EXHIBIT B

EXHIBIT B

OCEAN COUNTY COLLEGE

BOARD OF TRUSTEES

Bylaw, Policy, and Curriculum Committee Agenda Items

To: Board of Trustees

From: Office of the President

Date: July 17, 2025

The following Bylaw, Policy, and Curriculum Committee items are recommended to the Ocean County College Board of Trustees for approval at its meeting on **Thursday, July 24, 2025**:

1. Recommend approval of the following items as accepted by the College Senate at its meeting on July 17, 2025:

   a. New Courses

      a. CHEM 181L, General Chemistry I Lab **(Exhibit B-1)**
      b. CHEM 182L, General Chemistry II Lab **(Exhibit B-2)**
      c. CHEM 283L, Organic Chemistry I Lab **(Exhibit B-3)**
      d. CHEM 284L, Organic Chemistry II Lab **(Exhibit B-4)**
      e. PHYS 171L, Physics I Lab **(Exhibit B-5)**
      f. PHYS 172L, Physics II Lab **(Exhibit B-6)**
      g. PHYS 180L, Introduction to Astronomy Lab **(Exhibit B-7)**
      h. PHYS 181L, Astronomy of the Solar System Lab **(Exhibit B-8)**
      i. PHYS 182L, Astronomy of Stars and Galaxies Lab **(Exhibit B-9)**
      j. PHYS 281L, General Physics I Lab **(Exhibit B-10)**
      k. PHYS 282L, General Physics II Lab **(Exhibit B-11)**

   b. Revised Course

      a. ENVI 259, Field Experience/Practicum **(Exhibit B-12)**

   c. Revised Courses with Name Change

      a. CHEM 181, General Chemistry I to General Chemistry I Lecture **(Exhibit B-13)**
      b. CHEM 182, General Chemistry II to General Chemistry II Lecture **(Exhibit B-14)**
      c. CHEM 283, Organic Chemistry I to Organic Chemistry I Lecture **(Exhibit B-15)**
      d. CHEM 284, Organic Chemistry II to Organic Chemistry II Lecture **(Exhibit B-16)**
      e. PHYS 171, Physics I to Physics I Lecture **(Exhibit B-17)**

f. PHYS 172, Physics II to Physics II Lecture **(Exhibit B-18)**
g. PHYS 180, Introduction to Astronomy to Introduction to Astronomy Lecture **(Exhibit B-19)**
h. PHYS 181, Astronomy of the Solar System to Astronomy of the Solar System Lecture **(Exhibit B-20)**
i. PHYS 182, Astronomy of Stars and Galaxies to Astronomy of Stars and Galaxies Lecture **(Exhibit B-21)**
j. PHYS 281, General Physics I to General Physics I Lecture **(Exhibit B-22)**
k. PHYS 282, General Physics II to General Physics II Lecture **(Exhibit B-23)**

EXHIBIT B-1

Course Change Request

New Course Proposal

Date Submitted: 06/11/25 4:12 pm

Viewing: CHEM 181L : General Chemistry I Lab

Last edit: 07/11/25 7:16 am

Changes proposed by: Maria Hartwell (mhartwell)

Learning Outcomes

Display (show only)

In Workflow

1. **STEM Academic Administrator**
2. **STEM Dean**
3. **Executive Director of Curriculum and Program Development**
4. **Curriculum Committee Chair**
5. **Senate Chair**
6. Vice President of Academic Affairs
7. Cabinet
8. President
9. Board of Trustees Chair
10. STEM Academic Administrator
11. Colleague

Approval Path

1. 06/17/25 12:27 pm Connor Sampson (csampson): Approved for STEM Academic Administrator
2. 07/01/25 12:30 pm Vandana Saini (vsaini): Rollback to STEM Academic Administrator for STEM Dean
3. 07/01/25 12:55 pm Connor Sampson

(csampson): Approved for STEM Academic Administrator
4. 07/01/25 3:52 pm Vandana Saini (vsaini): Approved for STEM Dean
5. 07/07/25 9:55 am James Marshall (jmarshall): Approved for Executive Director of Curriculum and Program Development
6. 07/11/25 3:03 pm Caroline Brittain (cbrittain): Approved for Curriculum Committee Chair

1. Course Information

Subject	CHEM - Chemistry
School	Science, Technology, Engineering, Mathematics
Course Title	General Chemistry I Lab

2. Hours

Semester Hours	1.00
Lecture	0
Lab	3.00
Practicum	0

3. Catalog Description

For display in the online catalog

This laboratory course, intended for science majors, is the first course of a two-course sequence. The laboratory work includes basic laboratory techniques and is intended to support lecture topics including stoichiometry, inorganic nomenclature, solutions, gas laws, thermochemistry atomic structure, and chemical bonding. It is highly recommended that students who enroll in this course have completed high school Chemistry (or CHEM 180) and high school Algebra II.

4. Requisites

Prerequisites

MATH-023 or Mathematics placement requiring no remediation.

Corequisites

For the first attempt CHEM 181 is considered a corequisite. If the student should fail either lecture or lab after the first attempt, then they may take the individual failed section.

5. Course Type

Course Type for Perkins Reporting	non-vocational (not approved for Perkins funding)

6. Justification

Describe the need for this course

This course is required for bachelor-level degree programs in science, engineering and in many health-related pre-professional disciplines.

7. General Education

Will the college submit this course to the statewide General Education Coordinating Committee for approval as a course, which satisfies a general education requirement?

Yes

General Education Category

Lab Science

General Education Status Proposed

8. Consistency with the Vision and Mission Statements, the Academic Master Plan, and the strategic initiatives of the College

Please describe how this course is consistent with Ocean County College's current Vision Statement, Mission Statement, Academic Master Plan, and the strategic initiatives of the College:

	Add item
1	Providing student-centered, high quality educational experiences that prepare and empower diverse learners (Mission Statement)
2	Cultivating a technologically progressive spirit (Mission Statement)
3	Providing and supporting the delivery of high-quality, relevant, and emerging STEM courses (Academic Master Plan)
4	Reviewing and revising course content, prerequisites, learning objectives and integrated assessments to meet current trends and transferability. (Academic Master Plan)

9. Related Courses at Other Institutions

Comparable Courses at NJ Community Colleges

Institution Bergen CC

Course Title General Chemistry I - Lab

Course Number CHM 141

Number of Credits 1

Comments

Requires a pre-req/co-req of CHM 140

Institution County College of Morris

Course Title General Chemistry I – Laboratory

Course Number	CHM 126
Number of Credits	1

Comments

Requires a pre-req of college level Math test or a C or better in MAT-110 and a co-req of CHM-125

Institution	Middlesex County College
Course Title	General Chemistry I Lab
Course Number	CHM-125
Number of Credits	1

Comments

Two years of high school algebra and geometry or MAT-014 and one year of high school chemistry or CHM-020 - Must be completed prior to taking this course.
CHM-121 - Must be taken either prior to or at the same time as this course.

Institution	Rowan College at Burlington County
Course Title	General Chemistry I Laboratory
Course Number	CHE 116
Number of Credits	1

Comments

Requires a co-req or pre-req of CHE-115

Transferability of Course

Georgian Court
University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
CH113 General Chemistry I 1cr. (together with lecture component)	Major, Gen. Ed	

Kean University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
CHEMX 10083, K1, K3, General Chemistry I CHEM1083 (together with lecture component) 1 cr. D minimum as elective, C minimum as major	Elective	

Monmouth University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
CE111L General Chemistry I Laboratory 1 cr., C minimum	Major, Gen. Ed. Natural Sciences	

Rowan University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
CHEM05076 (GE Chemistry Lab Elective) 1 cr CHEM 06100 General Chemistry I 1 cr. (with lecture component)	Major, Gen. Ed., Laboratory Science, Scientific Literacy (with lecture component), GE Chemistry Lab Elective (by itself)	

Rutgers - New Brunswick, Mason Gross School of the Arts

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
01160171 Introduction to experimentation, 1cr, C minimum	Major, Gen. Ed.)-	

Stockton University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
CHEM 2115 Chemistry I Lab, 1 cr	Major, Gen. Ed., Science	

If not transferable to any institution, explain:

10. Course Learning Outcomes

Learning Outcomes

	Students who successfully complete this course will be able to:
CLO1	Explain the properties of matter.
CLO2	Utilize scientific/quantitative calculations to carry out dimensional analysis, stoichiometry, and thermodynamics.
CLO3	Characterize solvation by water and its relationship to concentration.
CLO4	Illustrate the organization and trends of the periodic table.
CLO5	Interpret nomenclature and predict atomic/molecular structure, bonding and geometry.
CLO6	Explain the relationship between electrons, electromagnetic spectrum, orbitals, and the valence shell.
CLO7	Interpret the gas laws and the Kinetic-Molecular Theory.

11. Topical Outline

(include as many themes/skills as needed)

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
TO1	TO1 Matter & Measurements Scientific Method, Classes of Matter, States of matter, Properties of Matter (Physical vs Chemical, Extensive vs. Intensive), Scientific Measurements, SI Units, Unit conversion	Lab Experiment, Pre-lab and Post-lab written assignments, worksheet	Laboratory experiment, Pre-lab and Post-lab written assignments, quiz graded participation, laboratory practical	CLO1, CLO2

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
	and Dimensional Analysis, Significant Figures, Accuracy, Precision Lab Experiment, homework, group assignment, Pre-lab and Post-lab written assignments, worksheet Test, Laboratory experiment, Pre-lab and Post-lab written assignments, quiz,quiz graded participation, laboratory practical CLO1, CLO2			
TO2	Atoms and elements Atomic theory, Atomic Structure, Discovery of electrons, protons, and neutrons, Atomic number, mass number, Atomic mass, Isotopes, Nuclear model of the atom	Lab Experiment, Pre-lab and Post-lab written assignments, class discussion	Laboratory experiment, Pre-lab and Post-lab written assignments	CLO1, CLO2, CLO4
TO3	Molecules, Ions & Compounds Molecular and ionic compounds, Nomenclature, atomic ions, polyatomic ions, hydrates	Lab Experiment, Pre-lab and Post-lab written assignments	Laboratory experiment, graded worksheet, Pre-lab and Post-lab written assignments, laboratory practical	CLO1, CLO5
TO4	Chemical Equations & Stoichiometry Molecular and formula masses, Mole, Molar	Lab Experiment, Pre-lab and Post-lab written assignments	Laboratory experiment, quiz, Pre-lab and Post-lab written assignments, laboratory practical	CLO2

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
	mass, percent composition, Writing and balancing equations, Empirical and Molecular Formulas, combustion analysis, limiting reactants, Percent yield			
TO5	Reactions in Aqueous Solutions Concentration Units, Molarity, Dilutions, electrolytes and nonelectrolytes, Acid-Base reactions, Bronsted Acids and Bases, Ion-exchange reactions, precipitation reactions, Oxidation numbers, oxidation-reduction reactions, ionic equations, Net ionic equation	Lab Experiment, Pre-lab and Post-lab written assignments	Laboratory experiment, Pre-lab and Post-lab written assignments, laboratory practical	CLO1, CLO2, CLO3, CLO4
TO6	Energy and Chemical Reactions Energy, Thermodynamics, energy transfer, Enthalpy, Hess's Law, Specific heat, Specific heat capacity, State functions, Work and heat, Calorimetry, Constant pressure calorimetry, Constant volume calorimetry	Lab Experiment, Pre-lab and Post-lab written assignments	Pre-lab and Post-lab written assignments, Laboratory experiment, quiz, laboratory practical	CLO1, CLO2, CLO4
TO7	Atomic Electron Configuration	Lab Experiment, Pre-lab and Post-lab written	, Laboratory experiment, Pre-lab and Post-lab	CLO2, CLO4, CLO5, CLO6

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
	Electromagnetic spectrum, Properties of waves, Photoelectric effect, Bohr's Theory, Quantum Mechanics, Quantum numbers, Atomic orbitals, Electron Configuration, Pauli's exclusion principle, Aufbau principle, Hund's Rule, Periodic trends in atomic radius, ionization energy, electron affinity, and chemical properties, Effective nuclear charge	assignments,reading assignment,	written assignments	
TO8	Bonding and Molecular Structure Lewis Dot structure, Ionic bonds, covalent bonds, electronegativity and polarity, Octet rule, Expanded octet, formal charge and resonance, Bond enthalpy, Born-Haber cycle	Lab Experiment, Pre-lab and Post-lab written assignments	Laboratory experiment, graded worksheet, quiz Pre-lab and Post-lab written assignments	CLO4, CLO5, CLO6
TO9	Orbital Hybridization VSEPR Geometry, Molecular Geometry, Hybridization, Valence bond Theory, Bond angles, Molecular Orbital Theory, sigma and pi bonds, bond order, bonding and antibonding orbitals	Lab Experiment, homework, Pre-lab and Post-lab written assignments	Laboratory experiment, quiz, Pre-lab and Post-lab written assignments	CLO5, CLO6

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
TO10	Gases and Their Properties Properties of gases, gas pressure units, Boyle's law, Charles's law, Avogadro's law, Gay-Lussac's law, Combined gas law, Ideal Gas law, Dalton's law, Mole fraction, Partial pressures, Kinetic Molecular Theory, Partial pressures, Diffusion and Effusion, Real gases, Van der Waals equation	Lab Experiment, homework, Pre-lab and Post-lab written assignments	Laboratory experiment, Pre-lab and Post-lab written assignments, quiz, graded worksheet, laboratory practical	CLO1, CLO2, CLO7

12. Methods of Instruction

In the structuring of this course, what major methods of instruction will be utilized?

- o Mini-Lecture and discussion of the topics.
- o Reading and analyzing the theory behind the experiments and the laboratory procedures
- o Data analysis
- o Laboratory experimentation.

13. General Education Goals Addressed by this Course (this section is to fulfill state requirements)

Information

Communication-Written and Oral

_____

Quantitative Knowledge and Skills Yes

Related Course Learning Outcome: CLO2, CLO6, CLO7

Related Outline Component: TO1, TO2, TO4, TO5, TO6, TO7, TO10

Assessment of General Education Goal (Recommended but not limited to)

Laboratory experiment, quiz, worksheet, Laboratory Practical

Scientific Knowledge and Reasoning: Yes

Related Course Learning Outcome: CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7

Related Outline Component: TO1, TO2, TO4, TO5, TO6, TO7, TO10

Assessment of General Education Goal (Recommended but not limited to)

Laboratory experiment, oral assessment

Technological Competency

Information Literacy

Society and Human Behavior

Humanistic Perspective

Historical Perspective

Global and Cultural Awareness

Ethical Reasoning and Action

Independent/Critical Thinking: Yes

Related Course Learning Outcome	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7
Related Outline Component	TO1, TO2, TO3, TO4, TO5, TO6, TO7, TO8, TO9, TO10

Assessment of General Education Goal (Recommended but not limited to)

Laboratory experiment, oral assessment, worksheet, Lab practical, Pre-lab and Post-lab written assignments

14. Needs

Instructional Materials (text etc.):

An appropriate text or open educational resource will be selected. Contact the department for current adoptions. A calculator with logarithmic functions. Safety goggles and a lab coat are required. Appropriately selected and maintained laboratory notebook.

Technology Needs:

Computers with Microsoft Office. Laboratory technology appropriate for planned experiments.

Human Resource Needs (Presently Employed vs. New Faculty):

Tutors: Depending on available college resources, professional tutors may provide support for students

Facility Needs:

Laboratory setting and appropriate laboratory materials

Library needs:

none

15. Grade Determinants

The final grade in the course will be the cumulative grade based on the following letter grades or their numerical equivalents for the course assignments and examinations

A: Excellent

B+: Very Good

B: Good

C+: Above Average

C: Average

D: Below Average

F: Failure

I: Incomplete

R: Audit

For more detailed information on the Ocean County College grading system, please see Policy #5154.

Reviewer Comments

Vandana Saini (vsaini) (07/01/25 12:30 pm): Rollback: Add faculty suggestions

Key: 2367

EXHIBIT B-2

Course Change Request

EXHIBIT B-2

New Course Proposal

Date Submitted: 06/12/25 4:08 pm

Viewing: CHEM 182L : General Chemistry II Lab

Last edit: 07/01/25 12:56 pm

Changes proposed by: Maria Hartwell (mhartwell)

Learning Outcomes

Display (show only)

In Workflow

1. **STEM Academic Administrator**
2. **STEM Dean**
3. **Executive Director of Curriculum and Program Development**
4. **Curriculum Committee Chair**
5. **Senate Chair**
6. Vice President of Academic Affairs
7. Cabinet
8. President
9. Board of Trustees Chair
10. STEM Academic Administrator
11. Colleague

Approval Path

1. 06/17/25 12:27 pm Connor Sampson (csampson): Approved for STEM Academic Administrator
2. 07/01/25 12:30 pm Vandana Saini (vsaini): Rollback to STEM Academic Administrator for STEM Dean
3. 07/01/25 12:56 pm Connor Sampson

(csampson): Approved for STEM Academic Administrator
4. 07/01/25 3:52 pm Vandana Saini (vsaini): Approved for STEM Dean
5. 07/07/25 9:55 am James Marshall (jmarshall): Approved for Executive Director of Curriculum and Program Development
6. 07/11/25 3:03 pm Caroline Brittain (cbrittain): Approved for Curriculum Committee Chair

1. Course Information

Subject	CHEM - Chemistry
School	Science, Technology, Engineering, Mathematics
Course Title	General Chemistry II Lab

2. Hours

Semester Hours	1.00
Lecture	0
Lab	3.00
Practicum	0

3. Catalog Description

For display in the online catalog

This laboratory course is intended for science majors and is the second of a two-course sequence. The laboratory work involves analytical and spectrophotometric techniques relating to lecture topics, including colligative properties, chemical equilibrium, acid-base chemistry, kinetics, thermodynamics, electrochemistry, and nuclear chemistry.

4. Requisites

Prerequisites

CHEM 181 and CHEM181L

Corequisites

For the first attempt CHEM 182 is considered a corequisite. If the student should fail either lecture or lab after the first attempt, then they may take the individual failed section

5. Course Type

Course Type for Perkins Reporting	non-vocational (not approved for Perkins funding)

6. Justification

Describe the need for this course

This course is required for bachelor-level degree programs in science, engineering, and in many health-related pre-professional disciplines.

7. General Education

Will the college submit this course to the statewide General Education Coordinating Committee for approval as a course, which satisfies a general education requirement?

Yes

General Education Category

Lab Science

General Education Status	Proposed

8. Consistency with the Vision and Mission Statements, the Academic Master Plan, and the strategic initiatives of the College

Please describe how this course is consistent with Ocean County College's current Vision Statement, Mission Statement, Academic Master Plan, and the strategic initiatives of the College:

	Add item
1	Demonstrating the college's commitment to offer comprehensive educational programs that develop intentional learners of all ages. (Mission Statement)
2	Seeking to ensure that students will thrive in an increasingly diverse and complex world. (Vision Statement)
3	Preparing students for successful transfer to other educational institutions and/or for entrance into the workforce. (Academic Master Plan)
4	Seeking to empower students through the mastery of intellectual and Practical Skills. (Academic Master Plan)
5	Challenging students to transfer information into knowledge and knowledge into action. (Academic Master Plan)

9. Related Courses at Other Institutions

Comparable Courses at NJ Community Colleges

Institution Bergen CC

Course Title General Chemistry II – Lab

Course Number CHM 241

Number of Credits 1

Comments

Requires a pre-req of a C or better in CHM-140 and CHM-141 and a pre-req/co-req of CHM-240

Institution County College of Morris

Course Title General Chemistry II – Laboratory

Course Number CHM128

Number of Credits 1

Comments

Requires a pre-req of a C or better in CHM-125, CHM-126, and a co-req of CHM-127

Institution Middlesex County College

Course Title General Chemistry II Lab

Course Number CHM- 126

Number of Credits 1

Comments

CHM-121, CHM-125 with a grade of "C" or better - Must be completed prior to taking this course.

CHM-122 - Must be taken either prior to or at the same time as this course

Institution Rowan College at Burlington County

Course Title General Chemistry II Lab

Course Number CHE-118

Number of Credits 1

Comments

Requires a co-req or pre-req of CHE-117

Transferability of Course

Georgian Court
University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
CHM 114 General Chem II 4-cr	Major (linked course must complete both lecture & lab or only elective credit is granted)	

Kean University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
CHEM 1084 Chemistry II 4-cr	complete both lecture & lab or only elective credit is granted)	

Monmouth University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
CE 112L General Chemistry II 1-cr	Major	

Rowan University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
CHEM 06101 Chemistry II 4-cr	Major (linked course must complete both lecture & lab or only elective credit is granted)	

Rutgers - New Brunswick, Mason Gross School of the Arts

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
01160171 Intro to Experimentation 1-cr	Major (linked course must complete both lecture & lab or only elective credit is granted)	

Stockton University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
CHEM 2145 Chemistry IV Lab 1-credit	Major	

If not transferable to any institution, explain:

10. Course Learning Outcomes

Learning Outcomes

	Students who successfully complete this course will be able to:
CLO1	Evaluate the relative strengths of intermolecular forces and predict the effect of intermolecular forces on a substance's heat of vaporization, surface tension, viscosity, vapor pressure and boiling point
CLO2	Describe solution properties and different ways to describe solution concentration. Define terms: solubility, saturated/unsaturated/supersaturated solution, solvent, solute, colligative properties. Describe the effect of a solution concentration on the solution's colligative properties. Characterize solubility equilibria. Set up and perform laboratory experiments characterizing solution concentrations, colligative properties, and solubility constants for solutes
CLO3	Determine reaction rate law from experimental data, analyze and predict the effects of different environmental factors and reaction parameters on the rate of a chemical reaction. Use integrated rate law expressions and half-life to rate constant relationships to calculate the reaction half-life, the rate law constant, initial or final reactant concentration. Describe and perform at least two types of laboratory experiments characterizing the reaction kinetics.
CLO4	Given a chemical system at equilibrium: • Determine the effect of adding a common ion • Calculate the concentration of species in solution. • Write the equilibrium expression for the system and calculate the reaction quotient and/or equilibrium constant for the system • Predict possible effects of changes to different species concentration, overall system and partial system component pressures, volume, temperature on the direction of the chemical reaction (if any) according to Le Chatelier's principle. Evaluate experimental data on systems in equilibrium, set up and perform laboratory experiments to determine the equilibrium constant.
CLO5	Given an acid's molar concentration, calculate the solution's pH and describe how the two are related. Identify acidic and basic compounds and compare relative strengths of acids and bases based on ionization constants, equilibria positions and the substance structure features. Define Lewis acids and bases, give examples of a Lewis acid/base. Set up and perform an acid-base titration to characterize concentration and other properties of acids and bases, explain the theoretical basis and possible and/or actual results of such an experiment.
CLO6	Adhere to laboratory safety protocols, read a substance safety information and act on that information, perform basic laboratory operations with glassware, and basic spectroscopic and computer-based instruments. Collect and process laboratory data with proper precision and perform basic statistical analysis of the experimental results

	Students who successfully complete this course will be able to:
CLO7	List and briefly explain the Laws of Thermodynamics. Define the terms: exothermic process, endothermic process, entropy. Calculate Entropy and Free energy of a reaction. Analyze the spontaneity of a given chemical reaction using thermodynamic data either at a given temperature or over the entire temperature range. Describe the connection between equilibrium constant and reaction quotient and standard and non-standard free energy of a reaction. Describe and perform a laboratory experiment determining basic thermodynamic functions of a chemical reaction.
CLO8	Define terms: oxidation, reduction, electrode. Balance Redox Equations. Use reaction potentials to determine if a reaction will be spontaneous. Set up a laboratory experiment determining reaction potentials
CLO9	State how a nuclear reaction's rate is persistent. Given a nuclear equation and its mode of decay, determine the identity of the daughter nuclide. Describe, set up, and/or perform laboratory experiment studying kinetics of a nuclear decay. Discuss basic ideas behind radiation safety in the lab.

11. Topical Outline

(include as many themes/skills as needed)

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
TO1	Intermolecular Forces, Liquids & Solids Ion-ion interactions, Ion-Dipole interactions, Dipole-Dipole interactions, Hydrogen bonding, Dispersion forces, phase changes	Lab Experiment, a worksheet	Laboratory experiment, pre-lab and post-lab assignments	CLO1, CLO6
TO2	Solutions & Their Behavior Molality, Factors that affect solubility, Colligative properties	Lab Experiment	Laboratory experiment, pre-lab and post-lab assignments	CLO2, CLO6

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
TO3	Chemical Kinetics Reaction Rates; Concentration, temperature and catalysts effects on reaction rate; reaction mechanism	Lab Experiment	Laboratory experiment, pre-lab and post-lab assignments	CLO4, CLO6
TO4	Chemical Equilibria Equilibrium constants K, Reaction Quotient Q, Le Châtelier's Principle	Lab Experiment	Laboratory experiment, pre-lab and post-lab assignments	CLO4, CLO6
TO5	Chemistry of Acids & Bases Bronsted-Lowry acid and bases, pH, pOH, Ka, Kb, strong acids/bases, weak acids/bases. Lewis acids/bases, coordination compounds.	Lab Experiment	Laboratory experiment, pre-lab and post-lab assignments	CLO5, CLO6
TO6	Aqueous Equilibria Buffers, Solubility, Ksp, common ion effect	Lab Experiment	Laboratory experiment pre-lab and post-lab assignments	CLO2, CLO5, CLO6
TO7	Entropy & Free Energy Entropy S, Gibb's Free energy G, Second law of thermodynamics, Third law of Thermodynamics, predicting spontaneity of a reaction	Lab Experiment	Laboratory experiment, pre-lab and post-lab assignments	CLO6, CLO7
TO8	Electron Transfer Reaction	Lab Experiment	Laboratory experiment, pre-lab and post-lab	CLO6, CLO8

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
	Redox equations, Galvanic Cells, Ecell, Nernst equation, batteries, electrolysis		assignments	
TO9	Nuclear Chemistry Kinetics of radioactive decay, Nuclear Fission, Nuclear Fusion	Lab Experiment	Laboratory experiment, pre-lab and post-lab assignments	CLO6, CLO9

12. Methods of Instruction

In the structuring of this course, what major methods of instruction will be utilized?

Lecture/Discussion/Laboratory Experimentation

13. General Education Goals Addressed by this Course (this section is to fulfill state requirements)

Information

Communication-Written and Oral

Quantitative Knowledge and Skills Yes

Related Course Learning Outcome CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7, CLO8, CLO9

Related Outline Component TO1, TO2, TO3, TO4, TO5, TO6, TO7, TO8, TO9

Assessment of General Education Goal (Recommended but not limited to)

Laboratory Experiment, pre-lab and post-lab assignments

Scientific Knowledge and Reasoning Yes

Related Course Learning Outcome: CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7, CLO8, CLO9

Related Outline Component: TO1, TO2, TO3, TO4, TO5, TO6, TO7, TO8, TO9

Assessment of General Education Goal (Recommended but not limited to)

Laboratory Experiment, pre-lab and post-lab assignments

Technological Competency

Information Literacy

Society and Human Behavior

Humanistic Perspective

Historical Perspective

Global and Cultural Awareness

Ethical Reasoning and Action

Independent/Critical Thinking Yes

Related Course Learning Outcome: CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7, CLO8, CLO9

Related Outline Component: TO1, TO2, TO3, TO4, TO5, TO6, TO7, TO8, TO9

Assessment of General Education Goal (Recommended but not limited to)

Laboratory Experiment, pre-lab and post-lab assignments

14. Needs

Instructional Materials (text etc.):

An appropriate text will be selected. Contact the department for current adoptions. A Calculator with logarithmic functions, safety goggles, and a lab coat are required.

Technology Needs:

Computers with internet capability, Excel, Molecular Modeling Microsoft Office. Laboratory technology appropriate for planned experiments

Human Resource Needs (Presently Employed vs. New Faculty):

Presently employed and Adjunct Faculty.

Facility Needs:

Laboratory setting and appropriate laboratory materials.

Library needs:

none

15. Grade Determinants

The final grade in the course will be the cumulative grade based on the following letter grades or their numerical equivalents for the course assignments and examinations

A: Excellent

B+: Very Good

B: Good

C+: Above Average

C: Average

D: Below Average

F: Failure

I: Incomplete

R: Audit

For more detailed information on the Ocean County College grading system, please see Policy #5154.

Reviewer Comments

Vandana Saini (vsaini) (07/01/25 12:30 pm): Rollback: Add faculty suggestions

Key: 2368

EXHIBIT B-3

Course Change Request

New Course Proposal

Date Submitted: 06/12/25 11:08 pm

Viewing: CHEM 283L : Organic Chemistry I Lab

Last edit: 07/11/25 7:16 am

Changes proposed by: Maria Hartwell (mhartwell)

Learning Outcomes

Display (show only)

In Workflow

1. **STEM Academic Administrator**
2. **STEM Dean**
3. **Executive Director of Curriculum and Program Development**
4. **Curriculum Committee Chair**
5. **Senate Chair**
6. Vice President of Academic Affairs
7. Cabinet
8. President
9. Board of Trustees Chair
10. STEM Academic Administrator
11. Colleague

Approval Path

1. 06/17/25 12:27 pm Connor Sampson (csampson): Approved for STEM Academic Administrator
2. 07/01/25 12:31 pm Vandana Saini (vsaini): Rollback to STEM Academic Administrator for STEM Dean
3. 07/01/25 12:58 pm Connor Sampson

(csampson): Approved for STEM Academic Administrator
4. 07/01/25 3:53 pm Vandana Saini (vsaini): Approved for STEM Dean
5. 07/07/25 9:55 am James Marshall (jmarshall): Approved for Executive Director of Curriculum and Program Development
6. 07/11/25 3:03 pm Caroline Brittain (cbrittain): Approved for Curriculum Committee Chair

1. Course Information

Subject	CHEM - Chemistry
School	Science, Technology, Engineering, Mathematics
Course Title	Organic Chemistry I Lab

2. Hours

Semester Hours	1.00
Lecture	0
Lab	3.00
Practicum	0

3. Catalog Description

For display in the online catalog

This laboratory course is the first course in a two-course sequence exploring the structure-activity relationships of functional groups. Course topics include: nature of the covalent bond, alkanes, alkenes, stereochemistry, reaction mechanisms, and functional group chemistry. The laboratory work consists of basic separation and purification, and synthetic organic laboratory techniques.

4. Requisites

Prerequisites

CHEM 182, CHEM 182L

Corequisites

For the first attempt CHEM 283 is considered a corequisite. If the student should fail either lecture or lab after the first attempt, then they may take the individual failed section.

5. Course Type

Course Type for Perkins Reporting	non-vocational (not approved for Perkins funding)

6. Justification

Describe the need for this course

This course is required for bachelor-level degree programs in chemistry, many other sciences, engineering, and pre-professional programs.

7. General Education

Will the college submit this course to the statewide General Education Coordinating Committee for approval as a course, which satisfies a general education requirement?

Yes

General Education Category

Lab Science

General Education Status: Proposed

8. Consistency with the Vision and Mission Statements, the Academic Master Plan, and the strategic initiatives of the College

Please describe how this course is consistent with Ocean County College's current Vision Statement, Mission Statement, Academic Master Plan, and the strategic initiatives of the College:

	Add item
1	Demonstrating the college’s commitment to offer comprehensive educational programs that develop intentional learners of all ages. (Mission Statement)
2	Seeking to ensure that students will thrive in an increasingly diverse and complex world. (Vision Statement)
3	Preparing students for successful transfer to other educational institutions and/or for entrance into the workforce. (Academic Master Plan)
4	Seeking to empower students through the mastery of intellectual and practical skills. (Academic Master Plan)
5	Challenging students to transfer information into knowledge and knowledge into action. (Academic Master Plan)

9. Related Courses at Other Institutions

Comparable Courses at NJ Community Colleges

Institution: County College of Morris

Course Title: Organic Chemistry I – Laboratory

Course Number: CHM232

Number of Credits: 1

Comments:
pre-req of C or better in CHM127 and CHM128 and a co-req of CHM-231 and ENG-111 or ENG-111CL or ENG-111CW

Institution	Middlesex County College
Course Title	Organic Chemistry I Lab
Course Number	CHM227
Number of Credits	1

Comments

CHM-122, CHM-126 with a grade of "C" or better - Must be completed prior to taking this course.
CHM-221 - Must be taken either prior to or at the same time as this course.

