Environmental: Classroom or training area large enough to accommodate the entire group.
3. **Standard:** The cadet will explain aspects of air navigation by:
 - a. defining air navigation terms; and
 - b. describing the magnetic compass.
4. **Remarks:** Nil.
5. **Complementary Material:**
 - a. Complementary material associated with PO 437 is designed to enhance the cadet's knowledge of air navigation, specifically:
 - (1) EO C437.01 (Solve Navigation Problems With a Manual Flight Computer), and
 - (2) EO C437.02 (Use a Visual Flight Rules [VFR] Navigation Chart [VNC]).
 - b. Complementary material from PO 337 that was not conducted in the previous year may be selected as complementary training in Proficiency Level Four.

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EO M437.01

1. **Performance:** Define Air Navigation Terms
2. **Conditions:**
 - a. Given:
 - (1) Supervision, and
 - (2) Assistance as required.
 - b. Denied: Nil.
 - c. Environmental: Classroom or training area large enough to accommodate the entire group.
3. **Standard:** The cadet shall define:
 - a. latitude and longitude,
 - b. great circles,
 - c. rhumb lines, and
 - d. headings and bearings.

4. **Teaching Points:**

TP	Description	Method	Time	Refs
TP1	Define: <ol style="list-style-type: none"> a. meridians of longitude, b. parallels of latitude, c. geographical co-ordinates, and d. the relationship between time and longitude. 	Interactive Lecture	25 min	C3-116 (pp. 175–176)
TP2	Define great circles and rhumb lines.	Interactive Lecture	10 min	C3-116 (p. 177)
TP3	Define headings and bearings.	Interactive Lecture	5 min	C3-116 (p. 177)
TP4	Have the cadets take headings and bearings.	In-Class Activity	10 min	

5. **Time:**

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|-------------------------------|--------|
| a. Introduction / Conclusion: | 10 min |
| b. Interactive Lecture: | 40 min |
| c. In-Class Activity: | 10 min |
| d. Total: | 60 min |

6. **Substantiation:**

- a. An interactive lecture was chosen for TPs 1–3 to clarify, emphasize, and summarize navigation terms.
- b. An in-class activity was chosen for TP 4 as it is an interactive way to reinforce bearings and headings, and confirm the cadets' comprehension of navigation terms.

7. **References:** C3-116 ISBN 0-9680390-5-7 MacDonald, A. F., & Pepler, I. L. (2000). *From the ground up: Millennium edition*. Ottawa, ON: Aviation Publishers Co. Limited.

8. **Training Aids:**

- a. Presentation aids (eg, whiteboard / flip chart / OHP / multimedia projector) appropriate for the classroom / training area,
- b. Large globe with latitude and longitude markings, and
- c. Douglas protractor.

9. **Learning Aids:**

- a. Local VFR Navigation Chart (VNC),
- b. Douglas protractor,
- c. Pen / pencil, and
- d. Headings and Bearings worksheet.

10. **Test Details:** This EO is assessed IAW Chapter 3, Annex B, Aviation Subjects–Combined Assessment PC.

11. **Remarks:** Cadets who are qualified Advanced Aviation may assist with this instruction.

EO M437.02

1. **Performance:** Describe the Magnetic Compass
2. **Conditions:**
 - a. Given:
 - (1) Supervision, and
 - (2) Assistance as required.
 - b. Denied: Nil.
 - c. Environmental: Classroom or training area large enough to accommodate the entire group.
3. **Standard:** The cadet shall describe the magnetic compass, to include:
 - a. the Earth's magnetism,
 - b. the main parts of the compass,
 - c. variation, and
 - d. compass errors.

4. **Teaching Points:**

TP	Description	Method	Time	Refs
TP1	Describe the Earth's magnetism.	Interactive Lecture	5 min	C3-116 (pp. 177–178)
TP2	Describe the main parts of the magnetic compass.	Interactive Lecture	5 min	C3-116 (p. 179)
TP3	Describe variation.	Interactive Lecture	5 min	C3-116 (pp. 178–179)
TP4	Describe compass errors.	Interactive Lecture	10 min	C3-116 (pp. 179–182)

5. **Time:**
 - a. Introduction / Conclusion: 5 min
 - b. Interactive Lecture: 25 min
 - c. Total: 30 min
6. **Substantiation:** An interactive lecture was chosen for this lesson to clarify, emphasize, and summarize the magnetic compass.
7. **References:** C3-116 ISBN 0-9680390-5-7 MacDonald, A. F., & Pepler, I. L. (2000). *From the ground up: Millennium edition*. Ottawa, ON: Aviation Publishers Co. Limited.

8. **Training Aids:**

- a. Presentation aids (eg, whiteboard / flip chart / OHP / multimedia projector) appropriate for the classroom / training area, and
- b. Examples of magnetic compasses.

9. **Learning Aids:**

- a. Pen / pencil, and
- b. Magnetic Headings worksheet.

10. **Test Details:** This EO is assessed IAW Chapter 3, Annex B, Aviation Subjects–Combined Assessment PC.

11. **Remarks:** Cadets who are qualified Advanced Aviation may assist with this instruction.

