UNIVERSITY of VIRGINIA

**UVA IN VALENCIA PROGRAM**

# MAE 2300 STATICS FALL 2026

## I. COURSE DESCRIPTION

This course provides an introduction to topics as basic concepts of mechanics, systems of forces and couples: equilibrium of particles and rigid bodies; analysis of structures: trusses, frames, machines; internal forces, shear and bending moment diagrams; distributed forces; friction, centroids, and moments of inertia; introduction to stress and strain; computer applications.

## II. GRADING SCALE AND BREAKDOWN

Grades will be awarded according to the **Uva grading scale**:

| | | | |
|---|---|---|---|
| **A** 10-9<br>**A-** 8,9-8 | **B+** 7,9-7<br>**B** 6,9-6<br>**B-** 5,9-5,5 | **C** 5,4-5 | **F** 4,9-0 |

| | |
|---|---|
| Weekly homework assignments | 25% |
| Participation | 10% |
| Midterm exam | 25% |
| Final exam | 40% |

**Weekly homework assignments (25%) and participation (10%)**

Weekly homework assignments will be delivered. Typically, the HW assignments will be due by 11:59 pm on Sundays by mail. If there is any change to this, an announcement will be made. Late homework will not be graded.

Students are expected to comply with the assigned work plan on a daily basis. Coming prepared to class is essential to the learning process.

The following rubric is important regarding participation grades:

A The student always prepares the class and complies with the work plan assigned daily; he/she participates voluntarily and frequently, works well as a team, and contributes positively to the classroom environment.

B The student participates voluntarily and frequently by answering questions from the teacher

C The student participates sporadically when the teacher asks and he/she/they occasionally asks questions.

D The student does not make an effort to participate or minimum work is done.

F The student is absent and shows disrespect to other peers and to the professor.

**Midterm exam (25%)**

Type of Exam: Midterm exam will comprise of multiple-choice questions or conventional written problems like homework assignments.

**Final exam (40%)**

Final exam will comprise of multiple-choice questions or conventional written problems like homework assignments. The final exam will be comprehensive and cumulative. It will be based on all the topics covered in this course.

## III. BIBLIOGRAPHY AND MATERIALS

The reference textbook we will use is Hibbeler's Statics: Engineering Mechanics, 10th edition.

