PHYSICS (PHYS)

PHYS 1111 Introductory Computational Physics 3 Credits (3)
Introduction to computational techniques for the solution of physics-related problems. (2+2P)
Prerequisite(s): a C- or better in MATH 1220G or MATH 1250G or MATH 1511G
View Course Outcomes

PHYS 1112 Introductory Physics for the Health Sciences 3 Credits (3)
Algebra-level introduction to topics required for the Health Sciences including basic mechanics (including sound, mechanical waves and fluids), heat and thermodynamics, electricity and magnetism, optics and electromagnetic waves, atomic and nuclear physics and applications to medical imaging.
Prerequisite(s): MATH 1215
Learning Outcomes
1. The objective of the course is to familiarize the student with the concepts and methods used in the underlying physics associated with various Health Science disciplines.
2. The course will demonstrate how the basic principles of mechanics, thermodynamics, electricity, magnetism, electromagnetic waves and optics can be applied to solve particular problems in Health Sciences applications. Introduces the student to selected topics in modern physics including quantum physics, atomic and nuclear physics.

View Course Outcomes

PHYS 1115G Survey of Physics with Laboratory 4 Credits (4)
Overview of the concepts and basic phenomena of physics. This course provides a largely descriptive and qualitative treatment with a minimum use of elementary mathematics to solve problems. No previous knowledge of physics is assumed. Includes laboratory. (3+3P)Provides lab.
Provides Lab
View Course Outcomes

PHYS 1125G The Physics of Music 4 Credits (4)
Introduction for non-science majors to basic concepts, laws, and skills in physics, in the context of a study of sound, acoustics, and music. (3+2P)
View Course Outcomes

PHYS 1230G Algebra-Based Physics I 3 Credits (3)
An algebra-based treatment of Newtonian mechanics. Topics include kinematics and dynamics in one and two dimensions, conservation of energy and momentum, rotational motion, equilibrium, and fluids.
View Course Outcomes

PHYS 1230L Algebra-based Physics I Laboratory 1 Credit (1)
A series of laboratory experiments associated with the material presented in PHYS 1230.
Prerequisite(s)/Corequisite(s): PHYS 1230G
Learning Outcomes
1. Explain the scientific method.
2. Test ideas using modern laboratory equipment.
3. Estimate experimental uncertainties using statistical methods.
4. Use computers to analyze and report laboratory results.
5. Draw appropriate conclusions from quantitative scientific observations.
6. Accurately and clearly communicate the results of scientific experiments.

View Course Outcomes

PHYS 1240G Algebra-Based Physics II 3 Credits (3)
The second half of a two semester algebra-based introduction to Physics. This course covers electricity, magnetism and optics.
Prerequisite(s): a C- or better in PHYS 1230G or PHYS 2230G
View Course Outcomes

PHYS 1240L Algebra-based Physics II Laboratory 1 Credit (1)
A series of laboratory experiments associated with the material presented in PHYS 1240.
Prerequisite(s)/Corequisite(s): PHYS 1240
Learning Outcomes
1. Explain the scientific method.
2. Test ideas using modern laboratory equipment.
3. Estimate experimental uncertainties using statistical methods.
4. Use computers to analyze and report laboratory results.
5. Draw appropriate conclusions from quantitative scientific observations.
6. Accurately and clearly communicate the results of scientific experiments.

View Course Outcomes

PHYS 1310G Calculus -Based Physics I 3 Credits (3)
A calculus level treatment of classical mechanics and waves, which is concerned with the physical motion concepts, forces, energy concepts, momentum, rotational motion, angular momentum, gravity, and static equilibrium.
Prerequisite(s): a C- or better in MATH 1511G or higher
View Course Outcomes

PHYS 1310L Calculus - Based Physics I Laboratory 1 Credit (1)
A series of laboratory experiments associated with the material presented in Calculus-based Physics I. Students will apply the principles and concepts highlighting the main objectives covered in coursework for Calculus-based Physics I.
Prerequisite(s)/Corequisite(s): PHYS 1310G
Learning Outcomes
1. Develop a reasonable hypothesis.
2. Work effectively as part of a team.
3. Take measurements and record measured quantities to the appropriate precision.
4. Estimate error sources in experimental techniques.
5. Apply appropriate methods of analysis to raw data, including using graphical and statistical methods via computer-based tools.
6. Determine whether results and conclusions are reasonable.
7. Present experimental results in written form in appropriate style and depth.
8. Experience the relationship between theory and experiment.

