COURSE SYLLABUS

LAST REVIEW	Spring 2021
COURSE TITLE	Statics
COURSE NUMBER	NASC-0248
DIVISION	Math, Science, Business & Technology
DEPARTMENT	Physical Sciences
CIP CODE	24.0101
CREDIT HOURS	3
CONTACT HOURS/WEEK	Class: 3
PREREQUISITES	NASC-0245, Engineering Physics I AND MATH-0123, Calculus and Analytic Geometry II
COURSE PLACEMENT	None

COURSE DESCRIPTION
The course covers force vectors, equilibrium of particles, equilibrium of rigid bodies in two and three dimensions, trusses, friction, centroids and moments of inertia. Schedule: 3 hours of lectures per week. The course is currently being offered spring semester only.

TEXTBOOKS
http://kckccbookstore.com/

METHODS OF INSTRUCTION
A variety of instructional methods may be used depending on content area. These include but are not limited to: lecture, multimedia, cooperative/collaborative learning, labs and demonstrations, projects and presentations, speeches, debates, panels, conferencing, performances, and learning experiences outside the classroom. Methodology will be selected to best meet student needs.

COURSE OUTLINE
The course outline is indicated below and is subject to change as course development dictates.

I. Force Vectors
   A. Scalars and Vectors
   B. Vector operations
   C. Cartesian Vectors
   D. Force Vector along a line
   E. Dot Product

II. Equilibrium of a Particle
    A. Condition for the Equilibrium
    B. The Free-Body Diagram
    C. Coplanar Force Systems
    D. Three-Dimensional Force Systems
III. Moment of Force
    A. Moment of Force-Scalar Formulation
    B. Cross Product
    C. Moment of Force-Vector Formulation
    D. Principle of Moments
    E. Moment of a Force about a Specified Axis
    F. Moment of Couple
    G. Simplification of Force & Couple System
    H. Reduction of a Simple Distributed Loading
IV. Equilibrium of a Rigid Body
    A. Conditions for Rigid-Body Equilibrium
    B. Free-body Diagrams
    C. Equations for Equilibrium
    D. Two and Three-Force Members
    E. Equations of Equilibrium
V. Structure Analysis
    A. Simple Trusses
    B. The Method of Joints
    C. Zero-Force Members
    D. The Method of Sections
    E. Space Trusses
VI. Internal Forces
    A. Internal Loading Developed in Structural Members
    B. Shear & Moment Equations & Diagrams
    C. Relations between Distributed Load, Shear, and Moment
VII. Friction
    A. Dry Friction
    B. Wedges
    C. Frictional Forces on Screws
    D. Frictional Forces on Flat Belts
    E. Frictional Forces on Collar Bearing, Pivot, Bearings, and Disks
    F. Frictional Forces on Journal Bearings
VIII. Center of Gravity and Centroid
    A. Center of Gravity, Center of Mass, and the Centroid of a Body
    B. Composite Bodies
    C. Theorems of Pappus and Guldinus
    D. Resultant of a General Distributed Loading
    E. Fluid Pressure
IX. Moment of Inertia

A. Definition of Moments of Inertia for Areas
B. Parallel-Axis Theorem for an Area
C. Radius of Gyration of an Area
D. Moments of Inertia for Composite Areas
E. Moment of Inertia for an Area about Inclined Axes
F. Mass Moment of Inertia

COURSE LEARNING OUTCOMES AND COMPETENCIES

Upon successful completion of this course, the student will:

A. Be able to demonstrate knowledge of vectors
   1. The learner will be able to perform vector operation in 1D, 2D, 3D
   2. The learner will be able to perform up to 3D Cartesian vectors operation
   3. The learner will be able to find vector directed along a specific line
   4. The learner will be able to perform dot products and cross products.

B. Be able to demonstrate knowledge of equilibrium of a particle under various forces.
   5. The learner will be able to describe or illustrate the conditions necessary to produce equilibrium.
   6. The learner will be able to illustrate the free body diagram for a force system.
   7. The learner will be able to solve equilibrium problems involving coplanar force
   8. The learner will be able to solve three dimensional equilibrium problems

C. The learner will be able to demonstrate the knowledge of solving problems on moment of force
   9. The learner will be able to calculate any unknown forces or moments of force in a force system at equilibrium.
   10. The learner will be able to calculate moment of force a force system using vector form of moment of force.
   11. The learner will be able to calculate the concentrated force and moment equivalent of a distributed force.

D. Be able to demonstrate the knowledge of solving problems involving equilibrium of a rigid body.
   12. The learner will be able to solve problems involving equilibrium of a rigid body or a force system at equilibrium.

E. Be able to demonstrate knowledge of solving problem involving structural analysis.
   13. The learner will be able to solve truss problems method of joints and method of sections.

F. Be able to demonstrate the knowledge of internal forces
   14. The learner will be able to calculate shear and moment for various static force systems.

G. Be able to demonstrate the knowledge of Friction
   15. The learner will be able to calculate frictional force on screws, belt, bearings, and disks.

H. Be able to demonstrate the knowledge of center of gravity and centroid
   16. The learner will be able to calculate centroid, center of mass, and center of gravity for different system using calculus.

I. Be able to demonstrate the knowledge of moment of inertia
   17. The learner will be able to find moment of inertia of different geometry and systems using algebra and calculus.

ASSESSMENT OF COURSE LEARNING OUTCOMES AND COMPETENCIES
Student progress is evaluated through both formative and summative assessment methods. Specific details may be found in the instructor's course information document.

COLLEGE POLICIES AND PROCEDURES
Student Handbook
https://www.kckcc.edu/files/docs/student-resources/student-handbook-and-code-of-conduct.pdf

College Catalog
https://www.kckcc.edu/academics/catalog/index.html

College Policies and Statements
https://www.kckcc.edu/about/policies-statements/index.html

Accessibility and Accommodations
https://www.kckcc.edu/academics/resources/student-accessibility-support-services/index.html.