Institution	Rowan College at Burlington County
Course Title	Organic Chemistry I Lab
Course Number	CHE-241
Number of Credits	1

Comments

Requires a co-req or pre-req of CHE-241

Transferability of Course

Georgian Court University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
CH 223 Organic Chemistry I 4-cr	Major (linked course must complete both lecture & lab or only elective credit is granted)	

Kean University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
CHEM 2581 Organic Chemistry I Lab & Recitation I 1-cr	Major	

Monmouth University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
CE 241L Organic Chemistry I 1-cr	Major	

Rowan University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
CHEM 07200 Organic Chemistry I 4-cr	Major (linked course must complete both lecture & lab or only elective credit is granted)	

Rutgers - New Brunswick, Mason Gross School of the Arts

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
01160313 Organic Chemistry Lab 1-cr	Major (linked course must complete lecture & lab for CHEM 283 & CHEM 284 to receive credits. If not, only elective credit is granted)	

Stockton University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
CHEM 2125 Chemistry II Lab 1-cr	Major	

If not transferable to any institution, explain:

10. Course Learning Outcomes

Learning Outcomes

	Students who successfully complete this course will be able to:
CLO1	Draw and interpret Lewis structures, bond-line structures of alkanes, cycloalkanes, alkenes, alkynes, alkyl halides, ethers, and alcohols using IUPAC system of nomenclature. Determine hybridization, bonds, bond angles, geometry, polarities, and dipole moments of organic compounds.

	Students who successfully complete this course will be able to:
CLO2	Draw, interpret, and compare relative stabilities of acyclic and cyclic alkane conformations. Determine Distinguish conformational isomers, constitutional isomers, geometric isomers, enantiomers, diastereomers, and meso compounds
CLO3	Describe acids and bases in reactions, identify components in a reaction and compare relative acidity and basicity of organic compounds.
CLO4	Distinguish reaction types, use kinetics to elucidate reaction mechanisms, and use reaction energy diagrams to illustrate reaction mechanisms. Draw reaction mechanisms.
CLO5	Describe SN1, SN2, E1 and E2 reactions, predicting reactivity, and reaction products
CLO6	Identify IUPAC name for dienes including stereochemistry, predict the relative stability of dienes, and classify specific reactions and reaction's mechanisms of dienes.
CLO7	Devise syntheses including steps, reagents, and products including regiochemistry and stereochemistry
CLO8	Perform simple syntheses isolating measurable quantities of a final product. Perform basic organic microscale operations using microscale glassware: • Melting point determination • Boiling point determination • Refractive index • Recrystallization Use Material Safety Data Sheets (MSDS) to obtain information such as molecular formula, physical properties, hazards, and disposal procedures for chemicals used in each experiment. Prepare and maintain a laboratory notebook, including a write-up of each experiment detailing the purpose, chemical equations, calculation of theoretical yield, percent yield, and record of experimental observations. Write clear, concise, scientific laboratory reports using American Chemical Society style for each experiment. Use critical analysis skills to interpret data and draw conclusions

11. Topical Outline

(include as many themes/skills as needed)

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
TO1	Structure and Bonding Lewis structures, polar covalent bonds, hybridization, structural formulas, acids and bases, pKa, reaction energy diagram	Homework and/or Laboratory Experiment	Pre-and post-laboratory assignments, formal laboratory reports	CLO1, CLO2, CLO3, CLO4, CLO8
TO2	Nomenclature, conformations, geometric isomers, free radical reactions	Homework and/or Laboratory Experiment	Pre-and post-laboratory assignments, formal laboratory reports, laboratory exam	CLO1, CLO2, CLO3, CLO4, CLO8
TO3	Alkenes Nomenclature, conformations, elimination reactions, addition reactions, cleavage, synthesis, allylic systems, dienes	Homework and/or Laboratory Experiment	Pre-and post-laboratory assignments, formal laboratory reports, laboratory exam	CLO1, CLO2, CLO4, CLO5, CLO6, CLO7, CLO8
TO4	Alkynes Nomenclature, acidity, elimination reactions, addition reactions, cleavage, synthesis	Homework and/or Laboratory Experiment	Pre-and post-laboratory assignments, formal laboratory reports, laboratory exam	CLO1, CLO3, CLO4, CLO5, CLO7, CLO8
TO5	Alkyl Halides Nomenclature, substitution and elimination reactions, substitution vs. elimination reactions, synthesis	Homework and/or Laboratory Experiment	Pre-and post-laboratory assignments, formal laboratory reports, laboratory exam	CLO1, CLO2, CLO3, CLO4, CLO5, CLO7, CLO8

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
TO6	Alcohols Nomenclature, substitution and elimination reactions, synthesis	Homework and/or Laboratory Experiment	Pre-and post-laboratory assignments, formal laboratory reports, laboratory exam	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7, CLO8
TO7	Chirality Stereochemistry and reactions	Homework and/or Laboratory Experiment	Pre-and post-laboratory assignments, formal laboratory reports, laboratory exam	CLO1, CLO2, CLO3, CLO4, CLO5, CLO7, CLO8

12. Methods of Instruction

In the structuring of this course, what major methods of instruction will be utilized?

Lecture/Lab/Discussion

13. General Education Goals Addressed by this Course (this section is to fulfill state requirements)

Information

Communication-Written and Oral

_____

Quantitative Knowledge and Skills

_____

Scientific Knowledge and Reasoning Yes

Related Course Learning Outcome CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7, CLO8

Related Outline Component: TO1, TO2, TO3, TO4, TO5, TO6, TO7

Assessment of General Education Goal (Recommended but not limited to)

Exam and Laboratory Reports

Technological Competency

Information Literacy

Society and Human Behavior

Humanistic Perspective

Historical Perspective

Global and Cultural Awareness

Ethical Reasoning and Action

Independent/Critical Thinking: Yes

Related Course Learning Outcome: CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7, CLO8

Related Outline Component: TO1, TO2, TO3, TO4, TO5, TO6, TO7

Assessment of General Education Goal (Recommended but not limited to)

Exams and Laboratory Reports

14. Needs

Instructional Materials (text etc.):

An appropriate textbook will be selected. Please contact the Department Office for current adoptions. Safety goggles and a lab coat are required for this course.

Technology Needs:

Computers with internet capability

Human Resource Needs (Presently Employed vs. New Faculty):

Presently employed Faculty with a Master's Degree in Chemistry can teach this course

Facility Needs:

A laboratory space with appropriate Organic Chemistry equipment.

Library needs:

none

15. Grade Determinants

The final grade in the course will be the cumulative grade based on the following letter grades or their numerical equivalents for the course assignments and examinations

A: Excellent

B+: Very Good

B: Good

C+: Above Average

C: Average

D: Below Average

F: Failure

I: Incomplete

R: Audit

For more detailed information on the Ocean County College grading system, please see Policy #5154.

Reviewer

Comments

Vandana Saini (vsaini) (07/01/25 12:31 pm): Rollback: Add faculty suggestions

Key: 2369

EXHIBIT B-4

Course Change Request

New Course Proposal

Date Submitted: 06/13/25 12:01 am

Viewing: CHEM 284L : Organic Chemistry II Lab

Last edit: 07/11/25 7:16 am

Changes proposed by: Maria Hartwell (mhartwell)

Learning Outcomes

Display (show only)

In Workflow

1. **STEM Academic Administrator**
2. **STEM Dean**
3. **Executive Director of Curriculum and Program Development**
4. **Curriculum Committee Chair**
5. **Senate Chair**
6. Vice President of Academic Affairs
7. Cabinet
8. President
9. Board of Trustees Chair
10. STEM Academic Administrator
11. Colleague

Approval Path

1. 06/17/25 12:27 pm Connor Sampson (csampson): Approved for STEM Academic Administrator
2. 07/01/25 12:31 pm Vandana Saini (vsaini): Rollback to STEM Academic Administrator for STEM Dean
3. 07/01/25 1:00 pm Connor Sampson

(csampson): Approved for STEM Academic Administrator
4. 07/01/25 1:05 pm Vandana Saini (vsaini): Rollback to STEM Academic Administrator for STEM Dean
5. 07/01/25 1:09 pm Connor Sampson (csampson): Approved for STEM Academic Administrator
6. 07/01/25 3:53 pm Vandana Saini (vsaini): Approved for STEM Dean
7. 07/07/25 9:55 am James Marshall (jmarshall): Approved for Executive Director of Curriculum and Program Development
8. 07/11/25 3:04 pm Caroline Brittain (cbrittain): Approved for Curriculum Committee Chair

1. Course Information

Subject	CHEM - Chemistry
School	Science, Technology, Engineering, Mathematics

Course Title Organic Chemistry II Lab

2. Hours

Semester Hours 1.00

Lecture	0.00
Lab	3.00
Practicum	0

3. Catalog Description

For display in the online catalog

This is the second laboratory course in a two-course sequence exploring the structure-activity relationship of functional groups. Course topics include: the structure and reactions of aromatic compounds, the carbonyl, and nitrogen containing functional groups. Molecular structure determination using infrared and nuclear magnetic resonance is also discussed. The laboratory work includes organic synthesis and organic analysis.

4. Requisites

Prerequisites

CHEM 283 and CHEM 283L

Corequisites

For the first attempt CHEM 284 is considered a corequisite. If the student should fail either lecture or lab after the first attempt, then they may take the individual failed section

5. Course Type

Course Type for Perkins Reporting non-vocational (not approved for Perkins funding)

6. Justification

Describe the need for this course

This course is required for bachelor-level degree programs in chemistry, many other sciences, engineering, and pre-professional programs.

7. General Education

Will the college submit this course to the statewide General Education Coordinating Committee for approval as a course, which satisfies a general education requirement?

Yes

General Education Category

Lab Science

General Education Status

Proposed

8. Consistency with the Vision and Mission Statements, the Academic Master Plan, and the strategic initiatives of the College

Please describe how this course is consistent with Ocean County College's current Vision Statement, Mission Statement, Academic Master Plan, and the strategic initiatives of the College:

	Add item
1	Demonstrating the college's commitment to offer comprehensive educational programs that develop intentional learners of all ages. (Mission Statement)
2	Seeking to ensure that students will thrive in an increasingly diverse and complex world. (Vision Statement)
3	Preparing students for successful transfer to other educational institutions and/or for entrance into the workforce. (Academic Master Plan)
4	Seeking to empower students through the mastery of intellectual and practical skills. (Academic Master Plan)
5	Challenging students to transfer information into knowledge and knowledge into action. (Academic Master Plan)

9. Related Courses at Other Institutions

Comparable Courses at NJ Community Colleges

Institution	County College of Morris
Course Title	Organic Chemistry II - Laboratory
Course Number	CHM-234
Number of Credits	1

Comments

pre-req of C or better in CHM231 and CHM232 and a co-req of CHM-233

Institution	Middlesex County College
Course Title	Organic Chemistry II Lab
Course Number	CHM228
Number of Credits	1

Comments

CHM-221, CHM-227 with a grade of "C" or better - Must be completed prior to taking this course.

CHM-222 - Must be taken either prior to or at the same time as this course.

Institution	Rowan College at Burlington County
Course Title	Organic Chemistry II Lab
Course Number	CHE-243
Number of Credits	1

Comments

Requires a co-req or pre-req of CHE-242

Transferability of Course

Georgian Court
University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
CH 224 Organic Chemistry II 4-cr	Major (linked course must complete both lecture & lab or only elective credit is granted)	

Kean University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
CHEM 2582L Organic Chemistry Lecture II 1-cr	Major	

Monmouth University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
CE 241L Organic Chemistry Lab II 1-cr	Major	

Rowan University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
CHEM 07201 Organic Chemistry II 4-cr	Major (linked course must complete both lecture & lab or only elective credit is granted)	

Rutgers - New Brunswick, Mason Gross School of the Arts

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
01160314 Organic Chemistry Lab II 1-cr	Major (linked course must complete lecture & lab for CHEM 283 & CHEM 284 to receive credits. If not, only elective credit is granted)	

Stockton University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
CHEM 2135 Chem III Lab 1-cr	Major	

If not transferable to any institution,

explain:

10. Course Learning Outcomes

Learning Outcomes

	Students who successfully complete this course will be able to:
CLO1	Identify the common organic compounds' functional groups and determine the structure of an unknown compound using UV/Vis, IR, Mass, and NMR spectroscopes.
CLO2	Construct the molecular-orbital energy diagram, explain aromaticity using MO diagram, identify the structure and the name of the monocyclic aromatic compounds, also classify the acidity and basicity of cyclic compounds
CLO3	Identify the mechanisms, relative ring activation and deactivation, and position's predictions of the electrophilic aromatic mono-, di-, and multi- substitution reaction in the aromatic compounds; also classify the nucleophilic aromatic substitution reaction.
CLO4	Predict the naming, properties, preparations, and reactions of alcohols and phenols. Write the IUPAC name, the properties, and draw the structure of ethers, epoxide, thiols, organometallic compounds, aldehydes, ketones, carboxylic acid and its derivatives, amines and arylamines.
CLO5	Show how to prepare Grignard reagents and organolithium compounds.
CLO6	Recognize the carbonyl alpha-substitution reaction and carbonyl condensation reaction with specific reagents and mechanism.
CLO7	Classify the reaction and spectroscopy of amines and arylamines.
CLO8	Use Material Safety Data Sheets (MSDS) to obtain information such as molecular formula, physical properties, hazards, and disposal procedures for chemicals used in each experiment. Prepare and maintain a laboratory notebook, including a write-up of each experiment detailing the purpose, chemical equations, calculation of theoretical yield, percent yield, and record of experimental observations. Write clear, concise, scientific laboratory reports using American Chemical Society style for each experiment. Use critical analysis skills to interpret data and draw conclusions. Perform simple syntheses isolating measurable quantities of a final product.

11. Topical Outline

(include as many themes/skills as needed)

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
TO1	Spectroscopy Theory & interpretation of: IR spectroscopy, NMR, Mass spectrometry, UV-Vis spectroscopy	Homework and/or Laboratory Experiment	Exam, Pre-lab and/or Post-lab assignments	CLO1, CLO8
TO2	Aromatics Structure, MO's nomenclature, reactions	Homework and/or Laboratory Experiment	Exam, Pre-lab and/or Post-lab assignments	CLO2, CLO3, CLO8
TO3	Organometallics Preparation of organometallic compounds and reactions	Homework and/or Laboratory Experiment	Exam, Pre-lab and/or Post-lab assignments	CLO4, CLO5, CLO8
TO4	Alcohols, Ethers and Epoxides Nomenclature, structural analysis, preparation and reactions	Homework and/or Laboratory Experiment	Exam, Pre-lab and/or Post-lab assignments	CLO4, CLO8
TO5	Ketones & Aldehydes Nomenclature, structural analysis, preparation and reactions, including nucleophilic addition and oxidation	Homework and/or Laboratory Experiment	Exam, Pre-lab and/or Post-lab assignments	CLO4, CLO6, CLO8
TO6	Carboxylic Acids and Carboxylic Acid Derivatives Nomenclature, structural	Homework and/or Laboratory Experiment	Exam, Pre-lab and/or Post-lab assignments	CLO4, CLO6, CLO8

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
	analysis, preparation and reactions			
TO7	Enols & Enolates Structural analysis and reactions	Homework and/or Laboratory Experiment	Exam, Pre-lab and/or Post-lab assignments	CLO4, CLO6, CLO8
TO8	Amines Nomenclature, structural analysis, reactions, basicity	Homework and/or Laboratory Experiment	Exam, Pre-lab and/or Post-lab assignments	CLO4, CLO7, CLO8

12. Methods of Instruction

In the structuring of this course, what major methods of instruction will be utilized?

Lecture/Laboratory/Discussion

13. General Education Goals Addressed by this Course (this section is to fulfill state requirements)

Information

Communication-Written and Oral

_____

Quantitative Knowledge and Skills

_____

Scientific Knowledge and Reasoning Yes

Related Course Learning Outcome CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7, CLO8

Related Outline Component	TO1, TO2, TO3, TO4, TO5, TO6, TO7, TO8

Assessment of General Education Goal (Recommended but not limited to)

Exams and Laboratory Reports

Technological Competency

Information Literacy

Society and Human Behavior

Humanistic Perspective

Historical Perspective

Global and Cultural Awareness

Ethical Reasoning and Action

Independent/Critical Thinking Yes

Related Course Learning Outcome	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7, CLO8

Related Outline Component	TO1, TO2, TO3, TO4, TO5, TO6, TO7, TO8

Assessment of General Education Goal (Recommended but not limited to)

Exam and Laboratory Reports

14. Needs

Instructional Materials (text etc.):

An appropriate textbook will be selected. Please contact the Department Office for current adoptions. Safety goggles and a lab coat are required for this course.

Technology Needs:

Computers with internet capability

Human Resource Needs (Presently Employed vs. New Faculty):

Presently employed Faculty with a Masters degree in Chemistry can teach this course.

Facility Needs:

A laboratory space with appropriate organic chemistry equipment.

Library needs:

none

15. Grade Determinants

The final grade in the course will be the cumulative grade based on the following letter grades or their numerical equivalents for the course assignments and examinations

A: Excellent

B+: Very Good

B: Good

C+: Above Average

C: Average

D: Below Average

F: Failure

I: Incomplete

R: Audit

For more detailed information on the Ocean County College grading system, please see Policy #5154.

16. Board Approval

Reviewer

Comments

Vandana Saini (vsaini) (07/01/25 12:31 pm): Rollback: Add faculty suggestions

Vandana Saini (vsaini) (07/01/25 1:05 pm): Rollback: additional comment need to be added

Key: 2370

EXHIBIT B-5

Course Change Request

New Course Proposal

Date Submitted: 06/30/25 11:09 pm

Viewing: PHYS 171L : Physics I Lab

Last edit: 07/11/25 4:23 pm

Changes proposed by: Christopher MacDonald (cmacdonald)

Justification for this inactivation request

Learning Outcomes
Display (show only)

In Workflow

1. **STEM Academic Administrator**
2. **STEM Dean**
3. **Executive Director of Curriculum and Program Development**
4. **Curriculum Committee Chair**
5. **Senate Chair**
6. Vice President of Academic Affairs
7. Cabinet
8. President
9. Board of Trustees Chair
10. STEM Academic Administrator
11. Colleague

Approval Path

1. 07/01/25 8:45 am Connor Sampson (csampson): Approved for STEM Academic Administrator
2. 07/01/25 3:53 pm Vandana Saini (vsaini): Approved for STEM Dean
3. 07/07/25 9:57 am James Marshall (jmarshall): Approved for

Executive Director of Curriculum and Program Development

4. 07/11/25 3:04 pm Caroline Brittain (cbrittain): Approved for Curriculum Committee Chair

1. Course Information

Subject	PHYS - Physics and Astronomy
New Subject	
School	Science, Technology, Engineering, Mathematics
Course Title	Physics I Lab

2. Hours

Semester Hours	1
Lecture	0
Lab	2
Practicum	0
Clinical Preceptorship	

3. Catalog Description

For display in the online catalog

This is the laboratory complement of the PHYS-171 lecture course. Experiments are performed to illustrate the concepts and principles discussed in the lecture course. Elementary analysis techniques are employed to parse data and interpret results.

4. Requisites

Prerequisites

Corequisites

MATH 161 or higher

For the first attempt PHYS 171 is considered a corequisite. If the student should fail either lecture or lab after the first attempt then they may take the individual failed section.

5. Course Type

Course Type for Perkins Reporting	non-vocational (not approved for Perkins funding)

6. Justification

Describe the need for this course

This course will contribute to the fulfillment of the Lab Science general education requirement for graduation and transfer.

7. General Education

Will the college submit this course to the statewide General Education Coordinating Committee for approval as a course, which satisfies a general education requirement?

Yes

General Education Category

Lab Science

General Education Status	Proposed

If the course does not satisfy a general education requirement, which of the following does it satisfy:

8. Consistency with the Vision and Mission Statements, the Academic Master Plan, and the strategic initiatives of the College

Please describe how this course is consistent with Ocean County College's current Vision Statement, Mission Statement, Academic Master Plan, and the strategic initiatives of the College:

	Add item
1	Demonstrating the college's commitment to offer comprehensive educational programs that develop intentional learners of all ages. (Mission Statement)
2	Seeking to ensure that students will thrive in an increasingly diverse and complex world. (Vision Statement)
3	Preparing students for successful transfer to other educational institutions and/or for entrance into the workforce. (Academic Master Plan)
4	Seeking to empower students through the mastery of intellectual and practical skills. (Academic Master Plan)
5	Challenging students to transfer information into knowledge and knowledge into action. (Academic Master Plan)

9. Related Courses at Other Institutions

Comparable Courses at NJ Community Colleges

Institution	Brookdale CC
Course Title	General Physics I (non-calculus) Lab
Course Number	PHYS111LAB
Number of Credits	0
Comments	

Institution	Rowan College at Burlington County
Course Title	Principles of Physics I Laboratory
Course Number	PHY-111
Number of Credits	1
Comments	contact hours: 0 lecture / 2 lab / 0 practicum

Institution	County College of Morris
Course Title	General Physics I - Laboratory
Course Number	PHY-126
Number of Credits	1
Comments	LAB 45 hrs

Institution	Middlesex County College
Course Title	General Physics I Lab
Course Number	PHY-125
Number of Credits	1
Comments	

Transferability of Course

Georgian Court University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
PH111 Physics in Everyday Life 4-credits	Major (linked course must complete both lecture & lab or only elective credit is granted)	

Kean University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
PHYS 2091 General Physics I 4-credits	Major (linked course must complete both lecture & lab or only elective credit is granted)	

Monmouth University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
PH 105L Physics for the Life Science I Lab 1-credits	Major	

Rowan University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
PHYS00210 Physics I without Calculus 4-credits	Major (linked course must complete both lecture & lab or only elective credit is granted)	

Rutgers - New Brunswick, Mason Gross School of the Arts

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
01750193 Physics for the Sciences 4-credits	Major (linked course must complete both lecture & lab or only elective credit is granted)	

Stockton University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
PHYS2115 Physics for Life Sciences Lab I 1-credit	Major	

If not transferable to any institution, explain:

10. Course Learning Outcomes

Learning Outcomes

	Students who successfully complete this course will be able to:
CLO1	Express measured quantities in appropriate units, perform conversions as necessary, and use an appropriate number of significant digits.
CLO2	Estimate uncertainties in measured quantities and calculate the propagated uncertainty in calculated quantities and evaluate the strength of experimental

	Students who successfully complete this course will be able to:
	conclusions by comparing uncertainty and error.
CLO3	Distinguish between accuracy and precision and determine the limiting factors on experimental results based on measurement resolution, experimental design, etc.
CLO4	Perform experiments, illustrating the principles and concepts discussed in the lecture course, carefully and methodically to reduce uncertainties and exercise practical reasoning to obtain high quality data.
CLO5	Interpret graphical data and use it to draw conclusions and infer physical principles.

11. Topical Outline

(include as many themes/skills as needed)

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
TO1	Dimensions, Units, Measurement and Uncertainty	Reading assignment, pre-lab exercise, experimental exercise	Post-lab exercise, quizzes, exams	1-4
TO2	Vectors and Vector Arithmetic	Reading assignment, pre-lab exercise, experimental exercise	Post-lab exercise, quizzes, exams	2, 4
TO3	Kinematics with Constant Acceleration	Reading assignment, pre-lab exercise, experimental exercise	Post-lab exercise, quizzes, exams	1-4,5
TO4	Forces and Newton's Law's of Motion	Reading assignment, pre-lab exercise, experimental exercise	Post-lab exercise, quizzes, exams	1-4
TO5	Work and Energy	Reading assignment, pre-lab exercise, experimental exercise	Post-lab exercise, quizzes, exams	1-4, 5
TO6	Impulse and Momentum	Reading assignment, pre-lab exercise, experimental exercise	Post-lab exercise, quizzes, exams	1-4,5
TO7	Rotational Motion	Reading assignment, pre-lab exercise, experimental	Post-lab exercise, quizzes, exams	1-4,5

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
		exercise		
TO8	Fluid Statics and Dynamics	Reading assignment, pre-lab exercise, experimental exercise	Post-lab exercise, quizzes, exams	1-4

12. Methods of Instruction

In the structuring of this course, what major methods of instruction will be utilized?

o Review/Discussion
o Demonstration
o Laboratory

13. General Education Goals Addressed by this Course (this section is to fulfill state requirements)

Information

Communication-Written and Oral

Related Course

Related Outline

Assessment of General Education Goal (Recommended but not limited to)

_____

Quantitative Knowledge and Skills Yes

Related Course Learning Outcome 1-5

Related Outline Component 1-8

Assessment of General Education Goal (Recommended but not limited to)

Pre-lab exercise, experimental exercise, post-lab exercise, quizzes, exams

---

Scientific Knowledge and Reasoning Yes

Related Course Learning Outcome 1-5

Related Outline Component 1-8

Assessment of General Education Goal (Recommended but not limited to)

Pre-lab exercise, experimental exercise, post-lab exercise, quizzes, exams

---

Technological Competency

Related Course

Related Outline

Assessment of General Education Goal (Recommended but not limited to)

Information Literacy

Related Course

Related Outline

Assessment of General Education Goal (Recommended but not limited to)

Society and Human Behavior

Related Course

Related Outline

Assessment of General Education Goal (Recommended but not limited to)

Humanistic Perspective

Related Outline
Component
Assessment of General Education Goal (Recommended but not limited to)

_____

Historical Perspective

Related Course
Learning Outcome
Related Outline
Component
Assessment of General Education Goal (Recommended but not limited to)

_____

Global and Cultural Awareness

Related Course
Learning Outcome
Related Outline
Component
Assessment of General Education Goal (Recommended but not limited to)

_____

Ethical Reasoning and Action

Related Course
Learning Outcome
Related Outline
Component
Assessment of General Education Goal (Recommended but not limited to)

_____

Independent/Critical Thinking Yes

Related Course Learning Outcome 1-5

Related Outline Component 1-8

Assessment of General Education Goal (Recommended but not limited to)

Pre-lab exercise, experimental exercise, post-lab exercise, quizzes, exams

14. Needs

Instructional Materials (text etc.):

Several physical apparatuses (varies by topic) for experiments are needed, as well as the space/utilities to accommodate these. Ample board space for instruction is required.

Technology Needs:

A computer and projector for lecture presentations, as well as a projection surface (separate from the board/writing surface). Additionally, a set of computers for students to use for data acquisition, processing, analysis, and report composition are needed for the lab portion of the course, as well as corresponding hardware/equipment (probes, instruments, detectors, computer interfaces, printers, etc.) and software (Microsoft Office Suite, data analysis, etc.).

Human Resource Needs (Presently Employed vs. New Faculty):

Peer and professional tutors.

Facility Needs:

An appropriate laboratory facility to conduct experiments (dry lab) is required.

Library needs:

15. Grade Determinants

The final grade in the course will be the cumulative grade based on the following letter grades or their numerical equivalents for the course assignments and examinations

A: Excellent

B+: Very Good

B: Good

C+: Above Average

C: Average

D: Below Average

F: Failure

I: Incomplete

R: Audit

For more detailed information on the Ocean County College grading system, please see Policy #5154.

16. Board Approval

History of Board

Reviewer

Comments

Key: 2375

EXHIBIT B-6

Course Change Request

New Course Proposal

Date Submitted: 06/30/25 11:09 pm

Viewing: PHYS 172L : Physics II Lab

Last edit: 07/11/25 4:31 pm

Changes proposed by: Christopher MacDonald (cmacdonald)

Learning Outcomes
Display (show only)

In Workflow

1. **STEM Academic Administrator**
2. **STEM Dean**
3. **Executive Director of Curriculum and Program Development**
4. **Curriculum Committee Chair**
5. **Senate Chair**
6. Vice President of Academic Affairs
7. Cabinet
8. President
9. Board of Trustees Chair
10. STEM Academic Administrator
11. Colleague

Approval Path

1. 07/01/25 8:45 am Connor Sampson (csampson): Approved for STEM Academic Administrator
2. 07/01/25 3:53 pm Vandana Saini (vsaini): Approved for STEM Dean
3. 07/07/25 9:57 am James Marshall (jmarshall): Approved for

Executive Director of Curriculum and Program Development

4. 07/11/25 3:04 pm Caroline Brittain (cbrittain): Approved for Curriculum Committee Chair

1. Course Information

Subject	PHYS - Physics and Astronomy
School	Science, Technology, Engineering, Mathematics
Course Title	Physics II Lab

2. Hours

Semester Hours	1
Lecture	0
Lab	2
Practicum	0

3. Catalog Description

For display in the online catalog

This is the laboratory complement of the PHYS-172 lecture course. Experiments are performed to illustrate the concepts and principles discussed in the lecture course. Elementary analysis techniques are employed to parse data and interpret results.

4. Requisites

Prerequisites

PHYS 171, PHYS 171L

Corequisites

For the first attempt PHYS 172 is considered a corequisite. If the student should fail either lecture or lab after the first attempt then they may take the individual failed section.

5. Course Type

Course Type for Perkins Reporting: non-vocational (not approved for Perkins funding)

6. Justification

Describe the need for this course

This course will contribute to the fulfillment of the Lab Science general education requirement for graduation and transfer.

7. General Education

Will the college submit this course to the statewide General Education Coordinating Committee for approval as a course, which satisfies a general education requirement?

Yes

General Education Category

Lab Science

General Education Status: Proposed

8. Consistency with the Vision and Mission Statements, the Academic Master Plan, and the strategic initiatives of the College

Please describe how this course is consistent with Ocean County College's current Vision Statement, Mission Statement, Academic Master Plan, and the strategic initiatives of the College:

	Add item
1	Demonstrating the college’s commitment to offer comprehensive educational programs that develop intentional learners of all ages. (Mission Statement)

	Add item
2	Seeking to ensure that students will thrive in an increasingly diverse and complex world. (Vision Statement)
3	Preparing students for successful transfer to other educational institutions and/or for entrance into the workforce.
4	Seeking to empower students through the mastery of intellectual and practical skills. (Academic Master Plan)
5	Challenging students to transfer information into knowledge and knowledge into action. (Academic Master Plan)

9. Related Courses at Other Institutions

Comparable Courses at NJ Community Colleges

Institution	Brookdale CC
Course Title	General Physics II (non-calculus) Lab
Course Number	PHYS112LAB
Number of Credits	0
Comments	

Institution	Rowan College at Burlington County
Course Title	Principles of Physics II Laboratory
Course Number	PHY-113
Number of Credits	1
Comments	contact hours: 0 lecture / 2 lab / 0 practicum

Institution	County College of Morris
Course Title	General Physics II Laboratory

Course Number	PHY-128
Number of Credits	1
Comments	LAB 45 hrs

Institution	Middlesex County College
Course Title	General Physics II Lab
Course Number	PHY-126
Number of Credits	1
Comments	

Transferability of Course

Georgian Court University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
PH 112 Physics in Everyday Life II 4-credits	Major (linked course must complete both lecture & lab or only elective credit is granted)	

Kean University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
PHYS 2092 General Physics II 4-credits	Major (linked course must complete both lecture & lab or only elective credit is granted)	

Monmouth University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
PH 106L Physics for the Life Science II Lab 1-credits	Major	

Rowan University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
PHYS 00211 Physics II without Calculus 4-credits	Major (linked course must complete both lecture & lab or only elective credit is granted)	

Rutgers - New Brunswick, Mason Gross School of the Arts

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
Rutgers – New Brunswick, School of Arts & Sciences 01750194 Physics for the Science 4-credits Major (linked course must complete both lecture & lab or only elective credit is granted)	Major (linked course must complete both lecture & lab or only elective credit is granted)	

Stockton University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
PHYS2120 Physics for Life Science II Lab 1-credits	Major	

If not transferable to any institution, explain:

10. Course Learning Outcomes

Learning Outcomes

	Students who successfully complete this course will be able to:
CLO1	Express measured quantities in appropriate units, perform conversions as necessary, and use an appropriate number of significant digits.
CLO2	Estimate uncertainties in measured quantities and calculate the propagated uncertainty in calculated quantities and evaluate the strength of experimental conclusions by comparing uncertainty and error.

	Students who successfully complete this course will be able to:
CLO3	Distinguish between accuracy and precision and determine the limiting factors on experimental results based on measurement resolution, experimental design, etc.
CLO4	Perform experiments carefully and methodically to reduce uncertainties and exercising practical reasoning to obtain high quality data.
CLO5	Interpret graphical data and use it to draw conclusions and infer physical principles.

