ENGR 200: Statics

Course Syllabus
Summer Session I – 2026

Instructor: TBD
Credits: 3
Contact Hours: 45 (9 hours/week, e.g., 3 days/week, 3 hours/day)
Prerequisites: Physics I (Mechanics, e.g., PHYS 111 at LVC, PHYS 1501Q at UConn) and Calculus I
Class Meeting Days & Time: TBD (e.g., M/T/W/Th, 9:00 AM–11:15 AM)
Office Hours: By appointment after class or via Zoom (see Moodle)
Email: TBD
Course Type: Standard Course
Course Fee: TBD

Course Description
This course introduces the principles of statics, focusing on the analysis of forces and moments on objects in equilibrium, with applications in engineering and physics. Topics include vector mechanics, free-body diagrams, equilibrium of particles and rigid bodies, structural analysis, centroids, moments of inertia, and friction. Optional computational assignments using MATLAB, Python, or CAD software enhance problem-solving and visualization, preparing students for mechanical, civil, and aerospace engineering.

Learning Outcomes and Assessment Measures
By the end of this course, students will be able to:

- *Perform* vector operations and analyze forces/moments in 2D and 3D (Quizzes, Problem Sets, Midterm, Final).
- *Construct* and *solve* free-body diagrams for equilibrium (Quizzes, Problem Sets, Midterm, Final).
- *Analyze* structures (trusses, frames, machines) for internal forces (Problem Sets, Midterm, Final).
- *Calculate* centroids and moments of inertia for areas (Problem Sets, Midterm, Final).
- *Solve* problems involving friction and engineering applications (Problem Sets, Final).
- *Use* computational tools (optional) to model and analyze static systems (Computational Assignments).

Course Materials
Textbook: Hibbeler, R. C. (2022). *Engineering Mechanics: Statics* (15th ed.). Pearson.

Additional Resources

- A course reader with supplementary notes and practice problems will be provided on Moodle.
- Software (optional): MATLAB, Python (NumPy), or SolidWorks for computational labs, accessible via institutional licenses or free downloads.
- Moodle: Primary location for readings, assignments, and announcements.

Grading
Students are reminded that it is their responsibility to note the dates of exams and other assignments. No alternative exam dates will be offered and professors are not required to give partial credit for any late work (they do so at their discretion: the Institute's default policy is no extensions and a zero for any work turned in late). Students who book travel when they have an exam or other assessment will have to change their plans or accept a zero. Letter grades for student work are based on the following percentage scale:

Letter Grade Range	Numerical Score Equivalent	Student Performance
A A-	93% - 100% 90% - 92%	Exceptional Excellent
B+ B B-	87% -89% 83% - 86% 80% - 82%	Superior
C+ C C-	77% - 79% 73% - 76% 70% - 72%	Satisfactory
D+ D D-	67% - 69% 63% - 66% 60% - 62%	Low Pass
F	59% or less	Fail (no credit)

Please note: decimal numerals between 1-4 are rounded down while 5-9 are rounded up: e.g., expect 89.4 to be 89.0 while 89.5 to round up to 90.

Course Requirements

Attendance: 10%
Quizzes: 15% (weekly, in-class, testing core skills)
Problem Sets: 25% (weekly, theoretical and applied problems)
Computational Assignments: 10% (weekly, MATLAB/Python/SolidWorks, optional, submitted via Moodle)
Midterm Exam: 25% (Week 3, covering Weeks 1–2)
Final Exam: 25% (Week 5, comprehensive)

Extension & Submitting Late Work
Umbra Academic Policies apply

Attendance Policy
Umbra Academic Policies apply

Tardiness Policy
Umbra Academic Policies apply

Academic Integrity
Umbra Academic Policies apply

Classroom Policy
Umbra Academic Policies apply

Moodle
Please note that Moodle, not this syllabus, is the ultimate reference for due dates, assignment prompts, and course announcements. It is *the student's responsibility* to check the site regularly to be aware of announcements as well as to see and record all due dates for assignments.

