Aerospace Engineering / College of Engineering

AERE 192 - Aerospace Seminar : Math you need to know

Spring 2018 Syllabus

Instructor: **Tejaswi Soori (TA)**
Class schedule: **M,W,F 4:10 PM – 5:00 PM**
Location: **HOWE 0010**
TA Email: **tsoori@iastate.edu**
TA Office Hours: **M,W,F 12:30 PM – 1:30 PM**
TA Office Number: **HOWE 0245/0224(Lab)**

Course Information

Required Materials

Scientific Calculator
The instructor will post lecture notes on Canvas.

To receive a passing grade:

Homework average > 70% and
Final Exam grade > 70% and
Attendance > 80%

Exam 1:

The week of **January** 22^{nd}, there will be in-class placement exam covering the future material of class. The purpose of this exam is to evaluate the knowledge spectrum of the students. To test out of the course, one should achieve a grade **above 90 percent** on this exam.

Assignments policy

The weekly homework assignments shall be submitted by students on engineering paper. Except in extremely rare circumstances, a late work will not be accepted. If you have questions or concerns about assignments or grades, please contact our TA ASAP. Do not wait until final grades have been posted to discuss assignments or grades.

Make-up Exams

Make-up exams will be given only for very unusual circumstances and/or approved medical excuses. For anticipated conflicts with a scheduled exam, you must contact your instructor **BEFORE** the exam to request and **attempt** to arrange an alternate exam. **(All requests for make-up exams must be submitted in writing and must include the reason for the request and a copy of your schedule.)**

Topic Outline

Topics to be covered:

1. 2D and 3D Vectors, Components, Resultants, Trigonometry, and Forces and Reactions
2. Matrix and Vector Operations and Matrix Terminology
   (a) Addition
   (b) Subtraction
   (c) Multiplication
   (d) Identity Matrix
   (e) Vector Dot Product
   (f) Vector Cross Product
   (g) Determinant and Inverse of a Matrix (2×2)
   (h) Introduction to Matrix Representation of System of Equations
3. Solving Force Problems Using System of Equations
   (a) Method of Equation Multiplication and Subtraction
   (b) Method of Variable Substitution
4. Differentiation
   (a) Chain Rule
   (b) Product and Quotient Rules
   (c) Second Derivative and Parametric Differentiation
   (d) Maxima and Minima Word Problems
5. Integration
   (a) Midpoint Rule
   (b) Indefinite Integrals
   (c) Integration by Parts
   (d) Integration by Substitution
   (e) Definite Integrals

Class Schedule:

Day	Date	Lecture	Topics covered	HW
M	1/8/2018	Introduction	TA introduction Syllabus Placement exam topics	
W	1/10/2018			
F	1/12/2018			
M,W,F	1/15 to 1/19	MLK Day (Monday)	No Classes	
M,W,F	1/22 to 1/26	Placement Exams		
M	1/29/2018	Lecture 1		None
W	1/31/2018			
F	2/2/2018			
M	2/5/2018	Lecture 2		HW 1 due
W	2/7/2018			
F	2/9/2018			
M	2/12/2018	Lecture 3		HW 2 due
W	2/14/2018			
F	2/16/2018			
M	2/19/2018	Lecture 4		HW 3 due
W	2/21/2018			
F	2/23/2018			
M	2/26/2018	Lecture 5		HW 4 due
W	2/28/2018			
F	3/2/2018			
M	3/5/2018	Lecture 6		HW 5 due
W	3/7/2018			
F	3/8/2018			
M	3/12/2018	Spring break	No Classes	None
W	3/14/2018			
F	3/16/2018			
M	3/19/2018	Lecture 7		HW 6 due
W	3/21/2018			
F	3/23/2018			
M	3/26/2018	Lecture 8		HW 7 due
W	3/28/2018			
F	3/30/2018			
M	4/2/2018	Lecture 9		HW 8 due
W	4/4/2018			
F	4/6/2018			
M,W,F	4/9 to 4/13	Topic review		HW 9 due
M,W,F	4/16 to 4/20	Final Exams		

Learning Outcomes:

Students will be able to:

1. Vectors:
    - Resolve a vector into components, add vectors, find dot & cross product of two vectors, and find direction cosines.
2. Matrices:
    - Perform addition, subtraction, and multiplication of matrices.
    - Find determinant, adjoint, and inverse of a matrix.
    - Solve system of equations using matrix terminology.
3. Statics:
    - Use free body diagrams to solve simple force–reaction problems.
    - Use sine, cosine rules to find resultant forces.
4. Differentiation:
    - Differentiate a function using quotient rule, chain rule, parametric derivatives.
5. Integration:
    - Integrate a function using definite, indefinite integral method.
    - Integrate by parts and substitution.

Academic Dishonesty
The class will follow Iowa State Universitys policy on academic dishonesty. Anyone suspected of academic dishonesty will be reported to the Dean of Students Office.
http://www.dso.iastate.edu/ja/academic/misconduct.html

Disability Accommodation
Iowa State University complies with the Americans with Disabilities Act and Sect 504 of the Rehabilitation Act. If you have a disability and anticipate needing accommodations in this course, please contact me to set up a meeting within the first two weeks of the semester or as soon as you become aware of your needs. Before meeting with me, you will need to obtain a SAAR form with recommendations for accommodations from the Disability Resources Office, located in Room 1076 on the main floor of the Student Services Building. Their telephone number is 515-294-7220 or email disabilityresources@iastate.edu . Retroactive requests for accommodations will not be honored.

Dead Week
This class follows the Iowa State University Dead Week policy as noted in section 10.6.4 of

the Faculty Handbook http://www.provost.iastate.edu/resources/faculty-handbook.

Harassment and Discrimination
Iowa State University strives to maintain our campus as a place of work and study for faculty, staff, and students that is free of all forms of prohibited discrimination and harassment based upon race, ethnicity, sex (including sexual assault), pregnancy, color, religion, national origin, physical or mental disability, age, marital status, sexual orientation, gender identity, genetic information, or status as a U.S. veteran. Any student who has concerns about such behavior should contact his/her instructor, Student Assistance at 515-294-1020 or email dsosas@iastate.edu, or the Office of Equal Opportunity and Compliance at 515-294-7612.

Religious Accommodation
If an academic or work requirement conflicts with your religious practices and/or observances, you may request reasonable accommodations. Your request must be in writing, and your instructor or supervisor will review the request. You or your instructor may also seek assistance from the Dean of Students Office or the Office of Equal Opportunity and Compliance.

Academic Issues
If you are experiencing, or have experienced, a problem with any of the above issues, email academicissues@iastate.edu.

Important Note: This syllabus, along with course assignments and due dates, are subject to change. It is the students responsibility to check Blackboard for corrections or updates to the syllabus. Any changes will be clearly noted in course announcement or through Canvas or email.