Syllabus

MAE 478: Guided Missile Systems

Spring 2017

Instructor: Dr. Alfred Lynam
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Classroom: MRB 209 from 12:30-1:45pm.

Prerequisites: MAE 336 and MAE 426 (co-requisite)

Course Structure: Two 75-minute lectures per week (3 credit hours). Two in-class exams. Office Hours: TR: 10:00-11:00am.

Attendance Policy: Attendance is expected. Homework and projects must be turned in at the beginning of class on their due date.

Grading Breakdown:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Homework</td>
<td>10%</td>
</tr>
<tr>
<td>Exam 1</td>
<td>20%</td>
</tr>
<tr>
<td>Exam 2</td>
<td>20%</td>
</tr>
<tr>
<td>Semester Project</td>
<td>30%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>20%</td>
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</tbody>
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Grading Scale:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A</td>
<td>90–100</td>
</tr>
<tr>
<td>B</td>
<td>80–89</td>
</tr>
<tr>
<td>C</td>
<td>70–79</td>
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<tr>
<td>D</td>
<td>60–69</td>
</tr>
<tr>
<td>F</td>
<td>0–60</td>
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</tbody>
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Course Topics:

1) Introduction to Missiles and Rocket Propulsion. (Weeks 1–2)
2) Solid Rocket Motors. (Week 3–6)
3) Supersonic Airfoil Theory (Weeks 7–10)
4) Missile Body Aerodynamics (Weeks 11–13)
5) Missile Guidance, Navigation and Control (Week 14)
6) Missile Warheads (Week 15).


Course Objectives: 1) Students will have knowledge of fundamental components of historic and contemporary guided missile systems.
2) Students will be able to utilize knowledge from (1) and apply effective problem solving skills to evaluate and/or design basic guided missiles.

**Learning Outcomes:** At the end of the course, students will be able to:
1. Apply mathematics, science, and modern engineering practice to solve unique-answer problems as well as open-ended design problems;
2. Develop an understanding of the importance of missile observability;
3. Predict missile trajectories and understand target approach methods;
4. Recognize historic and contemporary missile systems;
5. Understand the basic principles of warhead technology;
6. Acquire a reasonable knowledge of contemporary missile and weapon systems.
7. Design rocket motor pressure chambers and nozzles for solid and liquid fuel rockets;
8. Design solid rocket motors to achieve specific missile mission goals
9. Design aerodynamic control surfaces to control missiles and rockets;
10. Work effectively in teams to design missiles and related components;
11. Use computer application software to facilitate missile design and components.

**Homework:** Late HW will be accepted within one day after it is due for a 10% grade deduction.

**Academic Dishonesty:** The integrity of the classes offered by any academic institution solidifies the foundation of its mission and cannot be sacrificed to expediency, ignorance, or blatant fraud. Therefore, I will enforce rigorous standards of academic integrity in all aspects and assignments of this course. For the detailed policy of West Virginia University regarding the definitions of acts considered to fall under academic dishonesty and possible ensuing sanctions, please see the Student Conduct Code: [http://studentlife.wvu.edu/office_of_student_conduct/student_conduct_code](http://studentlife.wvu.edu/office_of_student_conduct/student_conduct_code).

Should you have any questions about possibly improper research citations or references, or any other activity that may be interpreted as an attempt at academic dishonesty, please see me before the assignment is due to discuss the matter.

**Inclusivity Statement:** “The West Virginia University community is committed to creating and fostering a positive learning and working environment based on open communication, mutual respect, and inclusion. If you are a person with a disability and anticipate needing any type of accommodation in order to participate in this class, please advise me and make appropriate arrangements with the Office of Accessibility Services (293-6700). For more information on West Virginia University's Diversity, Equity, and Inclusion initiatives, please see [http://diversity.wvu.edu](http://diversity.wvu.edu)."