

# Minnesota State University Moorhead

## PHYS 330: Intermediate Mechanics

### A. COURSE DESCRIPTION

Credits: 4

Lecture Hours/Week: 4

Lab Hours/Week: 0

OJT Hours/Week: \*.\*

Prerequisites:

PHYS 201 - General Physics II AND MATH 366 - Differential Equations AND PHYS 350 - Computational Methods for Physical Science

Corequisites: None

MnTC Goals: None

An advanced unified approach to physical problems: Newton's Laws; particle dynamics in one, two, and three dimensions; systems of particles, gravitation, moving reference frames; Lagrange's equations, dynamics of rigid bodies; Hamilton's equations.

**B. COURSE EFFECTIVE DATES:** 06/01/1995 - Present

### C. OUTLINE OF MAJOR CONTENT AREAS

1. One, two, and three dimensional mechanics and energy
2. Lagrangian mechanics and calculus of variations
3. Oscillations; driven, damped and coupled
4. Nonlinear oscillations
5. Central forces and gravitation
6. Hamiltonian mechanics
7. Rigid body motion and rotations
8. Motion in non-inertial frames

### D. LEARNING OUTCOMES (General)

1. Apply Lagrangian and Hamiltonian dynamics to physically interesting systems
2. Comfortably apply advanced mathematical techniques to physical problems
3. Analyze and model the motion of objects in complex settings
4. Develop the skills of a physicist: checking units, limiting cases, developing conceptual and mathematical skills

### E. Minnesota Transfer Curriculum Goal Area(s) and Competencies

None

### F. LEARNER OUTCOMES ASSESSMENT

As noted on course syllabus

### G. SPECIAL INFORMATION

None noted