Institutional Syllabus

___ New Course                        Date of Last Review  September 15, 2005
___ Substantive Change in Existing Course  Date of Most Recent Approval

I. Course Title
   • Mechanics

II. Course Prefix/Number
   • 302

III. Credit Hours
   • 4.0

IV. Prerequisites
   • PHYS 230, 231, 232, 233 and MATH 327

V. Catalog Description
   • Advanced study of the laws of motion using Newtonian mechanics, an introduction to Hamilton’s principle and Lagrangian dynamics. Topics include systems of particles, linear and driven oscillators, central force motion, motion in non-inertial reference frames, and dynamics of rigid bodies. Offered spring of odd years.

VI. Curricular Relationships
   • The course is required for students pursuing the B.S. in Chemical Physics and the B.S. in Mathematics – Physics Emphasis.

VII. Student Learning Outcomes
   • Students will demonstrate an understanding of intermediate classical mechanics topics such as coordinate transformations, oscillatory motion, gravitation and other central forces, and Lagrangian mechanics.
   • Students will be able to apply their mathematics skills to intermediate classical mechanics problems.
   • Students will demonstrate an ability to use Newton’s Laws of Motion and conservation laws in the solution of physical problems.

VIII. Content Outline
   • Coordinates and coordinate transformations,
   • Kinematics and non-uniform acceleration,
   • Newton’s Laws of Motion,
   • Energy and its use in problem solving,
   • Momentum and its use in problem solving,
   • Gravitational Force,
• Harmonic motion,
• Lagrangian Mechanics,
• Techniques for solution of differential equations.

IX. Course Procedures/Policies/Grading Scale
• 3-5 examinations are given during the course of the semester in addition to a comprehensive final exam. The tests are not trivial and should focus on complex problem solving. Tests during the semester are generally take-home exercises.
• Homework should be assigned with a representative group of problems being graded and weighted as a portion of the course grade.

X. Required/Recommended Readings
• The course will use a standard intermediate mechanics textbook such as *Analytical Mechanics 7th* ed. by Fowles, published by Brooks/Cole

XI. Issues Unique to this Course
• None

XII. Additional Departmental Issues
• None