

Fall 2019

ME 403-101: Mechanical Systems Design I

Trivikrama Pala

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Recommended Citation

Pala, Trivikrama, "ME 403-101: Mechanical Systems Design I" (2019). *Mechanical and Industrial Engineering Syllabi*. 93.
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ME 403 Mechanical Systems Design I

Fall 2019; Instructor: Prof. Trivikrama Pala; Location: GITC 2302; Office Hours: 5:00 to 6:00PM

COURSE OUTLINE

Prerequisites: ME 304 Fluid mechanics, ME 305 Introduction to system dynamics, ME 316 Machine design. ME 407 Heat transfer can be taken as Co-requisite.

Instructor: Dr. Trivikrama Pala
Phone: 862-221-0860 E-mail: trivikrama.b.pala@njit.edu

Office Hours: Monday: 5:00 to 6:00 pm at Adjunct office.

Textbook:

1. Atila Ertas, Jesse Jones, The Engineering Design Process, John Wiley & Sons, 1996 2ndedition. (Required)
2. Engineering Design with SolidWorks, Planchard and Planchard, SDC Publications, 2017 (Reference)

Course Description: Lectures and projects covering problem solving methodology in the design, analysis, and synthesis of mechanical and thermal systems. The student's academic background combines with engineering principles and topics to serve as a foundation for broad engineering projects. Emphasis on creative thinking and the engineering design process in projects involving optimal conversion of resources

Grading Scale and Policies:

Point Values:

Homework/Class-Exercises	20%
Projects	25%
Mid-Term Exam	20%
Final Project	10%
Final Exam	25%

Ground Rules:

1. Attending class, completing assignments on time, and keeping up with the class material is important for success in this course and in college. Generally, late or missed assignments **will not** be accepted except for legitimate (**pre-approved when possible**) reasons as determined by the instructor. Examples of legitimate reasons are: illness, death in family, etc.
2. Missing more than **Two Classes** will lead to failing the class.
3. **ANY FORM OF CHEATING ON PROJECTS or EXAMS WILL RESULT IN AN "F" FOR THE COURSE.** This includes looking at another person's exam or copying another person's work for exams. The honor code will be used for all situations that involve cheating, copying, misrepresentation of student work, and misrepresentation of student information.

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4. The student who compromised as well as the student who allowed will **BOTH** be awarded the **SAME** penalty.
5. NJIT honor code will be used for all situations that involve cheating, copying, misrepresentation of student work, and misrepresentation of student information and any violations will be brought to the immediate attention of the Dean of Students (visit <http://www.njit.edu/academics/honorcode.php>.)
6. Homework is due **BEFORE** the start of Lecture. Assignments turned in after the lecture starts will be counted as **LATE**.
7. Homework and projects more than 2 weeks late will not be accepted.
8. While the professor is discussing the lecture, all monitors should be turned off. If anyone caught typing or browsing internet, the student will be asked to leave the class for the day and this will count as an absence.
9. **If you would like to use you Cell Phone or Text** during class, please step outside.
10. Taking the Mid Term Exam is mandatory to receive a final grade in the course.
11. Attendance, attitude, class participation and effort can and will be used to change borderline grades up or down.
12. The student must approach Disability Resource Center for special allowances associated with disabilities.

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Week	Topic
1) 09/09	<ul style="list-style-type: none"> Introduction/Engineering Design CAD/CAM/CAE Lab - Solidworks I
2) 09/16	<ul style="list-style-type: none"> Engineering Design & Design Morphology Lab - Solidworks II
3) 09/23	<ul style="list-style-type: none"> Design Methods, Design Synthesis and Analysis, Structured and Unstructured Problems. Lab – DFMXpress and Sustainability Express
4) 09/30	<ul style="list-style-type: none"> Ethics & Resume Writing Innovations in Engineering Design Lab – Ethics Video
5) 10/07	<ul style="list-style-type: none"> Creative Design/Ideation Lab - FEA I
6) 10/14	<ul style="list-style-type: none"> Ethics Presentations, Finite Element Analysis, Making Effective Presentations Lab - FEA II
7) 10/21	<ul style="list-style-type: none"> RASI Chart and PUGH Analysis for Design Processes/Material Selection
8) 10/28	MIDTERM EXAM
9) 11/04	<ul style="list-style-type: none"> Decision Support: Selection Problem Uncertainty (Optimization & Optimism, Math formulation) Lab – Solidworks Drop test
10) 11/11	<ul style="list-style-type: none"> Decision Support: Compromise Problem (Decision making – Maximin, Maximax criterion) Lab - CREO Optimization
11) 11/18	<ul style="list-style-type: none"> Optimization Methods in Design (Graphical Programming, Lagrange) Lab – Finite Element Analysis/Modeling and Simulation in Thermal/Fluid Systems
12) 11/25	<ul style="list-style-type: none"> Optimization/Mathematical Models (Lagrange)
13) 12/02	<ul style="list-style-type: none"> Project Management Tools
14) 12/09	<ul style="list-style-type: none"> Course revision/Review – Project report results & discussion – Backup- All Resubmissions
15) 12/16	FINAL EXAM