11. Topical Outline

(include as many themes/skills as needed)

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
TO1	Oscillations and Waves	Reading assignment, pre-lab exercise, experimental exercise	Post-lab exercise, quizzes, exams	1-4
TO2	Sound Waves and Hearing	Reading assignment, pre-lab exercise, experimental exercise	Post-lab exercise, quizzes, exams	1-4
TO3	Electrostatics	Reading assignment, pre-lab exercise, experimental exercise	Post-lab exercise, quizzes, exams	1-5
TO4	Electrical Circuits	Reading assignment, pre-lab exercise, experimental exercise	Post-lab exercise, quizzes, exams	1-4
TO5	Electromagnetic Induction	Reading assignment, pre-lab exercise, experimental exercise	Post-lab exercise, quizzes, exams	1-4
TO6	Geometric Optics	Reading assignment, pre-lab exercise, experimental exercise	Post-lab exercise, quizzes, exams	1-5
TO7	Physical Optics	Reading assignment, pre-lab exercise, experimental exercise	Post-lab exercise, quizzes, exams	1-4

12. Methods of Instruction

In the structuring of this course, what major methods of instruction will be utilized?

o Review/discussion
o Demonstration
o Laboratory

13. General Education Goals Addressed by this Course (this section is to fulfill state requirements)

Information

Communication-Written and Oral

Quantitative Knowledge and Skills Yes

Related Course Learning Outcome 1-5

Related Outline Component 1-7

Assessment of General Education Goal (Recommended but not limited to)

Pre-lab exercise, experimental exercise, post-lab exercise, quizzes, exams

---

Scientific Knowledge and Reasoning Yes

Related Course Learning Outcome 1-5

Related Outline Component 1-7

Assessment of General Education Goal (Recommended but not limited to)

Pre-lab exercise, experimental exercise, post-lab exercise, quizzes, exams

---

Technological Competency

_____

Information Literacy

_____

Society and Human Behavior

_____

Humanistic Perspective

_____

Historical Perspective

_____

Global and Cultural Awareness

_____

Ethical Reasoning and Action

_____

Independent/Critical Thinking	Yes
Related Course Learning Outcome	1-5
Related Outline Component	1-7

Assessment of General Education Goal (Recommended but not limited to)

Pre-lab exercise, experimental exercise, post-lab exercise, quizzes, exams

14. Needs

Instructional Materials (text etc.):

Several physical apparatuses (varies by topic) for experiments are needed, as well as the space/utilities to accommodate these. Ample board space for instruction is required.

Technology Needs:

A computer and projector for discussion/lessons, as well as a projection surface (separate from the board/writing surface). Additionally, a set of computers for students to use for data acquisition, processing, analysis, and report composition are needed, as well as corresponding

hardware/equipment (probes, instruments, detectors, computer interfaces, printers, etc.) and software (Microsoft Office Suite, data analysis, etc.).

Human Resource Needs (Presently Employed vs. New Faculty):

Peer and professional tutors.

Facility Needs:

An appropriate laboratory facility to conduct experiments (dry lab) is required.

Library needs:

15. Grade Determinants

The final grade in the course will be the cumulative grade based on the following letter grades or their numerical equivalents for the course assignments and examinations

A: Excellent

B+: Very Good

B: Good

C+: Above Average

C: Average

D: Below Average

F: Failure

I: Incomplete

R: Audit

For more detailed information on the Ocean County College grading system, please see Policy #5154.

Reviewer Comments

EXHIBIT B-7

Course Change Request

New Course Proposal

Date Submitted: 07/01/25 2:05 pm

Viewing: **PHYS 180L : Introduction to Astronomy Lab**

Last edit: 07/11/25 4:39 pm

Changes proposed by: Connor Sampson (csampson)

Justification for this

Learning Outcomes

Display (show only)

In Workflow

1. **STEM Academic Administrator**
2. **STEM Dean**
3. **Executive Director of Curriculum and Program Development**
4. **Curriculum Committee Chair**
5. **Senate Chair**
6. Vice President of Academic Affairs
7. Cabinet
8. President
9. Board of Trustees Chair
10. STEM Academic Administrator
11. Colleague

Approval Path

1. 07/01/25 2:06 pm Connor Sampson (csampson): Approved for STEM Academic Administrator
2. 07/01/25 3:54 pm Vandana Saini (vsaini): Approved for STEM Dean
3. 07/07/25 9:57 am James Marshall (jmarshall): Approved for

Executive Director of Curriculum and Program Development
4. 07/11/25 3:04 pm Caroline Brittain (cbrittain): Approved for Curriculum Committee Chair

1. Course Information

Subject	PHYS - Physics and Astronomy
School	Science, Technology, Engineering, Mathematics
Course Title	Introduction to Astronomy Lab

2. Hours

Semester Hours	1
Lecture	0
Lab	2
Practicum	0

3. Catalog Description

For display in the online catalog

This is an introductory, one-semester laboratory course that explores the nature of the Universe, including the Solar System, stars, galaxies, and the cosmos as a whole. The course emphasizes hands-on laboratory skills in astronomy.

It begins by examining the nature of the scientific method as applied to key problems in the history of astronomy. It then progresses to cover current discoveries regarding the nature, origin, and evolution of planets, stars, galaxies, and the Universe itself.

Laboratory activities include observations with the unaided eye and telescopes, use of

astronomical tools and methods, and the analysis of more complex data.

This course may be used in place of PHYS 181L: Astronomy of the Solar System or PHYS 182L: Astronomy of Stars and Galaxies.

4. Requisites

Prerequisites

None

Corequisites

MATH 023

For the first attempt PHYS 180 is considered a corequisite. If the student should fail either lecture or lab after the first attempt, then they may take the individual failed section.

5. Course Type

Course Type for Perkins Reporting	non-vocational (not approved for Perkins funding)

6. Justification

Describe the need for this course

This course will fulfill the lab portion of a lab science requirement for programs requiring only one semester of a lab portion of a lab science. It also offers a science elective that is appealing to many students and utilizes the strong and unique astronomy resources at OCC.

7. General Education

Will the college submit this course to the statewide General Education Coordinating Committee for approval as a course, which satisfies a general education requirement?

Yes

General Education Category

Lab Science

General Education Status	Proposed

If the course does not satisfy a gene

8. Consistency with the Vision and Mission Statements, the Academic Master Plan, and the strategic initiatives of the College

Please describe how this course is consistent with Ocean County College's current Vision Statement, Mission Statement, Academic Master Plan, and the strategic initiatives of the College:

	Add item
1	Demonstrating the college’s commitment to offer comprehensive educational programs that develop intentional learners of all ages (Mission Statement)
2	Seeking to ensure that students will thrive in an increasingly diverse and complex world (Vision Statement)
3	Preparing students for successful transfer to other educational institutions and/or for entrance into the workforce (Academic Master Plan)
4	Seeking to empower students through the mastery of intellectual and practical skills (Academic Master Plan)
5	Challenging students to transfer information into knowledge and knowledge into action (Academic Master Plan)

9. Related Courses at Other Institutions

Comparable Courses at NJ Community Colleges

Institution	Rowan College at Burlington County
Course Title	Astronomy Lab
Course Number	Phy - 121
Number of Credits	1
Comments	

Institution	Union County College
Course Title	Astronomy Beyond the Solar System Laboratory

Course Number	ASTL 102
Number of Credits	1
Comments	

Institution	None
Course Title	Rutgers University Introductory Astronomy Lab
Course Number	21:750:110
Number of Credits	1
Comments	

Transferability of Course

Georgian Court University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
General Education 1-credits	General Education – Natural Science	

Kean University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
ASTR1100 Intro to Astronomy 4-credits	Major (linked course must complete both lecture & lab or only elective credit is granted)	

Monmouth University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
PH001 100-Level Physics Elective	Elective	

Rowan University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
ASTR11120 Intro to Astronomy 4-credits	Major (linked course must complete both lecture & lab or only elective credit is granted)	

Rutgers - New Brunswick, Mason Gross School of the Arts

Stockton University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
TRCREC Elective Transfer Credit 1-credit	Elective	

If not transferable to any institution, explain:

10. Course Learning Outcomes

Learning Outcomes

	Students who successfully complete this course will be able to:
CLO1	Discuss the fundamental concepts, laws, and relationships of astronomy within the solar system and beyond the solar system in the Milky Way Galaxy and the universe at large.
CLO2	Demonstrate an understanding of basic astronomical phenomena such as the notion of the celestial sphere, early Greek cosmological models, Kepler's laws of planetary motion, Newton's laws of motion, the laws of light, etc.
CLO3	Identify the instruments and techniques of scientific inquiry and observation pertinent to astronomy. astronomy, including the use and critical analysis of the results through laboratory exercises.
CLO4	Demonstrate skills necessary for scientific inquiry, including the application of mathematics through algebra to scientific problems.
CLO5	Discuss how our understanding of the universe is built upon past concepts and the importance of the past in shaping the future of science.

11. Topical Outline

(include as many themes/skills as needed)

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
TO1	Introduction and Scientific Method	Lab	Lab	CLO 1, 2, 3, 4, 5
TO2	Celestial Sphere and Constellations	Lab	Lab	CLO 1, 2, 3, 4
TO3	Motions in the Sky	Lab	Lab	CLO 1, 2, 3, 4
TO4	Measurement of the Solar System	Lab	Lab	CLO 1, 2, 3, 4
TO5	Kepler's Laws and Newton's Laws; Origin of the Solar System	Lab	Lab	CLO 1, 2, 3, 4
TO6	Light and Telescopes	Lab	Lab	CLO 1, 2, 3, 4
TO7	The Earth and Moon	Lab	Lab	CLO 1, 2, 3, 4
TO8	The Terrestrial Planets	Lab	Lab	CLO 1, 2, 3, 4
TO9	The Jovian Planets	Lab	Lab	CLO 1, 2, 3, 4
TO10	Minor Members of the Solar System	Lab	Lab	CLO 1, 2, 3, 4
TO11	Properties of Stars; Interstellar Medium	Lab	Lab	CLO 1, 2, 3, 4
TO12	Stellar Evolution	Lab	Lab	CLO 1, 2, 3, 4
TO13	Structure of the Milky Way	Lab	Lab	CLO 1, 2, 3, 4
TO14	Galaxies and Galaxy Evolution	Lab	Lab	CLO 1, 2, 3, 4
TO15	Cosmology	Lab	Lab	CLO 1, 2, 3, 4

12. Methods of Instruction

In the structuring of this course, what major methods of instruction will be utilized?

Demonstrations/ Videos/ Labs

13. General Education Goals Addressed by this Course (this section is to fulfill state requirements)

Information

Communication-Written and Oral

Related Course
Related Outline
Assessment of General Education Goal (R

Quantitative Knowledge and Skills — Yes

Related Course Learning Outcome: CLO: 4

Related Outline Component: TO: 1,6

Assessment of General Education Goal (Recommended but not limited to)

Lab Reports

Scientific Knowledge and Reasoning — Yes

Related Course Learning Outcome: CLO: all

Related Outline Component: TO: 1 - 15

Assessment of General Education Goal (Recommended but not limited to)

Lab Reports

Technological Competency — Yes

Related Course Learning Outcome: CLO: all

Related Outline Component: TO: 1 - 15

Assessment of General Education Goal (Recommended but not limited to)

Lab Reports

Information Literacy: Yes

Related Course Learning Outcome: CLO: all

Related Outline Component: TO: 1 - 15

Assessment of General Education Goal (Recommended but not limited to)

Lab Reports

Society and Human Behavior

Related Course
Related Outline
Assessment of General Education Goal (Re

Humanistic Perspective

Related Course
Related Outline
Assessment of General Education Goal (Recc

Historical Perspective

Related Course
Related Outline
Assessment of General Education Goal (Recor

Global and Cultural Awareness

Related Course
Related Outline
Assessment of General Education Goal (Recom

Ethical Reasoning and Action

Related Course
Related Outline
Assessment of General Education Goal (Recomm

Independent/Critical Thinking	Yes
Related Course Learning Outcome	CLO: all
Related Outline Component	TO: 1 - 15

Assessment of General Education Goal (Recommended but not limited to)

Lab Reports

14. Needs

Instructional Materials (text etc.):

Textbook, handouts, laboratory exercises, calculator with trigonometric functions

Technology Needs:

Instruments, software, computers

Human Resource Needs (Presently Employed vs. New Faculty):

Facility Needs:

Library needs:

15. Grade Determinants

The final grade in the course will be the cumulative grade based on the following letter grades or their numerical equivalents for the course assignments and examinations

A: Excellent

B+: Very Good

B: Good

C+: Above Average

C: Average

D: Below Average

F: Failure

I: Incomplete

R: Audit

For more detailed information on the Ocean County College grading system, please see Policy #5154.

16. Board Approval

Reviewer

Comments

Key: 2371

EXHIBIT B-8

Course Change Request

New Course Proposal

Date Submitted: 06/30/25 11:11 pm

Viewing: **PHYS 181L : Astronomy of the Solar System Lab**

Last edit: 07/11/25 4:49 pm

Changes proposed by: Christopher MacDonald (cmacdonald)

Justification for this inactivation request

Learning Outcomes Display (show only)

1. Course Information

Subject	PHYS - Physics and Astronomy
New Subject	
School	Science, Technology, Engineering, Mathematics
Course Title	Astronomy of the Solar System Lab

2. Hours

Semester Hours	1
Lecture	0
Lab	2
Practicum	0

In Workflow

1. **STEM Academic Administrator**
2. **STEM Dean**
3. **Executive Director of Curriculum and Program Development**
4. **Curriculum Committee Chair**
5. **Senate Chair**
6. Vice President of Academic Affairs
7. Cabinet
8. President
9. Board of Trustees Chair
10. STEM Academic Administrator
11. Colleague

Approval Path

1. 07/01/25 8:45 am Connor Sampson (csampson): Approved for STEM Academic Administrator
2. 07/01/25 3:53 pm Vandana Saini (vsaini): Approved for STEM Dean
3. 07/07/25 9:58 am James Marshall (jmarshall): Approved for Executive Director of Curriculum and Program Development
4. 07/11/25 3:04 pm Caroline Brittain (cbrittain): Approved for Curriculum Committee Chair

Clinical

Preceptorship

3. Catalog Description

For display in the online catalog	This is the laboratory complement to the PHYS181 lecture course. Lab exercises are performed to illustrate the principles discussed in the lecture course, including observations with the unaided eye and analysis of more complex observations.

4. Requisites

Prerequisites	MATH 012 or MATH 023 with grade of C or higher, or Mathematics placement requiring no remediation.
Corequisites	For the first attempt PHYS 181 is considered a corequisite. If the student should fail either lecture or lab after the first attempt then they may take the individual failed section.

5. Course Type

Course Type for Perkins Reporting	non-vocational (not approved for Perkins funding)

6. Justification

Describe the need for this course	This course will provide an alternative for students to satisfy their laboratory science requirement. It also makes use of the extensive astronomy knowledge and resources available at Ocean County College to attract students to an exciting area of science.

7. General Education

Will the college submit this course to the statewide General Education Coordinating Committee for approval as a course, which satisfies a general education requirement?

Yes

General Education Category	Lab Science
General Education Status	Proposed

If the course does not satisfy a general education requirement, which of the following does it satisfy:

8. Consistency with the Vision and Mission Statements, the Academic Master Plan, and the strategic initiatives of the College

Please describe how this course is consistent with Ocean County College's current Vision Statement, Mission Statement, Academic Master Plan, and the strategic initiatives of the College:

	Add item
1	Demonstrating the college's commitment to offer comprehensive educational programs that develop intentional learners of all ages (Mission Statement)
2	Seeking to ensure that students will thrive in an increasingly diverse and complex world (Vision Statement)
3	Preparing students for successful transfer to other educational institutions and/or for entrance into the workforce (Academic Master Plan)
4	Seeking to empower students through the mastery of intellectual and practical skills (Academic Master Plan)
5	Challenging students to transfer information into knowledge and knowledge into action (Academic Master Plan)

9. Related Courses at Other Institutions

Comparable Courses at NJ Community Colleges

Institution	Atlantic Cape CC
Course Title	Fundamentals of Astronomy
Course Number	PHYS102
Number of Credits	4
Comments	Contact hours: 3 lec + 3 lab Lab and lecture are combined Mixed topics

Institution	Bergen CC
Course Title	Astronomy
Course Number	PHY-111
Number of Credits	4
Comments	Mixed topics. Lab and lecture are combined.

Institution	Brookdale CC
Course Title	Astronomy with Laboratory
Course Number	PHYS107
Number of Credits	4
Comments	Emphasis on planetary astronomy. Lab and lecture combined, though there is a separate lecture only course (no separate lab only course).

Institution	Rowan College at Burlington County
Course Title	Astronomy Lab
Course Number	PHY 121
Number of Credits	3
Comments	Mixed topics (planetary and stellar) Contact Hours: 0 lecture / 2 lab / 0 practicum

Institution	Rowan College of South Jersey
Course Title	Astronomy
Course Number	PI 115
Number of Credits	4
Comments	This entry refers to the Cumberland campus. Mixed topics (planetary and stellar). Lab and lecture are combined.

Institution	Essex County College
Course Title	Astronomy
Course Number	PHY113
Number of Credits	4
Comments	Mixed topics (planetary and stellar) Lab and lecture are combined.

Institution	Rowan College of South Jersey
Course Title	Modern Astronomy
Course Number	PHY 105
Number of Credits	4
Comments	This entry corresponds to the Gloucester campus. Mixed topics (planetary and stellar) Contact Hours: 3 lecture / 3 lab Lab and lecture are combined

Institution	Hudson County CC
Course Title	Introduction to Astronomy
Course Number	SCI 105
Number of Credits	4
Comments	ixed topics (planetary and stellar). Lab and lecture are combined.

Institution	Mercer County CC
Course Title	The Universe
Course Number	PHY 121
Number of Credits	3
Comments	Mixed topics (planetary and stellar). Contact hours: 2 lecture / 2 lab Lab and lecture are combined.

Institution	Middlesex County College
Course Title	Planetary Astronomy
Course Number	SCI-158
Number of Credits	4
Comments	Emphasis on planetary. Lab and lecture are combined.

Institution	County College of Morris
Course Title	General Astronomy
Course Number	SCI-118
Number of Credits	4
Comments	Mixed topics (planetary and stellar). Contact Hours: LECT 45 hrs, LAB 30 hrs Lab and lecture are combined

Institution	Passaic County CC
Course Title	Astronomy
Course Number	SC-105
Number of Credits	4
Comments	Mixed topics (planetary and stellar). Lab and lecture are combined.

Institution	Raritan Valley CC
Course Title	Astronomy
Course Number	PHYS 130
Number of Credits	4
Comments	Mixed topics (planetary and stellar). Contact Hours: 3 lecture 2 lab.

Lab and lecture are combined.

Institution	Sussex County CC
Course Title	Introduction to Astronomy Lab
Course Number	PHYS 105L
Number of Credits	0
Comments	Emphasis on planetary. Separate lecture: 105

Institution	Union County College
Course Title	Astronomy of the Solar System
Course Number	AST 101
Number of Credits	4
Comments	Emphasis on planetary. Contact Hours: 3 lecture 3 Lab Lab and lecture are combined

Institution	Warren County CC
Course Title	Astronomy
Course Number	PHY 105
Number of Credits	3
Comments	Mixed topics (planetary and stellar/cosmology). Contact Hours: 3 lecture 3 lab Lab and lecture are combined.

Transferability of Course

Georgian Court University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
General Education 1-credit	Georgian Court University General Education 1-credit General Education – Natural Science	

Kean University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
ASTR1100 Intro to Astronomy 4-credits	Major (linked course must complete both lecture & lab or only elective credit is granted)	Will not transfer

Monmouth University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
PH 150 Principles of Astronomy 4-credits	Major (linked course must complete both lecture & lab or only elective credit is granted)	

Rowan University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
ASTR 11120 Intro to Astronomy 4-credits	Major (linked course must complete both lecture & lab or only elective credit is granted)	

Rutgers - New Brunswick, Mason Gross School of the Arts

Stockton University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
TRCREC Elective Transfer Credit 1-credit	Elective	

If not transferable to any institution, explain:

10. Course Learning Outcomes

Learning Outcomes

	Students who successfully complete this course will be able to:
CLO1	Demonstrate concepts and topics discussed in the lecture course via experiments with data acquisition or laboratory exercises based on simulations.
CLO2	Identify the instruments and techniques of scientific inquiry and observation pertinent to astronomy, including the use and critical analysis of the results, through laboratory exercises, planetarium demonstrations, and naked eye observing.
CLO3	Demonstrate the skills necessary for scientific inquiry including the application of mathematics through algebra, specifically as applied to laboratory analysis.

11. Topical Outline

(include as many themes/skills as needed)

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
TO1	Celestial Sphere and Constellations	1. Reading 2. Class discussion 3. Laboratory exercises	1. Test	1-3
TO2	Motions of the Sky	1. Reading 2. Class discussion 3. Laboratory exercises	1. Test	1-3

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
TO3	Origins of Modern Astronomy	1. Reading 2. Class discussion 3. Laboratory exercises	1. Test	1-3
TO4	Astronomical Tools	1. Reading 2. Class discussion 3. Laboratory exercises	1. Test	1-3
TO5	Jovian Planets	1. Reading 2. Class discussion 3. Laboratory exercises	1. Test 2. Paper/Presentation	1
TO6	Exoplanets	1. Reading 2. Class discussion 3. Laboratory exercises	1. Test	1

12. Methods of Instruction

In the structuring of this course, what major methods of instruction will be utilized?

o review/discussion
o demonstration
o laboratory

13. General Education Goals Addressed by this Course (this section is to fulfill state requirements)

Information

Communication-Written and Oral

Related Course Learning Outcome

Related Outline Component

Assessment of General Education Goal (Recommended but not limited to)

_____

Quantitative Knowledge and Skills Yes

Related Course Learning Outcome 1,3

Related Outline Component 1,3

Assessment of General Education Goal (Recommended but not limited to)
1. Test
2. Lab Reports

_____

Scientific Knowledge and Reasoning Yes

Related Course Learning Outcome: all

Related Outline Component: 1-6

Assessment of General Education Goal (Recommended but not limited to)

1. Test
2. Lab Reports

Technological Competency

Related Course Learning Outcome:

Related Outline Component:

Assessment of General Education Goal (Recommended but not limited to)

Information Literacy

Related Course Learning Outcome:

Related Outline Component:

Assessment of General Education Goal (Recommended but not limited to)

Society and Human Behavior

Related Course Learning Outcome:

Related Outline Component:

Assessment of General Education Goal (Recommended but not limited to)

Humanistic Perspective

Related Course Learning Outcome:

Related Outline Component:

Assessment of General Education Goal (Recommended but not limited to)

Historical Perspective

Related Course

Related Outline Component

Assessment of General Education Goal (Recommended but not limited to)

_____

Global and Cultural Awareness

Related Course Learning Outcome

Related Outline Component

Assessment of General Education Goal (Recommended but not limited to)

_____

Ethical Reasoning and Action

Related Course Learning Outcome

Related Outline Component

Assessment of General Education Goal (Recommended but not limited to)

_____

Independent/Critical Thinking	Yes
Related Course Learning Outcome	all
Related Outline Component	1-6

Assessment of General Education Goal (Recommended but not limited to)

1. Test
2. Lab Reports

14. Needs

Instructional Materials (text etc.):	Laboratory exercises, calculator with trigonometric functions
Technology Needs:	The Planetarium Theater is utilized at many stages in this course. Physics laboratory equipment; Telescopes and accessories, laptops with appropriate software for lab activities
Human Resource Needs (Presently Employed vs. New Faculty):	Peer and professional tutors.

Facility Needs:

An appropriate laboratory facility to conduct experiments (dry lab) is required and use of the planetarium.

Library needs:

15. Grade Determinants

The final grade in the course will be the cumulative grade based on the following letter grades or their numerical equivalents for the course assignments and examinations

A: Excellent

B+: Very Good

B: Good

C+: Above Average

C: Average

D: Below Average

F: Failure

I: Incomplete

R: Audit

For more detailed information on the Ocean County College grading system, please see Policy #5154.

16. Board Approval

History of Board
approval dates

Reviewer
Comments

EXHIBIT B-9

Course Change Request

New Course Proposal

Date Submitted: 06/30/25 11:11 pm

Viewing: **PHYS 182L : Astronomy of Stars and Galaxies Lab**

Last edit: 07/11/25 4:52 pm

Changes proposed by: Christopher MacDonald (cmacdonald)

Justification for this inactivation request

Learning Outcomes Display (show only)

1. Course Information

Subject	PHYS - Physics and Astronomy
New Subject	
School	Science, Technology, Engineering, Mathematics
Course Title	Astronomy of Stars and Galaxies Lab

2. Hours

Semester Hours	1
Lecture	0
Lab	2
Practicum	0

In Workflow

1. **STEM Academic Administrator**
2. **STEM Dean**
3. **Executive Director of Curriculum and Program Development**
4. **Curriculum Committee Chair**
5. **Senate Chair**
6. Vice President of Academic Affairs
7. Cabinet
8. President
9. Board of Trustees Chair
10. STEM Academic Administrator
11. Colleague

Approval Path

1. 07/01/25 8:45 am Connor Sampson (csampson): Approved for STEM Academic Administrator
2. 07/01/25 3:53 pm Vandana Saini (vsaini): Approved for STEM Dean
3. 07/07/25 9:58 am James Marshall (jmarshall): Approved for Executive Director of Curriculum and

Program Development
4. 07/11/25 3:04 pm Caroline Brittain (cbrittain): Approved for Curriculum Committee Chair

Clinical Preceptorship

3. Catalog Description

For display in the online catalog	This is the laboratory complement to the PHYS182 lecture course. Lab exercises are performed to illustrate the principles discussed in the lecture course, including analysis of laboratory measurements and complex observations.

4. Requisites

Prerequisites	MATH 012 or MATH 023 with grade of C or higher, or Mathematics placement requiring no remediation
Corequisites	For the first attempt PHYS 182 is considered a corequisite. If the student should fail either lecture or lab after the first attempt then they may take the individual failed section.

5. Course Type

Course Type for Perkins Reporting	non-vocational (not approved for Perkins funding)

6. Justification

Describe the need for this course	This course will provide an alternative for students to satisfy their laboratory science requirement. It also makes use of the extensive astronomy knowledge and resources available at Ocean County College to attract students to an exciting area of science.

7. General Education

Will the college submit this course to the statewide General Education Coordinating Committee for approval as a course, which satisfies a general education requirement?

Yes

General Education Category	Lab Science
General Education Status	Proposed

If the course does not satisfy a general education requirement, which of the following does it satisfy:

8. Consistency with the Vision and Mission Statements, the Academic Master Plan, and the strategic initiatives of the College

Please describe how this course is consistent with Ocean County College's current Vision Statement, Mission Statement, Academic Master Plan, and the strategic initiatives of the College:

	Add item
1	Demonstrating the college's commitment to offer comprehensive educational programs that develop intentional learners of all ages (Mission Statement)
2	Seeking to ensure that students will thrive in an increasingly diverse and complex world (Vision Statement)
3	Preparing students for successful transfer to other educational institutions and/or for entrance into the workforce (Academic Master Plan)
4	Seeking to empower students through the mastery of intellectual and practical skills (Academic Master Plan)
5	Challenging students to transfer information into knowledge and knowledge into action (Academic Master Plan)

9. Related Courses at Other Institutions

Comparable Courses at NJ Community Colleges

Institution	Atlantic Cape CC
Course Title	Fundamentals of Astronomy
Course Number	PHYS102
Number of Credits	4
Comments	Contact hours: 3 lec + 3 lab Lab and lecture are combined Mixed topics

Institution	Bergen CC
Course Title	Astronomy
Course Number	PHY-111
Number of Credits	4
Comments	Mixed topics. Lab and lecture are combined.

Institution	Brookdale CC
Course Title	Astronomy with Laboratory
Course Number	PHYS107
Number of Credits	4
Comments	Emphasis on planetary astronomy. Lab and lecture combined, though there is a separate lecture only course (no separate lab only course).

Institution	Rowan College at Burlington County
Course Title	Astronomy Lab
Course Number	PHY 121
Number of Credits	3
Comments	Mixed topics (planetary and stellar) Contact Hours: 0 lecture / 2 lab / 0 practicum

Institution	Rowan College of South Jersey
Course Title	Astronomy
Course Number	PI 115
Number of Credits	4
Comments	This entry refers to the Cumberland campus. Mixed topics (planetary and stellar). Lab and lecture are combined.

Institution	Essex County College

Course Title	Astronomy
Course Number	PHY113
Number of Credits	4
Comments	Mixed topics (planetary and stellar) Lab and lecture are combined.

Institution	Rowan College of South Jersey
Course Title	Modern Astronomy
Course Number	PHY 105
Number of Credits	4
Comments	This entry refers to the Gloucester campus. Mixed topics (planetary and stellar) Contact Hours: 3 lecture / 3 lab Lab and lecture are combined

Institution	Hudson County CC
Course Title	Introduction to Astronomy
Course Number	SCI 105
Number of Credits	4
Comments	Mixed topics (planetary and stellar). Lab and lecture are combined.

Institution	Mercer County CC
Course Title	The Universe
Course Number	PHY 121
Number of Credits	3
Comments	Mixed topics (planetary and stellar). Contact hours: 2 lecture / 2 lab Lab and lecture are combined.

Institution	Middlesex County College

Course Title	Stellar and Galactic Astronomy
Course Number	SCI-256
Number of Credits	4
Comments	Emphasis on stellar/galactic astronomy. Lab and lecture are combined.

Institution	County College of Morris
Course Title	General Astronomy
Course Number	SCI-118
Number of Credits	4
Comments	Mixed topics (planetary and stellar). Contact Hours: LECT 45 hrs, LAB 30 hrs Lab and lecture are combined

Institution	Passaic County CC
Course Title	Astronomy
Course Number	SC-105
Number of Credits	4
Comments	Mixed topics (planetary and stellar). Lab and lecture are combined.

Institution	Raritan Valley CC
Course Title	Introduction to Astronomy
Course Number	PHYS 130
Number of Credits	4
Comments	Mixed topics (planetary and stellar). Contact Hours: 3 lecture 2 lab. Lab and lecture are combined. There is a separate lecture only course (PHYS 120), but no separate lab only course.

Institution	Sussex County CC

Course Title	Introduction to Astronomy
Course Number	PHYS 105L
Number of Credits	
Comments	Emphasis on planetary. Separate lecture: 105

Institution	Union County College
Course Title	Astronomy Beyond of the Solar System
Course Number	AST 102
Number of Credits	4
Comments	Emphasis on stellar/galactic. Contact Hours: 3 lecture 3 Lab Lab and lecture are combined

Institution	Warren County CC
Course Title	Astronomy
Course Number	PHY 105
Number of Credits	3
Comments	Mixed topics (planetary and stellar/cosmology). Contact Hours: 3 lecture 3 lab Lab and lecture are combined.

Transferability of Course

Georgian Court University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
General Education 1-credit	General Education – Natural Science	

Kean University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
ASTR1100 Intro to Astronomy 4-credits	Major (linked course must complete both lecture & lab or only elective credit is granted)	

Monmouth University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
Monmouth University PH 150 Principles of Astronomy 4-credits Major (linked course must complete both lecture & lab or only elective credit is granted)	Major (linked course must complete both lecture & lab or only elective credit is granted)	

Rowan University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
ASTR 17070 General Education Lab Science Elective 1-credit	General Education – Lab Science	

Rutgers - New Brunswick, Mason Gross School of the Arts

Stockton University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
TRCREC Elective Transfer Credit 1-credit	Elective	

If not transferable to any institution, explain:

10. Course Learning Outcomes

Learning Outcomes

	Students who successfully complete this course will be able to:
CLO1	Illustrate the concepts and topics discussed in the lecture course via experiments with data acquisition or laboratory exercises based on simulations.
CLO2	Develop a working knowledge of the instruments and techniques of scientific inquiry and observations pertinent to astronomy, including the use, and critical analysis of the results, through laboratory exercises.

	Students who successfully complete this course will be able to:
CLO3	Demonstrate the skills necessary for scientific inquiry including the application of mathematics through algebra to scientific problems, in particular the application of these to laboratory exercises.

