MESABI RANGE COMMUNITY & TECHNICAL COLLEGE – VIRGINIA/EVELETH

Course Outline

Course Title:	**Dynamics**	**Submitted By:**	**M. Threapleton**
Semester Course Prefix and Number:	**ENGR 2420**	**Approval Date:**	**April 2002**
Old Quarter Course Prefix and Number:	**ENGR 222**	**Revision Date:**	**April 2002**

Number of Credits: **3**	**Number of Lecture Credits:**	**3**	
Semester(s) Offered:	**Number of Lab Credits:**	**Number of Lab Hours:**	**0**
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 and vector calculus in the solutions of kinematic and dynamic problems. It uses conservation principles in dealing with the dynamics of particle and rigid body systems.

Prerequisites and/or recommended entry skills/knowledge:

Course Prerequisite(s):	PHYS 1571 Engineering Physics I or instructor consent
Reading Prerequisite:	None
Composition Prerequisite:	None
Mathematics Prerequisite:	Concurrent enrollment in MATH 1562 Calculus II or instructor consent

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. __X__ 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:

- Apply vector methods to the kinematics and dynamics of particles and rigid bodies.
- Solve dynamical problems by application of work-energy methods, momentum conservation, and impulse methods.
- Use Newton's laws to solve rectilinear and curvilinear translation problems.
- Analyze rigid body motion in a plane.

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. Use the concepts of position, displacement, velocity and acceleration to analyze the motion of particles in one, two and three dimensions.
2. Analyze relative motion of two particles.
3. Apply Newton's Laws of Motion and gravitational attraction.
4. Use central force analysis in problems of space mechanics.
5. Solve dynamics problems using the work energy theorem.
6. Solve problems involving power and efficiency.
7. Solve problems using the principles of momentum conservation.
8. Analyze the planar motion of a rigid body rotating about a fixed axis.
9. Solve general planar motion problems.
10. Solve general planar motion problems using work and energy methods.
11. Solve general planar motion problems using impulse and momentum methods.
12. Analyze the three-dimensional kinematics of a rigid body.
13. Apply energy and momentum methods to the three-dimensional kinetics of a rigid body.
14. Solve problems in free and forced undamped vibrations.

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 dynamics and should be accepted by any engineering school.

Approvals:

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

Faculty Association		
Meet and Confer	Dr. Jill Peterson	
Chief Academic Officer	Dr. Jill Peterson	

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