

**Course Syllabus Engineering Statics ENGR 2301 (Spring 2017)**

**Instructor:** Haitham Abdelmoaty

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# Course Location And Time:

**Office Hours**

Alief - Hayes Rm 411 Sat. 9:00-1:00 PM

By appointment.

# Course number and CRN:

ENGR 2301, 14001

# Course Semester Credit Hours:

**Course Textbook:**

Credit Hours: 3

Lecture Hours: 3

Laboratory Hours: 1

Vector Mechanics for Engineers – Statics, 11th Edition Beer, Johnston, Mazurek, McGraw-Hill Publishers (2013)

ISBN-13 9780077889708,

(Statics only), ISBN-13 9780073398136, (Statics + Dynamics)

# Total Course Contact Hours and course length:

* 1. hours and 16 weeks

**Type of Instruction:** Lecture, Face to face

**Course Description:** Basic theory of engineering mechanics, using calculus, involving the description of forces, moments, and couples acting on stationary engineering structures, equilibrium in two and three dimensions, free body diagrams, friction, centroids, center of gravity, and moments of inertia.

# Course Prerequisite(s):

* PHYS 2325 University Physics I and PHYS 2125 University Physics I (Lab), or PHYS 2325 University Physics I (Lab & Lecture)
* Concurrent enrollment or previous completion of MATH 2414, Calculus II

**Instructor Objectives:** Upon completion of this course students will become aware about personal growth and development through these step discussions:

* + 1. Reflect on their capabilities (strengths and weaknesses)
    2. Find out about their short term and long term goals
    3. Develop analytical thinking and problem solving skills
    4. Perceive highly demand qualities in real engineering world
    5. What type of soft skills play a major role in the future engineering world
    6. Which one play a major role get your foot to engineering: knowledge vs. soft skills
    7. How to go up the ladder in engineering world

**Course Objectives:** Upon completion of this course students should be able to:

1. State the fundamental principles used in the study of mechanics
2. Define magnitude and directions of forces and moments and identify associated scalar and vector products.
3. Draw a free body diagrams for two and three dimension systems.
4. Solve problems using the equations of statics equilibrium.
5. Compute the moment of force about the specific point or line.
6. Replace system of forces by an equivalent simplified system.
7. Analyze the forces and couples acting on variety of objects.
8. Determine unknown forces and couples acting on objects in equilibrium
9. Analyze simple truss using method of joints or the method of sections
10. Determine the location of the centroid and the center of mass for a system of discrete particles and objects of arbitrary shape.
11. Analyze structures with a distributed load.
12. Calculate moments of inertia for lines, area, and volumes
13. Apply a parallel; axis theorem to compute moments of inertia for composite regions.
14. Solve problems involving equilibrium of rigid bodies subjected to a system of forces and moments that include friction.
15. Solve problem involving dry sliding friction, including problems with wedges and belts.

# Grading and instructor grading criteria:

**5 Exams (10% each):** 50%

**Attendance:** 10%

**Final Exam:** 20%

**Home Work:** 20%

* + Please do not miss any session before the exams, because we discuss the details for that specific exam. Practice examples and home-works carefully. In exam 1&2, you are going to answer two questions. At least one problem might be in your exam which we have not solved in the class. General advice for the exams, is focus on the home works and problems solved in the class Also, we will discuss in the great details in the session before the final exam.
  + If your methodology for solving a problem is correct and you somehow did not get the final answer right. You will miss **two points** for not getting the final answers right. If your methodology is half way right, you will receive **half a grad**e. In the case, you miss the methodology you will receive only **one or two points.**

**Grading Scale:** For final grade percentage x:

x > 90.000 A 80.000<x<90.000 B

70.000<x<80.000 C

* 1. 00<x<70.000 D x<60.000 F

**Attendance:** Class attendance will be enforced on the random bases and if you missed four sessions during this course, you may be administratively withdrawn (an Fx will be issued after the final drop date). Attendance count will begin with the first class. **If you are absent from any class, it is your responsibility to obtain the lecture material from one of your classmates. Please, do not send any email inquiry regarding the session that you have been absent.**

**Withdrawal:** HCC policy provides that students may be dropped after missing more than eight hours of class time. A grade of FX will be issued in this case.

Withdrawal from the course is the responsibility of the student and must be done by the drop date. If the student stops attending, and does not drop the class, an “FX” will be recorded for the course.

Students who take a course for the third time or more must now pay significant tuition/fee increases at HCC and other Texas public colleges and universities. At HCC it is an additional $50 per credit hour. Also, the state of Texas has passed a new law limiting new students (as of Fall 2007) to no more than six withdrawals throughout their academic career in obtaining a baccalaureate degree.

**Homework:** These problem sets are essential for your learning the course, therefore, take them seriously. The home works from last semester are already posted in the learning web. More problems will be assigned from the eleventh edition. Your final grade for home works will be calculated from the quizzes take a place at the beginning of each session. Please do not come late. Quizzes are only 20 minutes, and if you came late you lost it. No favor for anybody. Quizzes are from chap. 2,3,4,5,6,7, and 9. Among seven quizzes, the five highest quizzes will be selected and your 10% homework will be calculated based on that.

# Exams and Makeup

**Exam Policy**  If a student under a valid circumstance misses an exam, the lowest

grade among other two other exams will count for your missed exam. If

you don’t communicate with me in advance regarding an exam that you are not able to participate, your grade for that exam is going to be zero, no favor at all please do not ask for any.

* + - No formula sheet at all. I will provide one for each exam.
    - A session before each exam, we will greatly discuss the details of that exam. Do not miss it, if you did, I do not accept any excuse regarding that you were not aware of the details of the exam.