11. Topical Outline

(include as many themes/skills as needed)

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
TO1	Astronomical Tools	1. Reading 2. Class discussion 3. Laboratory exercise	1. Test	1-3
TO2	Atoms and Light	1. Reading 2. Class discussion 3. Laboratory exercise	1. Test	1-3
TO3	Relativity and Quantum Mechanics	1. Reading 2. Class discussion 3. Laboratory exercise	1. Test	1-3
TO4	Stellar Spectra	1. Reading 2. Class discussion 3. Laboratory exercise	1. Test	1-3
TO5	The Hertzsprung-Russell Diagram	1. Reading 2. Class discussion 3. Laboratory exercise	1. Test	1-3
TO6	Stellar Evolution	1. Reading 2. Class discussion 3. Laboratory exercise	1. Test	1-3
TO7	White Dwarfs, Neutron Stars, and Black Holes	1. Reading 2. Class discussion 3. Laboratory exercise	1. Test	1-3
TO8	The Milky Way Galaxy	1. Reading 2. Class discussion 3. Laboratory exercise	1. Test	1-3
TO9	Galaxies; Galaxy Evolution, Active Galaxies	1. Reading 2. Class discussion 3. Laboratory exercise	1. Test	1-3

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
TO10	Cosmology	1. Reading 2. Class discussion 3. Laboratory exercise	1. Test	1-3

12. Methods of Instruction

In the structuring of this course, what major methods of instruction will be utilized?

o Review/discussion
o Demonstration
o laboratory

13. General Education Goals Addressed by this Course (this section is to fulfill state requirements)

Information

Communication-Written and Oral

Related Course Learning Outcome

Related Outline Component

Assessment of General Education Goal (Recommended but not limited to)

Quantitative Knowledge and Skills Yes

Related Course Learning Outcome all

Related Outline Component 1-10

Assessment of General Education Goal (Recommended but not limited to)

1. Test
2. Lab Reports

Scientific Knowledge and Reasoning Yes

Related Course Learning Outcome all

Related Outline Component 1-10

Assessment of General Education Goal (Recommended but not limited to)

1. Test
2. Lab Reports

Technological Competency

Related Course Learning Outcome

Related Outline Component

Assessment of General Education Goal (Recommended but not limited to)

Information Literacy

Related Course Learning Outcome

Related Outline Component

Assessment of General Education Goal (Recommended but not limited to)

Society and Human Behavior

Related Course Learning Outcome

Related Outline Component

Assessment of General Education Goal (Recommended but not limited to)

Humanistic Perspective

Related Course Learning Outcome

Related Outline Component

Assessment of General Education Goal (Recommended but not limited to)

Historical Perspective

Related Course Learning Outcome

Related Outline
Assessment of General Education Goal (Recommended but not limited to)

_____

Global and Cultural Awareness

Related Course
Learning Outcome
Related Outline
Component
Assessment of General Education Goal (Recommended but not limited to)

_____

Ethical Reasoning and Action

Related Course
Learning Outcome
Related Outline
Component
Assessment of General Education Goal (Recommended but not limited to)

_____

Independent/Critical Thinking	Yes
Related Course Learning Outcome	all
Related Outline Component	1-10

Assessment of General Education Goal (Recommended but not limited to)

1. Test
2. Lab Reports

14. Needs

Instructional Materials (text etc.):	Laboratory exercises, calculator with trigonometric functions
Technology Needs:	The Planetarium Theater is utilized at many stages in this course. Physics laboratory equipment; Telescopes and accessories, laptops and software for lab activities
Human Resource Needs (Presently Employed vs. New Faculty):	Peer and profesional tutors.

Facility Needs: An appropriate laboratory facility to conduct experiments (dry lab) is required and use of the planetarium.

Library needs:

15. Grade Determinants

The final grade in the course will be the cumulative grade based on the following letter grades or their numerical equivalents for the course assignments and examinations

A: Excellent

B+: Very Good

B: Good

C+: Above Average

C: Average

D: Below Average

F: Failure

I: Incomplete

R: Audit

For more detailed information on the Ocean County College grading system, please see Policy #5154.

16. Board Approval

History of Board approval dates

Reviewer Comments

EXHIBIT B-10

Course Change Request

New Course Proposal

Date Submitted: 06/30/25 11:08 pm

Viewing: PHYS 281L : General Physics I Lab

Last edit: 07/11/25 4:55 pm

Changes proposed by: Christopher MacDonald (cmacdonald)

Learning Outcomes
Display (show only)

In Workflow

1. **STEM Academic Administrator**
2. **STEM Dean**
3. **Executive Director of Curriculum and Program Development**
4. **Curriculum Committee Chair**
5. **Senate Chair**
6. Vice President of Academic Affairs
7. Cabinet
8. President
9. Board of Trustees Chair
10. STEM Academic Administrator
11. Colleague

Approval Path

1. 07/01/25 8:44 am Connor Sampson (csampson): Approved for STEM Academic Administrator
2. 07/01/25 3:53 pm Vandana Saini (vsaini): Approved for STEM Dean
3. 07/07/25 9:58 am James Marshall (jmarshall): Approved for

Executive Director of Curriculum and Program Development

4. 07/11/25 3:04 pm Caroline Brittain (cbrittain): Approved for Curriculum Committee Chair

1. Course Information

Subject	PHYS - Physics and Astronomy
School	Science, Technology, Engineering, Mathematics
Course Title	General Physics I Lab

2. Hours

Semester Hours	1
Lecture	0
Lab	3
Practicum	0

3. Catalog Description

For display in the online catalog

This is the laboratory complement of the PHYS-281 lecture course. Experiments are performed to illustrate the concepts and principles discussed in the lecture, as well as to employ data reduction and analysis techniques. Uncertainty propagation and error analysis are introduced and applied.

4. Requisites

Prerequisites

Corequisites

For the first attempt PHYS 281 is considered a corequisite. If the student should fail either lecture or lab after the first attempt then they may take the individual failed section.

5. Course Type

Course Type for Perkins Reporting: non-vocational (not approved for Perkins funding)

6. Justification

Describe the need for this course

This course will contribute to the fulfillment of the Lab Science general education requirement for graduation and transfer. The course is required for all students planning to major in engineering, physical science, pre-med, and computer science.

7. General Education

Will the college submit this course to the statewide General Education Coordinating Committee for approval as a course, which satisfies a general education requirement?

Yes

General Education Category

Lab Science

General Education Status: Proposed

8. Consistency with the Vision and Mission Statements, the Academic Master Plan, and the strategic initiatives of the College

Please describe how this course is consistent with Ocean County College's current Vision Statement, Mission Statement, Academic Master Plan, and the strategic initiatives of the College:

	Add item
1	Demonstrating the college's commitment to offer comprehensive educational programs that develop intentional learners of all ages. (Mission Statement)
2	Seeking to ensure that students will thrive in an increasingly diverse and complex world. (Vision Statement)
3	Preparing students for successful transfer to other educational institutions and/or for entrance into the workforce. (Academic Master Plan)
4	Seeking to empower students through the mastery of intellectual and Practical Skills. (Academic Master Plan)

9. Related Courses at Other Institutions

Comparable Courses at NJ Community Colleges

Institution	Brookdale CC
Course Title	General Physics I Lab
Course Number	PHYS121LAB
Number of Credits	0
Comments	

Institution	Rowan College at Burlington County
Course Title	General Physics I Laboratory
Course Number	PHY-211
Number of Credits	1
Comments	

Institution	Middlesex County College
Course Title	Analytical Physics I Lab

Course Number	PHY-135
Number of Credits	1
Comments	

Transferability of Course

Georgian Court University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
PH 121 University Physics I 4-credits	Major (linked course must complete both lecture & lab or only elective credit is granted)	

Kean University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
Kean University PHYS 2095 Physics I 4-credits Major (linked course must complete both lecture & lab or only elective credit is granted)	Major (linked course must complete both lecture & lab or only elective credit is granted)	

Monmouth University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
PH 211L General Physics with Calculus I Lab 1-credit	Major	

Rowan University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
PHYS 00220 Introductory Mechanics 4-credits	Major (linked course must complete both lecture & lab or only elective credit is granted)	

Rutgers - New Brunswick, Mason

Gross School of the Arts

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
01750205 General Physics I Lab 1-credits	Major	

Stockton University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
Stockton University PHYS 2225 Physics I Lab 1-credits Major	Major	

If not transferable to any institution, explain:

10. Course Learning Outcomes

Learning Outcomes

	Students who successfully complete this course will be able to:
CLO1	Express measured quantities in appropriate units, perform conversions as necessary, and use an appropriate number of significant digits.
CLO2	Estimate uncertainties in measured quantities and calculate the propagated uncertainty in calculated quantities and evaluate the strength of experimental conclusions by comparing uncertainty and error.
CLO3	Distinguish between accuracy and precision and determine the limiting factors on experimental results based on measurement resolution, experimental design, etc.
CLO4	Perform experiments or exercises, on topics covered in the lecture course, carefully and methodically to reduce uncertainties and exercising practical reasoning to obtain high quality data.
CLO5	Interpret graphical data and use it to draw conclusions and infer physical principles.

11. Topical Outline

(include as many themes/skills as needed)

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
TO1	Error and Uncertainty	Reading assignment, pre-lab exercise, experimental exercise	Post-lab exercise, quizzes, exams	CLO: 1-5
TO2	Kinematics with Constant Acceleration	Reading assignment, pre-lab exercise, experimental exercise	Post-lab exercise, quizzes, exams	CLO: 1-5
TO3	Forces and Newton's Law's of Motion	Reading assignment, pre-lab exercise, experimental exercise	Post-lab exercise, quizzes, exams	CLO: 1-5
TO4	Work and Energy	Reading assignment, pre-lab exercise, experimental exercise	Post-lab exercise, quizzes, exams	CLO: 1-5
TO5	Impulse and Momentum	Reading assignment, pre-lab exercise, experimental exercise	Post-lab exercise, quizzes, exams	CLO: 1-5
TO6	Rotational Motion	Reading assignment, pre-lab exercise, experimental exercise	Post-lab exercise, quizzes, exams	CLO: 1-5
TO7	Oscillatory Motion	Reading assignment, pre-lab exercise, experimental exercise	Post-lab exercise, quizzes, exams	CLO: 1-5
TO8	Mechanical Waves and Resonance	Reading assignment, pre-lab exercise, experimental exercise	Post-lab exercise, quizzes, exams	CLO: 1-5
TO9	Fluids	Reading assignment, pre-lab exercise, experimental exercise	Post-lab exercise, quizzes, exams	CLO: 1-5

12. Methods of Instruction

In the structuring of this course, what major methods of

instruction will be
utilized?

- o Review/Discussion
- o Demonstration
- o Laboratory

13. General Education Goals Addressed by this Course (this section is to fulfill state requirements)

Information

Communication-Written and Oral

Quantitative Knowledge and Skills Yes

Related Course Learning Outcome 1-5

Related Outline Component 1-9

Assessment of General Education Goal (Recommended but not limited to)

Pre-lab exercise, experimental exercise, post-lab exercise, quizzes, exams

---

Scientific Knowledge and Reasoning Yes

Related Course Learning Outcome 1-5

Related Outline Component 1-9

Assessment of General Education Goal (Recommended but not limited to)

Pre-lab exercise, experimental exercise, post-lab exercise, quizzes, exams

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Technological Competency

Information Literacy

Society and Human Behavior

_____

Humanistic Perspective

_____

Historical Perspective

_____

Global and Cultural Awareness

_____

Ethical Reasoning and Action

_____

Independent/Critical Thinking	Yes
Related Course Learning Outcome	1-5
Related Outline Component	1-9

Assessment of General Education Goal (Recommended but not limited to)

Pre-lab exercise, experimental exercise, post-lab exercise, quizzes, exams

14. Needs

Instructional Materials (text etc.):

Several physical apparatuses (varies by topic) for experiments are needed, as well as the space/utilities to accommodate these. Ample board space for instruction is required.

Technology Needs:

A computer and projector for review/lesson presentations, as well as a projection surface (separate from the board/writing surface). Additionally, a set of computers for students to use for data acquisition, processing, analysis, and report composition are needed, as well as corresponding hardware/equipment (probes, instruments, detectors, computer interfaces, printers, etc.) and software (Microsoft Office Suite, data analysis, etc.).

Human Resource Needs (Presently

Employed vs. New
Faculty):

Peer and professional tutors.

Facility Needs:

The laboratory portion requires an appropriate facility to conduct experiments (dry lab).

Library needs:

15. Grade Determinants

The final grade in the course will be the cumulative grade based on the following letter grades or their numerical equivalents for the course assignments and examinations

A: Excellent

B+: Very Good

B: Good

C+: Above Average

C: Average

D: Below Average

F: Failure

I: Incomplete

R: Audit

For more detailed information on the Ocean County College grading system, please see Policy #5154.

Reviewer
Comments

EXHIBIT B-11

Course Change Request

New Course Proposal

Date Submitted: 06/30/25 11:09 pm

Viewing: PHYS 282L : General Physics II Lab

Last edit: 07/11/25 4:59 pm

Changes proposed by: Christopher MacDonald (cmacdonald)

Justification for this inactivation request

Learning Outcomes Display (show only)

1. Course Information

Subject	PHYS - Physics and Astronomy
New Subject	
School	Science, Technology, Engineering, Mathematics
Course Title	General Physics II Lab

2. Hours

Semester Hours	1
Lecture	0
Lab	3
Practicum	0

In Workflow

1. **STEM Academic Administrator**
2. **STEM Dean**
3. **Executive Director of Curriculum and Program Development**
4. **Curriculum Committee Chair**
5. **Senate Chair**
6. Vice President of Academic Affairs
7. Cabinet
8. President
9. Board of Trustees Chair
10. STEM Academic Administrator
11. Colleague

Approval Path

1. 07/01/25 8:44 am Connor Sampson (csampson): Approved for STEM Academic Administrator
2. 07/01/25 3:54 pm Vandana Saini (vsaini): Approved for STEM Dean
3. 07/07/25 9:58 am James Marshall (jmarshall): Approved for Executive Director of Curriculum and Program Development
4. 07/11/25 3:04 pm Caroline Brittain (cbrittain): Approved for Curriculum Committee Chair

Clinical

Preceptorship

3. Catalog Description

For display in the online catalog	This is the laboratory complement of the PHYS-282 lecture course. Experiments are performed to illustrate the concepts and principles discussed in the lecture course, as well as to employ and further develop the data reduction and analysis and error analysis methods developed in PHYS-281L.

4. Requisites

Prerequisites	PHYS-281, PHYS-281L, and MATH-265
Corequisites	PHYS-282L; MATH-266 For the first attempt PHYS 282 is considered a corequisite. If the student should fail either lecture or lab after the first attempt then they may take the individual failed section.

5. Course Type

Course Type for Perkins Reporting	non-vocational (not approved for Perkins funding)

6. Justification

Describe the need for this course	This course will contribute to the fulfillment of the Lab Science general education requirement for graduation and transfer. The course is required for all students planning to major in engineering, physical science, pre-med, and computer science.

7. General Education

Will the college submit this course to the statewide General Education Coordinating Committee for approval as a course, which satisfies a general education requirement?

Yes

General Education Category	Lab Science
General Education Status	Proposed

If the course does not satisfy a general education requirement, which of the following does it satisfy:

8. Consistency with the Vision and Mission Statements, the Academic Master Plan, and the strategic initiatives of the College

Please describe how this course is consistent with Ocean County College's current Vision Statement, Mission Statement, Academic Master Plan, and the strategic initiatives of the College:

	Add item
1	Demonstrating the college's commitment to offer comprehensive educational programs that develop intentional learners of all ages. (Mission Statement)
2	Seeking to ensure that students will thrive in an increasingly diverse and complex world. (Vision Statement)
3	Preparing students for successful transfer to other educational institutions and/or for entrance into the workforce. (Academic Master Plan)
4	Seeking to empower students through the mastery of intellectual and Practical Skills. (Academic Master Plan)
5	Challenging students to transfer information into knowledge and knowledge into action. (Academic Master Plan)

9. Related Courses at Other Institutions

Comparable Courses at NJ Community Colleges

Institution	Brookdale CC
Course Title	General Physics II Lab
Course Number	PHYS122LAB
Number of Credits	0
Comments	

Institution	Rowan College at Burlington County
Course Title	General Physics II Laboratory
Course Number	PHY-213
Number of Credits	1
Comments	contact hours: 0 lecture / 2 lab / 0 practicum

Institution	County College of Morris
Course Title	Laboratory for Engineering Physics II
Course Number	PHY-134
Number of Credits	1
Comments	LAB 45 hrs

Institution	Middlesex County College
Course Title	Analytical Physics II Lab
Course Number	PHY-136

Number of Credits 1

Comments

Transferability of Course

Georgian Court University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
PH 122 University Physics II 4-credits	Major (linked course must complete both lecture & lab or only elective credit is granted)	

Kean University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
PHYS 2196 Physics II 4-credits	Major (linked course must complete both lecture & lab or only elective credit is granted)	

Monmouth University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
PH 212L General Physics with Calculus II 1-credits	Major	

Rowan University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
PHYS 00222 Electricity & Magnetism 4-credits	Major (linked course must complete both lecture & lab or only elective credit is granted)	

Rutgers - New Brunswick, Mason Gross School of the Arts

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
01750206 General Physics Lab or 01750229 Analytical Physics II Lab 1-credit	Major	

Stockton University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
PHYS2235 Physics II Lab 1-credit	Major	

If not transferable to any institution, explain:

10. Course Learning Outcomes

Learning Outcomes

	Students who successfully complete this course will be able to:
CLO1	Express measured quantities in appropriate units, perform conversions as necessary, and use an appropriate number of significant digits.
CLO2	Estimate uncertainties in measured quantities and calculate the propagated uncertainty in calculated quantities and evaluate the strength of experimental conclusions by comparing uncertainty and error.

	Students who successfully complete this course will be able to:
CLO3	Distinguish between accuracy and precision and determine the limiting factors on experimental results based on measurement resolution, experimental design, etc.
CLO4	Perform experiments, on topics covered in the course, carefully and methodically to reduce uncertainties and exercising practical reasoning to obtain high quality data.
CLO5	Interpret graphical data and use it to draw conclusions and infer physical principles.

11. Topical Outline

(include as many themes/skills as needed)

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
TO1	Ideal gases and Thermodynamics	Reading assignment, pre-lab exercise, experimental exercise	Post-lab exercise, quizzes, exams	1-5
TO2	Electrostatic fields and Electric Potential	Reading assignment, pre-lab exercise, experimental exercise	Post-lab exercise, quizzes, exams	1-5
TO3	Electric Circuits	Reading assignment, pre-lab exercise, experimental exercise	Post-lab exercise, quizzes, exams	1-5
TO4	Magnetic fields, forces, and torques	Reading assignment, pre-lab exercise, experimental exercise	Post-lab exercise, quizzes, exams	1-5
TO5	Induction and Faraday's law	Reading assignment, pre-lab exercise, experimental exercise	Post-lab exercise, quizzes, exams	1-5
TO6	Reflection, Refraction, and Snell's law	Reading assignment, pre-lab exercise, experimental exercise	Post-lab exercise, quizzes, exams	1-5
TO7	Geometric optics	Reading assignment, pre-lab exercise, experimental exercise	Post-lab exercise, quizzes, exams	1-5
TO8	Wave optics	Reading assignment, pre-lab exercise, experimental exercise	Post-lab exercise, quizzes, exams	1-5

12. Methods of Instruction

In the structuring of this course, what major methods of instruction will be utilized?

o Review/Discussion
o Demonstration
o Laboratory

13. General Education Goals Addressed by this Course (this section is to fulfill state requirements)

Information

Communication-Written and Oral

Related Course
Learning Outcome

Related Outline
Component

Assessment of General Education Goal (Recommended but not limited to)

Quantitative Knowledge and Skills Yes

Related Course all
Learning Outcome

Related Outline all
Component

Assessment of General Education Goal (Recommended but not limited to)
Pre-lab exercise, experimental exercise, post-lab exercise, quizzes, exams

---

Scientific Knowledge and Reasoning Yes

Related Course all
Learning Outcome

Related Outline all
Component

Assessment of General Education Goal (Recommended but not limited to)
Pre-lab exercise, experimental exercise, post-lab exercise, quizzes, exams

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Technological Competency

Related Course
Learning Outcome

Related Outline
Component

Assessment of General Education Goal (Recommended but not limited to)

Information Literacy

Related Course
Learning Outcome

Related Outline
Component

Assessment of General Education Goal (Recommended but not limited to)

Society and Human Behavior

Related Course
Learning Outcome

Related Outline

Assessment of General Education Goal (Recommended but not limited to)

_____

Humanistic Perspective

Related Course
Learning Outcome

Related Outline
Component

Assessment of General Education Goal (Recommended but not limited to)

_____

Historical Perspective

Related Course
Learning Outcome

Related Outline
Component

Assessment of General Education Goal (Recommended but not limited to)

_____

Global and Cultural Awareness

Related Course
Learning Outcome

Related Outline
Component

Assessment of General Education Goal (Recommended but not limited to)

_____

Ethical Reasoning and Action

Related Course
Learning Outcome

Related Outline
Component

Assessment of General Education Goal (Recommended but not limited to)

_____

Independent/Critical Thinking Yes

Related Course all
Learning Outcome

Related Outline all
Component

Assessment of General Education Goal (Recommended but not limited to)

Pre-lab exercise, experimental exercise, post-lab exercise, quizzes, exams

14. Needs

Instructional Materials (text etc.):	Several physical apparatuses (varies by topic) for experiments are needed, as well as the space/utilities to accommodate these. Ample board space for instruction is required.
Technology Needs:	A computer and projector for lecture presentations, as well as a projection surface (separate from the board/writing surface). Additionally, a set of computers for students to use for data acquisition, processing, analysis, and report composition are needed, as well as corresponding hardware/equipment (probes, instruments, detectors, computer interfaces, printers, etc.) and software (Microsoft Office Suite, data analysis, etc.).
Human Resource Needs (Presently Employed vs. New Faculty):	Peer and professional tutors.
Facility Needs:	The laboratory portion requires an appropriate facility to conduct experiments (dry lab).
Library needs:	

15. Grade Determinants

The final grade in the course will be the cumulative grade based on the following letter grades or their numerical equivalents for the course assignments and examinations

A: Excellent

B+: Very Good

B: Good

C+: Above Average

C: Average

D: Below Average

F: Failure

I: Incomplete

R: Audit

For more detailed information on the Ocean County College grading system, please see Policy #5154.

16. Board Approval

History of Board approval dates	
Reviewer Comments	

EXHIBIT B-12

EXHIBIT B-12

Course Change Request

Date Submitted: 06/06/25 9:00 am

Viewing: ENVI 259 : Field Experience/Practicum

Last approved: 10/16/21 4:00 am

Last edit: 06/06/25 9:00 am

Changes proposed by: Connor Sampson (csampson)

Catalog Pages referencing this course

Environmental Science (ENVI)

Programs referencing this course

AS.ES: Environmental Studies, Associate in Science

Justification for this

Learning Outcomes Display (show only)

In Workflow

1. **STEM Academic Administrator**
2. **STEM Dean**
3. **Executive Director of Curriculum and Program Development**
4. **Curriculum Committee Chair**
5. **Senate Chair**
6. Vice President of Academic Affairs
7. Cabinet
8. President
9. Board of Trustees Chair
10. STEM Academic Administrator
11. Colleague

Approval Path

1. 06/06/25 9:01 am Connor Sampson (csampson): Approved for STEM Academic Administrator
2. 06/11/25 1:52 pm Vandana Saini (vsaini): Approved for STEM Dean
3. 06/24/25 1:18 pm James Marshall (jmarshall): Approved for

Executive Director of Curriculum and Program Development
4. 07/11/25 3:03 pm Caroline Brittain (cbrittain): Approved for Curriculum Committee Chair

History

1. Oct 16, 2021 by soconnor

1. Course Information

Subject	ENVI - Environmental Science
School	Science, Technology, Engineering, Mathematics
Course Title	Field Experience/Practicum

2. Hours

Semester Hours	3.00000
Lecture	0.00
Lab	0.00
Practicum	9.00

3. Catalog Description

For display in the online catalog

~~Required of all environmental sciencemajors.~~This course is intended to provide an off-campus work-study experience that is planned and conducted under the supervision of an environmental science faculty member. Arrangements must be made well in advance before the course is to be taken. Prerequisites: Permission of the department dean.

4. Requisites

Prerequisites

Permission of the department dean.

Corequisites

None

5. Course Type

Course Type for Perkins Reporting	non-vocational (not approved for Perkins funding)

6. Justification

Describe the need for this course

This course is designed primarily for students majoring in the A.S. in Environmental Science program.

7. General Education

Will the college submit this course to the statewide General Education Coordinating Committee for approval as a course, which satisfies a general education requirement?

No

General Education

General Education

If the course does not satisfy a general education requirement, which of the following does it satisfy:

Program-specific requirement

8. Consistency with the Vision and Mission Statements, the Academic Master Plan, and the strategic initiatives of the College

Please describe how this course is consistent with Ocean County College's current Vision Statement, Mission Statement, Academic Master Plan, and the strategic initiatives of the College:

	Add item
1	Demonstrating the college's commitment to offer comprehensive educational programs that develop intentional learners of all ages. (Mission Statement)
2	Seeking to ensure that students will thrive in an increasingly diverse and complex world. (Vision Statement)
3	Preparing students for successful transfer to other educational institutions and/or for entrance into the workforce. (Academic Master Plan)
4	Seeking to empower students through the mastery of intellectual and practical skills. (Academic Master Plan)
5	Challenging students to transfer information into knowledge and knowledge into action. (Academic Master Plan)

9. Related Courses at Other Institutions

Comparable Courses at NJ Community Colleges

Transferability of Course

Georgian Court University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
None		

Kean University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
None		

Monmouth University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
None		

Rowan University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
None		

Rutgers - New Brunswick, Mason Gross School of the Arts

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
None		

Stockton University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
None		

If not transferable to any institution, explain:

10. Course Learning Outcomes

Learning Outcomes

	Students who successfully complete this course will be able to:
CLO1	Apply theory to an actual work site.
CLO2	Practice surveying, blueprint reading, equipment operation, aspects of landfill/water treatment facilities management.
CLO3	Discuss the policies and regulations that govern permitting of disposal, as well as treatment facilities.

11. Topical Outline

(include as many themes/skills as needed)

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
TO1	This course will run as a practicum during the			

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
	summer. Students will be expected to become thoroughly familiar with the operation and management of a water treatment, or solid waste treatment faculty, or operations of an air quality/monitoring laboratory.			

12. Methods of Instruction

In the structuring of this course, what major methods of instruction will be utilized?

- Discussion of material and instructions presented
- Field practice

13. General Education Goals Addressed by this Course (this section is to fulfill state requirements)

Information

Communication-Written and Oral

Related Course
Related Outline
Assessment of General Education Goal (Recomm

_____

Quantitative Knowledge and Skills

Related Course
Related Outline
Assessment of General Education Goal (Recomme

_____

Scientific Knowledge and Reasoning

Related Course
Related Outline
Assessment of General Education Goal (Recommende

Technological Competency

Related Course
Related Outline
Assessment of General Education Goal (Recommended b

Information Literacy

Related Course
Related Outline
Assessment of General Education Goal (Recommended bu

Society and Human Behavior Yes

Related Course Learning Outcome None

Related Outline Component None

Assessment of General Education Goal (Recommended but not limited to)

N/A

Humanistic Perspective

Related Course
Related Outline
Assessment of General Education Goal (Recommended but n

Historical Perspective

Related Course
Related Outline
Assessment of General Education Goal (Recommended but not

Global and Cultural Awareness

Related Course

Related Outline

Assessment of General Education Goal (Recommended but not l

_____

Ethical Reasoning and Action

Related Course

Related Outline

Assessment of General Education Goal (Recommended but not lin

_____

Independent/Critical Thinking

Related Course

Related Outline

Assessment of General Education Goal (Recommended but not limit

14. Needs

Instructional Materials (text etc.):

An appropriate textbook will be selected. Please contact the department for current adoptions

Technology Needs:

Human Resource Needs (Presently Employed vs. New Faculty):

Facility Needs:

Library needs:

15. Grade Determinants

The final grade in the course will be the cumulative grade based on the following letter grades or their numerical equivalents for the course assignments and examinations

A: Excellent

B+: Very Good

B: Good

C+: Above Average

C: Average

D: Below Average

F: Failure

I: Incomplete

R: Audit

For more detailed information on the Ocean County College grading system, please see Policy #5154.

16. Board Approval

History of Board
approval dates

- Board of Trustees Approval Date: September 22, 2008
- Board of Trustees Approval Date: March 26, 2012
- Board of Trustees Approval Date: May 28, 2013
- Board of Trustees Approval Date: July 25, 2014

Reviewer
Comments

Key: 767

EXHIBIT B-13

EXHIBIT B-13

Course Change Request

Date Submitted: 06/11/25 3:38 pm

Viewing: CHEM 181 : General Chemistry I Lecture

Last approved: 02/12/25 1:41 pm

Last edit: 06/11/25 3:38 pm

Changes proposed by: Maria Hartwell (mhartwell)

Catalog Pages referencing this course

- Approved General Education Courses
- Chemistry (CHEM)

Programs referencing this course

- AAS.HS.MDLT: Health Science - Option in Medical Laboratory Technology (w/ Mercer CC)
- AS.CS: Computer Science, Associate in Science
- AS.CS.CIS: Computer Science with Cyber-Information Security Option, Associate in Science
- AS.ENGR: Engineering, Associate in Science
- AS.ES: Environmental Studies, Associate in Science
- AS.CS.GDD: Computer Science with Game Development & Design Option, Associate in Science
- AS.CS.IT: Computer Science with Information Technology Option, Associate in Science
- AAS.NURS: Nursing, Associate in Applied Science
- AS.CHEM: Chemistry, Associate in Science

Learning Outcomes Display (show only)

In Workflow

1. **STEM Academic Administrator**
2. **STEM Dean**
3. **Executive Director of Curriculum and Program Development**
4. **Curriculum Committee Chair**
5. **Senate Chair**
6. Vice President of Academic Affairs
7. Cabinet
8. President
9. Board of Trustees Chair
10. STEM Academic Administrator
11. Colleague

Approval Path

1. 06/17/25 12:26 pm Connor Sampson (csampson): Approved for STEM Academic Administrator
2. 07/01/25 12:29 pm Vandana Saini (vsaini): Rollback to STEM Academic Administrator for STEM Dean
3. 07/01/25 12:56 pm Connor Sampson

(csampson): Approved for STEM Academic Administrator
4. 07/01/25 3:52 pm Vandana Saini (vsaini): Approved for STEM Dean
5. 07/07/25 9:55 am James Marshall (jmarshall): Approved for Executive Director of Curriculum and Program Development
6. 07/11/25 3:03 pm Caroline Brittain (cbrittain): Approved for Curriculum Committee Chair

History

1. Apr 29, 2021 by soconnor
2. Feb 12, 2025 by James Marshall (jmarshall)

AS.CHEM: Chemistry, Associate in Science

PLO 1: Apply and describe chemical concepts from the microscale level to the macroscale level.

PLO 2: Apply critical thinking skills by use of scientific methods to observe, collect data, perform experimental procedures, and interpret data to formulate hypotheses.

PLO 3: Demonstrate the relationships between the scientific, mathematical, social science, and technology disciplines.

PLO 4: Describe quantitative reasoning and knowledge, both orally and written.

PLO 5: Develop necessary skills to work effectively in a team or independently in multiplatform settings.

PLO 6: Develop necessary technical skills for the laboratory setting.

1. Course Information

Subject	CHEM - Chemistry
School	Science, Technology, Engineering, Mathematics
Course Title	General Chemistry I Lecture

2. Hours

Semester Hours	3.00000 ~~4.00000~~	
	Lecture	3.00
	Lab	~~2.00~~
	Practicum	

3. Catalog Description

For display in the online catalog

This course, intended for science majors, is the first course of a two-course sequence. Course topics include stoichiometry, inorganic nomenclature, solutions, gas laws, thermochemistry atomic structure, and chemical bonding. ~~The laboratory work includes basic laboratory techniques and is intended to support lecturetopics.~~It is highly recommended that students who enroll in this course have completed high school Chemistry (or CHEM 180) and high school Algebra II.

4. Requisites

Prerequisites

MATH-023 or Mathematics placement requiring no remediation.

Corequisites

For the first attempt CHEM 181L is considered a corequisite. If the student should fail either lecture or lab after the first attempt then they may take the individual failed section. ~~None~~

5. Course Type

Course Type for Perkins Reporting	non-vocational (not approved for Perkins funding)

6. Justification

Describe the need for this course

This course is required for bachelor-level degree programs in science, engineering and in many health-related pre-professional disciplines.

7. General Education

Will the college submit this course to the statewide General Education Coordinating Committee for approval as a course, which satisfies a general education requirement?