EO C437.01

1. **Performance:** Solve Navigation Problems With a Manual Flight Computer
2. **Conditions:**
 - a. Given:
 - (1) Manual flight computer,
 - (2) Supervision, and
 - (3) Assistance as required.
 - b. Denied: Nil.
 - c. Environmental: Classroom or training area large enough to accommodate the entire group.
3. **Standard:** The cadet shall solve navigation problems with a manual flight computer by:
 - a. converting units of measure; and
 - b. calculating:
 - (1) speed,
 - (2) distance, and
 - (3) time.

4. **Teaching Points:**

TP	Description	Method	Time	Refs
TP1	Demonstrate how to use a manual flight computer to convert units of measure and have the cadets practice converting units of measure.	Demonstration and Performance	25 min	C3-116 (pp. 199–200)
TP2	Demonstrate how to use a manual flight computer to calculate speed, distance, and time and have the cadets practice calculating speed, distance, and time.	Demonstration and Performance	25 min	C3-116 (pp. 199–200)

5. **Time:**
 - a. Introduction / Conclusion: 10 min
 - b. Demonstration and Performance: 50 min
 - c. Total: 60 min
6. **Substantiation:** A demonstration and performance was chosen for this lesson as it allows the instructor to explain and demonstrate solving navigation problems with a manual flight computer while providing an opportunity for the cadets to practice this skill under supervision.
7. **References:** C3-116 ISBN 0-9680390-5-7 MacDonald, A. F., & Peppler, I. L. (2000). *From the ground up: Millennium edition*. Ottawa, ON: Aviation Publishers Co. Limited.

8. **Training Aids:**

- a. Presentation aids (eg, whiteboard / flip chart / OHP / multimedia projector) appropriate for the classroom / training area, and
- b. Manual flight computer.

9. **Learning Aids:**

- a. Pen / pencil,
- b. Manual flight computer, and
- c. Navigation problems worksheet.

10. **Test Details:** Nil.

11. **Remarks:**

- a. Assistant instructors may be required for this lesson.
- b. Cadets who are qualified Advanced Aviation may assist with this instruction.

EO C437.02

1. **Performance:** Use a Visual Flight Rules (VFR) Navigation Chart (VNC)
2. **Conditions:**
 - a. Given:
 - (1) VNC,
 - (2) International Civil Aviation Organization (ICAO) ruler,
 - (3) Douglas protractor,
 - (4) Supervision, and
 - (5) Assistance as required.
 - b. Denied: Nil.
 - c. Environmental: Classroom or training area large enough to accommodate the entire group.
3. **Standard:** The cadet shall use a VNC by:
 - a. explaining types of projections;
 - b. describing types of aeronautical charts;
 - c. locating landmarks using latitude and longitude;
 - d. plotting tracks between landmarks;
 - e. measuring distances; and
 - f. determining headings.
4. **Teaching Points:**

TP	Description	Method	Time	Refs
TP1	Explain types of projections.	Interactive Lecture	5 min	C3-116 (pp. 184–186)
TP2	Describe types of aeronautical charts.	Interactive Lecture	5 min	C3-116 (pp. 186–188)
TP3	Explain, demonstrate and have the cadets practice locating landmarks on a VNC using latitude and longitude.	Demonstration and Performance	15 min	
TP4	Explain, demonstrate and have the cadets practice plotting tracks between landmarks on a VNC.	Demonstration and Performance	5 min	
TP5	Explain, demonstrate and have the cadets practice measuring distances on a VNC.	Demonstration and Performance	10 min	

TP	Description	Method	Time	Refs
TP6	Explain, demonstrate and have the cadets practice determining headings on a VNC.	Demonstration and Performance	10 min	

5. **Time:**

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|----|--------------------------------|--------|
| a. | Introduction / Conclusion: | 10 min |
| b. | Interactive Lecture: | 10 min |
| c. | Demonstration and Performance: | 40 min |
| d. | Total: | 60 min |

6. **Substantiation:**

- An interactive lecture was chosen for TPs 1 and 2 to clarify, emphasize, and summarize types of projections and aeronautical charts.
- A demonstration and performance was chosen for TPs 3–6 as it allows the instructor to explain and demonstrate using a VNC while providing an opportunity for the cadets to practice using a VNC under supervision.

7. **References:** C3-116 ISBN 0-9680390-5-7 MacDonald, A. F., & Pepler, I. L. (2000). *From the ground up: Millennium edition*. Ottawa, ON: Aviation Publishers Co. Limited.8. **Training Aids:**

- Presentation aids (eg, whiteboard / flip chart / OHP / multimedia projector) appropriate for the classroom / training area,
- Large globe with latitude and longitude markings,
- Sheet of flip chart paper,
- VNC,
- World Aeronautical Chart,
- VFR Terminal Area Chart,
- Enroute Chart,
- ICAO ruler, and
- Douglas protractor.

9. **Learning Aids:**

- Pencil,
- VNC,
- ICAO ruler,
- Ruler,

- e. Paper, and
- f. Douglas protractor.

10. **Test Details:** Nil.

11. **Remarks:**

- a. Assistant instructors may be required for this lesson.
- b. Cadets who are qualified Advanced Aviation may assist with this instruction.