Exam Rules:

-No talking or discussion is allowed.

-You must bring your own calculator and make sure it has adequate batteries. If you are using graphic you should clear the memory before the exam, otherwise you are not allowing to use it.

- No restroom during the exam. In case of digestive problem please let me know before the exam and you will be hand out the problems one by one.

-No cell phone or any other electronics may be used.

-No books or other references allowed unless otherwise instructed.

-If you must use the restroom during the exam, only one student at a time may leave the room, and you must leave your cell phone with me.

# Student Responsibilities and Roles:

* Student is responsible to understand the syllabus.
* Student is responsible to read the textbook and/or course material without instructor explicitly assigning reading.
* Student is responsible to attend all lecture sections.
* It is the student’s responsibility to properly withdraw from the class.
* Student is responsible to finish all homework on time.
* Student is responsible to ask questions on any material or homework he/she is having difficulty to understand.
* Student is responsible to take the exams and final on the assigned dates.
* Student need to be active and engaged with the instructor.
* Student handbook: <http://www.hccs.edu/district/students/student-> handbook/

# Students with Disabilities:

Any student with a documented disability (e.g. physical, learning, psychiatric, vision, hearing, etc.) who needs to arrange reasonable accommodations must contact the Disability Service Office (713-718-5422) at the beginning of each semester. Faculty members are authorized to provide only the accommodations requested by the Disability Support Services Office.

**Student Discipline:** As students studying for the engineering profession, adult and professional behavior is expected. Disruptive behavior/ activities, which interfere with teaching and /or learning will not be tolerated, and may result in an administrative withdrawal without refund.

# Academic Honesty, Plagiarism, and Collusion

HCC Policy: “Scholastic dishonesty includes, but is not limited to, cheating on a test, plagiarism, and collusion. Cheating on a test includes copying from another student's test paper; using, during a test, materials not authorized by the person giving the test; collaborating with another student during a test without authority; knowingly using, buying, selling, stealing, transporting, or soliciting in whole or part the contents of an administered test; or bribing another person to obtain a test that is to be administered. ‘Plagiarism’ means the appropriation of another's work and the unacknowledged incorporation of that work in one's own written work for credit. ‘Collusion’ means the unauthorized collaboration with another person in preparing written work offered for credit.”

In simplified terms, cheating is: (1) taking unchanged passages (or slightly edited) from another person's writing and portraying them as one's own; (2) submitting a paper that includes paraphrases of another person's writing without giving credit;

(3) having someone else write your paper for you; (4) copying or using another person's work during in-class writing or testing; and (5) the unauthorized use of electronic devices during in-class writing or testing. Keep in mind also that whether you are cheating or not, not following testing or writing rules properly, such as communicating with your neighbor or using a cell phone during a test will be construed as cheating. This is not an exhaustive list of the forms of scholastic dishonesty. If you are in doubt, consult your instructor.

# Student Learning Outcomes:

**Catalog Course Description:**

**Academic Discipline/CTE Programming Learning Outcomes:**

**Topics to be Covered (\*Tentative)**

1. Analyze forces and find out the resultant forces in two and three dimensions.
2. Demonstrate qualitative and quantitative understanding of equilibrium of a particle and rigid bodies.
3. Differentiate between various type of supports and draw free-body diagrams.
4. Obtain center of mass and centroid for different engineering shapes.
5. Give analysis of structures, friction, and calculation of moment of inertia in two and three dimensional objects

Composition and resolution of forces, free body diagrams, analysis of forces acting on structures and machines, friction, centroids, and moments of inertia.

PLSO #4: Apply knowledge of Vector Analysis to solve Engineering Statics Problems.

* + Introduction (Chapter 1)
  + Statics of Particles (Chapter 2)
  + Rigid Bodies: Equivalent Systems of Forces Equilibrium of Rigid Bodies (Chapter 3 & 4)
  + Distributed Forces: Centroids and Centers of Gravity Analysis of Structures (Chapter 5)
  + Analysis of Structures (Chapter 6)
  + Forces in Beams and Cables (Chapter 7)
  + Friction (Chapter 8)
  + Distributed force: Moment of inertia (Chapter 9)

**Title IX Statement:** HCC is committed to provide a learning and working environment that is free from discrimination on the basis of sex which includes all forms of sexual

misconduct. Title IX of the Education Amendments of 1972 requires that when a complaint is filed, a prompt and thorough investigation is initiated. Complaints may be filed with the HCC Title IX coordinator available at 713 718-8271 or email at [oie@hccs.edu.](mailto:oie@hccs.edu)

# HCC Anti- Discrimination Policy

<http://www.hccs.edu/district/students/anti-discrimination/>

**Course topics calendar (Subject to change if necessary)**

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| Session dates | Materials cover |
| 01/21 | Introduction, Syllabus discussion, Assessments |
| 01/28 | Chapter 2 |
| 02/04 | Chapter 3 |
| 02/11 | Chapter 4 |
| 02/18 | Chapter 4 |
| 02/25 | Chapter 4 & 5 |
| 03/04 | Chapter 5 & Exam 1 |
| 03/11 | Chapter 6 & Exam 2 |
| 03/18 | Chapter 6 |
| 03/25 | Exam III |
| 04/01 | Chapter 7 |
| 04/8 | Chapter 7 & Exam IV |
| 04/15 | Chapter 8 |
| 04/22 | Chapter 9 & Exam V |
| 04/29 | Chapter 9 and final exam review |
| 05/06 | Final exam |