## IV. COURSE PLANNING AND CALENDAR (subject to revision)

| Date | Chapter(s) | Topics | Reading (Hibbeler) | HW Due (2 exercises) |
|---|---|---|---|---|
| 09/07/26 | 1. Introduction & 2. Force Vectors | Fundamental concepts, scalars, vectors, vector addition, vector resolution | §1.1-2.8 | Fri 09/11/26, 9:00 PM |
| 09/09/26 | 2. Force Vectors & 3. Equilibrium of a Particle | Cartesian vectors (2D, 3D), position vector, force directed along a line | §1.1-2.8 | Fri 09/11/26, 9:00 PM |
| 09/14/26 | 2. Force Vectors & 3. Equilibrium of a Particle -> 3. Equilibrium of a Particle & 4. Force System Resultants | Cartesian vectors (2D, 3D), position vector, force directed along a line -> Dot product, free body diagram, 3D forces, moment of a force | §2.9-4.1 | Fri 09/18/26, 9:00 PM |
| 09/16/26 | 3. Equilibrium of a Particle & 4. Force System Resultants | Dot product, free body diagram, 3D forces, moment of a force | §2.9-4.1 | Fri 09/18/26, 9:00 PM |
| 09/21/26 | 3. Equilibrium of a Particle & 4. Force System Resultants -> 4. Force System Resultants | Dot product, free body diagram, 3D forces, moment of a force -> Cross products, moments, moment of a couple, moment of a force about a specific axis | §4.2-4.6 | Fri 09/25/26, 9:00 PM |
| 09/23/26 | 4. Force System Resultants | Cross products, moments, moment of a couple, moment of a force about a specific axis | §4.2-4.6 | Fri 09/25/26, 9:00 PM |
| 09/28/26 | 4. Force System Resultants & 5. Equilibrium of a Rigid Body | Resultant of a force and couple system, wrench, support reactions, equations of equilibrium | §4.7-5.3 | Fri 10/02/26, 9:00 PM |
| 09/30/26 | 4. Force System Resultants & 5. Equilibrium of a Rigid Body -> 5. Equilibrium of a Rigid Body | Resultant of a force and couple system, wrench, support reactions, equations of equilibrium -> Two- and three-force members, equations of equilibrium | §4.7-5.3 | Fri 10/02/26, 9:00 PM |
| 10/05/26 | 5. Equilibrium of a Rigid Body | Two- and three-force members, equations of equilibrium | §5.4-5.6 | Fri 10/09/26, 9:00 PM |
| 10/07/26 | 5. Equilibrium of a Rigid Body | Equations of equilibrium, constraints | §5.4-5.6 | Fri 10/09/26, 9:00 PM |
| 10/19/26 | 5. Equilibrium of a Rigid Body -> 6. Structural Analysis | Equations of equilibrium, constraints -> Simple trusses, method of joints, method of sections | §5.7-6.4 | Fri 10/23/26, 9:00 PM |
| 10/21/26 | 6. Structural Analysis | Simple trusses, method of joints, method of sections | §5.7-6.4 | Fri 10/23/26, 9:00 PM |
| **10/26/26** | **REVIEW** | **Review session for Midterm Exam 1 (content through prior class)** | ***Review §1.1-6.4*** ***(no new reading)*** | ***No new HW (Review week)*** |

| Date | Chapter(s) | Topics | Reading (Hibbeler) | HW Due (2 exercises) |
|---|---|---|---|---|
| **10/28/26** | **MIDTERM EXAM** | **Midterm Exam 1 (in class)** | ***No new reading*** | ***No new HW (Midterm week)*** |
| 11/02/26 | 6. Structural Analysis | Frames and machines, internal loadings | §6.5-7.2 | Fri 11/06/26, 9:00 PM |
| 11/04/26 | 6. Structural Analysis -> 7. Internal Forces | Frames and machines, internal loadings -> Shear and moment equations | §6.5-7.2 | Fri 11/06/26, 9:00 PM |
| 11/09/26 | 7. Internal Forces | Shear and moment equations | §7.3-7.4 | Fri 11/13/26, 9:00 PM |
| 11/11/26 | 7. Internal Forces | Shear and moment equations, cables | §7.3-7.4 | Fri 11/13/26, 9:00 PM |
| 11/16/26 | 7. Internal Forces -> 8. Friction | Shear and moment equations, cables -> Dry friction, problem solving with friction, wedges, belts, bearing resistance | §8.1-9.1 | Fri 11/20/26, 9:00 PM |
| 11/18/26 | 8. Friction | Dry friction, problem solving with friction, wedges, belts, bearing resistance | §8.1-9.1 | Fri 11/20/26, 9:00 PM |
| 11/20/26 | 9. Center of Gravity and Centroid | Gravity, centroid, composite bodies | §8.1-9.1 | Fri 11/20/26, 9:00 PM |
| 11/23/26 | 9. Center of Gravity and Centroid | Gravity, centroid, composite bodies | §9.2-10.1 | Fri 12/04/26, 9:00 PM |
| 11/25/26 | 9. Center of Gravity and Centroid & 10. Moment of Inertia | Distributed loading, moments of inertia, parallel-axis theorem, radius of gyration | §9.2-10.1 | Fri 12/04/26, 9:00 PM |
| 12/02/26 | 10. Moment of Inertia & 11. Virtual Work | Moments of inertia, mass moment of inertia, virtual work | §10.2-10.5 | Fri 12/04/26, 9:00 PM |
| 12/09/26 | 10. Moment of Inertia & 11. Virtual Work -> 11. Virtual Work | Moments of inertia, mass moment of inertia, virtual work -> Virtual work | §10.6-11.7 | Fri 12/11/26, 9:00 PM |
| **12/14/26** | **FINAL EXAM** | **Final Exam (cumulative)** | ***Cumulative review, §1.1-11.7*** | ***No new HW (Final Exam)*** |

## IMPORTANT INFORMATION

### 1) Use of Spanish at the Center

The use of Spanish at the Center is strongly encouraged. Remember that you have come to Spain to learn Spanish and immerse yourself in its culture, and there is no better way to do so than by using Spanish on as many occasions as possible.

