MESABI RANGE COMMUNITY & TECHNICAL COLLEGE – VIRGINIA/EVELETH

Course Outline

Course Title:	**Statics**	**Submitted By:**	**M. Threapleton**
Semester Course Prefix and Number:	**ENGR 2410**	**Approval Date:**	**April 2002**
Old Quarter Course Prefix and Number:	**ENGR 221**	**Revision Date:**	**April 2002**

Number of Credits: **3**
Number of Lecture Credits: **3**
Semester(s) Offered:
Number of Lab Credits:
Number of Lab Hours:
Negotiated Class Size:
Number of Studio/Demonstration/Internship Credits:

Course Purpose Code:

_____ **0 –** Developmental Courses
_____ **1 –** Non-transferable, General Education
_____ **2 –** Technical course related to career programs
_____ **3 –** College course which has the primary goal of applying certain concepts (e.g. vocal ensemble)
__X__ **4 -** Other college course not considered a part of general education (MNTC) e.g. computer science, health, physical education
_____ **5 –** Course which is intended to fulfill the Minnesota Transfer Curriculum (MNTC) requirements.
_____ **9 –** Continuing Education/Customized Training specialized credit course (not occurring in 0-5)

Catalog Description:
This course applies vector algebra to equilibrium analysis of structures, frames and machines.
It studies resultants of force systems, equilibrium of rigid bodies, analysis of structures, centroids, moments of inertia, friction and methods of virtual work.

Prerequisites and/or recommended entry skills/knowledge:

Course Prerequisite(s):	PHYS 1571 Engineering Physics I
Reading Prerequisite:	None
Composition Prerequisite:	None
Mathematics Prerequisite:	MATH 1561 Calculus I

Career Programs and Transfer Majors Accessing this Course:
Engineering majors

Minnesota Transfer Curriculum Goal(s) partially met by this course if applicable: Notes: No more than two goals may be met by any one course. (Curriculum Committee review and the Chief Academic Officer's approval are required).

0. _____ None
1. _____ Communications
6. _____ The Humanities and Fine Arts
7. _____ Human Diversity

2. _____ Critical Thinking
3. _____ Natural Sciences
4. _____ Mathematical/Logical Reasoning
5. _____ History and the Social and Behavioral Sciences
8. _____ Global Perspectives
9. _____ Ethical and Civic Responsibility
10. _____ People and the Environment

Learning outcomes, including any relevant competencies listed in the Minnesota Transfer Curriculum:

- Learn how to apply the techniques of vector algebra to systems in static equilibrium.
- Develop a rigorous approach to free body diagram analysis.
- Apply calculus to problems of distributed load and moments of inertia.
- Use energy and virtual work principles for static analysis problems.

Student assessment methods:
Graded homework problems; three problem-based exams; open-ended engineering design project.

Use of instructional technology (includes software, interactive video and other instructional technologies):
Use of mathematical software (MathCAD, Mathematica, Derive, Excel) for numerical analysis and graphics.

Outline of the major course content:

1. Vector algebra including force vectors in 2 and 3-D, Cartesian representation of unit vectors, scalar and vector products.
2. Free-body diagrams for particles and rigid bodies.
3. Use the equations of equilibrium to solve particle equilibrium problems.
4. Calculate moments of forces and resultants of nonconcurrent force systems.
5. Reduction of distributed loads to a specific resultants.
6. Calculate the moments of couples and use the equations of equilibrium to solve rigid body equilibrium problems.
7. Analyze the forces and stresses in trusses, frames and machines.
8. Analyze the equilibrium of rigid bodies subjected to dry friction forces.
9. Find the center of gravity, centroid and moments of inertia of systems of particles and bodies.
10. Analyze the resultant of fluid pressure.
11. Use the principle of virtual work to determine the equilibrium configuration of a series of pin-connected members.
12. Use the potential energy function to investigate the equilibrium configuration of rigid bodies.

Additional special information (special fees, directives on hazardous materials, etc.)

Transfer Information: (Please list colleges/majors that accept this course in transfer.)
This is a standard first course in statics and should be accepted by any engineering school.

Approvals:

Body	Representative Signatures	Date
Curriculum Committee	Kim Giermann	April 2, 2002
Faculty Association	Georgia Suoja	April 8, 2002

Meet and Confer	Dr. Jill Peterson	April 17, 2002
Chief Academic Officer	Dr. Jill Peterson	April 17, 2002

Distribution: Original – Administrative Office, Library, Learning Center, Records, Student Services, Curriculum Committee Chair