Yes

General Education Category

~~Lab Science~~

Science (Non-Lab)

General Education Status	Approved

8. Consistency with the Vision and Mission Statements, the Academic Master Plan, and the strategic initiatives of the College

Please describe how this course is consistent with Ocean County College's current Vision Statement, Mission Statement, Academic Master Plan, and the strategic initiatives of the College:

	Add item
1	Providing student-centered, high quality educational experiences that prepare and empower diverse learners (Mission Statement)
2	Cultivating a technologically progressive spirit (Mission Statement)
3	Providing and supporting the delivery of high-quality, relevant, and emerging STEM courses (Academic Master Plan)

	Add item
4	Reviewing and revising course content, prerequisites, learning objectives and integrated assessments to meet current trends and transferability. (Academic Master Plan)

9. Related Courses at Other Institutions

Comparable Courses at NJ Community Colleges

Institution: Bergen ~~Brookdale~~ CC

Course Title: General Chemistry I

Course Number: CHEM 140 ~~101~~

Number of Credits: 3 ~~5~~

Comments: Requires a pre-req of MAT 044 ~~college level math and a C~~ or MAT-048 math and a C or better in CHM ~~CHEM~~ 100 and a pre-req/co-req of CHM-141 ~~or C in high school chemistry~~

Institution: County College of Morris ~~Mercer County CC~~

Course Title: General Chemistry I - Lecture

Course Number: CHM 125 ~~CHE 101~~

Number of Credits: 3 ~~4~~

Comments: Requires a pre-req of college level Math placement test or C or better in MAT-110 and a co-req of CHM-126 ~~English~~

Institution: Middlesex County College ~~Atlantic Cape CC~~

Course Title: General Chemistry I Lecture

Course Number: CHM 121 ~~CHEM 110~~

Number of Credits: 3 ~~4~~

Comments:

Two years of high school algebra and geometry or MAT-014 and one year of high school chemistry or CHM-020 - Must be completed prior to taking this course. ~~Requires a pre-req of college level Math and English~~

Institution	Rowan College at Burlington County
Course Title	General Chemistry I ~~+ General Chemistry Laboratory~~
Course Number	CHE 115 ~~+ CHE 116~~
Number of Credits	3 ~~+ 1~~

Comments

Requires a pre-req of High school chemistry or CHE 107/108 (Introductory course) and MTH 085 ~~012~~ or equivalent skills (college level math)

Institution	Union ~~Camden~~ County College
Course Title	Chemistry I ~~I-Science~~
Course Number	CHE-125 ~~CHM-111~~
Number of Credits	3 ~~4~~

Comments

Requires a division approval ~~Requires a pre-req of CHM-010 (a course to prepare for math requirements of chemistry), and MTH-124 or MTH-125 (Precalculus)~~

Transferability of Course

Georgian Court University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
CH ~~CHEM~~ 113 General Chemistry I 3 cr.(together with lab component), C minimum ~~4 cr.~~	Major, Gen. Ed.	

Kean University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
CHEM 1083 General Chemistry I 3 ~~4~~ cr. (together with lab component) D minimum as elective, C minimum as a major	Major, Gen. Ed., K1, K3 ~~Ed.~~	

Monmouth University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
CE111 ~~CE111/CE111L~~ General Chemistry I 3 cr., C minimum ~~4 cr.~~	Major, Gen. Ed. Natural Sciences	

Rowan University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
CHEM05075 (GE ~~CHEM 06100 General~~ Chemistry Elective) 3 cr CHEM 06100 General Chemistry I 3 ~~4~~ cr. (with lab component)	Major, Gen. Ed., Laboratory Science, Scientific Literacy (with lab component), Elective (by itself) ~~Ed.~~	

Rutgers - New Brunswick, Mason Gross School of the Arts

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
01160161 ~~01160161/01160171~~ General Chemistry 3 ~~4~~ cr.	Major, Gen. Ed.	

Stockton University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
CHEM 2110 Chemistry I: General Principles 3 ~~4~~ cr.	Major, Gen. Ed., Science ~~Ed.~~	

If not transferable to any institution, explain:

10. Course Learning Outcomes

Learning Outcomes

	Students who successfully complete this course will be able to:
CLO1	Explain the properties of matter.
CLO2	Utilize scientific/quantitative calculations to carry out dimensional analysis, stoichiometry, and thermodynamics.
CLO3	Characterize solvation by water and its relationship to concentration.
CLO4	Illustrate the organization and trends of the periodic table.
CLO5	Interpret nomenclature and predict atomic/molecular structure, bonding and geometry.
CLO6	Explain the relationship between electrons, electromagnetic spectrum, orbitals, and the valence shell.
CLO7	Interpret the gas laws and the Kinetic-Molecular Theory.

11. Topical Outline

(include as many themes/skills as needed)

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
TO1	Matter & Measurements Scientific Method, Classes of Matter, States of matter, Properties of Matter (Physical vs Chemical, Extensive vs. Intensive), Scientific Measurements, SI Units, Unit conversion and Dimensional Analysis, Significant Figures, Accuracy, Precision	Homework, ~~Lab Experiment, homework,~~ group assignment, worksheet	Test, ~~Laboratory experiment,~~ quiz, graded participation ~~participation, laboratory practical~~	CLO1, CLO2
TO2	Atoms and elements Atomic theory, Atomic Structure, Discovery of electrons, protons, and	~~Lab Experiment,~~ homework, class discussion	Test, ~~Laboratory experiment,~~ group oral response assignment	CLO1, CLO2, CLO4

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
	neutrons, Atomic number, mass number, Atomic mass, Isotopes, Nuclear model of the atom			
TO3	Molecules, Ions & Compounds Molecular and ionic compounds, Nomenclature, atomic ions, polyatomic ions, hydrates	~~Lab Experiment,~~ homework, competitive group challenge	Test, ~~Laboratory experiment,~~ graded worksheet ~~laboratory practical~~	CLO1, CLO5
TO4	Chemical Equations & Stoichiometry Molecular and formula masses, Mole, Molar mass, percent composition, Writing and balancing equations, Empirical and Molecular Formulas, combustion analysis, limiting reactants, Percent yield	~~Lab Experiment,~~ homework, class discussion, online assignment	Test, quiz ~~Test, Laboratory experiment, quiz, laboratory practical~~	CLO2
TO5	Reactions in Aqueous Solutions Concentration Units, Molarity, Dilutions, electrolytes and nonelectrolytes, Acid-Base reactions, Bronsted Acids and Bases, Ion-exchange reactions, precipitation reactions, Oxidation numbers, oxidation-	~~Lab Experiment,~~ homework, group project, flipped classroom session, online assignment	Test, ~~Laboratory experiment,~~ graded group project, oral presentation ~~presentation, laboratory practical~~	CLO1, CLO2, CLO3, CLO4

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
	reduction reactions, ionic equations, Net ionic equation			
TO6	Energy and Chemical Reactions Energy, Thermodynamics, energy transfer, Enthalpy, Hess's Law, Specific heat, Specific heat capacity, State functions, Work and heat, Calorimetry, Constant pressure calorimetry, Constant volume calorimetry	~~Lab Experiment,~~ homework, class discussion	Test, quiz ~~Test, Laboratory experiment, quiz, laboratory practical~~	CLO1, CLO2, CLO4
TO7	Atomic Electron Configuration Electromagnetic spectrum, Properties of waves, Photoelectric effect, Bohr's Theory, Quantum Mechanics, Quantum numbers, Atomic orbitals, Electron Configuration, Pauli's exclusion principle, Aufbau principle, Hund's Rule, Periodic trends in atomic radius, ionization energy, electron affinity, and chemical properties, Effective nuclear charge	~~Lab Experiment,~~ homework, reading assignment ~~assignment,~~	Test, ~~Laboratory experiment,~~ graded group response	CLO2, CLO4, CLO5, CLO6
TO8	Bonding and Molecular Structure Lewis Dot structure, Ionic	~~Lab Experiment,~~ homework, class discussion, group project	Test, ~~Laboratory experiment,~~ graded worksheet, quiz	CLO4, CLO5, CLO6

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
	bonds, covalent bonds, electronegativity and polarity, Octet rule, Expanded octet, formal charge and resonance, Bond enthalpy, Born-Haber cycle			
TO9	Orbital Hybridization VSEPR Geometry, Molecular Geometry, Hybridization, Valence bond Theory, Bond angles, Molecular Orbital Theory, sigma and pi bonds, bond order, bonding and antibonding orbitals	~~Lab Experiment,~~ homework, practical hands-on project with presentation	Test, quiz ~~Test, Laboratory experiment, quiz, oral~~	CLO5, CLO6
TO10	Gases and Their Properties Properties of gases, gas pressure units, Boyle's law, Charles's law, Avogadro's law, Gay-Lussac's law, Combined gas law, Ideal Gas law, Dalton's law, Mole fraction, Partial pressures, Kinetic Molecular Theory, Partial pressures, Diffusion and Effusion, Real gases, Van der Waals equation	~~Lab Experiment,~~ homework, flipped classroom session	Test, ~~Laboratory experiment,~~ quiz, graded worksheet, ~~laboratory practical~~	CLO1, CLO2, CLO7

12. Methods of Instruction

In the structuring of this course, what major methods of

instruction will be
utilized?

o Lecture and discussion of the topics.

o Reading assigned chapters and performing textbook and/or online homework assignments. ~~o Laboratory experimentation.~~

13. General Education Goals Addressed by this Course (this section is to fulfill state requirements)

Information

Communication-Written and Oral

Quantitative Knowledge and Skills Yes

Related Course Learning Outcome	CLO2, CLO6, CLO7
Related Outline Component	TO1, TO2, TO4, TO5, TO6, TO7, TO10

Assessment of General Education Goal (Recommended but not limited to)

Test, ~~Laboratory experiment,~~ quiz, worksheet ~~worksheet, Laboratory Practical~~

Scientific Knowledge and Reasoning Yes

Related Course Learning Outcome	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7
Related Outline Component	TO1, TO2, TO3, TO4, TO5, TO6, TO7, TO8, TO9, TO10

Assessment of General Education Goal (Recommended but not limited to)

Test, ~~Laboratory experiment,~~ oral assessment

Technological Competency

Information Literacy

Society and Human Behavior

_____

Humanistic Perspective

_____

Historical Perspective

_____

Global and Cultural Awareness

_____

Ethical Reasoning and Action

_____

Independent/Critical Thinking	Yes
Related Course Learning Outcome	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7
Related Outline Component	TO1, TO2, TO3, TO4, TO5, TO6, TO7, TO8, TO9, TO10

Assessment of General Education Goal (Recommended but not limited to)

Test, ~~Laboratory experiment,~~ oral assessment, worksheet ~~worksheet, Lab practical~~

14. Needs

Instructional Materials (text etc.):

An appropriate text or open educational resource will be selected. Contact the department for current adoptions. A calculator with logarithmic functions. ~~Safety goggles are required.Appropriately selected and maintained laboratory notebook.~~

Technology Needs:

Computers with Microsoft Office. ~~Laboratory technology appropriate for planned experiments.~~

Human Resource Needs (Presently Employed vs. New Faculty):

Tutors: Depending on available college resources, professional tutors may provide support for students.

Facility Needs:

~~Laboratory setting and appropriate laboratory materials.~~

Library needs:

15. Grade Determinants

The final grade in the course will be the cumulative grade based on the following letter grades or their numerical equivalents for the course assignments and examinations

A: Excellent

B+: Very Good

B: Good

C+: Above Average

C: Average

D: Below Average

F: Failure

I: Incomplete

R: Audit

For more detailed information on the Ocean County College grading system, please see Policy #5154.

16. Board Approval

History of Board
approval dates

Board of Trustees Approval Date: November 5, 2007
Board of Trustees Approval Date: September 22, 2008
Board of Trustees Approval Date: March 26, 2012
Board of Trustees Approval Date: May 28, 2013
Board of Trustees Approval Date: December 12, 2019

Reviewer
Comments

Vandana Saini (vsaini) (07/01/25 12:29 pm): Rollback: Add faculty suggestions

EXHIBIT B-14

Course Change Request

Date Submitted: 06/12/25 3:27 pm

Viewing: CHEM 182 : General Chemistry II Lecture

Last approved: 02/12/25 1:41 pm

Last edit: 06/12/25 3:27 pm

Changes proposed by: Maria Hartwell (mhartwell)

Catalog Pages referencing this course

- Approved General Education Courses
- Chemistry (CHEM)

Programs referencing this course

- AS.CS: Computer Science, Associate in Science
- AS.CS.CIS: Computer Science with Cyber-Information Security Option, Associate in Science
- AS.ENGR: Engineering, Associate in Science
- AS.ES: Environmental Studies, Associate in Science
- AS.CS.GDD: Computer Science with Game Development & Design Option, Associate in Science
- AS.CS.IT: Computer Science with Information Technology Option, Associate in Science
- AS.CHEM: Chemistry, Associate in Science

Justification for this inactivation request

Learning Outcomes Display (show only)

In Workflow

1. **STEM Academic Administrator**
2. **STEM Dean**
3. **Executive Director of Curriculum and Program Development**
4. **Curriculum Committee Chair**
5. **Senate Chair**
6. Vice President of Academic Affairs
7. Cabinet
8. President
9. Board of Trustees Chair
10. STEM Academic Administrator
11. Colleague

Approval Path

1. 06/17/25 12:26 pm Connor Sampson (csampson): Approved for STEM Academic Administrator
2. 07/01/25 12:30 pm Vandana Saini (vsaini): Rollback to STEM Academic Administrator for STEM Dean
3. 07/01/25 12:56 pm Connor Sampson

(csampson): Approved for STEM Academic Administrator
4. 07/01/25 3:52 pm Vandana Saini (vsaini): Approved for STEM Dean
5. 07/07/25 9:55 am James Marshall (jmarshall): Approved for Executive Director of Curriculum and Program Development
6. 07/11/25 3:03 pm Caroline Brittain (cbrittain): Approved for Curriculum Committee Chair

History

1. Apr 29, 2021 by soconnor
2. Sep 23, 2022 by sfarrell
3. Feb 12, 2025 by James Marshall (jmarshall)

AS.CHEM: Chemistry, Associate in Science

PLO 1: Apply and describe chemical concepts from the microscale level to the macroscale level.

PLO 2: Apply critical thinking skills by use of scientific methods to observe, collect data, perform experimental procedures, and interpret data to formulate hypotheses.

PLO 3: Demonstrate the relationships between the scientific, mathematical, social science, and technology disciplines.

PLO 4: Describe quantitative reasoning and knowledge, both orally and written.

PLO 5: Develop necessary skills to work effectively in a team or independently in multiplatform settings.

PLO 6: Develop necessary technical skills for the laboratory setting.

1. Course Information

Subject	CHEM - Chemistry
New Subject	
School	Science, Technology, Engineering, Mathematics
Course Title	General Chemistry II Lecture

2. Hours

Semester Hours	3.00000 ~~4.00000~~	
	Lecture	3.00
	Lab	~~2.00~~
	Practicum	
	Clinical Preceptorship	

3. Catalog Description

For display in the online catalog

This course is intended for science majors and is the second of a two-course sequence. Course topics include colligative properties, chemical equilibrium, acid-base chemistry, kinetics, thermodynamics, electrochemistry, and nuclear chemistry. ~~The laboratory work involves analytical and spectrophotometric techniques relating to lecture topics.~~

4. Requisites

Prerequisites

CHEM 181 and CHEM181L

Corequisites

For the first attempt CHEM 182L is considered a corequisite. If the student should fail either lecture or lab after the first attempt, then they may take the individual failed section. ~~NONE~~

5. Course Type

Course Type for Perkins Reporting: non-vocational (not approved for Perkins funding)

6. Justification

Describe the need for this course

This course is required for bachelor-level degree programs in science, engineering, and in many health-related pre-professional disciplines.

7. General Education

Will the college submit this course to the statewide General Education Coordinating Committee for approval as a course, which satisfies a general education requirement?

Yes

General Education Category

~~Lab Science~~

Science (Non-Lab)

General Education Status: Approved

If the course does not satisfy a general education requirement, which of the following does it satisfy:

8. Consistency with the Vision and Mission Statements, the Academic Master Plan, and the strategic initiatives of the College

Please describe how this course is consistent with Ocean County College's current Vision Statement, Mission Statement, Academic Master Plan, and the strategic initiatives of the College:

	Add item
1	Demonstrating the college’s commitment to offer comprehensive educational programs that develop intentional learners of all ages. (Mission Statement)

	Add item
2	Seeking to ensure that students will thrive in an increasingly diverse and complex world. (Vision Statement)
3	Preparing students for successful transfer to other educational institutions and/or for entrance into the workforce. (Academic Master Plan)
4	Seeking to empower students through the mastery of intellectual and Practical Skills. (Academic Master Plan)
5	Challenging students to transfer information into knowledge and knowledge into action. (Academic Master Plan)

9. Related Courses at Other Institutions

Comparable Courses at NJ Community Colleges

Institution Bergen ~~Brookdale~~ CC

Course Title General Chemistry II

Course Number CHM 240 ~~CHEM 102~~

Number of Credits 3 ~~5~~

Comments

Requires a pre-req of CHM 140 and MAT-159 or MAT-160 with a C or better, CHM-241 is recommended at the same time ~~or better in CHEM 101~~

Institution County College of Morris ~~Mercer County CC~~

Course Title General Chemistry II - Lecture

Course Number CHM 127 ~~CHE 102~~

Number of Credits 3 ~~4~~

Comments

Requires a pre-req of a C or better in CHM 125 and a co-req of CHM-128 ~~CHE 101~~

Institution Middlesex County College ~~Atlantic Cape CC~~

Course Title General Chemistry II Lecture

Course Number CHM 122 ~~CHEM 111~~

Number of Credits 3 ~~4~~

Comments

CHM-121 with a grade of "C" or better - Must be completed prior to taking this course ~~Requires a pre-req of a C or better in CHEM 110~~

Institution Rowan College at Burlington County

Course Title General Chemistry II

Course Number CHE-117

Number of Credits 3

Comments

Requires a pre-req of CHE 115 and MTH 112,MTH-116, MTH-130, or MTH-132, and a co-req or pre-req of CHE-118

Institution Union County College

Course Title General Chemistry II

Course Number CHE-126

Number of Credits 3

Comments

Requires division approval

Transferability of Course

Georgian Court University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
General Chemistry II CHEM 114 4 cr.	Major, Gen. Ed.	

Kean University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
CHEM 1084 General Chemistry II 4 cr.	Major, Gen. Ed.	

Monmouth University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
General Chemistry II CE 112	Major, Gen. Ed.	

Rowan University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
General Chemistry II CHEM 06101 4 cr.	Major, Gen. Ed.	

Rutgers - New Brunswick, Mason Gross School of the Arts

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
General Chemistry II 01:160:162 4 cr.	Major, Gen. Ed.	

Stockton University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
Chemistry IV: Theory & Application CHEM 2140 4 cr.	Major, Gen. Ed.	

If not transferable to any institution, explain:

10. Course Learning Outcomes

Learning Outcomes

	Students who successfully complete this course will be able to:
CLO1	Evaluate the relative strengths of intermolecular forces and predict the effect of intermolecular forces on a substance's heat of vaporization, surface tension, viscosity, vapor pressure and boiling point. ~~Define each of the following terms:~~ ~~• Exothermic processes~~ ~~• Endothermic processes~~ ~~• Colligative properties~~ ~~• Entropy~~ ~~• Three laws of thermodynamics~~ ~~• Electrode~~ ~~• Oxidation~~ ~~• Reduction~~ ~~• Inner transition element~~
CLO2	Describe solution properties and different ways to describe solution concentration. Define terms: solubility, saturated/unsaturated/supersaturated solution, solvent, solute, colligative properties. Describe ~~List actions that would increase~~ the effect ~~rate~~ of a solution concentration on the solution's colligative properties ~~chemical reaction.~~
CLO3	Determine reaction ~~Given a table of reactant concentrations and~~ rate law from experimental data, analyze and predict ~~determine~~ the effects of different environmental factors and reaction parameters on the ~~corresponding~~ rate of a chemical reaction. ~~law.~~ Use integrated rate law expressions and half-life to rate constant relationships to calculate the reaction half-life, the rate law constant, initial or final reactant concentration.
CLO4	Given a chemical system at equilibrium: • Determine the effect of adding a common ion • Calculate the concentration of species in solution. • Write the equilibrium expression for the system and calculate the reaction quotient and/or equilibrium constant for the system • Predict possible effects of changes to different species concentration, overall system and partial system component pressures, volume, temperature on the direction of the chemical reaction (if any) according to Le Chatelier's principle ~~Given the half-life equation and a radioisotope's half-life, calculate the rate constant.~~
CLO5	Given an acid's molar concentration, calculate the solution's pH and describe how the two are related. Identify acidic and basic compounds and compare relative strengths of acids and bases based on ionization constants, equilibria positions and the substance structure features

	Students who successfully complete this course will be able to:
	~~Given a chemical system at equilibrium:~~ ~~• Determine the effect of adding a common ion~~ ~~• Calculate the concentration of species in solution.~~
CLO6	Define “inner transition element”. List the properties of the transition metals, including the ability to form colored compounds; the ability to form complex ions; possessing multiple oxidation states. For transition metal complexes, identify and name main structural components and features and provide proper systematic name given the coordination compound structure and write the correct formula given the correct systematic name. ~~Describe how intermolecular forces affect a solution’s heat of vaporization.~~
CLO7	List and briefly explain the Laws of Thermodynamics. Define the terms: exothermic process, endothermic process, entropy. Calculate Entropy and Free energy of a reaction. Analyze the spontaneity of a given chemical reaction using thermodynamic data either at a given temperature or over the entire temperature range. Describe the connection between equilibrium constant and reaction quotient and standard and non-standard free energy of a reaction. ~~Describe the effect of solution concentration on:~~ ~~• Freezing point~~ ~~• Boiling point~~ ~~• Osmotic pressure.~~
CLO8	Define terms: oxidation, reduction, electrode. Balance Redox Equations. Use reaction potentials to determine if a reaction will be spontaneous ~~Given an acid’s molar concentration, calculate the solution’s pH.~~
CLO9	State how a nuclear reaction’s rate is persistent. Given a nuclear equation and its mode of decay, determine the identity of the daughter nuclide ~~Describe how the pH scale is affected by acid concentration.~~
~~CLO10~~	~~List the properties of the transition metals including:~~ ~~• Ability to form colored compounds~~ ~~• Ability to form complex ions~~ ~~• Possessing multiple oxidation states~~
~~CLO11~~	~~Calculate Entropy and Free energy of a reaction.~~
~~CLO12~~	~~Determine if a reaction will be spontaneous~~
~~CLO13~~	~~Balance Redox Equations.~~
~~CLO14~~	~~State how a nuclear reaction’s rate is persistent.~~

	Students who successfully complete this course will be able to:
~~CLO15~~	~~Given a nuclear equation and it's mode of decay, determine the identity of the daughter nuclide.~~

11. Topical Outline

(include as many themes/skills as needed)

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
TO4 ~~TO1~~	Intermolecular Forces, Liquids & Solids Ion-ion interactions, Ion-Dipole interactions, Dipole-Dipole interactions, Hydrogen bonding, Dispersion forces, phase changes ~~changes~~	Homework, worksheet, class discussion ~~Lab Experiment~~	Test, quiz ~~Laboratory experiment~~	CLO1
TO5 ~~TO2~~	Solutions & Their Behavior Molality, Factors that affect solubility, Colligative properties ~~properties~~	Homework, worksheet, class discussion ~~Lab Experiment~~	Test, quiz ~~Laboratory experiment~~	CLO1, CLO2 ~~CLO6, CLO7~~
TO6 ~~TO3~~	~~3~~ Chemical Kinetics Reaction Rates; Concentration, temperature and catalysts effects on reaction rate; reaction mechanism ~~mechanism~~	Homework, worksheet, class discussion ~~Lab Experiment~~	Test, quiz ~~Laboratory experiment~~	CLO3 ~~CLO2, CLO3, CLO4~~

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
TO7 ~~TO4~~	Chemical Equilibria Equilibrium constants K, Reaction Quotient Q, Le Châtelier's Principle ~~Principle~~	Homework, worksheet, class discussion ~~Lab Experiment~~	Test, quiz ~~Laboratory experiment~~	CLO4, CLO7 ~~CLO5~~
TO8 ~~TO5~~	Chemistry of Acids & Bases Bronsted-Lowry acid and bases, pH, pOH, Ka, Kb, strong acids/bases, weak acids/bases ~~acids/bases~~	Homework, worksheet, class discussion ~~Lab Experiment~~	Test, quiz ~~Laboratory experiment~~	CLO4, CLO5 ~~CLO8, CLO9~~
TO9 ~~TO6~~	Aqueous Equilibria Buffers, Solubility, Ksp, common ion effect	Homework, worksheet, class discussion ~~Lab Experiment~~	Test, quiz ~~Laboratory experiment~~	CLO5
TO10 ~~TO7~~	Entropy & Free Energy Entropy S, Gibb's Free energy G, Second law of thermodynamics, Third law of Thermodynamics, predicting spontaneity of a reaction ~~reaction~~	Homework, worksheet, class discussion ~~Lab Experiment~~	Test, quiz ~~Laboratory experiment~~	CLO7 ~~CLO1, CLO11, CLO12~~
~~TO8~~	Electron Transfer Reaction Redox equations, Galvanic Cells, Ecell, Nernst equation, batteries, electrolysis	Homework, worksheet, class discussion ~~Lab Experiment~~	Test, quiz ~~Laboratory experiment~~	CLO8 ~~CLO1, CLO13~~

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
	~~electrolysis~~			
CLO3, CLO3, CLO5, CLO6, CLO7, CLO8, CLO9, CLO11, CLO12, CLO13, CLO14 ~~TO9~~	Chemistry of Transition Elements Lewis acid and bases, complex ions, coordination compounds	Homework, worksheet, class discussion ~~Test~~	Test, quiz ~~Test~~	CLO6 ~~CLO10~~
CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7, CLO8, CLO9, CLO10, CLO11, CLO12, CLO13, CLO14, CLO15 ~~TO10~~	Nuclear Chemistry Kinetics of radioactive decay, Nuclear Fission, Nuclear Fusion	Homework, worksheet, class discussion ~~Lab Experiment~~	Homework, quiz ~~Test, Laboratory experiment~~	CLO9 ~~CLO4, CLO14, CLO15~~

12. Methods of Instruction

In the structuring of this course, what major methods of

instruction will be utilized?

Lecture/Discussion ~~Lecture/Discussion/Laboratory Experimentation~~

13. General Education Goals Addressed by this Course (this section is to fulfill state requirements)

Information

Communication-Written and Oral

Related Course

Related Outline

Assessment of General Education Goal (Recommended but not limited to)

Quantitative Knowledge and Skills Yes

Related Course Learning Outcome: CLO1, CLO2, CLO3, CLO4, ~~CLO3,~~ CLO5, CLO7,CLO8, CLO10 ~~CLO6, CLO7, CLO8, CLO9, CLO11, CLO12, CLO13, CLO14~~

Related Outline Component: TO2, TO3, TO4, TO5, TO6, TO7, TO8, TO10

Assessment of General Education Goal (Recommended but not limited to)

Test ~~Test, Laboratory Experiment~~

Scientific Knowledge and Reasoning Yes

Related Course Learning Outcome: CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7, CLO8, CLO9 ~~CLO9, CLO10, CLO11, CLO12, CLO13, CLO14, CLO15~~

Related Outline Component: TO1, TO2, TO3, TO4, TO5, TO6, TO7, TO8, TO9, TO10

Assessment of General Education Goal (Recommended but not limited to)

Test ~~Test, Laboratory Experiment~~

_____

Technological Competency

Related Course

Related Outline

Assessment of General Education Goal (Recommended but not limited to)

_____

Information Literacy

Related Course

Related Outline

Assessment of General Education Goal (Recommended but not limited to)

_____

Society and Human Behavior

Related Course

Related Outline

Assessment of General Education Goal (Recommended but not limited to)

_____

Humanistic Perspective

Related Course

Related Outline

Assessment of General Education Goal (Recommended but not limited to)

_____

Historical Perspective

Related Course

Related Outline

Assessment of General Education Goal (Recommended but not limited to)

_____

Global and Cultural Awareness

Related Course
Learning Outcome
Related Outline
Component
Assessment of General Education Goal (Recommended but not limited to)

_____

Ethical Reasoning and Action

Related Course
Learning Outcome
Related Outline
Component
Assessment of General Education Goal (Recommended but not limited to)

_____

Independent/Critical Thinking	Yes
Related Course Learning Outcome	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7, CLO8, CLO9 ~~CLO9, CLO10, CLO11, CLO12, CLO13, CLO14, CLO15~~
Related Outline Component	TO1, TO2, TO3, TO4, TO5, TO6, TO7, TO8, TO9, TO10

Assessment of General Education Goal (Recommended but not limited to)

Test ~~Test, Laboratory Experiment~~

14. Needs

Instructional Materials (text etc.):

An appropriate text will be selected. Contact the department for current adoptions. A Calculator with logarithmic functions is ~~and safety goggles are~~ required.

Technology Needs:

Computers with internet capability, Excel, Molecular Modeling Microsoft Office. ~~Laboratory technology appropriate for planned experiments.~~

Human Resource Needs (Presently

Employed vs. New
Faculty):

Presently employed and Adjunct Faculty.

Facility Needs:

~~Laboratory setting and appropriate laboratory materials.~~

Library needs:

15. Grade Determinants

The final grade in the course will be the cumulative grade based on the following letter grades or their numerical equivalents for the course assignments and examinations

A: Excellent

B+: Very Good

B: Good

C+: Above Average

C: Average

D: Below Average

F: Failure

I: Incomplete

R: Audit

For more detailed information on the Ocean County College grading system, please see Policy #5154.

16. Board Approval

History of Board
approval dates

Revised: December, 1990
Revised: February 27, 1996
Revised: April 30, 1996
Revised: December, 1998
Revised: May 4, 2004
Revised: August 18, 2005
Revised: August 27, 2007

Revised: April 27, 2009

Revised: May 22, 2012

Board of Trustees Approval Date: January 26, 2017

Board of Trustees Approval Date: August 25, 2022

Reviewer

Comments

Vandana Saini (vsaini) (07/01/25 12:30 pm): Rollback: Add faculty suggestions

EXHIBIT B-15

Course Change Request

Date Submitted: 06/12/25 6:21 pm

Viewing: CHEM 283 : Organic Chemistry I Lecture

Last approved: 04/29/21 4:00 am

Last edit: 06/12/25 6:21 pm

Changes proposed by: Maria Hartwell (mhartwell)

Catalog Pages referencing this course	Approved General Education Courses Chemistry (CHEM)
Programs referencing this course	AS.ES: Environmental Studies, Associate in Science AS.CHEM: Chemistry, Associate in Science

Justification for this inactivation request

Learning Outcomes Display (show only)

AS.CHEM: Chemistry, Associate in Science

PLO 1: Apply and describe chemical concepts from the microscale level to the macroscale level.

PLO 2: Apply critical thinking skills by use of scientific methods to observe, collect data, perform experimental procedures, and interpret data to formulate hypotheses.

PLO 3: Demonstrate the relationships between the scientific, mathematical, social science, and technology disciplines.

PLO 4: Describe quantitative reasoning and knowledge, both orally and written.

PLO 5: Develop necessary skills to work effectively in a team or independently in multiplatform settings.

PLO 6: Develop necessary technical skills for the laboratory setting.

1. Course Information

Subject	CHEM - Chemistry
New Subject	
School	Science, Technology, Engineering, Mathematics
Course Title	Organic Chemistry I Lecture

In Workflow

1. **STEM Academic Administrator**
2. **STEM Dean**
3. **Executive Director of Curriculum and Program Development**
4. **Curriculum Committee Chair**
5. **Senate Chair**
6. Vice President of Academic Affairs
7. Cabinet
8. President
9. Board of Trustees Chair
10. STEM Academic Administrator
11. Colleague

Approval Path

1. 06/17/25 12:26 pm Connor Sampson (csampson): Approved for STEM Academic Administrator
2. 07/01/25 12:31 pm Vandana Saini (vsaini): Rollback to STEM Academic Administrator for STEM Dean
3. 07/01/25 12:56 pm Connor Sampson (csampson): Approved for STEM Academic Administrator

2. Hours

Semester Hours	3.00000 ~~4.00000~~
Lecture	3.00
Lab	~~3.00~~
Practicum	
Clinical Preceptorship	

3. Catalog Description

For display in the online catalog

This is the first course in a two-course sequence exploring the structure-activity relationships of functional groups. Course topics include: nature of the covalent bond, alkanes, alkenes, stereochemistry, reaction mechanisms, and functional group chemistry. ~~The laboratory work consists of basic separation and purification, and synthetic organic laboratory techniques.~~

4. Requisites

Prerequisites

CHEM 182 and CHEM182L

Corequisites

For the first attempt CHEM 283L is considered a corequisite. If the student should fail either lecture or lab after the first attempt, then they may take the individual failed section.

5. Course Type

Course Type for Perkins Reporting	non-vocational (not approved for Perkins funding)

6. Justification

Describe the need for this course	This course is required for bachelor-level degree programs in chemistry, many other sciences, engineering, and pre-professional programs.

7. General Education

Will the college submit this course to the statewide General Education Coordinating Committee for approval as a course, which satisfies a general education requirement?

