

# Syllabus for MECH 4395: Special Topics in Mechanical Engineering Aerospace Structures Design Fall 2019

## **Overview**

This class is an introduction to the aerospace structures design with emphasis on the Aircraft structures. This class will build the students' skills in performing linear analysis for aircraft, an approximate calculation for section properties, calculation of loads, analyzing and design connection, discussing the types of materials used for aerospace structures.

## **Course Information**

**CRN:**15912

**Credit Hours:** 3

**Instructor:** Dr. Methaq Abed

**Email:** msabed@utep.edu

**Office Hours:**(10:30- 11:30 am) MTWR

**Office:** Engineering Annex, A104

**Textbook:** "Aircraft Structures for Engineering Students," by T.H.G. Megson, fifth edition

**Prerequisites:** MECH 3352 & MECH 3334

**Location:** College of Business Admin 323

## **Course Objectives**

At the end of this class, the typical students should be well prepared in the following areas:

- Understand the concept of torsion in open-and- closed beam sections
- Perform an approximate analysis for the box –sections under torsion
- Understand the bending in thin plates
- Solve some differential equations related to the structures by using MATLAB
- Analyze and design of connections
- Use finite element analysis to solve some structural problems

## Course Policies

### ***Grading:***

- 1) Two exams will be given during the semester.
- 2) 2 Research Projects + One Analysis Project by using X Plane 11 software
- 3) A few take-home assignments
- 4) Attendance will be taken through Top Hat

The grade will be computed as follows:

$$\text{Final Score} = 40\% \text{ Exams} + 20\% \text{ Research Projects} + 20\% \text{ Analysis Project (by Using XPlane 11)} + 20\% \text{ (Attendance + Assignments)}$$

There is no curve, dropping of exams, or room for negotiation on this part.

The letter grade that will be assigned is given as follows:

$$88 \leq A \leq 100$$

$$75 \leq B < 88$$

$$62 \leq C < 75$$

$$50 \leq D < 62$$

$$F < 50$$

***Exams:*** The exams will be announced at least one week in advance so that there is no excuse for missing an exam. ***There will be no make-up exams given!*** If you miss an exam with reasonable justification, your grade will be based on two exams. Also, if you show up for an exam after the exam has started, you ***will not be allowed to take the exam.***

### Course Delivery

This class will be delivered in a partially “flipped” modality. This means that much of the typical lecture material will be posted online and it is expected that you view/read/digest this material before the lecture that it is due. The class time will be reserved for more active learning exercises such as solving problems and performing calculations. You will be graded on your efforts in class as a quiz grade.

So, it is essential that you come to class

- 1) with the assigned reading and materials covered,
- 2) a device with Top Hat ® installed.
- 3) MATLAB software

**Top Hat** : We will be using the Top Hat ([www.tophat.com](http://www.tophat.com)) classroom response system in class. You will be able to submit answers to in-class questions using Apple or Android smartphones and tablets, laptops, or via text message (SMS).

You can visit <http://tinyurl.com/THStudentRegistration> for the Student Quick Start Guide, which outlines how you will register for a Top Hat account, as well as providing a brief overview to get you up and running on the system. An email invitation will also be sent to your email account (if you don't receive this email, you can register by visiting our direct Top Hat course URL: <https://app.tophat.com/e/608212>)

## **Course ID:608212**

**Readings:** I do not explicitly cover everything that is in the text, but that does not mean you are not responsible for the material. Each lecture I will state what sections I am covering, and you are to read that outside of class. I try to lecture so that I supplement the text not simply recite it.

**Attendance:** Attendance is expected and required. Attendance will be taken using Top Hat ® daily.

**Students with Special Needs:** Students with disabilities or special needs, including both permanent disabilities (including learning disabilities, Attention Deficit Disorder, visual, mobility and hearing impairments, psychological disabilities, and chronic systemic disorders) as well as some temporary medical conditions (e.g. a broken arm), are encouraged to see the UTEP Disabled Student Services Office (DSSO) located at Union East Room 106 or contact them at (915) 747-5148 or at [dss@utep.edu](mailto:dss@utep.edu).

