# 8/12/2020

# brcc keystone logo

Baton Rouge Community College

*Academic Affairs Master Syllabus*

Date Approved: 2 September 2020

Term and Year of Implementation: Fall 2020

**Course Title:** Statics

**BRCC Course Rubric:** ENGR 2453

**Previous Course Rubric**: ENGR 245

**Lecture Hours per week-Lab Hours per week-Credit Hours**: 2-2-3

**Per semester: Lecture Hours-Lab Hours-Instructional Contact Hours**: 30-30-60

**Louisiana Common Course Number:**

**CIP Code:** 14.0101

**Course Description:** Introduces the students to engineering skills and provides a strong engineering foundation for further study. Emphasizes vector treatment of resultants and equilibrium of force systems, including equilibrium of particles, internal forces, rigid bodies, trusses and frames. Also focuses on the area moment of inertia, the center of mass and the centroid of area.

**Prerequisites:** MATH 2125 (or MATH 211) and PHYS 2133 (or PHYS 221) with grade of C or better

**Co-requisites:** None

**Suggested Enrollment Cap:** 30

**Learning Outcomes.** *Upon successful completion of this course, the students will be able to:*

1. Draw correct free-body-diagrams, including determination of whether or not an object or force system can be analyzed using a particle or a rigid body approach.

2. Use equilibrium equations to solve for quantifiable forces on individual components in a system of constrained, rigid bodies and for resultant forces in irregular objects.

3. Express forces in vector form given various forms of component information.

4. Determine force components in arbitrary directions using vector expressions.

5. Express moments in vector form using the right hand rule and the cross product.

6. Simplify a system of forces to a single force moment system.

7. Determine the centroid and/or center of gravity of composite shapes or bodies.

8. Determine equilibrium loads acting on single particle or single rigid bodies in 2D and 3D; on truss-type structures using the method of joints and the method of sections, and in frames and machines.

9. Determine moments of inertia of composite shapes and masses about centroidal axes or other axes using the parallel-axis theorem.

**Assessment Measures.** Assessment of all learning outcomes will be measured using the following methods:

1. Individual instructor-designed assignments will assess a portion of the learning outcomes and will be given as a portion of the total grade. Assignments will include written assignments, homework and quizzes; all assignments will be graded using an instructor-designed rubric.

2. Department-designed quizzes/tests will collectively assess a portion of the learning outcomes and will be administered during the semester as listed.

3. A department-designed comprehensive final exam will cover the learning outcomes and will be given at the end of the semester.

**Information to be included on the Instructor’s Course Syllabi:**

* ***Disability Statement*:** Baton Rouge Community College seeks to meet the needs of its students in many ways. See the Office of Disability Services to receive suggestions for disability statements that should be included in each syllabus.
* ***Grading:*** The College grading policy should be included in the course syllabus. Any special practices should also go here. This should include the instructor’s and/or the department’s policy for make-up work. For example in a speech course, “Speeches not given on due date will receive no grade higher than a sixty” or “Make-up work will not be accepted after the last day of class”.
* ***Attendance Policy*:** Include the overall attendance policy of the college. Instructors may want to add additional information in individual syllabi to meet the needs of their courses.
* ***General Policies*:** Instructors’ policy on the use of things such as beepers and cell phones and/or hand held programmable calculators should be covered in this section.
* ***Cheating and Plagiarism*:** This must be included in all syllabi and should include the penalties for incidents in a given class. Students should have a clear idea of what constitutes cheating in a given course.
* ***Safety Concerns:*** In some courses, this may be a major issue. For example, “No student will be allowed in the lab without safety glasses”. General statements such as, “Items that may be harmful to one’s self or others should not be brought to class”.
* ***Library/ Learning Resources:*** Since the development of the total person is part of our mission, assignments in the library and/or the Learning Resources Center should be included to assist students in enhancing skills and in using resources. Students should be encouraged to use the library for reading enjoyment as part of lifelong learning.

**Expanded Course Outline:**

I. Calculus Review, Fundamental Principles, Newton’s Laws & Units

II. Force Vectors (Adding Two or More Forces & Rectangular Form)

III. Statics of Particles (Free Body Diagrams & Equilibrium)

IV. Moment Systems (Scalar Form & Right Hand Rule)

V. Moments (Vector Form & Cross Product)

VI. Couples

VII. Force System Simplification

VIII. Free Body Diagrams of Rigid Bodies

IX. Equilibrium Equations

X. Equilibrium in Two & 3 Dimensions

XI. Trusses (Method of Joints & Method of Sections)

XII. Frames and Machines

XIII. Center of Gravity and Center of Mass (Common Shapes & Composite Bodies)

XIV. Moments of Inertia