View Course Outcomes

PHYS 1311 Problems in Calculus-Based Physics I 0.5 Credits (0.5)
This is a supplemental course for Calculus-based Physics I. Repeatable: up to 1 credits.
Corequisite(s): PHYS 1310G
View Course Outcomes

PHYS 1320G Calculus-Based Physics II 3 Credits (3)
A calculus level treatment of classical electricity and magnetism. It is strongly recommended that this course is taken at the same time as Calculus-based Physics II laboratory.
Prerequisite(s): a C- or better in PHYS 2110 or PHYS 1310G and MATH 1521G or higher
View Course Outcomes

PHYS 1320L Calculus-Based Physics II Laboratory 1 Credit (1)
A series of Laboratory experiments associated with the material presented in Calculus-Based Physics II. Students will apply the principles and concepts highlighting the main objectives covered in coursework for Calculus-Based Physics II.
Prerequisite(s): A C- or better in PHYS 2110L or PHYS 1310L
Prerequisite(s)/Corequisite(s): PHYS 1320G
Learning Outcomes
1. Develop a reasonable hypothesis.
2. Work effectively as part of a team.
3. Take measurements and record measured quantities to the appropriate precision.
4. Estimate error sources in experimental techniques.
5. Apply appropriate methods of analysis to raw data, including using graphical and statistical methods via computer-based tools.
6. Determine whether results and conclusions are reasonable.
7. Present experimental results in written form in appropriate style and depth.
8. Experience the relationship between theory and experiment.

View Course Outcomes

PHYS 1321 Problems in Calculus-Based Physics II 0.5 Credits (0.5)
This is a supplemental course for Calculus-based Physics II.
Corequisite(s): PHYS 1320G
View Course Outcomes

PHYS 2110 Mechanics 3 Credits (3)
Newtonian mechanics.
Prerequisite(s)/Corequisite(s): MATH 1511G or higher
View Course Outcomes

PHYS 2110L Experimental Mechanics 1 Credit (1)
Laboratory experiments associated with the material presented in PHYS 2110. Science majors. (3P)
Prerequisite(s)/Corequisite(s): PHYS 2110
View Course Outcomes

PHYS 2111 Problems in Mechanics 1 Credit (1)
This Optional workshop as a supplement to PHYS 2110. The tutorial sessions focus on reasoning and hands-on problem solving. Repeatable: up to 1 credit.
Corequisite(s): PHYS 2110
Learning Outcomes
1. analyze real world phenomena by constructing simplified idealized models and appropriate mathematical reasoning to make predictions or explain a phenomena or function.
2. use multiple representations to build, interpret and communicate the model, including visual representations such as sketches or diagrams, mathematical expressions, graphs, or text.
3. in the contexts of concepts and physical laws discussed in PHYS 2110, apply quantitative analysis to solve problems, including the use of scientific notation, unit conversion and vector algebra.
4. self-check reasonableness of assumptions and solutions, making use of limiting cases or symmetry arguments.
5. develop learning strategies and use metacognition to promote thinking in the discipline.

View Course Outcomes

PHYS 2120 Heat, Light, and Sound 3 Credits (3)
Calculus-level treatment of thermodynamics, geometrical and physical optics, and sound. Repeatable: up to 3 credits.
Prerequisite(s): a C- or better in PHYS 2110 or PHYS 1310G, and MATH 1511G or higher
View Course Outcomes

PHYS 2120L Heat, Light, and Sound Laboratory 1 Credit (1)
Laboratory experiments associated with the material presented in PHYS 2120. Science majors. (+3P)
Prerequisite(s): a C- or better in PHYS 2110L or PHYS 1310L
Prerequisite(s)/Corequisite(s): PHYS 2120
Learning Outcomes

View Course Outcomes

PHYS 2121 Supplemental Instruction to PHYS 2120 1 Credit (1)
This optional workshop supplements PHYS 2120 Heat, Light, and Sound. Students actively apply concepts and methods introduced in PHYS 2120 to problem solving and quantitative analysis. Repeatable: up to 1 credit.
Corequisite(s): PHYS 2120
Learning Outcomes

1. analyze real world phenomena by constructing simplified idealized models and appropriate mathematical reasoning to make predictions or explain a phenomena or function.
2. use multiple representations to build, interpret and communicate the model, including visual representations such as sketches or diagrams, mathematical expressions, graphs, or text.
3. in the contexts of concepts and physical laws discussed in PHYS 2120, apply quantitative analysis to solve problems involving wave propagation and interference, geometric optics, heat transfer and thermodynamics.
4. self-check reasonableness of assumptions and solutions, making use of limiting cases or symmetry arguments.
5. develop learning strategies and use metacognition to promote thinking in the discipline.

