

Broward Community College Course Outline

STATUS: A

COMMON COURSE NUMBER: EGS 2310

COURSE TITLE: Statistics

CREDIT HOURS: 3

CONTACT HOURS BREAKDOWN:

Lecture/Discussion	<u>48</u>
Lab	<u>00</u>
Other	<u>00</u>
Contact Hours/Week	<u>3</u>

CATALOG COURSE DESCRIPTION:

Prerequisite: PHY 2048

Corequisite: None

Forces on particles; equilibrium of a particle; moments of a force; couples; equilibrium of rigid bodies; centroids and centers of gravity; analysis of trusses, shear and moment diagram, friction, moment of inertia, Mohr's circle.

General Education Requirements - Associate of Arts Degree, meets Area(s):

General Education Requirements - Associate in Science Degree, meets Area(s):

UNIT TITLES:

1. **Statics of a Particle**
2. **Equivalent Systems of Forces and Equilibrium of Rigid Bodies**
3. **Centroids, Centers of Gravity and Moments of Inertia**
4. **Analysis of Structure**
5. **Force in Beams and Cables**
6. **Friction**

I. Course Overview:

Upon successful completion of this course, the students should be able to describe and apply the fundamentals of statics according to accepted engineering standards with a high degree of accuracy.

II. Units:

Unit 1. Statics of Particles

General Outcome:

- 1.0 The students should be able to demonstrate a proficiency in the fundamental concepts of equilibrium of a particle.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 1.1 Describe the fundamental operations in vector algebra.
- 1.2 Describe and obtain the rectangular components of a force in two and three dimensions.
- 1.3 Describe and apply Newton's First Law of Motion to the Equilibrium of a particle.

Unit 2. Equivalent Systems of Forces and Equilibrium of Rigid Bodies

General Outcome:

- 2.0 The students should be able to demonstrate a proficiency in the basic methods of replacing a given system of forces exerted on a rigid body of a simpler equivalent system and to apply these basic methods to the equilibrium of rigid bodies with a high degree of accuracy.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 2.1 Describe Vector Product and Scalar Products in vector algebra.
- 2.2 Describe and obtain the rectangular components of the moment of a force.
- 2.3 Describe and identify equivalent couples.
- 2.4 Reduce a system of forces to one force and one couple or a wrench.
- 2.5 Describe the various types of reactions at supports for a two or three-dimensional structure.
- 2.6 Describe the equilibrium of a rigid body in two and three dimensions.

Unit 3. Centroids, Centers of Gravity and Moments of Inertia

General Outcome:

- 3.0 The students should be able to demonstrate a proficiency in the basic concepts of calculating centroids of areas and lines, centers of gravity of rigid bodies and moments of inertia.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 3.1 Identify and calculate the center of gravity of a two or three-dimensional body.
- 3.2 Identify and calculate the centroid of areas and lines.
- 3.3 Describe and apply the theorems of Pappus-Guldinus to surface and bodies of revolution.
- 3.4 Identify and calculate the moments of inertia and products of inertia of areas and masses.
- 3.5 Describe the Steiner's Theorem for moments and products of inertia.
- 3.6 Identify Mohr's Circle for moments and products of inertia.

Unit 4. Analysis of Structures

General Outcome:

- 4.0 The students should be able to demonstrate a proficiency in the basic methods of analyzing trusses, frames and machines.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 4.1 Define and identify the various types of trusses.
- 4.2 Analyze trusses by the method of the joints.
- 4.3 Analyze trusses by the method of the sections.
- 4.4 Identify and analyze compound trusses.
- 4.5 Analyze frames and machines.

Unit 5. Forces in Beams and Cables

General Outcome:

- 5.0 The students should be able to demonstrate a proficiency in the basic methods of determining the internal forces in beams and cables.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 5.1 Identify the various types of beams loading and supports.
- 5.2 Draw the shear and bending moment diagrams of beams with various types of loading.
- 5.3 Describe the relations among load, shear, and bending moment.
- 5.4 Describe the basic categories of cables according to their loading.
- 5.5 Examine cables supporting concentrate loads.
- 5.6 Examine parabolic cables and catenary.

Unit 6. Friction

General Outcome:

6.0 The students should be able to demonstrate a proficiency in the fundamental concepts of friction along nonlubricated surfaces.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 6.1 Describe the laws of dry friction.
- 6.2 Describe the angles of friction.
- 6.3 Examine problems involving dry friction.
- 6.4 Examine problems involving axle, disk, and wheel friction.
- 6.5 Examine problems involving belt friction.