Schedule of Topics, Readings, and Assignments

(Each meeting is two hours and fifteen minutes, with a break)

Week 1: Vector Mechanics and Equilibrium of Particles

- **Meeting 1**: Scalars, vectors, force systems, dot/cross products.
- **Meeting 2**: Free-body diagrams, equilibrium of particles in 2D; MATLAB/Python/SolidWorks assistance (vector calculations).
- **Meeting 3**: Equilibrium of particles in 3D.
- **Meeting 4**: Resultants, applications (e.g., cables); MATLAB/Python/SolidWorks assistance (force resultants); Quiz 1.
- **Readings**: Hibbeler, Sections 2.1–2.6, 3.1–3.4.
- **Assignments**:
  - **Problem Set 1**: Compute vector operations, draw free-body diagrams, solve 2D/3D particle equilibrium problems.
  - **Computational Assignment 1** (optional): Use MATLAB/Python to calculate force resultants or SolidWorks to model a cable system. Submit .m, .py, or report via Moodle.

Week 2: Equilibrium of Rigid Bodies

- **Meeting 1**: Rigid body equilibrium, reaction forces.
- **Meeting 2**: Two- and three-force members; MATLAB/Python/SolidWorks assistance (equilibrium analysis).
- **Meeting 3**: Constraints, supports, free-body diagrams.
- **Meeting 4**: Applications (e.g., beams, hinges); MATLAB/Python/SolidWorks assistance (reaction forces); Quiz 2.
- **Readings**: Hibbeler, Sections 4.1–4.4, 5.1–5.4.
- **Assignments**:
  - **Problem Set 2**: Solve rigid body equilibrium problems, analyze reaction forces, draw free-body diagrams for beams.
  - **Computational Assignment 2** (optional): Use MATLAB/Python to solve equilibrium equations or SolidWorks to simulate beam supports. Submit .m, .py, or report via Moodle.

Week 3: Structural Analysis

- **Meeting 1**: Trusses: method of joints.
- **Meeting 2**: Trusses: method of sections; MATLAB/Python/SolidWorks assistance (truss analysis).
- **Meeting 3**: Frames and machines.
- **Meeting 4**: Midterm Exam (covers Weeks 1–2); MATLAB/Python/SolidWorks assistance (frame analysis).
- **Readings**: Hibbeler, Sections 6.1–6.4, 6.6.
- **Assignments**:
  - **Problem Set 3**: Analyze trusses using joints/sections, solve frame and machine problems.

    - **Computational Assignment 3** (optional): Use MATLAB/Python to compute truss forces or SolidWorks to model a frame. Submit .m, .py, or report via Moodle.

Week 4: Centroids and Moments of Inertia

- **Meeting 1**: Centroids of areas and composite bodies.
- **Meeting 2**: Moments of inertia, parallel-axis theorem; MATLAB/Python/SolidWorks assistance (centroid calculations).
- **Meeting 3**: Mass moments of inertia.
- **Meeting 4**: Applications (e.g., beam design); MATLAB/Python/SolidWorks assistance (inertia calculations); Quiz 3.
- **Readings**: Hibbeler, Sections 9.1–9.3, 10.1–10.4.
- **Assignments**:
    - **Problem Set 4**: Calculate centroids, compute moments of inertia, analyze composite bodies.
    - **Computational Assignment 4** (optional): Use MATLAB/Python to calculate centroids/inertia or SolidWorks to model a composite section. Submit .m, .py, or report via Moodle.

Week 5: Friction and Applications

- **Meeting 1**: Dry friction, coefficients of friction.
- **Meeting 2**: Wedges, belts, screws; MATLAB/Python/SolidWorks assistance (friction analysis).
- **Meeting 3**: Applications (e.g., pulleys, tipping).
- **Meeting 4**: Final Exam (comprehensive); MATLAB/Python/SolidWorks assistance (application modeling); review (finalize assignment submission).
- **Readings**: Hibbeler, Sections 8.1–8.3, 8.5–8.6.
- **Assignments**:
    - **Problem Set 5**: Solve friction problems, analyze wedges and belts, design pulley systems.
    - **Computational Assignment 5** (optional): Use MATLAB/Python to model friction forces or SolidWorks to simulate a pulley system. Submit .m, .py, or report via Moodle.