### **Topics covered:**

- Elasticity
- Structural Components of aircraft
- Materials
- Bending of open and closed, thin-walled beams
- Torsion of beams
- Torsion of open and closed, thin-walled beams
- Combined open and closed section beam
- Structural Idealization of Aircrafts
- Fuselage

- Wing Spars and Box Beams
- Deflection and Temperature Effects
- Using XPlane 11 Software for the analysis

## **Departmental Policy**

### **Academic Honesty**

During exams and quizzes, you are not allowed to use any form of wifi enabled electronic device, including cell phones or other electronic communication devices or methods (wrist watches, earbuds, etc.). No wristwatch or another electronic device may be worn.

No electronic version of the book, loose paper print-outs of the book or extra sheets of paper of any kind are allowed unless explicitly mentioned in writing by the instructor. As a part of the zero-tolerance policy, if you have a cellphone or other electronic device capable of communication on your person; or if any proctor sees or hears any electronic device during the exam or if you share your work with someone else, you will be reported to the proper authorities, and you may receive a zero on the exam and an F in the class. Other actions including suspension may also be pursued.

If anyone leaves the exam room during an exam, they must be accompanied by a proctor. This includes restroom breaks. University approved recording devices may also be located at various locations in the room and may be out of sight of the students. These recordings will be managed according to the UTEP approved regulations for such media.

If you are suspected of scholastic dishonesty, you may not be directly confronted about your conduct by the instructor or proctor. You will, however, be reported to the Office of Student Conduct and Conflict Resolution (OSCCR) and your exam will not be admissible. Your grade in the class may not be available until OSCCR makes a final ruling, this may adversely impact your ability to enroll in other classes.

If you arrive more than 15 minutes late to an exam, you will not be allowed to take the examination.

There will be no makeup exams administered. If you have a university approved excuse, your instructor will have a process for determining how to handle the missing grade outlined in the syllabus. However, no makeup exams will be given.

If you miss more than one exam, the instructor may choose to drop you from the class administratively. This may adversely impact a visa and financial aid.

Any food or drink brought into the examination room is subject to careful inspection by a proctor.

Departmental policy allows for the use of assigned seats. All students must present their UTEP issued ID prior to and during every exam and may be required to sign in. Not having a UTEP issued ID when asked will result in forfeiture of the exam.

Scholastic dishonesty on homework, lab assignments, and all other class assignments will be held to the same standards and requirements of academic honesty as quizzes and exams.

### **Class Attendance Policy**

Attendance is mandatory. Anyone with 5 or more absences will be dropped from the class. A drop for not attending will count toward the State Allowed Six-Drop Limit. If you are failing the class at the time of the drop, you may also be given a WF designation. Be advised that a drop could adversely impact visa status, financial aid, and other programs.

As per UTEP rules, you may be asked to show a UTEP ID at any time during class. Anyone who is present and not registered in the class will be subject to disciplinary action unless the instructor gives prior approval.

### **Excused Absence for Exams**

The UTEP catalog allows Exam Absence to be excused ONLY for University-Recognized Activities and very specific other situations. Medical absence is NOT allowed in the UTEP catalog. For consistency with the catalog, students will NOT be excused from exams due to illness.

### **Harassment Policy**

The department has a zero-tolerance policy for harassment. Engagement in any behavior considered harassment would be reported to the proper authorities. In addition to generally understood forms of harassment, the department also treats the following behavior as harassment:

- Repeated emails and/or calls regarding subjects that have already been addressed. Once a decision has been made, or a question answered, a student who continues to ask the same question will be given a warning by the recipient of the email/call. If the student continues, the behavior will be reported. Questions that seek understanding of course material are not harassment, but repeated questions about a grade or an administrative decision are.
- Grades are NOT negotiable, ever. If you believe a grading mistake has been made, you must follow the process described in the UTEP catalog. Any request for a grade elevation that is NOT based on a mistake is considered harassment and will be reported immediately.
- Remaining in an office after the occupant requests you leave is considered harassment and potentially threatening. You will be reported immediately without warning and depending on the severity, may be reported to law enforcement.

- Similar behavior towards department staff and student advisors will also be treated as harassment, including persistent phone calls, emails, and badgering. Department staff and student advisors are there to help students and should be treated with due respect.