View Course Outcomes

PHYS 2140 Electricity and Magnetism 3 Credits (3)
Charges and matter, the electric field, Gauss law, the electric potential, the magnetic field, Amperes law, Faradays law, electric circuits, alternating currents, Maxwells equations, and electromagnetic waves. Repeatable: up to 3 credits.
Prerequisite(s): a C- or better in PHYS 2110 or PHYS 1310G, and MATH 1511G or higher
Prerequisite(s)/Corequisite(s): MATH 1521G
View Course Outcomes

PHYS 2140L Electricity & Magnetism Laboratory 1 Credit (1)
Laboratory experiments associated with the material presented in PHYS 2140. (+3P)
Prerequisite(s): a C- or better in PHYS 2110 or PHYS 1310G
Prerequisite(s)/Corequisite(s): PHYS 2140
Learning Outcomes

View Course Outcomes

PHYS 2141 Supplemental Instruction to PHYS 2140 1 Credit (1)
Optional workshop as a supplement to PHYS 2140. The tutorial sessions focus on reasoning and hands-on problem solving.
Corequisite(s): PHYS 2140
Learning Outcomes

1. Analyze real-world phenomena by constructing simplified idealized models and appropriate mathematical reasoning to make predictions or explain a phenomenon or function.
2. Use multiple representations to build, interpret and communicate the model, including visual representations such as sketches or diagrams, mathematical expressions, graphs, or text.
3. In the contexts of concepts and physical laws discussed in PHYS 2140, apply quantitative analysis to solve problems, including the use of symmetry to study electric and magnetic fields. Practice concepts of calculus applied to charge and current distributions.
4. Self-check reasonableness of assumptions and solutions, making use of limiting cases or symmetry arguments.
5. Develop learning strategies and use metacognition to promote thinking in the discipline.

View Course Outcomes

PHYS 2230G General Physics for Life Sciences I 3 Credits (3)
This algebra-based introduction to general physics covers mechanics, waves, sound, and heat. Special emphasis is given to applications in the life sciences. This course is recommended for students in the life sciences and those preparing for the physics part of the MCAT.
Prerequisite(s): A C or better in MATH 1215 or higher
View Course Outcomes

PHYS 2230L Laboratory to General Physics for Life Sciences I 1 Credit (1)
Laboratory experiments in topics associated with material presented in PHYS 2230G.
Prerequisite(s)/Corequisite(s): PHYS 2230G
View Course Outcomes

PHYS 2231 Problems in Algebra-based Physics I 1 Credit (1)
This optional workshop supplements Physics for Life Sciences I. The tutorial sessions focus on reasoning and hands-on problem solving.
Corequisite(s): PHYS 2230G
View Course Outcomes

PHYS 2240G General Physics for Life Sciences II 3 Credits (3)
This algebra-based course covers electricity, magnetism, light, atomic physics, and radioactivity. Special emphasis is given to applications in the life sciences This course is recommended for students in the life sciences and those preparing for the physics part of the MCAT.
Prerequisite(s): a C- or better in PHYS 1230G or PHYS 2230G, and MATH 1220G or higher
View Course Outcomes

PHYS 2240L Laboratory to General Physics for Life Sciences II 1 Credit (1)
Laboratory experiments in topics associated with material presented in PHYS 2240G.
Prerequisite(s)/Corequisite(s): PHYS 2240G
View Course Outcomes

PHYS 2241 Problems in Algebra-based Physics II 1 Credit (1)
This optional workshop is a supplement to Physics for Life Science II. The tutorial sessions focus on reasoning and hands-on problem solving.
Corequisite(s): PHYS 2240G
Repeatable: up to 1 credits
View Course Outcomes

PHYS 2996 Topics in Physics 1-3 Credits
Topics to be announced in the Schedule of Classes. Repeatable: for a maximum of 12 credits.
View Course Outcomes

PHYS 2997 Independent Study in Physics 3 Credits (3)
Individual analytical or laboratory studies directed by a faculty member. Repeatable: for a maximum of 6 credits.Provides lab.
Provides Lab
View Course Outcomes