

Fall 2019

ME 616-101: Matrix and Tensor Method

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ME 616: Matrix and Tensor Method (Syllabus)

Students are expected to have completed the usual sequence of calculus courses as well as differential equations, and to have a sound knowledge of these subjects. In addition, some understanding of basic linear algebra is also required.

Required Text: *Advanced Calculus for Applications* by F. R. Hildebrand, 2nd Edition (Prentice-Hall)
Mechanics Lecture Notes Part III: Foundations of Continuum Mechanics, Chapter 1: Vector and Tensors
 (http://homepages.engineering.auckland.ac.nz/~pkel015/SolidMechanicsBooks/Part_III/index.html)

Course Grade: Based on the midterms and final exams. Solutions to assigned problems will either be done in class, or e-mailed.

Relevance: The material covered in the first 9 weeks of this course provides background to the following courses: ME611 (Dynamics of Incompressible Fluids), ME614 (Continuum Mechanics), ME620 (Mechanics of Materials), ME712 (Mechanics of Viscous Fluids)

Office Hours: By appointment. Send e-mail to rosato@njit.edu to setup a meeting.

Week	Topic	Reading	Homework ¹
1 to 5	Vector and Tensors – Part 1	Notes (E-mailed) Kelly (1.3, 1.5, 1.6, 1.8)	To be E-mailed to Class Selected problems from Kelly's book
		Hildebrand (6.17, 6.18)	Ch. 6 (103, 104)
6	Mid-Term Exam (Closed Book/Notes)		
7 to 9	Tensor Algebra	E-mail notes + Kelly (1.8, 1.9, 1.10)	Selected problems from Kelly's book
10	Mid-Term Exam 2 (Closed Book/Notes)		
11	Series Solutions of Differential Equations	4.1 – 4.3	Pg. 169: 5, 7, 11
12	Method of Frobenius	4.4	Pg. 171: 16, 17; Pg. 170: 11, 12, 14, 16, 17
13	Frobenius: Exceptional Cases	4.5, 4.6	Pg. 173: 24, 25
14	Special Equations: Bessel, Legendre, ...	4.7, 4.8, 4.12	Pg. 182: 63, 64
15	Final Exam (Closed Book/Notes)		

All violations of the NJIT Honor Code will be referred to the Office of the Dean of Students.

¹ These are the suggested problems for the course. Students are encouraged to work on other problems in the text.