Yes

4. 07/01/25 3:53 pm Vandana Saini (vsaini): Approved for STEM Dean
5. 07/07/25 9:55 am James Marshall (jmarshall): Approved for Executive Director of Curriculum and Program Development
6. 07/11/25 3:03 pm Caroline Brittain (cbrittain): Approved for Curriculum Committee Chair

History

1. Apr 29, 2021 by soconnor

General Education Category	~~Lab Science~~ Science (Non-Lab)
General Education Status	Approved

If the course does not satisfy a general education requirement, which of the following does it satisfy:

8. Consistency with the Vision and Mission Statements, the Academic Master Plan, and the strategic initiatives of the College

Please describe how this course is consistent with Ocean County College's current Vision Statement, Mission Statement, Academic Master Plan, and the strategic initiatives of the College:

	Add item
1	Demonstrating the college's commitment to offer comprehensive educational programs that develop intentional learners of all ages. (Mission Statement)
2	Seeking to ensure that students will thrive in an increasingly diverse and complex world. (Vision Statement)
3	Preparing students for successful transfer to other educational institutions and/or for entrance into the workforce. (Academic Master Plan)
4	Seeking to empower students through the mastery of intellectual and practical skills. (Academic Master Plan)
5	Challenging students to transfer information into knowledge and knowledge into action. (Academic Master Plan)

9. Related Courses at Other Institutions

Comparable Courses at NJ Community Colleges

Institution	County College of Morris ~~Brookdale CC~~
Course Title	Organic Chemistry I - Lecture
Course Number	CHM231 ~~CHEM203~~
Number of Credits	3 ~~5~~
Comments	pre-req of C or better in CHM127 and CHM128 and a co-req of CHM-232 and ENG-111 or ENG-111CL or ENG-111CW

Institution	Middlesex County College
Course Title	Organic Chemistry I Lecture
Course Number	CHM221
Number of Credits	3 ~~4~~
Comments	CHM-122 with a grade of "C" or better - Must be completed prior to taking this course.

Institution	Raritan Valley ~~Atlantic Cape~~ CC
Course Title	Organic Chemistry I - Lecture only
Course Number	CHEM213 ~~CHEM210~~
Number of Credits	4
Comments	Pre-req of CHEM104 – General Chemistry II

Institution	Rowan College at Burlington County
Course Title	Organic Chemistry I
Course Number	CHE-240
Number of Credits	3
Comments	Requires a pre-req of CHE 117, CHE-118, and a co-req or pre-req of CHE-241

Institution	Union County College
Course Title	Organic Chemistry I
Course Number	CHE-221
Number of Credits	3
Comments	pre-req of CHE-112

Transferability of Course

Georgian Court
University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
CH 223 Organic Chemistry I 4-cr ~~I, CH223, 4 cr.~~	Major (linked course must complete both lecture & lab or only elective credit is granted) ~~General Education~~	

Kean University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
CHEM 2581 Organic Chemistry I 3-cr ~~Elective Credit, 4 cr.~~	Major ~~Elective~~	

Monmouth University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
CE 241 Organic Chemistry I 3-cr ~~I, CE241, 4 cr.~~	Major ~~General Education~~	

Rowan University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
CHEM 07200 Organic Chemistry I 4-cr ~~I, CHEM07200, 4 cr.~~	Major (linked course must complete both lecture & lab or only elective credit is granted) ~~General Education~~	

Rutgers - New Brunswick, Mason Gross School of the Arts

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
01160307 Organic Chemistry I 4-credits ~~I, 01160NM, 4 cr.~~	Major (linked course must complete lecture & lab for CHEM 283 & CHEM 284 to receive credits. If not, only elective credit is granted) ~~General Education~~	

Stockton University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
CHEM 2120 Chemistry II Organic Structure 3-cr ~~Chem II:Organic Structure, CHEM2120, 3 cr.~~	Major ~~General Education~~	

If not transferable to any institution,

explain:

10. Course Learning Outcomes

Learning Outcomes

	Students who successfully complete this course will be able to:
CLO1	Draw and interpret Lewis structures, bond-line structures of alkanes, cycloalkanes, alkenes, alkynes, alkyl halides, ethers, and alcohols using IUPAC system of nomenclature. Determine hybridization, bonds, bond angles, geometry, polarities, and dipole moments of organic compounds.
CLO2	Draw, interpret, and compare relative stabilities of cyclic and acyclic alkane conformations. Distinguish conformational isomers, constitutional isomers, geometric isomers, enantiomers, diastereomers, and meso compounds. ~~Determine hybridization, bonds, bond angles, geometry, polarities, and dipole moments of organic compounds.~~
CLO3	Describe acids ~~Draw, interpret,~~ and bases in reactions, identify components in a reaction and compare relative acidity and basicity ~~stabilities~~ of organic compounds. ~~acyclic alkane conformations~~
CLO4	Distinguish reaction types, use kinetics to elucidate reaction mechanisms, and use reaction energy diagrams to illustrate reaction mechanisms. Draw reaction mechanisms ~~Draw, interpret, and compare relative stabilities of cyclic alkane conformations.~~
CLO5	Describe SN1, SN2, E1 ~~acids~~ and E2 ~~bases in~~ reactions, predicting reactivity, ~~identify components in a reaction~~ and reaction products ~~compare relative acidity and basicity of organic compounds.~~
CLO6	Identify IUPAC name for dienes including stereochemistry, predict the relative stability of dienes, and classify specific reactions and reaction's mechanisms of dienes. ~~Distinguish conformational isomers, constitutional isomers, geometric isomers, enantiomers, diastereomers, and meso compounds.~~
CLO7	Devise syntheses including steps, reagents, and products including regiochemistry and stereochemistry. ~~Distinguish reaction types, use kinetics to elucidate reaction mechanisms, and use reaction energy diagrams to illustrate reaction mechanisms.~~
~~CLO8~~	~~Draw reaction mechanisms.~~
~~CLO9~~	~~Describe SN1, SN2, E1 and E2 reactions, predicting reactivity, and reaction products~~
~~CLO10~~	~~Devise syntheses including steps, reagents, and products including regiochemistry and stereochemistry.~~
~~CLO11~~	~~Identify IUPAC name for dienes including stereochemistry, predict the relative stability of dienes, and classify specific reactions and reaction's mechanisms of~~

	Students who successfully complete this course will be able to:
	~~dienes.~~
~~CLO12~~	~~Use Material Safety Data Sheets (MSDS) to obtain information such as molecular formula, physical properties, hazards, and disposal procedures for chemicals used in each experiment.~~
~~CLO13~~	~~Prepare and maintain a laboratory notebook, including a write-up of each experiment detailing the purpose, chemical equations, calculation of theoretical yield, percent yield, and record of experimental observations.~~
~~CLO14~~	~~Write clear, concise, scientific laboratory reports using American Chemical Society style for each experiment~~
~~CLO15~~	~~Use critical analysis skills to interpret data and draw conclusions.~~
~~CLO16~~	~~Perform simple syntheses isolating measurable quantities of a final product.~~
~~CLO17~~	~~Perform basic organic microscale operations using microscale glassware:~~ ~~• Melting point determination~~ ~~• Boiling point determination~~ ~~• Refractive index~~ ~~• Recrystallization~~

11. Topical Outline

(include as many themes/skills as needed)

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
TO1	Structure and Bonding Lewis structures, polar covalent bonds, hybridization, structural formulas, acids and bases, pKa, reaction energy diagram	Homework, in-class discussion ~~Homework and/or Laboratory Experiment~~	Exam	CLO1, CLO2, CLO3, CLO4 ~~CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO12, CLO13, CLO14, CLO15, CLO16, CLO17~~
TO2	Alkanes Nomenclature, conformations, geometric isomers, free radical reactions	Homework, in-class discussion ~~Homework and/or Laboratory Experiment~~	Exam	CLO1, CLO2, CLO3, CLO4 ~~CLO4, CLO5, CLO6, CLO12, CLO13, CLO14, CLO15, CLO16,~~
TO3	Alkenes Nomenclature,	Homework, in-class discussion ~~Homework and/or Laboratory Experiment~~	Exam	CLO1, CLO2, CLO4, CLO5, CLO6, CLO7 ~~CLO1, CLO2, CLO6,~~

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
	conformations, elimination reactions, addition reactions, cleavage, synthesis, allylic systems, dienes			~~CLO7, CLO8, CLO9, CLO10, CLO11, CLO12, CLO13, CLO14, CLO15, CLO16~~
TO4	Alkynes Nomenclature, acidity, elimination reactions, addition reactions, cleavage, synthesis	Homework, in-class discussion ~~Homework and/or Laboratory Experiment~~	Exam	CLO1, CLO3, CLO4, CLO5, CLO7 ~~CLO1, CLO2, CLO7, CLO8, CLO9, CLO10, CLO12, CLO13, CLO14, CLO15, CLO16~~
TO5	Alkyl Halides Nomenclature, substitution and elimination reactions, substitution vs. elimination reactions, synthesis	Homework, in-class discussion ~~Homework and/or Laboratory Experiment~~	Exam	CLO1, CLO2, CLO3, CLO4, CLO5, CLO7 ~~CLO1, CLO2, CLO6, CLO7, CLO8, CLO9, CLO10, CLO12, CLO13, CLO14, CLO15, CLO16~~
TO6	Alcohols Nomenclature, substitution and elimination reactions, synthesis	Homework, in-class discussion ~~Homework and/or Laboratory Experiment~~	Exam	CLO1, CLO2, CLO3, CLO4, CLO5, CLO7 ~~CLO1, CLO2, CLO5, CLO6, CLO7, CLO8, CLO9, CLO10, CLO12, CLO13, CLO14, CLO15, CLO16~~
TO7	Chirality Stereochemistry and reactions	Homework, in-class discussion ~~Homework and/or Laboratory Experiment~~	Exam	CLO1, CLO2, CLO3, CLO4, CLO5, CLO7 ~~CLO6, CLO12, CLO13, CLO14, CLO15, CLO16~~

12. Methods of Instruction

In the structuring of this course, what major methods of

Lecture/Discussion ~~Lecture/Lab/Discussion~~

instruction will be utilized?

13. General Education Goals Addressed by this Course (this section is to fulfill state requirements)

Information

Communication-Written and Oral

Related Course Learning Outcome

Related Outline Component

Assessment of General Education Goal (Recommended but not limited to)

Quantitative Knowledge and Skills

Related Course Learning Outcome

Related Outline Component

Assessment of General Education Goal (Recommended but not limited to)

Scientific Knowledge and Reasoning Yes

Related Course Learning Outcome: CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7 ~~CLO7, CLO8, CLO9, CLO10, CLO11, CLO12, CLO13, CLO14, CLO15, CLO16, CLO17~~

Related Outline Component: TO1, TO2, TO3, TO4, TO5, TO6, TO7

Assessment of General Education Goal (Recommended but not limited to)

Exams, in-class discussions, homework assignments ~~Exams and Laboratory Reports~~

Technological Competency

Related Course Learning Outcome

Related Outline Component

Assessment of General Education Goal (Recommended but not limited to)

Information Literacy

Related Course
Learning Outcome
Related Outline
Component
Assessment of General Education Goal (Recommended but not limited to)

_____

Society and Human Behavior

Related Course
Learning Outcome
Related Outline
Component
Assessment of General Education Goal (Recommended but not limited to)

_____

Humanistic Perspective

Related Course
Learning Outcome
Related Outline
Component
Assessment of General Education Goal (Recommended but not limited to)

_____

Historical Perspective

Related Course
Learning Outcome
Related Outline
Component
Assessment of General Education Goal (Recommended but not limited to)

_____

Global and Cultural Awareness

Related Course
Learning Outcome
Related Outline
Component
Assessment of General Education Goal (Recommended but not limited to)

_____

Ethical Reasoning and Action

Related Course
Learning Outcome

Related Outline

Assessment of General Education Goal (Recommended but not limited to)

_____

Independent/Critical Thinking	Yes
Related Course Learning Outcome	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7 ~~CLO7, CLO8, CLO9, CLO10, CLO11, CLO12, CLO13, CLO14, CLO15, CLO16, CLO17~~
Related Outline Component	TO1, TO2, TO3, TO4, TO5, TO6, TO7

Assessment of General Education Goal (Recommended but not limited to)

Exams, in class discussions, Homework assignments ~~Exams and Laboratory Reports~~

14. Needs

Instructional Materials (text etc.):	An appropriate textbook will be selected. Please contact the Department Office for current adoptions.
Technology Needs:	Computers with internet capability and Microsoft Office Software Suite, presentation classroom equipment
Human Resource Needs (Presently Employed vs. New Faculty):	Presently employed Faculty with a Master's Degree in Chemistry can teach this course.
Facility Needs:	~~A laboratory space with appropriate Organic Chemistry equipment.~~
Library needs:	

15. Grade Determinants

The final grade in the course will be the cumulative grade based on the following letter grades or their numerical equivalents for the course assignments and examinations

A: Excellent

B+: Very Good

B: Good

C+: Above Average

C: Average

D: Below Average

F: Failure

I: Incomplete

R: Audit

For more detailed information on the Ocean County College grading system, please see Policy #5154.

16. Board Approval

History of Board approval dates	Board of Trustees Approval Date: September 22, 2008 Board of Trustees Approval Date: June 28, 2010 Board of Trustees Approval Date: March 26, 2012 Board of Trustees Approval Date: November 03, 2016 Board of Trustees Approval Date: June 28, 2018
Reviewer Comments	**Vandana Saini (vsaini) (07/01/25 12:31 pm):** Rollback: Add faculty suggestions

Key: 312

EXHIBIT B-16

Course Change Request

Date Submitted: 06/12/25 11:26 pm

Viewing: CHEM 284 : Organic Chemistry II Lecture

Last approved: 04/29/21 4:00 am

Last edit: 07/01/25 12:58 pm

Changes proposed by: Maria Hartwell (mhartwell)

Catalog Pages referencing this course

- Approved General Education Courses
- Chemistry (CHEM)

Programs referencing this course

- AS.ES: Environmental Studies, Associate in Science
- AS.CHEM: Chemistry, Associate in Science

Learning Outcomes Display (show only)

In Workflow

1. **STEM Academic Administrator**
2. **STEM Dean**
3. **Executive Director of Curriculum and Program Development**
4. **Curriculum Committee Chair**
5. **Senate Chair**
6. Vice President of Academic Affairs
7. Cabinet
8. President
9. Board of Trustees Chair
10. STEM Academic Administrator
11. Colleague

Approval Path

1. 06/17/25 12:26 pm Connor Sampson (csampson): Approved for STEM Academic Administrator
2. 07/01/25 12:31 pm Vandana Saini (vsaini): Rollback to STEM Academic Administrator for STEM Dean
3. 07/01/25 12:59 pm Connor Sampson

(csampson): Approved for STEM Academic Administrator
4. 07/01/25 3:53 pm Vandana Saini (vsaini): Approved for STEM Dean
5. 07/07/25 9:55 am James Marshall (jmarshall): Approved for Executive Director of Curriculum and Program Development
6. 07/11/25 3:03 pm Caroline Brittain (cbrittain): Approved for Curriculum Committee Chair

History

1. Apr 29, 2021 by soconnor

AS.CHEM: Chemistry, Associate in Science

PLO 1: Apply and describe chemical concepts from the microscale level to the macroscale level.

PLO 2: Apply critical thinking skills by use of scientific methods to observe, collect data, perform experimental procedures, and interpret data to formulate hypotheses.

PLO 3: Demonstrate the relationships between the scientific, mathematical, social science, and technology disciplines.

PLO 4: Describe quantitative reasoning and knowledge, both orally and written.

PLO 5: Develop necessary skills to work effectively in a team or independently in multiplatform settings.

PLO 6: Develop necessary technical skills for the laboratory setting.

1. Course Information

Subject	CHEM - Chemistry
School	Science, Technology, Engineering, Mathematics
Course Title	Organic Chemistry II Lecture

2. Hours

Semester Hours	3.00000 ~~4.00000~~	
	Lecture	3.00
	Lab	0.00 ~~3.00~~
	Practicum	0.00

3. Catalog Description

For display in the online catalog

This is the second in a two-course sequence exploring the structure-activity relationship of functional groups. Course topics include: the structure and reactions of aromatic compounds, the carbonyl, and nitrogen containing functional groups. Molecular structure determination using infrared and nuclear magnetic resonance is also discussed. ~~The laboratory work includes organic synthesis and qualitative organic analysis.~~

4. Requisites

Prerequisites

CHEM 283 and CHEM283L

Corequisites

For the first attempt CHEM 284L is considered a corequisite. If the student should fail either lecture or lab after the first attempt, then they may take the individual failed section. ~~NONE~~

5. Course Type

Course Type for Perkins Reporting	non-vocational (not approved for Perkins funding)

6. Justification

Describe the need
for this course

This course is required for bachelor-level degree programs in chemistry, many other sciences, engineering, and pre-professional programs.

7. General Education

Will the college submit this course to the statewide General Education Coordinating Committee for approval as a course, which satisfies a general education requirement?

Yes

General Education
Category

Lab Science

Science (Non-Lab)

General Education Status Approved

8. Consistency with the Vision and Mission Statements, the Academic Master Plan, and the strategic initiatives of the College

Please describe how this course is consistent with Ocean County College's current Vision Statement, Mission Statement, Academic Master Plan, and the strategic initiatives of the College:

	Add item
1	Demonstrating the college’s commitment to offer comprehensive educational programs that develop intentional learners of all ages. (Mission Statement)
2	Seeking to ensure that students will thrive in an increasingly diverse and complex world. (Vision Statement)
3	Preparing students for successful transfer to other educational institutions and/or for entrance into the workforce. (Academic Master Plan)
4	Seeking to empower students through the mastery of intellectual and practical skills. (Academic Master Plan)
5	Challenging students to transfer information into knowledge and knowledge into action. (Academic Master Plan)

9. Related Courses at Other Institutions

Comparable Courses at NJ Community Colleges

Institution	County College of Morris ~~Brookdale CC~~
Course Title	Organic Chemistry II– Lecture ~~II~~
Course Number	CHM 233 ~~CHEM 204~~
Number of Credits	3 ~~5~~
Comments	pre-req of C or better in CHM231 and CHM232 and a co-req of CHM-234

Institution	Middlesex County College
Course Title	Organic Chemistry II Lecture
Course Number	CHM222
Number of Credits	3 ~~4~~
Comments	CHM-221 Lecture with a grade of "C" or better, CHM-227 Lab - Must be completed prior to taking this course. CHM-227 - Must be completed prior to taking this course.

Institution	Raritan Valley ~~Atlantic Cape~~ CC
Course Title	Organic Chemistry II-Lecture only ~~II~~
Course Number	CHEM214 ~~CHEM211~~
Number of Credits	4
Comments	Pre-req of CHEM211 Organic Chemistry I or CHEM213 Organic Chemistry I – Lecture only

Institution	Rowan College at Burlington County
Course Title	Organic Chemistry II

Course Number CHE-242

Number of Credits 3

Comments

Requires a pre-req of CHE 240, CHE-241, and a co-req or pre-req of CHE-243

Institution Union County College

Course Title Organic Chemistry II

Course Number CHE-222

Number of Credits 3

Comments

pre-req of CHE-211

Transferability of Course

Georgian Court University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
CH 224 Organic Chemistry II 4-cr ~~II, CH224, 4 cr.~~	Major (linked course must complete both lecture & lab or only elective credit is granted) ~~Gen.Ed.~~	

Kean University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
CHEM 2582 Organic Chemistry Lecture II 3-cr ~~II, CHEM2582, 4 cr.~~	Major ~~Gen.Ed., Elective~~	

Monmouth University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
CE 242 Organic Chemistry II 3-cr ~~II, CE242, 4 cr~~	Major ~~Gen.Ed., Natural Sciences~~	

Rowan University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
CHEM 07201 Organic Chemistry II 4-cr ~~II, CHEM07201, 4 cr.~~	Major (linked course must complete both lecture & lab or only elective credit is granted) ~~Gen.Ed., Laboratory Science~~	

Rutgers - New Brunswick, Mason Gross School of the Arts

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
01160308 Organic Chemistry II 4-cr ~~II, 01160NM, 4 cr.~~	Major (linked course must complete lecture & lab for CHEM 283 & CHEM 284 to receive credits. If not, only elective credit is granted) ~~Gen.Ed.,Natural Sciences~~	

Stockton University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
CHEM 2130 Chem III: Organic Reactions 3-cr ~~Organic Reactions, CHEM2130, 3 cr.~~	Major ~~Gen.Ed., Science~~	

If not transferable to any institution, explain:

10. Course Learning Outcomes

Learning Outcomes

	Students who successfully complete this course will be able to:
CLO1	Identify the common organic compounds' functional groups and determine the structure of an unknown compound using UV/Vis, IR, Mass, and NMR spectroscopes.

	Students who successfully complete this course will be able to:
CLO2	Construct the molecular-orbital energy diagram, explain aromaticity using MO diagram, identify the structure and the name of the monocyclic aromatic compounds, also classify the acidity and basicity of cyclic compounds
CLO3	Identify the mechanisms, relative ring activation and deactivation, and position's predictions of the electrophilic aromatic mono-, di-, and multi- substitution reaction in the aromatic compounds; also classify the nucleophilic aromatic substitution reaction.
CLO4	Predict the naming, properties, preparations, and reactions of alcohols and phenols. Write the IUPAC name, the properties, and draw the structure of ethers, epoxide, thiols, organometallic compounds, aldehydes, ketones, carboxylic acid and its derivatives, amines and arylamines.
CLO5	Show how to prepare Grignard reagents and organolithium compounds. ~~Write the IUPAC name, the properties, and draw the structure of ethers, epoxide, thiols, organometallic compounds, aldehydes, ketones, carboxylic acid and its derivatives, amines and arylamines.~~
CLO6	Recognize the carbonyl alpha-substitution reaction and carbonyl condensation reaction with specific reagents and mechanism. ~~Show how to prepare Grignard reagents and organolithium compounds.~~
CLO7	Classify ~~Recognize~~ the ~~carbonyl alpha-substitution~~ reaction and spectroscopy of amines ~~carbonyl condensation reaction with specific reagents~~ and arylamines. ~~mechanism.~~
~~CLO8~~	~~Classify the reaction and spectroscopy of amines and arylamines.~~
~~CLO9~~	~~Use Material Safety Data Sheets (MSDS) to obtain information such as molecular formula, physical properties, hazards, and disposal procedures for chemicals used in each experiment~~
~~CLO10~~	~~Prepare and maintain a laboratory notebook, including a write-up of each experiment detailing the purpose, chemical equations, calculation of theoretical yield, percent yield, and record of experimental observations.~~
~~CLO11~~	~~Write clear, concise, scientific laboratory reports using American Chemical Society style for each experiment.~~
~~CLO12~~	~~Use critical analysis skills to interpret data and draw conclusions.~~
~~CLO13~~	~~Perform simple syntheses isolating measurable quantities of a final product.~~

11. Topical Outline

(include as many themes/skills as needed)

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
TO1	Spectroscopy Theory & interpretation of: IR spectroscopy, NMR, Mass spectrometry, UV-Vis spectroscopy	Homework and/or class discussion ~~Laboratory Experiment~~	Exam	CLO1 ~~CLO1, CLO9, CLO10, CLO11, CLO12, CLO13~~
TO2	Aromatics Structure, MO's nomenclature, reactions	Homework and/or class discussion ~~Laboratory Experiment~~	Exam	CLO2, CLO3 ~~CLO2, CLO3, CLO9, CLO10, CLO11, CLO12, CLO13~~
TO3	Organometallics Preparation of organometallic compounds and reactions	Homework and/or Lclass discussion ~~Laboratory Experiment~~	Exam	CLO4, CLO5 ~~CLO5, CLO6, CLO9, CLO10, CLO11, CLO12, CLO13~~
TO4	Alcohols, Ethers and Epoxides Nomenclature, structural analysis, preparation and reactions	Homework and/or class discussion ~~Laboratory Experiment~~	Exam	CLO4 ~~CLO4, CLO5, CLO9, CLO10, CLO11, CLO12, CLO13~~
TO5	Ketones & Aldehydes Nomenclature, structural analysis, preparation and reactions, including nucleophilic addition and oxidation	Homework and/or class discussion ~~Laboratory Experiment~~	Exam	CLO4, CLO6 ~~CLO5, CLO7, CLO9, CLO10, CLO11, CLO12, CLO13~~
TO6	Carboxylic Acids and Carboxylic Acid Derivatives Nomenclature, structural	Homework and/or class discussion ~~Laboratory Experiment~~	Exam	CLO4, CLO6 ~~CLO5, CLO7, CLO9, CLO10, CLO11, CLO12, CLO13~~

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
	analysis, preparation and reactions			
TO7	Enols & Enolates Structural analysis and reactions	Homework and/or class discussion ~~Laboratory Experiment~~	Exam	CLO4, CLO6 ~~CLO5, CLO7, CLO9, CLO10, CLO11, CLO12, CLO13~~
TO8	Amines Nomenclature, structural analysis, reactions, basicity	Homework and/or class discussion ~~Laboratory Experiment~~	Exam	CLO4, CLO7 ~~CLO5, CLO8, CLO9, CLO10, CLO11, CLO12, CLO13~~

12. Methods of Instruction

In the structuring of this course, what major methods of instruction will be utilized?

Lecture/Discussion ~~Lecture/Laboratory/Discussion~~

13. General Education Goals Addressed by this Course (this section is to fulfill state requirements)

Information

Communication-Written and Oral

_____

Quantitative Knowledge and Skills

_____

Scientific Knowledge and Reasoning Yes

Related Course Learning Outcome	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7 ~~CLO7, CLO8, CLO9, CLO10, CLO11, CLO12, CLO13~~
Related Outline Component	TO1, TO2, TO3, TO4, TO5, TO6, TO7, TO8

Assessment of General Education Goal (Recommended but not limited to)

Exams and Homework assignments ~~Laboratory Reports~~

Technological Competency

Information Literacy

Society and Human Behavior

Humanistic Perspective

Historical Perspective

Global and Cultural Awareness

Ethical Reasoning and Action

Independent/Critical Thinking Yes

Related Course Learning Outcome	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7 ~~CLO7, CLO8, CLO9, CLO10, CLO11, CLO12, CLO13~~
Related Outline Component	TO1, TO2, TO3, TO4, TO5, TO6, TO7, TO8

Assessment of General Education Goal (Recommended but not limited to)

Exams and Homework assignments ~~Laboratory Reports~~

14. Needs

Instructional Materials (text etc.):

An appropriate textbook will be selected. Please contact the Department Office for current adoptions.

Technology Needs:

Computers with internet capability, Microsoft Office Suite, and classroom presentation technology ~~capability~~

Human Resource Needs (Presently Employed vs. New Faculty):

Presently employed Faculty with a Masters degree in Chemistry can teach this course.

Facility Needs:

~~A laboratory space with appropriate organic chemistry equipment.~~

Library needs:

15. Grade Determinants

The final grade in the course will be the cumulative grade based on the following letter grades or their numerical equivalents for the course assignments and examinations

A: Excellent

B+: Very Good

B: Good

C+: Above Average

C: Average

D: Below Average

F: Failure

I: Incomplete

R: Audit

For more detailed information on the Ocean County College grading system, please see Policy #5154.

16. Board Approval

History of Board
approval dates

- Revised: December, 1990
- Revised: February 27, 1996
- Revised: April 30, 1996
- Revised: December, 1998
- Revised: May 4, 2004
- Revised: August 18, 2005
- Revised: August 27, 2007
- Revised: April 27, 2009
- Revised: May 22, 2012
- Board of Trustees Approval Date: January 26, 2017
- Board of Trustees Approval Date: June 28, 2018

Reviewer
Comments

- **Vandana Saini (vsaini) (07/01/25 12:31 pm):** Rollback: Add faculty suggestions

EXHIBIT B-17

Course Change Request

Date Submitted: 06/30/25 11:06 pm

Viewing: PHYS 171 : Physics I Lecture

Last approved: 02/22/21 4:00 am

Last edit: 07/11/25 4:22 pm

Changes proposed by: Christopher MacDonald (cmacdonald)

Catalog Pages referencing this course	Approved General Education Courses Physics and Astronomy (PHYS)
Programs referencing this course	AAS.TS.TECH: Technical Studies with Industrial/Technical Option, Associate in Applied Science AS.CHEM: Chemistry, Associate in Science

Justification for this inactivation request

Learning Outcomes Display (show only)

1. Course Information

Subject	PHYS - Physics and Astronomy
New Subject	
School	Science, Technology, Engineering, Mathematics
Course Title	Physics I Lecture

2. Hours

Semester Hours	3.00000 ~~4.00000~~	
	Lecture	3.00
	Lab	0.00 ~~2.00~~
	Practicum	0

In Workflow

1. **STEM Academic Administrator**
2. **STEM Dean**
3. **Executive Director of Curriculum and Program Development**
4. **Curriculum Committee Chair**
5. **Senate Chair**
6. Vice President of Academic Affairs
7. Cabinet
8. President
9. Board of Trustees Chair
10. STEM Academic Administrator
11. Colleague

Approval Path

1. 07/01/25 8:43 am Connor Sampson (csampson): Approved for STEM Academic Administrator
2. 07/01/25 3:53 pm Vandana Saini (vsaini): Approved for STEM Dean
3. 07/07/25 9:57 am James Marshall (jmarshall): Approved for Executive Director of Curriculum and Program Development

4. 07/11/25 3:04 pm Caroline Brittain (cbrittain): Approved for Curriculum Committee Chair

History

1. Feb 22, 2021 by soconnor

Clinical
Preceptorship

3. Catalog Description

For display in the online catalog	This course is an algebra/trigonometry-based course on the fundamental concepts of mechanics, fluids, and thermodynamics. The course begins with an introduction to the nature of measurement, scalars, vector arithmetic, and one- and two-dimensional kinematics, continuing on to discuss Newton's laws of motion, energy, and momentum, universal gravitation, with an introduction to the elastic properties of materials. Static and dynamic systems are studied, in the context of both translational and rotational motion. Further topics include fluid statics and dynamics, ideal gases, heat and temperature, the laws of thermodynamics, entropy, and heat engines.

4. Requisites

Prerequisites	None
Corequisites	MATH 161 or higher For the first attempt PHYS 171L is considered a corequisite. If the student should fail either lecture or lab after the first attempt then they may take the individual failed section.

5. Course Type

Course Type for Perkins Reporting	non-vocational (not approved for Perkins funding)

6. Justification

Describe the need for this course	This course will contribute to the fulfillment of the Lab Science general education requirement for graduation and transfer.

7. General Education

Will the college submit this course to the statewide General Education Coordinating Committee for approval as a course, which satisfies a general education requirement?

