

Fall 2024

## **ME 231-003: Kinematics of Machinery**

Anthony Glick

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## ME 231-003 – Kinematics of Machinery

### **Meeting Times & Location:**

T, Th 4:00 – 5:20pm

~~CKB-219~~ KUPF 202

### **Course Description:**

ME 231 is an introductory course in the design, selection and evaluation of mechanisms for various applications

### **Prerequisites:**

CS101, ME234

### **Textbook Required:**

*"Design of Machinery, 6th Edition"*, Robert L. Norton, McGraw Hill, 2019

ISBN 978-1-260-11331-0

### **Instructor:**

Mr. Anthony Glick

Office hours: T, Th 2:40 – 3:30pm MEC 333CD or via Zoom by appointment

Email: aglick@njit.edu

### **Course Objectives:**

1. To develop skills for designing and analyzing linkages, cams, gears and other mechanisms
2. To provide a foundation for the study of machine design
3. To develop skills for use of mathematics software and for writing computer programs to solve kinematic problems

### **Class Topics: (\*Note: the following list should be considered a general outline of topics and not a definitive, chronological list of topics.)**

- Introduction to Kinematics
- Degrees of Freedom, Links & Joints
- The Grashof Condition
- Types of Motion
- Position Analysis of 4-bar Linkage, 4-bar Crank-Slider & 4-bar Slider-Crank
- Velocity Analysis of 4-bar Linkage, 4-bar Crank-Slider & 4-bar Slider-Crank
- Acceleration Analysis of 4-bar Linkage, 4-bar Crank-Slider & 4-bar Slider-Crank
- The Fundamental Law of Gearing
- Gear Tooth Nomenclature
- Interference, Undercutting, Contact Ratio
- Gear Types
- Simple Gear Trains & Compound Gear Trains
- Planetary Gear Trains
- Efficiency of Gear Trains
- Cam Design

EXAM 1: Week 5 or 6

EXAM 2: Week 10 or 11

**Grading:**

Final Exam: 30%  
2 Examinations: 20% each  
Homework: 25%  
Attendance: 5%

**Grading Scale:**

A: 100.00 – 90.00%  
B+: 89.99 – 87.00%  
B: 86.99 – 80.00%  
C+: 79.99 - 77.00%  
C: 76.99 - 70.00%  
D: 69.99 – 60.00%  
F: 59.99 – 0%

**Policies:**

Homework submitted after due date will be penalized as follows: ½ credit if one week late and no credit beyond one week.

**Statement on Academic Integrity:**

*Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at:*

<http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf>.

*Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. **Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university.** If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at [dos@njit.edu](mailto:dos@njit.edu).*

**Statement on Artificial Intelligence:**

This course expects students to work without artificial intelligence (AI) assistance unless explicitly permitted by the instructor. Additionally, if and when students use AI in this course, the AI must be properly cited. If you have any questions or concerns about AI technology use in this class, please reach out to your instructor prior to submitting any assignments.