**MECH4810 – Unmanned Aviation Vehicle**

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<thead>
<tr>
<th>Course Code: MECH 4810</th>
<th>Course Title: Unmanned Aviation Vehicle</th>
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<tr>
<td>Required Course Or Elective Course:</td>
<td>Terms Offered (Credits): Fall or Spring, 3 credits</td>
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<td>Elective Course</td>
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<td>Faculty In Charge: Hongyu YU</td>
<td>Pre-Requisites: MECH3650</td>
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**Course Structure:**
Lecture – 3 hours per week

**Textbook/Required Material:**
Reg Austin, Unmanned Aircraft Systems: UAVS Design, Development and Deployment, 2010

**Course Description:**
1. Elective course for BEng in Aerospace Engineering
2. This course will introduce UAVs that are capable to operate remotely or autonomously. The knowledge of the mechanics, control and applications of the flight system and the design of UAVs (especially quadrotors) will be explored.

**Course Topics:**
(1) Introduction to UAVS: history, components and categories  
(2) Launching and recovery  
(3) Control and control systems  
(4) Sensors and payload, and UAVs’ functions for communication, sensing and avoidance  
(5) Quadrotors’ mechanics, control, planning, and system design  
(6) UAV regulations, human factors in the system, and legal and ethical issues

**Course Objectives:**
(1) Fundamental understanding on unmanned aerial systems for MAE students to partially fulfill Program Objectives (P-O1, P-O3, P-O5).
(2) Understanding and analyzing system requirements, control and payload selection for UAV’s different applications. (P-O1, P-O3, P-O4);
(3) Understanding the environmental and social consequences and impact of UAV technology development. (P-O2, P-O4, P-O5).

**Course Outcomes:**
On successful completion of this course, students will be able to:
A. Understand basic concepts, history, classification, applications and social impacts of unmanned aviation vehicles [1,2,3] (POC1, POC3, POC7, POC8, POC9, POC10);  
B. Understand and analyze basic requirements and specs for UAV’s system, including control, sensing and payloads [2][POC1, POC4, POC5, POC7, POC8, POC9];  
C. Recognize, analyze and design UAV’s control model and related systems [1,2][POC1, POC3, POC 4, POC5];
D. Understand the state of are of UAV and envision future trend of UAVs [3](POC1, POC7, POC8, POC9, PIC10);

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<th>Assessment Tools: (correlated course outcomes)</th>
<th>Assessment:</th>
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<tr>
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<td>Homework problems - 10% [A, B, C, D]</td>
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<td>Project - 20% [A, B, D]</td>
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<td>Mid-term and Final exams - 70% [A, B, C, D]</td>
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