Yes

General Education Category: Lab Science

General Education Status: Approved

If the course does not satisfy a general education requirement, which of the following does it satisfy:

8. Consistency with the Vision and Mission Statements, the Academic Master Plan, and the strategic initiatives of the College

Please describe how this course is consistent with Ocean County College's current Vision Statement, Mission Statement, Academic Master Plan, and the strategic initiatives of the College:

	Add item
1	Demonstrating the college’s commitment to offer comprehensive educational programs that develop intentional learners of all ages. (Mission Statement)
2	Seeking to ensure that students will thrive in an increasingly diverse and complex world. (Vision Statement)
3	Preparing students for successful transfer to other educational institutions and/or for entrance into the workforce. (Academic Master Plan)
4	Seeking to empower students through the mastery of intellectual and practical skills. (Academic Master Plan)
5	Challenging students to transfer information into knowledge and knowledge into action. (Academic Master Plan)

9. Related Courses at Other Institutions

Comparable Courses at NJ Community Colleges

Institution: Brookdale CC

Course Title: General Physics I (non-calculus) Lab

Course Number: PHYS111LAB ~~PHYS111~~

Number of Credits: 0 ~~4~~
~~(Lecture:3~~
~~Lab:2)~~

Comments	

Institution	~~Mercer County CC~~
Course Title	~~College Physics I~~
Course Number	~~PHY 101~~
Number of Credits	~~4 (3+3)~~
Comments	

Institution	~~Raritan Valley CC~~
Course Title	~~GENERAL PHYSICS I~~
Course Number	~~PHYS 101~~
Number of Credits	~~4 (3+3)~~
Comments	

Institution	Rowan College at Burlington County
Course Title	Principles of Physics I
Course Number	PHY-110 ~~PHY-110/111~~
Number of Credits	3 ~~3/1~~
Comments	contact hours: 3 lecture / 0 lab / 0 practicum

Institution	County College of Morris
Course Title	General Physics I - Lecture
Course Number	PHY-125 ~~PHY-125/126~~
Number of Credits	3 ~~3/1~~
Comments	LECT 45 hrs

Institution	~~Bergen CC~~
Course Title	~~General Physics I~~
Course Number	~~PHY-186~~
Number of Credits	~~4 (3+3)~~

Comments

Institution	Middlesex County College
Course Title	General Physics I Lecture
Course Number	PHY-123
Number of Credits	3
Comments	

Transferability of Course

Georgian Court University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
PH 111 Physics in Everyday Life 4-credits ~~PH111, PHYSICS IN EVERY DAY LIFE I, 4~~	Major (linked course must complete both lecture & lab or only elective credit is granted) ~~General Education~~	

Kean University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
PHYS 2091 General Physics I 4-credits ~~PHYS2091"K1,K3", GENERAL PHYSICS I, 4~~	Major (linked course must complete both lecture & lab or only elective credit is granted) ~~General Education~~	

Monmouth University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
PH 105 ~~PH105/105L,~~ Physics for the Life Science I 3-credits ~~Sciences I, 4~~	Major ~~General Education~~	

Rowan University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
PHYS 00210 Physics I without Calculus 4-credits ~~PHYS00210, PHYSICS I WITHOUT CALCULUS, 4~~	Major (linked course must complete both lecture & lab or only elective credit is granted) ~~General Education~~	

Rutgers - New Brunswick, Mason Gross School of the Arts

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
01750193 Physics for the Sciences 4-credits ~~01750193, PHYSICS FOR THE SCIENCES, 4~~	Major (linked course must complete both lecture & lab or only elective credit is granted) ~~General Education~~	

Stockton University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
PPHYS 2110 Physics for Life Sciences 3-credits ~~PHYS2110 "05", PHYSICS FOR LIFE SCIENCES I, 4~~	Major ~~General Education~~	

If not transferable to any institution, explain:

10. Course Learning Outcomes

Learning Outcomes

	Students who successfully complete this course will be able to:
CLO1	Use dimensional analysis to perform unit conversions, vet the validity of mathematical expressions representing physical quantities, and to surmise dimensions of unknown quantities.
CLO2	Parse pertinent information of physical systems/scenarios and form mathematical descriptions and constraints (limited to algebra and trigonometry) to address applications.
CLO3	Analyze physical systems conceptually, graphically, and quantitatively (within the confines of algebra and trigonometry) to address questions and solve for quantities using modeling and problem solving methods for a given application within ~~falling under~~ the scope ~~following topics:~~ ~~o Dimensional Analysis and Uncertainty~~ ~~o Vector arithmetic~~ ~~o 1D and 2D kinematics for constant acceleration~~

	Students who successfully complete this course will be able to:
	~~o Forces, Torque, Newton's laws~~ of the course's topics. ~~motion (statics and dynamics, translational and rotational motion)~~ ~~o Stress, Strain, and Elasticity~~ ~~o Universal gravitation~~ ~~o Work and energy (translational and rotational motion)~~ ~~o Impulse and momentum (translational and rotational motion)~~ ~~o Fluid statics and Dynamics~~ ~~o Ideal gases and Thermodynamics~~
~~CLO4~~	~~Estimate uncertainties in measured quantities and calculate the propagated uncertainty in calculated quantities and evaluate the strength of experimental conclusions by comparing uncertainty and error.~~
~~CLO5~~	~~Distinguish between accuracy and precision and determine the limiting factors on experimental results based on measurement resolution, experimental design, etc.,~~
~~CLO6~~	~~Perform experiments carefully and methodically to reduce uncertainties and exercising practical reasoning to obtain high quality data.~~
~~CLO7~~	~~Interpret graphical data and use it to draw conclusions and infer physical principles~~

11. Topical Outline

(include as many themes/skills as needed)

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
TO1	Dimensions, Units, Measurement and Uncertainty a. Assess the validity of expressions via dimensional analysis b. Express physical quantities in different units, and convert fluently between them ~~them~~ ~~c. Propagate the uncertainty for simple arithmetic operations (addition and multiplication of quantities, and multiplication by a constant)~~	Reading assignment, lecture/class discussion, problem ~~assignment~~ ~~Lecture/class discussion~~ ~~Problem~~ sets	Quizzes, exams ~~Laboratory exercise~~	CLO: 1-3 ~~1, 4-7~~
TO2	Vectors and Vector Arithmetic a. Depict vectors in graphical form and be able to graphically identify directions	Reading assignment, lecture/class discussion, problem sets ~~Reading assignment~~	Quizzes, exams ~~Laboratory exercise, exam~~	CLO: 1-3

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
	and magnitudes b. Represent vectors (algebraically) in different coordinate systems (Cartesian and polar coordinates) c. Perform vector arithmetic; addition and subtraction algebraically and graphically, and dot, and cross products algebraically	~~Lecture/class discussion~~ ~~Problem sets~~		
TO3	Kinematics with Constant Acceleration a. Define and use kinematic quantities algebraically (position, displacement, velocity, acceleration). b. Analyze motion diagrams to characterize motion according to kinematic parameters. c. Mathematically describe the linear motion (position, displacement, velocity, and acceleration) for systems in one and two dimensions undergoing a constant, uniform acceleration	Reading assignment, lecture/class discussion, problem sets ~~Reading assignment~~ ~~Lecture/class discussion~~ ~~Problem sets~~	Quizzes, exams ~~Laboratory exercise, exam~~	CLO: 1-3 ~~1-7~~
TO4	Forces and Newton's Law's of Motion a. Construct free body diagrams, depicting the forces acting on a system as well as relevant motion (acceleration, velocity); forces include contact forces with other bodies (Newton's third law) and surfaces (frictional forces and the normal force), given external forces (tension, compression, etc.), and gravity. b. Choose appropriate	Reading assignment, lecture/class discussion, problem sets ~~Reading assignment~~ ~~Lecture/class discussion~~ ~~Problem sets~~	Quizzes, exams	CLO: 1-3 ~~1-7~~

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
	coordinate systems to resolve forces in a free-body diagram, write down equations pertaining to Newton's first (statics) and second laws (dynamics), and solve these equations to find a variety of physical parameters (magnitude and directions of forces, acceleration, velocities, angles of inclination, coefficients of friction, etc.) c. Define elasticity and elastic moduli and calculate stress and strain on simple objects.			
TO5	Universal Gravitation a. Use Newton's law of gravity to calculate the force between two massive bodies and use this in the analysis of gravitational systems b. Discuss Kepler's laws of planetary motion and use them to describe satellite motion.	Reading assignment, lecture/class discussion, problem sets ~~Reading assignment Lecture/class discussion Problem sets~~	Quizzes, exams ~~Exam~~	CLO: 1-3
TO6	Work and Energy a. Calculate the work/power performed on a system by a given force b. Identify which forms (kinetic, gravitational/elastic potential) of energy a system possess in different configurations and express these mathematically c. Exploit the work-energy theorem to solve for a variety of physical quantities (velocities, positions, forces, amount of	Reading assignment, lecture/class discussion, problem ~~assignment Lecture/class discussion Problem~~ sets	Quizzes, exams ~~Laboratory exercise, exam~~	CLO: 1-3 ~~1-7~~

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
	stretching/compression of springs, elevation, etc.)			
TO7	Impulse and Momentum a. Determine the momentum of a system in one and two dimensions and relate this to the impulse a system experiences b. Classify collisions as elastic, inelastic, or perfectly inelastic c. Use the impulse-momentum theorem to analyze collisions in one dimension; determine initial and final velocities of constituent bodies, determine initial and final energies, calculate masses, etc.	Reading assignment, lecture/class discussion, problem sets ~~Reading assignment~~ ~~Lecture/class discussion~~ ~~Problem sets~~	Quizzes, exams ~~Laboratory exercise, exam~~	CLO: 1-3 ~~1-7~~
TO8	Rotational Motion a. Calculate the torque about a given axis that a force produces on a system b. Determine if a system is stable, unstable, or neutral given its configuration c. Determine the moments of inertia of simple bodies given their dimensional parameters d. Mathematically describe the angular motion (angular position, angular displacement, angular velocity, angular acceleration) as a function of time of systems undergoing a constant, uniform angular acceleration (i.e., rotational kinematics, uniform circular motion) e. Analyze systems with the rotational motion form of Newton's second law (using	Reading assignment, lecture/class discussion, problem sets ~~Reading assignment~~ ~~Lecture/class discussion~~ ~~Problem sets~~	Quizzes, exams ~~Laboratory exercise, exam~~	CLO: 1-3

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
	torques and moments of inertia) to solve for a variety of physical quantities (angular and linear position, displacement, velocity, and acceleration, torques, lever-arms, magnitudes of forces, etc.) f. Express mathematically the rotational kinetic energy of systems (spin and orbital components of kinetic energy) and use this with the conservation of energy to solve for a variety of physical quantities (both the translational and rotational quantities) in a given system g. Calculate the angular momentum and impulse of systems h. Apply the law of conservation of angular momentum to systems to solve for translational and rotational quantities			
TO9	Fluid Statics and Dynamics a. Calculate the pressure given a force and dimensions of surfaces or the density of a fluid b. Use Archimedes' principle to calculate the buoyant force on submerged bodies c. Apply buoyancy and Newton's laws to analyze systems with fluids to solve for a variety of physical quantities (densities, volumes, forces, etc.) d. Use the continuity equation to solve for initial and final	Reading assignment, lecture/class discussion, problem sets ~~Reading assignment~~ ~~Lecture/class discussion~~ ~~Problem sets~~	Quizzes, exams ~~Exam~~	CLO: 1-3

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
	velocities given a system e. Calculate the contributions to Bernoulli's equation (pressure, fluid flow, gravitational potential energy) for systems and use the Bernoulli's equation analyze systems with fluid flow to solve for a variety of physical quantities (densities, final and initial pressures, final and initial fluid velocities, etc.)			
TO10	Thermodynamics a. Define temperature and express the latter it in the Celsius, Fahrenheit, and Kelvin scales b. Define thermal equilibrium and relate it to the zeroth law of thermodynamics c. Determine the effect of temperature on solids and liquids (linear and volume expansion) and calculate the related thermal stress d. Define ideal gases and use the ideal gas law to describe its state e. Describe the kinetic theory and use it to relate the macroscopic parameters of a gas to its microscopic properties f. Describe the Maxwell Boltzmann Distribution for ideal gases g. Discuss the different modes of energy exchange via heat in thermal systems h. Define thermodynamic work and distinguish between heat and internal energy and	Reading assignment, lecture/class discussion, problem ~~assignment Lecture/class discussion Problem~~ sets	Quizzes, exams ~~Laboratory exercise, exam~~	CLO: 1-3 ~~1-7~~

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
	relate these via the first law of thermodynamics i. Use the first law to analyze isobaric, isochoric, isothermal, and adiabatic processes j. Discuss heat engines and refrigerators and state the second law of thermodynamics in terms of efficiency k. Define entropy macroscopically and microscopically and calculate the change of entropy for different thermodynamic processes l. Formulate the second law of thermodynamics in terms of entropy.			

12. Methods of Instruction

In the structuring of this course, what major methods of instruction will be utilized?

o Lecture/Discussion
o Demonstration ~~Laboratory~~

13. General Education Goals Addressed by this Course (this section is to fulfill state requirements)

Information

Communication-Written and Oral

Related Course Learning Outcome

Related Outline Component

Assessment of General Education Goal (Recommended but not limited to)

Quantitative Knowledge and Skills Yes

Related Course Learning Outcome CLO: 1-3 ~~1-7~~

Related Outline Component TO: 1-10

Assessment of General Education Goal (Recommended but not limited to)
Problem sets, quizzes, ~~labs,~~ exams

Scientific Knowledge and Reasoning Yes

Related Course Learning Outcome CLO: 1-3 ~~1-7~~

Related Outline Component TO: 1-10

Assessment of General Education Goal (Recommended but not limited to)
Problem sets, quizzes, ~~labs,~~ exams

Technological Competency

Related Course Learning Outcome

Related Outline Component

Assessment of General Education Goal (Recommended but not limited to)

Information Literacy

Related Course Learning Outcome

Related Outline Component

Assessment of General Education Goal (Recommended but not limited to)

Society and Human Behavior

Related Course Learning Outcome

Related Outline Component

Assessment of General Education Goal (Recommended but not limited to)

Humanistic Perspective

Related Course Learning Outcome

Related Outline Component

Assessment of General Education Goal (Recommended but not limited to)

Historical Perspective

Related Course Learning Outcome

Related Outline Component

Assessment of General Education Goal (Recommended but not limited to)

Global and Cultural Awareness

Related Course Learning Outcome

Related Outline Component

Assessment of General Education Goal (Recommended but not limited to)

Ethical Reasoning and Action

Related Course Learning Outcome

Related Outline Component

Assessment of General Education Goal (Recommended but not limited to)

Independent/Critical Thinking Yes

Related Course Learning Outcome CLO: 1-3 ~~1-7~~

Related Outline Component TO: 1-10

Assessment of General Education Goal (Recommended but not limited to)
Problem sets, quizzes, ~~labs,~~ exams

14. Needs

Instructional Materials (text etc.):	An appropriate textbook will be selected. Please contact the Department Office for current adoptions. Several physical apparatuses (varies by topic) for in-class demonstrations are needed, as well as the space/utilities to accommodate these. Ample board space for instruction is required.
Technology Needs:	A computer and projector for lecture presentations, as well as a projection surface (separate from the board/writing surface). ~~Additionally, a set of computers for students to use for data acquisition, processing, analysis, and report composition are needed for the lab portion of the course, as well as corresponding hardware/equipment (probes, instruments, detectors, computer interfaces, printers, etc.) and software (Microsoft Office Suite, data analysis, etc.).~~
Human Resource Needs (Presently Employed vs. New Faculty):	Peer and professional tutors.
Facility Needs:	Space at the front of the lecture room, and available power, for potential lecture demonstrations. ~~The laboratory portion requires an appropriate facility to conduct experiments (dry lab).~~
Library needs:	

15. Grade Determinants

The final grade in the course will be the cumulative grade based on the following letter grades or their numerical equivalents for the course assignments and examinations

A: Excellent

B+: Very Good

B: Good

C+: Above Average

C: Average

D: Below Average

F: Failure

I: Incomplete

R: Audit

For more detailed information on the Ocean County College grading system, please see Policy #5154.

16. Board Approval

History of Board approval dates	Board of Trustees Approval Date: September 22, 2008 Board of Trustees Approval Date: March 26, 2012 Board of Trustees Approval Date: March 29, 2018
Reviewer Comments	

Key: 1914

EXHIBIT B-18

EXHIBIT B-18

Course Change Request

Date Submitted: 06/30/25 11:05 pm

Viewing: PHYS 172 : Physics II Lecture

Last approved: 02/22/21 4:00 am

Last edit: 07/11/25 4:29 pm

Changes proposed by: Christopher MacDonald (cmacdonald)

Catalog Pages referencing this course	Approved General Education Courses Physics and Astronomy (PHYS)
Programs referencing this course	AAS.TS.TECH: Technical Studies with Industrial/Technical Option, Associate in Applied Science AS.CHEM: Chemistry, Associate in Science

Justification for this inactivation request

Learning Outcomes Display (show only)

1. Course Information

Subject	PHYS - Physics and Astronomy
New Subject	
School	Science, Technology, Engineering, Mathematics
Course Title	Physics II Lecture

2. Hours

Semester Hours	3.00000 ~~4.00000~~
Lecture	3.00
Lab	0.00 ~~2.00~~
Practicum	0

In Workflow

1. **STEM Academic Administrator**
2. **STEM Dean**
3. **Executive Director of Curriculum and Program Development**
4. **Curriculum Committee Chair**
5. **Senate Chair**
6. Vice President of Academic Affairs
7. Cabinet
8. President
9. Board of Trustees Chair
10. STEM Academic Administrator
11. Colleague

Approval Path

1. 07/01/25 8:43 am Connor Sampson (csampson): Approved for STEM Academic Administrator
2. 07/01/25 3:53 pm Vandana Saini (vsaini): Approved for STEM Dean
3. 07/07/25 9:57 am James Marshall (jmarshall): Approved for Executive Director of Curriculum and Program Development
4. 07/11/25 3:04 pm Caroline Brittain (cbrittain): Approved for Curriculum Committee Chair

History

1. Feb 22, 2021 by soconnor

Clinical

Preceptorship

3. Catalog Description

For display in the online catalog	This course is a continuation of Physics 171. Physics 172 (algebra/trigonometry based) covers latter topics in mechanics, electromagnetism, optics, and modern physics. The course begins with a study of oscillatory motion, mechanical waves, sound, and a discussion of human hearing. Topics in electromagnetism include sources and properties of electric and magnetic fields and how these interact charged particles and currents, electrical circuits, induction, and electromagnetic waves. The course covers both geometric and physical optics, including image formation, interference, and diffraction. The course ends on an introduction to special relativity and old quantum theory.

4. Requisites

Prerequisites	PHYS 171, PHYS 171L ~~171~~
Corequisites	For the first attempt PHYS 172L is considered a corequisite. If the student should fail either lecture or lab after the first attempt then they may take the individual failed section. ~~None~~

5. Course Type

Course Type for Perkins Reporting	non-vocational (not approved for Perkins funding)

6. Justification

Describe the need for this course	This course will contribute to the fulfillment of the Lab Science general education requirement for graduation and transfer.

7. General Education

Will the college submit this course to the statewide General Education Coordinating Committee for approval as a course, which satisfies a general education requirement?

Yes

General Education Category	Lab Science
General Education Status	Approved

If the course does not satisfy a general education requirement, which of the following does it satisfy:

8. Consistency with the Vision and Mission Statements, the Academic Master Plan, and the strategic initiatives of the College

Please describe how this course is consistent with Ocean County College's current Vision Statement, Mission Statement, Academic Master Plan and the strategic initiatives of the College:

	Add item
1	Demonstrating the college's commitment to offer comprehensive educational programs that develop intentional learners of all ages. (Mission Statement)
2	Seeking to ensure that students will thrive in an increasingly diverse and complex world. (Vision Statement)
3	Preparing students for successful transfer to other educational institutions and/or for entrance into the workforce.
4	Seeking to empower students through the mastery of intellectual and practical skills. (Academic Master Plan)
5	Challenging students to transfer information into knowledge and knowledge into action. (Academic Master Plan)

9. Related Courses at Other Institutions

Comparable Courses at NJ Community Colleges

Institution	Brookdale CC
Course Title	General Physics II (Non-Calculus)
Course Number	PHYS112
Number of Credits	4 ~~(Lecture:3~~ ~~Lab:2)~~
Comments	

Institution	~~Mercer County CC~~
Course Title	~~College Physics II~~
Course Number	~~PHY 102~~
Number of Credits	~~4 (3+3)~~
Comments	

Institution	~~Raritan Valley CC~~
Course Title	~~GENERAL PHYSICS II~~
Course Number	~~PHYS 102~~

Number of Credits	~~4 (3+3)~~
Comments	

Institution	Rowan College at Burlington County
Course Title	Principles of Physics II Laboratory
Course Number	PHY-112 ~~PHY-112/113~~
Number of Credits	3 ~~3/1~~
Comments	contact hours: 3 lecture / 0 lab / 0 practicum

Institution	County College of Morris
Course Title	General Physics II - Lecture
Course Number	PHY-127 ~~PHY-125/126~~
Number of Credits	3 ~~3/1~~
Comments	LECT 45 hrs

Institution	~~Bergen CC~~
Course Title	~~General Physics II~~
Course Number	~~PHY-286~~
Number of Credits	~~4 (3+3)~~
Comments	

Institution	Middlesex County College
Course Title	General Physics II Lecture
Course Number	PHY-124
Number of Credits	3
Comments	

Transferability of Course

Georgian Court University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
PH 112 Physics in Everyday Life II 4-credits ~~PH112, PHYSICS IN EVERY DAY LIFE II, 4~~	Major (linked course must complete both lecture & lab or only elective credit is granted) ~~General Education~~	

Kean University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
Kean University PHYS 2092 General Physics II 4-credits Major (linked course must complete both lecture & lab or only elective credit is granted) ~~PHYS2092 "K1,K3", GENERAL PHYSICS II, 4~~	Major (linked course must complete both lecture & lab or only elective credit is granted) ~~General Education~~	

Monmouth University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
PH 106 ~~PH106/106L,~~ Physics for the Life Science II Lab 3-credits ~~Sciences II, 4~~	Major ~~General Education~~	

Rowan University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
PHYS 00211 Physics II without Calculus 4-credits ~~PHYS00211, PHYSICS II WITHOUT CALCULUS, 4~~	Major (linked course must complete both lecture & lab or only elective credit is granted) ~~General Education~~	

Rutgers - New Brunswick, Mason Gross School of the Arts

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
01750194 Physics for the Science 4-credits ~~01750193, PHYSICS FOR THE SCIENCES, 4~~	Major (linked course must complete both lecture & lab or only elective credit is granted) ~~General Education~~	

Stockton University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
PHYS2120 Physics for Life Science ~~"05", PHYSICS FOR LIFE SCIENCES~~ II 3-credits	Major ~~General Education~~	

If not transferable to any institution, explain:

10. Course Learning Outcomes

Learning Outcomes

	Students who successfully complete this course will be able to:
CLO1	Use dimensional analysis to perform unit conversions, vet the validity of mathematical expressions representing physical quantities, and to surmise dimensions of unknown quantities.
CLO2	Parse pertinent information of physical systems/scenarios and form mathematical descriptions and constraints (limited to algebra and trigonometry) to address applications.
CLO3	Analyze physical systems conceptually, graphically, and quantitatively (within the confines of algebra and trigonometry) to address questions and solve for quantities using modeling and problem solving methods for a given application falling under the course's topics. ~~following topics:~~

	Students who successfully complete this course will be able to:
	~~o Oscillatory motion and waves~~ ~~o Electrostatics~~ ~~o Electrical circuits~~ ~~o Magnetostatics~~ ~~o Electromagnetic induction~~ ~~o Electromagnetic waves~~ ~~o Optics~~ ~~o Modern physics~~
~~CLO4~~	~~Estimate uncertainties in measured quantities and calculate the propagated uncertainty in calculated quantities and evaluate the strength of experimental conclusions by comparing uncertainty and error.~~
~~CLO5~~	~~Distinguish between accuracy and precision and determine the limiting factors on experimental results based on measurement resolution, experimental design, etc.~~
~~CLO6~~	~~Perform experiments carefully and methodically to reduce uncertainties and exercising practical reasoning to obtain high quality data.~~
~~CLO7~~	~~Interpret graphical data and use it to draw conclusions and infer physical principles.~~

11. Topical Outline

(include as many themes/skills as needed)

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
TO1	Oscillations and Waves a. Determine the period and frequency of a simple pendulum and mass-spring systems b. Calculate the velocity, position, and energy at any position of a mass-spring system c. Identify the amplitude, period, and wavelength of a (sinusoidal) wave given its graphical representation d. Relate the speed of a wave to its frequency/period	Reading assignment, lecture/class discussion, problem sets ~~Reading assignment~~ ~~Lecture/class discussion~~ ~~Problem sets~~	Quizzes, exams ~~Laboratory exercise, exam~~	CLO: 1-3 ~~1-7~~
TO2	Sound Waves and Hearing a. Given a description of a resonance cavity, be able to write down its harmonic series of allowed resonance frequencies b. Graphically depict the permitted standing waves (positional and pressure waves) given a resonance cavity; identify nodes and anti-nodes c. Calculate the sound intensity	Reading assignment, lecture/class discussion, problem ~~assignment~~ ~~Lecture/class discussion~~ ~~Problem~~ sets	Quizzes, exams ~~Laboratory exercise, exam~~	CLO: 1-3 ~~1-7~~

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
	level in dB given an intensity and vice-versa; relate the intensity of sound to power and distance from a source d. Given the description of a source and observer, determine relative frequencies and or velocities using mathematical expressions for the Doppler effect.			
TO3	Electrostatics a. Calculate the force, using Coulomb's law, on a charged particle given due to a configuration of other charged particles (both magnitude and direction) b. Determine the electric at an arbitrary point given a configuration of point charges c. Find the force on a charged particle given an electric field d. Graphically depict the electric field around a variety of charged systems e. Determine the electric potential and electric potential energy for a system of point charges f. Given an electric field, calculate the electric potential difference between two points in the region where the field is present g. Identify circuit elements given a schematic of a simple circuit (potential sources, batteries, resistors, capacitors) h. Calculate the equivalent capacitance and resistance given a network of capacitors/resistors	Reading assignment, lecture/class discussion, problem ~~assignment Lecture/class discussion Problem~~ sets	Quizzes, exams ~~Laboratory exercise, exam~~	CLO: 1-3 ~~1-7~~
TO4	Electrical Circuits a. Determine the electric current and potential drop across a resistor in a simple circuit using Ohm's law b. Use Kirchhoff's law to find the current and potential drop across resistors in simple DC circuits	Reading assignment, lecture/class discussion, problem ~~assignment Lecture/class discussion Problem~~ sets	Quizzes, exams ~~Laboratory exercise, exam~~	CLO: 1-3 ~~1-7~~

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
	(single battery, one loop) c. Mathematically relate the average and rms values of current, voltage, and power for AC circuits			
TO5	Magnetostatics a. Determine the direction of the magnetic force on a particle given a magnetic field and the particle's velocity using the right-hand rule b. Calculate the magnetic force a particle experiences in a uniform magnetic field; determine the resulting acceleration in terms of its orbital velocity, mass, charge, and radius of curvature c. Calculate the magnetic field due to a current-carrying wire and a solenoid d. Determine the magnetic force given to current-carrying wires	Reading assignment, lecture/class discussion, problem ~~assignment lecture/class discussion Problem~~ sets	Quizzes, exams ~~Exam~~	CLO: 1-3
TO6	Electromagnetic Induction a. Find the induced emf given a system with a time varying flux via Faraday's law b. Determine the polarity of an induced emf using Lenz's law	Reading assignment, lecture/class discussion, problem ~~assignment lecture/class discussion Problem~~ sets	Quizzes, exams ~~Laboratory exercise, exam~~	CLO: 1-3 ~~1-7~~
TO7	Electromagnetic Waves a. Characterize electromagnetic waves and their properties b. Identify parts of the electromagnetic spectrum and distinguish them from one another c. Calculate the energy properties of electromagnetic waves	Reading assignment, lecture/class discussion, problem ~~assignment lecture/class discussion Problem~~ sets	Quizzes, exams ~~Exam~~	CLO: 1-3
TO8	Geometric Optics a. Use ray tracing techniques for mirrors and thin lenses (convex and concave) to analyze optical systems (find object and image distances, focal lengths, etc.) b. Using Snell's law, determine angles of refraction and indices of refraction for different media	Reading assignment, lecture/class discussion, problem ~~assignment lecture/class discussion Problem~~ sets	Quizzes, exams ~~Laboratory exercise, exam~~	CLO: 1-3 ~~1-7~~

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
TO9	Physical Optics a. Locate the positions of diffraction/interference maxima and minima on a screen given a monochromatic light source and slit dimensions b. Apply the principles of interference to thin films to determine suppressed or transmitted wavelengths and the thickness of the film c. Qualitatively describe the direction of polarization of light propagating through filters d. Use Malus's law to determine the intensity of polarized light propagating through filters e. Use Brewster's law to determine the angle at which reflected light is polarized, given the index of refraction of the system	Reading assignment, lecture/class discussion, problem ~~assignment lecture/class discussion Problem~~ sets	Quizzes, exams ~~Laboratory exercise, exam~~	CLO: 1-3 ~~1-7~~
TO10	Modern Physics a. Qualitatively describe the principle of relativity and mathematically describe time dilation and Lorentz contraction b. Qualitatively describe Young's double slit experiment with electrons, the Heisenberg uncertainty principle, and wave particle duality	Reading assignment, lecture/class discussion, problem sets	Quizzes, exams	CLO: 1-3

12. Methods of Instruction

In the structuring of this course, what major methods of instruction will be utilized?

o Lecture/Discussion
o Laboratory

13. General Education Goals Addressed by this Course (this section is to fulfill state requirements)

Information

Communication-Written and Oral

Related Course Learning Outcome

Related Outline Component

Assessment of General Education Goal (Recommended but not limited to)

Quantitative Knowledge and Skills Yes

Related Course Learning Outcome 1-3 ~~CLO:1-7~~

Related Outline Component ~~TO:~~1-10

Assessment of General Education Goal (Recommended but not limited to)
Problem sets, quizzes, exams ~~Reading assignment Lecture/class discussion Problem sets Lab exercise Exam~~

Scientific Knowledge and Reasoning Yes

Related Course Learning Outcome 1-3

Related Outline Component 1-10

Assessment of General Education Goal (Recommended but not limited to)
Problem sets, quizzes, exams

Technological Competency

Related Course Learning Outcome

Related Outline Component

Assessment of General Education Goal (Recommended but not limited to)

Information Literacy

Related Course Learning Outcome

Related Outline Component

Assessment of General Education Goal (Recommended but not limited to)

Society and Human Behavior

Related Course Learning Outcome

Related Outline
Component

Assessment of General Education Goal (Recommended but not limited to)

_____

Humanistic Perspective

Related Course
Learning Outcome

Related Outline
Component

Assessment of General Education Goal (Recommended but not limited to)

_____

Historical Perspective

Related Course
Learning Outcome

Related Outline
Component

Assessment of General Education Goal (Recommended but not limited to)

_____

Global and Cultural Awareness

Related Course
Learning Outcome

Related Outline
Component

Assessment of General Education Goal (Recommended but not limited to)

_____

Ethical Reasoning and Action

Related Course
Learning Outcome

Related Outline
Component

Assessment of General Education Goal (Recommended but not limited to)

_____

Independent/Critical Thinking Yes

Related Course 1-3 ~~CLO:1-7~~
Learning Outcome

Related Outline TO: 1-10
Component

Assessment of General Education Goal (Recommended but not limited to)

Problem sets, quizzes, exams ~~ng assignment Lecture/class discussion Problem sets Lab exercise Exam~~

14. Needs

Instructional Materials (text etc.):	An appropriate textbook will be selected. Please contact the Department Office for current adoptions. Several physical apparatuses (varies by topic) for in-class demonstrations are needed, as well as the space/utilities to accommodate these. Ample board space for instruction is required.
Technology Needs:	A computer and projector for lecture presentations, as well as a projection surface (separate from the board/writing surface). ~~Additionally, a set of computers for students to use for data acquisition, processing, analysis, and report composition are needed for the lab portion of the course, as well as corresponding hardware/equipment (probes, instruments, detectors, computer interfaces, printers, etc.) and software (Microsoft Office Suite, data analysis, etc.).~~
Human Resource Needs (Presently Employed vs. New Faculty):	Peer and professional tutors.
Facility Needs:	Space at the front of the lecture room, and available power, for potential lecture demonstrations. ~~The laboratory portion requires an appropriate facility to conduct experiments (dry lab).~~
Library needs:	

15. Grade Determinants

The final grade in the course will be the cumulative grade based on the following letter grades or their numerical equivalents for the course assignments and examinations

A: Excellent

B+: Very Good

B: Good

C+: Above Average

C: Average

D: Below Average

F: Failure

I: Incomplete

R: Audit

For more detailed information on the Ocean County College grading system, please see Policy #5154.

16. Board Approval

History of Board approval dates	Board of Trustees Approval Date: September 22, 2008 Board of Trustees Approval Date: March 26, 2012

Board of Trustees Approval Date: March 29, 2018

Reviewer
Comments

Key: 1915

EXHIBIT B-19

Course Change Request

Date Submitted: 07/01/25 2:05 pm

Viewing: PHYS 180 : Introduction to Astronomy Lecture

Last approved: 02/22/21 4:00 am

Last edit: 07/11/25 4:34 pm

Changes proposed by: Connor Sampson (csampson)

Catalog Pages referencing this course	Approved General Education Courses Physics and Astronomy (PHYS)

Justification for this inactivation request

Learning Outcomes Display (show only)

1. Course Information

Subject	PHYS - Physics and Astronomy
New Subject	
School	Science, Technology, Engineering, Mathematics
Course Title	Introduction to Astronomy Lecture

2. Hours

Semester Hours	3.00 ~~4.00000~~	
	Lecture	3.00
	Lab	~~2.00~~
	Practicum	0

In Workflow

1. **STEM Academic Administrator**
2. **STEM Dean**
3. **Executive Director of Curriculum and Program Development**
4. **Curriculum Committee Chair**
5. **Senate Chair**
6. Vice President of Academic Affairs
7. Cabinet
8. President
9. Board of Trustees Chair
10. STEM Academic Administrator
11. Colleague

Approval Path

1. 07/01/25 2:06 pm Connor Sampson (csampson): Approved for STEM Academic Administrator
2. 07/01/25 3:53 pm Vandana Saini (vsaini): Approved for STEM Dean
3. 07/07/25 9:57 am James Marshall (jmarshall): Approved for Executive Director of Curriculum and Program Development
4. 07/11/25 3:04 pm Caroline Brittain (cbrittain): Approved for Curriculum Committee Chair

History

1. Feb 22, 2021 by soconnor

Clinical

Preceptorship

3. Catalog Description

For display in the online catalog	This is an introductory, one-semester course that studies the nature of the Universe: Solar System, stars, galaxies, and the overall Universe. This course investigates the tools and methods of astronomy and the implications of modern astronomical findings. The course examining the nature of the scientific method as applied to a number of key problems from the history of astronomy. It then proceeds to cover the most recent findings as to the nature, origin, and evolution of the planets, stars, galaxies, and the Universe itself. ~~Laboratory work includes observations with the unaided eye and the telescope, and analysis of more complexobservations.~~This course may be used in place of PHYS 181 Astronomy of the Solar System or PHYS 182 Astronomy of Stars and Galaxies.

