# New Jersey Institute of Technology
## Department of Engineering Technology
## MET 235 Statics for Technology

**COURSE NUMBER**

MET 235

**COURSE NAME**

Statics for Technology

**COURSE STRUCTURE**

3-0-3 (lecture hr/wk - lab hr/wk – course credits)

**COURSE COORDINATOR/ INSTRUCTOR**

Dr. J. Sodhi / Dr. Mena Tawfik

**COURSE DESCRIPTION**

Provides an understanding of equilibrium of particles and rigid bodies subject to concentrated and distributed forces. Upon successful completion of this course, the students should be able to analyze problems involving the equilibrium of particles and rigid bodies, including simple machines, trusses, and frictional forces.

**PREREQUISITE(S)**

Phys 102 or Phys 111 and Math 238 or Math 112

**COREQUISITE(S)**

None

**REQUIRED, ELECTIVE OR SELECTED ELECTIVE**

Required

**REQUIRED MATERIALS**

**Vector Mechanics for Engineers, 12th Ed.** by F.P. Beer, E.R. Johnston, Jr., and D.F. Mazurek, ISBN: 9781259977268

**COMPUTER USAGE**

Microsoft Office

**COURSE LEARNING OUTCOMES (CO)**

By the end of the course students should be able to:

1. Perform standard vector operations including addition, subtraction, Dot and Cross products
2. Resolve vectors into components along prescribed directions.
3. Perform equilibrium analysis of rigid bodies.
4. Determine equivalent systems of forces and couples.
5. Perform equilibrium and structural analysis of trusses and frames.
6. Determine centroids and moments of inertia of various areas.
7. Perform equilibrium analysis of impending motion including frictional forces.

**CLASS TOPICS**

Units, Fundamentals, Force Vectors, Unit Vectors, Equilibrium of a Particle, Forces in Space, Rectangular Components, Equilibrium Rigid Bodies, Equivalent Force Systems, Moments, Couple Systems, Equiv. Force-Couple Systems, Equilibrium of a Rigid Body, Distributed Forces,

Trusses, Frames, Machines, Centroids, Center of Gravity, Moment of Inertia, Polar Moments of Inertia, Friction and Belt Friction

**STUDENT OUTCOMES**

The Course Outcomes support the achievement of the following MET Student Outcomes:

**Student Outcome (1)** - an ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly-defined engineering problems appropriate to the discipline;
**Related CO – 1 thru 7**

**GRADING POLICY**

| | |
|---|---|
| Homework and Class Participation | 15 % |
| Tests   (3 @ 18% ea.) | 54 % |
| Final Exam | 31 % |

There are three tests during the semester.  The lowest grade will be dropped.  However, if you achieve an A for all three tests, you will not be excused from the final.  There will be no makeup tests – if you miss one test, then that is the test you will drop.

Homework is due at the beginning of the class period, one week after it is assigned.  Late homework will be penalized one problem grade per week and not accepted after graded homework has been returned.
1. Homework must be submitted in sets, arranged in order as in course outline. Sets must be stapled together in the upper left hand corner.
2. Homework problems should be done using the "Given and Find" format and all equations should be defined symbolically prior to calculating any values.  DO NOT HAND IN class notes or scratch work.

**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 to which you are working. 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 which is found

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

| | |
|---|---|
| **GENERATIVE AI** | Student use of artificial intelligence (AI) is permitted in this course for certain assignments and activities. It is not permitted to be used in the assignments noted by the instructor, as doing so would undermine student learning and achievement of course learning outcomes. Additionally, if and when students use AI in this course, the AI must be cited as is shown within the NJIT Library AI citation page for AI. 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. |

**STUDENT BEHAVIOR**

- No eating or drinking is allowed at the lectures, recitations, workshops, and laboratories.
- Cellular phones must be turned off during the class hours – if you are expecting an emergency call, leave it on vibrate.
- No headphones can be worn in class.
- Unless the professor allows the use during lecture, laptops should be closed during lecture.

**MODIFICATION TO COURSE**

The Course Outline may be modified at the discretion of the instructor or in the event of extenuating circumstances. Students will be notified in class of any changes to the Course outline.

**PREPARED BY**    Dr. Mena Tawfik / Dr. J. Sodhi

**COURSE COORDINATED BY**    Dr. J. Sodhi

**CLASS HOURS**

Wednesday    6– 8:50 PM              KUPF 107

**OFFICE HOURS:**

By Appointment: mena.tawfik.8@njit.edu

# New Jersey Institute of Technology
# Department of Engineering Technology
# MET 235 Statics for Technology

**NJIT ONLINE INFORMATION**

The instructor will discuss these requirements on the first day of the course and/or post on their Learning Management System (LMS). Please become familiar

- Canvas: https://canvas.njit.edu/
- Zoom: https://njit-edu.zoom.us/
- Online Proctoring: https://ist.njit.edu/online-course-exam-proctoring

**GRADING LEGEND**

| GRADE | NUMERIC RANGE |
|-------|---------------|
| A | 90 to 100 |
| B+ | 85 to 89 |
| B | 80 to 84 |
| C+ | 75 to 79 |
| C | 70 to 74 |
| D | 60 to 69 |
| F | 0 to 59 |

# New Jersey Institute of Technology
## Department of Engineering Technology
## MET 235 Statics for Technology

### MET 235 - COURSE OUTLINE

| WEEK | DATES | TOPICS | SECTIONS | ASSIGNMENTS |
|---|---|---|---|---|
| 1 | 1/22 | Introduction: Units, Concepts, Fundamentals | 1.1 thru 1.6 | |
| 2 | 1/29 | Force Vectors, Unit Vectors, Equilibrium of a Particle | 2.1 thru 2.3 | 2.1,4,5,6,8,23, 24,35,46 |
| 3 | 2/5 | Forces in Space: Rectangular Components, Equilibrium | 2.4 thru 2.5 | 2.70,107 |
| 4 | 2/12 | Quiz 1 - Rigid Bodies: Equivalent Force Systems, Moments | 3.1 thru 3.2 | 3.2,3,7,9,16,17,25 |
| 5 | 2/19 | Couple Systems | 3.3 | 3.71,73,74,97 |
| 6 | 2/26 | Equiv. Force-Couple Systems | 3.4 | 3.101,105,113 |
| 7 | 3/5 | Equilibrium of a Rigid Body | 4.1 thru 4.3 | 4.10,15,19,25,29, 33 |
| 8 | 3/12 | Centroids and Center of Gravity Quiz 2 | 5.1 thru 5.2 | 5.1,3,6,7 |
| 9 | 3/26 | Distributed Forces | 5.3 and 5.4 | 5.66,68,70,71 |

| 10 | 4/2 | Structural Analysis: Trusses | 6.1 thru 6.2 | 6.1,6,8,14,44,53 |
|----|-----|------------------------------|--------------|-------------------|
| 11 | 4/9 | Structural Analysis: Frames and Machines | 6.3 thru 6.4 | 6.79,82,85,140, 148 |
| 12 | 4/16 | Quiz 3 - Moment of Inertia and Polar Moments of Inertia | 9.1 thru 9.2 | 9.31,32,40,52 |
| 13 | 4/23 | Moment of Inertia Polar Moments of Inertia | 9.3 thru 9.6 | 9.71, 75,77 |
| 14 | 4/30 | Friction and Belt Friction | 8.1, 8.4 | 8.1,3,11 |
| 15 | TBD | Final Exam | | |