### 2) Class Attendance and Tardiness

2.1) Attendance and punctuality are essential for the successful completion of the course. Consequently, unexcused absences and lateness will negatively affect the final grade.

2.2) Only one unexcused absence is permitted. Please bear this in mind when planning trips or outings.

2.3) Arriving more than 5 minutes late to class will count as half an absence (1/2). It is the student's responsibility to notify the instructor of an absence before the class begins.

2.4) Arriving more than 30 minutes late to class will be considered an absence.

2.5) Four (4) unexcused absences will result in the student not receiving credit for the course.

2.6) Only documented absences will be considered excused: a religious holiday, a family emergency, or a medical appointment. Medical absences must be supported by a doctor's note and submitted at reception on the day the student returns to class after the incident has ended.

**3) Academic Integrity**

3.1) The exchange of information is not only permitted but is also a way of enriching the knowledge acquired during the course. However, all work submitted for each course must be individual and original in every respect. Any sources and direct quotations used must be properly cited.

3.2) Remember that the use of artificial intelligence to complete assignments or examinations is strictly prohibited unless an instructor expressly states otherwise. Such use constitutes a lack of authenticity, and may amount to direct plagiarism, in addition to undermining the development of critical thinking and writing skills, which are among the primary goals of this program. Failure to comply with this rule will result in a grade of "F" for the course.

3.3) Any work that has received credit for one course will NOT be accepted for credit in another course. There will be NO exceptions to this rule. Reusing such work will result in immediate failure of the second course. If assignments for two different courses are related in any way and the student has questions about whether the second project is permissible, the matter must be discussed with all instructors involved. This will prevent any possible unintentional violation of this rule.

3.4) As with punctuality, assignments must be submitted on time. Any late submission will result in a reduction of the grade for that assignment.

3.5) Failure to comply with the provisions set out above will result in the loss of the corresponding course credits for the course in which these rules have been violated.

3.6) If you have a documented special need that requires academic accommodations (SDAC), it must be certified by your home institution. Please contact the Head of Studies in Valencia, María Andrés (maria.andres@uvavalencia.org).

**4) Activities, Workshops, and Lectures**

Throughout the course, various activities, workshops, and lectures are organized. Participation may be voluntary or mandatory if the instructor considers the activity relevant to the course.

**5) Classroom Conduct**

5.1) It is very important that all students arrive to class on time, prepared, and with the materials needed for the day. During class, students must treat one another and the instructor with respect,

demonstrate a positive attitude, and help create a participatory and collaborative environment that supports effective learning. Any violation of these expectations will have direct consequences.

5.2) Electronic devices (laptop, mobile phone, smartwatch) may be used in class only for course-related purposes. If a student uses such technology for personal reasons during class, the student may be penalized with an unexcused absence.

5.3) The use of computer or electronic technology during examinations is prohibited unless the instructor determines otherwise in accordance with the examination format.

**6) Course Content**

On occasion, and always within the context of the course, certain “sensitive” topics may be addressed both inside and outside the classroom. Therefore, if a student feels offended by such content in a particular class, the student may leave the class, and doing so will not have any negative effect whatsoever on the final grade. Faculty members will always be open to communication and dialogue in order to promote better intercultural understanding.

**7) Final Clarification**

The instructor may modify or add activities and/or change the dates indicated according to the learning needs of the group. Effective learning requires not only careful planning, but also a certain degree of flexibility.