# Course Specifications

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|---|---|
| **Program(s) on which this course is given:** | Aerospace engineering |
| **Department offering the program:** | **Aerospace department** |
| **Department offering the course:** | **Aerospace department** |
| **Academic Level:** | 3rd year |
| **Date** | November 2014 |
| **Semester (based on final exam timing)** | ☐ Fall ■ Spring |

## A- Basic Information

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|---|---|---|---|---|---|---|---|---|
| **1. Title:** | **Mechanics of Flight and Control B** | | **Code:** | | **AER307B** | | | |
| **2. Units/Credit hours per week:** | Lectures | 3 hrs | Tutorial | 2 hrs | Practical | | Total | 5 hrs |

## B- Professional Information

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| **1. Course description:** | The course aims at teaching students the modeling, analysis, and design of continuous control systems. The course includes classical and modern control strategies |
| **2. Intended Learning Outcomes of Course (ILOs):** | **a) Knowledge and Understanding** |
| | -The student should be able to analysis the stability of both open loop and closed loop systems and design controllers using classical control techniques like Bode plot, and Nyquist Diagram and modem control techniques using pole placement, and optimal control. |
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| | **b) Intellectual Skills** |
| | The students should be able to draw conclusions and select appropriate controller. |
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| | **c) Professional and Practical Skills** |
| | The students should be able to design controllers. |
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| | **d) General and Transferable Skills** |
| | |

**3. Contents**

| Topic | Total hours | Lectures hours | Tutorial/ Practical hours |
|---|---|---|---|
| Introduction to classical control | 6 | 4 | 2 |
| Bode plot method | 18 | 12 | 6 |
| Polar plot and Nyquist diagram | 8 | 6 | 2 |

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|---|---|---|---|
| Introduction to modem control | 6 | 4 | 2 |
| State Space and state transformation | 14 | 10 | 4 |
| Controllability and Observability | 4 | 2 | 2 |
| Pole Assignment Design and State Estimation | 12 | 8 | 4 |
| Optimal Control | 6 | 4 | 2 |
| | Lectures (√ ) | Practical Training/ Laboratory (√ ) | Seminar/Workshop (√ ) |
| | Class Activity ( ) | Case Study (√ ) | Projects ( √) |
| | E-learning ( ) | Assignments /Homework (√) | Other: |

**5. Student Assessment Methods**

| • .Assessment Schedule | **Week** |
|---|---|
| -Assessment 1 | Every two weeks |
| -Assessment 2 | Week 11 |
| -Assessment 3 | Six announced tests |
| • **Weighting of Assessments** | |
| 6 Tests (best 4) | 14 % |
| Final-term Examination | 68 % |
| Projects | 11 % |
| Assignments | 7 % |
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**6. List of References**

**6.1- Course Notes**

**6.2- Essential Books (Text Books)**

John Van De Vegte, **"Feedback Control Systems".** Prentice Hall, 1994

**6.3- Recommended Books**

**ohn J. D'Azzo, "Linear Control Systems Analysis and Design". McGraw-Hill,** 1981.

**7. Facilities Required for Teaching and Learning**

Data Show , Screen

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|---|---|
| **Course Coordinator:** | **Prof. Ayman Hamdy** |
| **Head of Department:** | **Prof. Ayman Hamdy** |