4. Requisites

Prerequisites	NONE
Corequisites	MATH 023 For the first attempt PHYS 180L is considered a corequisite. If the student should fail either lecture or lab after the first attempt, then they may take the individual failed section. ~~MATH 012 or MATH 023~~

5. Course Type

Course Type for Perkins Reporting	non-vocational (not approved for Perkins funding)

6. Justification

Describe the need for this course	This course will fulfill the ~~lab~~ science requirement for programs requiring only one semester of a ~~lab~~ science. It also offers a science elective that is appealing to many students and utilizes the strong and unique astronomy resources at OCC.

7. General Education

Will the college submit this course to the statewide General Education Coordinating Committee for approval as a course, which satisfies a genera education requirement?

Yes

General Education Category	~~Lab Science~~ Science (Non-Lab)
General Education Status	Approved

If the course does not satisfy a general education requirement, which of the following does it satisfy:

8. Consistency with the Vision and Mission Statements, the Academic Master Plan, and the strategic initiatives of the College

Please describe how this course is consistent with Ocean County College's current Vision Statement, Mission Statement, Academic Master Plan, and the strategic initiatives of the College:

	Add item
1	Demonstrating the college's commitment to offer comprehensive educational programs that develop intentional learners of all ages (Mission Statement)
2	Seeking to ensure that students will thrive in an increasingly diverse and complex world (Vision Statement)
3	Preparing students for successful transfer to other educational institutions and/or for entrance into the workforce (Academic Master Plan)
4	Seeking to empower students through the mastery of intellectual and practical skills (Academic Master Plan)
5	Challenging students to transfer information into knowledge and knowledge into action (Academic Master Plan)

9. Related Courses at Other Institutions

Comparable Courses at NJ Community Colleges

Institution	Atlantic Cape CC
Course Title	Fundamentals of Astronomy
Course Number	PHYS102
Number of Credits	4
Comments	

Institution	Bergen CC
Course Title	Astronomy
Course Number	PHY-111
Number of Credits	4
Comments	

Institution	Brookdale CC
Course Title	Astronomy

Course Number	PHYS106
Number of Credits	3
Comments	

Institution	Rowan College at Burlington County
Course Title	Introduction to Astronomy
Course Number	PHY 120
Number of Credits	3
Comments	

Institution	~~Camden County College~~
Course Title	
Course Number	
Number of Credits	
Comments	

Institution	Essex County College
Course Title	Astronomy
Course Number	PHY113
Number of Credits	4
Comments	

Institution	~~Rowan College of South Jersey~~
Course Title	~~Modern Astronomy~~
Course Number	~~PHY 105~~
Number of Credits	~~4~~
Comments	

Institution	~~Hudson County CC~~
Course Title	~~None~~
Course Number	
Number of Credits	
Comments	

Institution	Mercer County CC
Course Title	The Universe
Course Number	PHY 121
Number of Credits	3
Comments	

Institution	Middlesex County College
Course Title	Planetary Astronomy
Course Number	SCI-158
Number of Credits	4
Comments	

Institution	County College of Morris
Course Title	Introduction to Astronomy
Course Number	SCI-06
Number of Credits	3
Comments	

Institution	Passaic County CC
Course Title	Astronomy
Course Number	SC105
Number of Credits	4 (3+3)
Comments	

Institution	Raritan Valley CC
Course Title	Introduction to Astronomy
Course Number	PHYS 120
Number of Credits	3
Comments	

Institution	~~Salem CC~~
Course Title	
Course Number	
Number of Credits	

Comments

Institution	Sussex County CC
Course Title	Introduction to Astronomy
Course Number	PHYS 105
Number of Credits	4
Comments	

Institution	Union County College
Course Title	Astronomy of the Solar ~~Soalr~~ System
Course Number	AST 101
Number of Credits	4
Comments	

Institution	Warren County CC
Course Title	Astronomy ~~None~~
Course Number	Physics 105
Number of Credits	3
Comments	

Institution	~~None~~
Course Title	~~Astronomy~~
Course Number	~~PI 116~~
Number of Credits	~~3~~
Comments	~~This item that appears in the original description is for Cumberland CC which no longer exists.~~

Transferability of Course

	Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
Georgian Court University	General Education 3-credits ~~GENED "G6" 4 cr.~~	General Education – Natural Science	
Kean University			

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
ASTR1100 Intro to Astronomy 4-credits ~~None~~	Major (linked course must complete both lecture & lab or only elective credit is granted)	Will not transfer

Monmouth University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
PH 150 Principles of Astronomy 3-credits ~~–4 cr.~~	Major ~~General Education Natural Science~~	

Rowan University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
ASTR11120 Intro to Astronomy 4-credits ~~ASTR17070 (GE Lab Science Elective) - 4 cr.~~	Major (linked course must complete both lecture & lab or only elective credit is granted) ~~General Education:Lab Science Elective~~	

Rutgers - New Brunswick, Mason Gross School of the Arts

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
01750EC Physics Elective 3-credits ~~Transfers as Astronomy & Cosmology 0175019 – 3 cr.~~	Major Elective ~~General Education:Natural Science~~	

Stockton University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
TRCREC Elective Transfer Credit 3-credits ~~TRCREC (ELECTIVE TRANS CREDIT) – 3 cr.~~	Elective	

If not transferable to any institution, explain:

10. Course Learning Outcomes

Learning Outcomes

	Students who successfully complete this course will be able to:
CLO1	Discuss the fundamental concepts, laws, and relationships of astronomy within the solar system and beyond the solar system in the Milky Way Galaxy and the universe at large.
CLO2	Demonstrate an understanding of basic astronomical phenomena such as the notion of the celestial sphere, early Greek cosmological models, Kepler's laws of planetary motion, Newton's laws of motion, the laws of light, etc.
CLO3	Identify the instruments and techniques of scientific inquiry and observation pertinent to astronomy. ~~astronomy, including the use and critical analysis of the results through laboratory exercises.~~
CLO4	Demonstrate skills necessary for scientific inquiry, including the application of mathematics through algebra to scientific problems.
CLO5	Discuss how our understanding of the universe is built upon past concepts and the importance of the past in shaping the future of science.

11. Topical Outline

(include as many themes/skills as needed)

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
TO1	Introduction and Scientific Method	1. Reading 2. Class discussion 3. Homework Assignment ~~Assignment~~ ~~4. Lab~~	1. Test	CLO: 1, 2, 3, 5
TO2	Celestial Sphere and Constellations	1. Reading 2. Class discussion 3. Homework Assignment ~~Assignment~~ ~~4. Lab~~	1. Test	CLO: 1, 2, 3, 4, 5
TO3	Motions in the Sky	1. Reading 2. Class discussion 3. Homework Assignment ~~Assignment~~ ~~4. Lab~~	1. Test	CLO: 1, 2, 3, 4, 5
TO4	Measurement of the Solar System	1. Reading 2. Class discussion 3. Homework Assignment ~~Assignment~~ ~~4. Lab~~	1. Test	CLO: 1, 2, 3, 5
TO5	Kepler's Laws and Newton's Laws; Origin of the Solar System	1. Reading 2. Class discussion 3. Homework Assignment ~~Assignment~~ ~~4. Lab~~	1. Test	CLO: 1, 2, 3, 4, 5
TO6	Light and Telescopes	1. Reading 2. Class discussion 3. Homework Assignment ~~Assignment~~ ~~4. Lab~~	1. Test	CLO: 2, 3, 4, 5
TO7	The Earth and Moon	1. Reading 2. Class discussion 3. Homework Assignment ~~Assignment~~ ~~4. Lab~~	1. Test	CLO: 1, 2, 3, 5
TO8	The Terrestrial Planets	1. Reading 2. Class discussion 3. Homework Assignment ~~Assignment~~ ~~4. Lab~~	1. Test	CLO: 1, 2, 3, 5
TO9	The Jovian Planets	1. Reading 2. Class discussion	1. Test	CLO: 1, 3, 5

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
		3. Homework Assignment ~~Assignment~~ ~~4. Lab~~		
TO10	Minor Members of the Solar System	1. Reading 2. Class discussion 3. Homework Assignment ~~Assignment~~ ~~4. Lab~~	1. Test	CLO: 1, 3, 5
TO11	Properties of Stars; Interstellar Medium	1. Reading 2. Class discussion 3. Homework Assignment ~~Assignment~~ ~~4. Lab~~	1. Test	CLO: 1, 3, 4, 5
TO12	Stellar Evolution	1. Reading 2. Class discussion 3. Homework Assignment ~~Assignment~~ ~~4. Lab~~	1. Test	CLO: 1, 3, 4, 5
TO13	Structure of the Milky Way	1. Reading 2. Class discussion 3. Homework Assignment ~~Assignment~~ ~~4. Lab~~	1. Test	CLO: 1, 3, 4, 5
TO14	Galaxies and Galaxy Evolution	1. Reading 2. Class discussion 3. Homework Assignment ~~Assignment~~ ~~4. Lab~~	1. Test	CLO: 1, 3, 5
TO15	Cosmology	1. Reading 2. Class discussion 3. Homework Assignment ~~Assignment~~ ~~4. Lab~~	1. Test	CLO: 1, 3, 4, 5

12. Methods of Instruction

In the structuring of this course, what major methods of instruction will be utilized?

Lecture/discussion, Videos, Demonstrations ~~Lecture/discussion, demonstration, and Laboratory~~

13. General Education Goals Addressed by this Course (this section is to fulfill state requirements)

Information

Communication-Written and Oral

Related Course Learning Outcome

Related Outline Component

Assessment of General Education Goal (Recommended but not limited to)

Quantitative Knowledge and Skills Yes

Related Course Learning Outcome CLO: 4

Related Outline Component TO: 1, 6

Assessment of General Education Goal (Recommended but not limited to)
~~1.~~Test ~~2. Lab Reports~~

Scientific Knowledge and Reasoning Yes

Related Course Learning Outcome CLO: all

Related Outline Component TO: 1 - 15

Assessment of General Education Goal (Recommended but not limited to)
~~1.~~Test ~~2. Lab Reports~~

Technological Competency

Related Course Learning Outcome

Related Outline Component

Assessment of General Education Goal (Recommended but not limited to)

Information Literacy

Related Course Learning Outcome

Related Outline Component

Assessment of General Education Goal (Recommended but not limited to)

Society and Human Behavior

Related Course
Learning Outcome

Related Outline
Component

Assessment of General Education Goal (Recommended but not limited to)

_____

Humanistic Perspective

Related Course
Learning Outcome

Related Outline
Component

Assessment of General Education Goal (Recommended but not limited to)

_____

Historical Perspective Yes

Related Course CLO: 1
Learning Outcome

Related Outline TO: 1 - 6
Component

Assessment of General Education Goal (Recommended but not limited to)
Test

_____

Global and Cultural Awareness

Related Course
Learning Outcome

Related Outline
Component

Assessment of General Education Goal (Recommended but not limited to)

_____

Ethical Reasoning and Action

Related Course
Learning Outcome

Related Outline
Component

Assessment of General Education Goal (Recommended but not limited to)

_____

Independent/Critical Thinking Yes

Related Course CLO: all
Learning Outcome

Related Outline Component	TO: 1 - 15

Assessment of General Education Goal (Recommended but not limited to)

1. Test ~~2. Lab Reports~~

14. Needs

Instructional Materials (text etc.):	Textbook, handouts, ~~laboratory exercises,~~ calculator with trigonometric functions
Technology Needs:	
Human Resource Needs (Presently Employed vs. New Faculty):	
Facility Needs:	
Library needs:	

15. Grade Determinants

The final grade in the course will be the cumulative grade based on the following letter grades or their numerical equivalents for the course assignments and examinations

A: Excellent

B+: Very Good

B: Good

C+: Above Average

C: Average

D: Below Average

F: Failure

I: Incomplete

R: Audit

For more detailed information on the Ocean County College grading system, please see Policy #5154.

16. Board Approval

History of Board approval dates	Board of Trustees Approval Date: August 27, 2007 Board of Trustees Approval Date: March 26, 2012 Board of Trustees Approval Date: February 22, 2018
Reviewer Comments	

EXHIBIT B-20

Course Change Request

Date Submitted: 06/30/25 11:06 pm

Viewing: PHYS 181 : Astronomy of the Solar System Lecture

Last approved: 04/01/25 4:17 am

Last edit: 07/11/25 4:41 pm

Changes proposed by: Christopher MacDonald (cmacdonald)

Catalog Pages referencing this course	Approved General Education Courses Physics and Astronomy (PHYS)
Other Courses referencing this course	In The Catalog Description: PHYS 180 : Introduction to Astronomy Lecture

Justification for this inactivation request

Learning Outcomes Display (show only)

1. Course Information

Subject	PHYS - Physics and Astronomy
New Subject	
School	Science, Technology, Engineering, Mathematics
Course Title	Astronomy of the Solar System Lecture

2. Hours

Semester Hours	3.00000 ~~4.00000~~
Lecture	3.00
Lab	0 ~~2.00~~
Practicum	0

In Workflow

1. **STEM Academic Administrator**
2. **STEM Dean**
3. **Executive Director of Curriculum and Program Development**
4. **Curriculum Committee Chair**
5. **Senate Chair**
6. Vice President of Academic Affairs
7. Cabinet
8. President
9. Board of Trustees Chair
10. STEM Academic Administrator
11. Colleague

Approval Path

1. 07/01/25 8:46 am Connor Sampson (csampson): Approved for STEM Academic Administrator
2. 07/01/25 3:53 pm Vandana Saini (vsaini): Approved for STEM Dean
3. 07/07/25 9:57 am James Marshall (jmarshall): Approved for Executive Director of Curriculum and Program Development
4. 07/11/25 3:04 pm Caroline Brittain (cbrittain): Approved for Curriculum Committee Chair

History

1. Feb 22, 2021 by soconnor
2. Apr 1, 2025 by James Marshall (jmarshall)

Clinical

Preceptorship

3. Catalog Description

For display in the online catalog	This is an introductory course that studies the nature of the solar system: the Sun, planets, moons, and other bodies orbiting the Sun. This course investigates the tools and methods of astronomy; the nature of the scientific method as applied to a number of key problems from the history of astronomy; the motions of the sky; recent findings as to the nature, origin, and evolution of the planets including exoplanets; and life in the universe. ~~Laboratory work includes observations with the unaided eye and analysis of more complex observations.~~

4. Requisites

Prerequisites	MATH 012 or MATH 023 with grade of C or higher, or Mathematics placement requiring no remediation.
Corequisites	For the first attempt PHYS 181L is considered a corequisite. If the student should fail either lecture or lab after the first attempt then they may take the individual failed section. ~~None~~

5. Course Type

Course Type for Perkins Reporting	non-vocational (not approved for Perkins funding)

6. Justification

Describe the need for this course	This course will provide an alternative for students to satisfy their laboratory science requirement. It also makes use of the extensive astronomy knowledge and resources available at Ocean County College to attract students to an exciting area of science.

7. General Education

Will the college submit this course to the statewide General Education Coordinating Committee for approval as a course, which satisfies a general education requirement?

Yes

General Education Category	Lab Science
General Education Status	Approved

If the course does not satisfy a general education requirement, which of the following does it satisfy:

8. Consistency with the Vision and Mission Statements, the Academic Master Plan, and the strategic initiatives of the College

Please describe how this course is consistent with Ocean County College's current Vision Statement, Mission Statement, Academic Master Plan and the strategic initiatives of the College:

	Add item
1	Demonstrating the college's commitment to offer comprehensive educational programs that develop intentional learners of all ages (Mission Statement)
2	Seeking to ensure that students will thrive in an increasingly diverse and complex world (Vision Statement)
3	Preparing students for successful transfer to other educational institutions and/or for entrance into the workforce (Academic Master Plan)
4	Seeking to empower students through the mastery of intellectual and practical skills (Academic Master Plan)
5	Challenging students to transfer information into knowledge and knowledge into action (Academic Master Plan)

9. Related Courses at Other Institutions

Comparable Courses at NJ Community Colleges

Institution	Atlantic Cape CC
Course Title	Fundamentals of Astronomy
Course Number	PHYS102
Number of Credits	4
Comments	Contact hours: 3 lec + 3 lab Lab and lecture are combined Mixed topics

Institution	Bergen CC
Course Title	Astronomy
Course Number	PHY-111
Number of Credits	4
Comments	Mixed topics. Lab and lecture are combined.

Institution	Brookdale CC
Course Title	Astronomy with Laboratory
Course Number	PHYS107 ~~PHYS106~~
Number of Credits	4 ~~3~~
Comments	Emphasis on planetary astronomy. Lab and lecture combined, though there is a separate lecture only course (no separate lab only course).

Institution	Rowan College at Burlington County
Course Title	Introduction to Astronomy
Course Number	PHY 120
Number of Credits	3
Comments	Mixed topics (planetary and stellar) Contact Hours: 3 lecture / 0 lab / 0 practicum

Institution	~~Camden County College~~
Course Title	
Course Number	
Number of Credits	
Comments	

Institution	Rowan College of South Jersey ~~None~~
Course Title	Astronomy
Course Number	PI 115 ~~116~~
Number of Credits	4 ~~3~~
Comments	This entry refers to the Cumberland campus. Mixed topics (planetary and stellar). Lab and lecture are combined. ~~This item appearing in the original course description is for Cumberland County College which no longer exists.~~

Institution	Essex County College
Course Title	Astronomy
Course Number	PHY113
Number of Credits	4
Comments	Mixed topics (planetary and stellar) Lab and lecture are combined.

Institution	Rowan College of South Jersey
Course Title	Modern Astronomy
Course Number	PHY 105
Number of Credits	4
Comments	This entry corresponds to the Gloucester campus. Mixed topics (planetary and stellar) Contact Hours: 3 lecture / 3 lab Lab and lecture are combined

Institution	Hudson County CC
Course Title	Introduction to Astronomy ~~None~~
Course Number	SCI 105
Number of Credits	4
Comments	Mixed topics (planetary and stellar). Lab and lecture are combined.

Institution	Mercer County CC
Course Title	The Universe
Course Number	PHY 121
Number of Credits	3
Comments	Mixed topics (planetary and stellar). Contact hours: 2 lecture / 2 lab Lab and lecture are combined.

Institution	Middlesex County College
Course Title	Planetary Astronomy
Course Number	SCI-158
Number of Credits	4
Comments	Emphasis on planetary. Lab and lecture are combined.

Institution	County College of Morris
Course Title	General ~~Introduction to~~ Astronomy
Course Number	SCI-118 ~~SCI-06~~
Number of Credits	4 ~~3~~

Comments	Mixed topics (planetary and stellar). Contact Hours: LECT 45 hrs, LAB 30 hrs Lab and lecture are combined

Institution	Passaic County CC
Course Title	Astronomy
Course Number	SC-105
Number of Credits	4
Comments	Mixed topics (planetary and stellar). Lab and lecture are combined.

Institution	Raritan Valley CC
Course Title	~~Introduction to~~ Astronomy
Course Number	PHYS 130
Number of Credits	4
Comments	Mixed topics (planetary and stellar). Contact Hours: 3 lecture 2 lab. Lab and lecture are combined.

Institution	~~Salem CC~~
Course Title	
Course Number	
Number of Credits	
Comments	

Institution	Sussex County CC
Course Title	Introduction to Astronomy
Course Number	105
Number of Credits	4
Comments	Emphasis on planetary. Separate lab: 105L

Institution	Union County College
Course Title	Astronomy of the Solar System
Course Number	AST 101

Number of Credits	4
Comments	Emphasis on planetary. Contact Hours: 3 lecture 3 Lab Lab and lecture are combined

Institution	Warren County CC
Course Title	Astronomy ~~None~~
Course Number	PHY 105
Number of Credits	3
Comments	Mixed topics (planetary and stellar/cosmology). Contact Hours: 3 lecture 3 lab Lab and lecture are combined.

Transferability of Course

Georgian Court University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
General Education 3-credits ~~GENED "G6" 4 cr.~~	General Education – Natural Science	

Kean University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
ASTR1100 Intro to Astronomy 4-credits ~~None~~	Major (linked course must complete both lecture & lab or only elective credit is granted)	Will not transfer

Monmouth University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
Monmouth University PH 150 Principles of Astronomy 4-credits Major ~~– 4 cr.~~	Major ~~General Education Natural Science~~	

Rowan University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
ASTR 11120 Intro to Astronomy 4-credits ~~ASTR17070 (GE Lab Science Elective) - 4 cr.~~	Major (linked course must complete both lecture & lab or only elective credit is granted) ~~General Education:Lab Science Elective~~	

Rutgers - New Brunswick, Mason Gross School of the Arts

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
01750109 ~~Transfers as~~ Astronomy & Cosmology 3-credits ~~0175019 – 3 cr.~~	General Education ~~Education: Natural Science~~	

Stockton University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
TRCREC Elective Transfer Credit 3-credits ~~TRCREC (ELECTIVE TRANS CREDIT) – 3 cr.~~	Elective	

If not transferable to any institution, explain:

10. Course Learning Outcomes

Learning Outcomes

	Students who successfully complete this course will be able to:
CLO1	Discuss the fundamental concepts, laws, and relationships of astronomy within the solar system, the characteristics and evolution of the objects in the solar system.
CLO2	Demonstrate an appreciation of our understanding of our place in the Universe based on various theoretical models from an historical perspective.
CLO3	Demonstrate an understanding of basic astronomical phenomena such as the notion of the celestial sphere, early Greek cosmological models, Kepler's laws of planetary motion, Newton's laws of motion, the laws of light, etc.
CLO4	Identify the instruments and techniques of scientific inquiry and observation pertinent to astronomy, including the use and critical analysis of the results, through ~~laboratory exercises,~~ planetarium demonstrations ~~demonstrations,~~ and naked eye observing.
CLO5	Demonstrate the skills necessary for scientific inquiry including the application of mathematics through algebra.
CLO6	Discuss how our understanding of the solar system is built upon past concepts and the importance of the past in shaping the future of science.

11. Topical Outline

(include as many themes/skills as needed)

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
TO1	Introduction and Scientific Method	1. Reading 2. Class discussion 3. Homework Assignment	1. Test	CLO: 1, 2, 3, 6
TO2	Celestial Sphere and Constellations	1. Reading 2. Class discussion 3. Homework Assignment ~~Assignment~~ ~~4. Lab~~	1. Test	CLO: 1, 2, 3, 4, 5, 6
TO3	Motions of the Sky	1. Reading 2. Class discussion 3. Homework Assignment	1. Test	CLO: 1, 2, 3, 4, 5, 6

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
		~~Assignment~~ ~~4. Lab~~		
TO4	Origins of Modern Astronomy	1. Reading 2. Class discussion 3. Homework Assignment ~~Assignment~~ ~~4. Lab~~	1. Test	CLO: 1, 2, 3, 4, 5, 6
TO5	Energy, Motion, and Gravity	1. Reading 2. Class discussion 3. Homework Assignment	1. Test	CLO: 1, 2, 3, 4, 5, 6
TO6	Atoms and Light	1. Reading 2. Class discussion 3. Homework Assignment	1. Test	CLO: 3, 4, 5, 6
TO7	Astronomical Tools	1. Reading 2. Class discussion 3. Homework Assignment ~~Assignment~~ ~~4. Lab~~	1. Test	CLO: 4, 5, 6
TO8	Origin of the Solar System	1. Reading 2. Class discussion 3. Homework Assignment	1. Test	CLO: 1, 2, 3, 4, 6
TO9	Terrestrial Planet Geology and Atmospheres	1. Reading 2. Class discussion 3. Homework Assignment	1. Test	CLO: 1, 3, 4, 6
TO10	Jovian Planets	1. Reading 2. Class discussion 3. Homework Assignment ~~Assignment~~ ~~4. Lab~~	1. Test 2. Paper/Presentation	CLO: 1, 3, 6
TO11	Asteroids, Comets	1. Reading 2. Class discussion 3. Homework Assignment	1. Test	CLO: 1, 3, 6
TO12	Exoplanets	1. Reading 2. Class discussion 3. Homework Assignment ~~Assignment~~ ~~4. Lab~~	1. Test	CLO: 1, 3, 6
TO13	The Sun as a Star	1. Reading 2. Class discussion 3. Homework Assignment	1. Test	CLO: 1, 2, 4, 5, 6
TO14	Life in the Universe	1. Reading 2. Class discussion 3. Homework Assignment	1. Test	CLO: 1, 2, 4, 6

12. Methods of Instruction

In the structuring of this course, what major methods of instruction will be utilized?	o Lecture/discussion o demonstration ~~o laboratory~~

13. General Education Goals Addressed by this Course (this section is to fulfill state requirements)

Information

Communication-Written and Oral

Related Course Learning Outcome

Related Outline Component

Assessment of General Education Goal (Recommended but not limited to)

Quantitative Knowledge and Skills	Yes
Related Course Learning Outcome	CLO: 3, 5
Related Outline Component	TO: 1, 2, 4
Assessment of General Education Goal (Recommended but not limited to)	1. Test ~~2. Lab Reports~~

Scientific Knowledge and Reasoning	Yes
Related Course Learning Outcome	CLO: all
Related Outline Component	TO: 1-14
Assessment of General Education Goal (Recommended but not limited to)	1. Test 2. ~~Lab Reports3.~~Paper

---

Technological Competency

Related Course Learning Outcome

Related Outline Component

Assessment of General Education Goal (Recommended but not limited to)

_____

Information Literacy

Related Course
Learning Outcome

Related Outline
Component

Assessment of General Education Goal (Recommended but not limited to)

_____

Society and Human Behavior

Related Course
Learning Outcome

Related Outline
Component

Assessment of General Education Goal (Recommended but not limited to)

_____

Humanistic Perspective

Related Course
Learning Outcome

Related Outline
Component

Assessment of General Education Goal (Recommended but not limited to)

_____

Historical Perspective

Related Course
Learning Outcome

Related Outline
Component

Assessment of General Education Goal (Recommended but not limited to)

_____

Global and Cultural Awareness

Related Course
Learning Outcome

Related Outline
Component

Assessment of General Education Goal (Recommended but not limited to)

Ethical Reasoning and Action	Yes
Related Course Learning Outcome	CLO: 2, 3
Related Outline Component	TO: 1, 4

Assessment of General Education Goal (Recommended but not limited to)

1. Test
2. Paper

Independent/Critical Thinking	Yes
Related Course Learning Outcome	CLO: all
Related Outline Component	TO: 1-14

Assessment of General Education Goal (Recommended but not limited to)

1. Test
2. ~~Lab Reports3.~~Paper

14. Needs

Instructional Materials (text etc.):	Textbook, handouts, laboratory exercises, calculator with trigonometric functions
Technology Needs:	The Planetarium Theater is utilized at many stages in this course. ~~Physics laboratory equipment; Telescopes and accessories~~
Human Resource Needs (Presently Employed vs. New Faculty):	Peer and professional tutors.
Facility Needs:	
Library needs:	

15. Grade Determinants

The final grade in the course will be the cumulative grade based on the following letter grades or their numerical equivalents for the course assignments and examinations

A: Excellent

B+: Very Good

B: Good

C+: Above Average

C: Average

D: Below Average

F: Failure

I: Incomplete

R: Audit

For more detailed information on the Ocean County College grading system, please see Policy #5154.

16. Board Approval

History of Board approval dates	Board of Trustees Approval Date: June 18, 2006 Board of Trustees Approval Date: March 26, 2012 Board of Trustees Approval Date: February 22, 2018
Reviewer Comments	

Key: 1917

EXHIBIT B-21

Course Change Request

Date Submitted: 06/30/25 11:06 pm

Viewing: PHYS 182 : Astronomy of Stars and Galaxies Lecture

Last approved: 04/01/25 4:17 am

Last edit: 07/11/25 4:50 pm

Changes proposed by: Christopher MacDonald (cmacdonald)

Catalog Pages referencing this course	Approved General Education Courses Physics and Astronomy (PHYS)
Other Courses referencing this course	In The Catalog Description: PHYS 180 : Introduction to Astronomy Lecture

Justification for this inactivation request

Learning Outcomes Display (show only)

1. Course Information

Subject	PHYS - Physics and Astronomy
New Subject	
School	Science, Technology, Engineering, Mathematics
Course Title	Astronomy of Stars and Galaxies Lecture

2. Hours

Semester Hours	3.00000 ~~4.00000~~
Lecture	3.00
Lab	0.00 ~~2.00~~
Practicum	0

In Workflow

1. **STEM Academic Administrator**
2. **STEM Dean**
3. **Executive Director of Curriculum and Program Development**
4. **Curriculum Committee Chair**
5. **Senate Chair**
6. Vice President of Academic Affairs
7. Cabinet
8. President
9. Board of Trustees Chair
10. STEM Academic Administrator
11. Colleague

Approval Path

1. 07/01/25 8:44 am Connor Sampson (csampson): Approved for STEM Academic Administrator
2. 07/01/25 3:53 pm Vandana Saini (vsaini): Approved for STEM Dean
3. 07/07/25 9:58 am James Marshall (jmarshall): Approved for Executive Director of Curriculum and Program Development
4. 07/11/25 3:04 pm Caroline Brittain (cbrittain): Approved for

Curriculum Committee Chair

History

1. Feb 22, 2021 by soconnor
2. Apr 1, 2025 by James Marshall (jmarshall)

Clinical

Preceptorship

3. Catalog Description

For display in the online catalog	This is an introductory course that studies the nature of the Universe: stars, formation and evolution of stars, death of stars, galaxies, and Cosmology. This course investigates the tools and methods of astronomy and the nature of the scientific method as applied to a number of key problems from stellar and galactic astronomy, and Cosmology. ~~Laboratory work includes analysis of laboratory measurements and complex observations.~~

4. Requisites

Prerequisites	MATH 012 or MATH 023 with grade of C or higher, or Mathematics placement requiring no remediation
Corequisites	For the first attempt PHYS 182L is considered a corequisite. If the student should fail either lecture or lab after the first attempt then they may take the individual failed section. ~~None~~

5. Course Type

Course Type for Perkins Reporting	non-vocational (not approved for Perkins funding)

6. Justification

Describe the need for this course	This course will provide an alternative for students to satisfy their laboratory science requirement. It also makes use of the extensive astronomy knowledge and resources available at Ocean County College to attract students to an exciting area of science.

7. General Education

Will the college submit this course to the statewide General Education Coordinating Committee for approval as a course, which satisfies a general education requirement?

Yes

General Education Category	Lab Science

General Education Status	Approved

If the course does not satisfy a general education requirement, which of the following does it satisfy:

8. Consistency with the Vision and Mission Statements, the Academic Master Plan, and the strategic initiatives of the College

Please describe how this course is consistent with Ocean County College's current Vision Statement, Mission Statement, Academic Master Plan, and the strategic initiatives of the College:

	Add item
1	Demonstrating the college's commitment to offer comprehensive educational programs that develop intentional learners of all ages (Mission Statement)
2	Seeking to ensure that students will thrive in an increasingly diverse and complex world (Vision Statement)
3	Preparing students for successful transfer to other educational institutions and/or for entrance into the workforce (Academic Master Plan)
4	Seeking to empower students through the mastery of intellectual and practical skills (Academic Master Plan)
5	Challenging students to transfer information into knowledge and knowledge into action (Academic Master Plan)

9. Related Courses at Other Institutions

Comparable Courses at NJ Community Colleges

Institution	Atlantic Cape CC
Course Title	Fundamentals of Astronomy
Course Number	PHYS102
Number of Credits	4
Comments	Contact hours: 3 lec + 3 lab Lab and lecture are combined Mixed topics

Institution	Bergen CC
Course Title	Astronomy
Course Number	PHY-111
Number of Credits	4
Comments	

Mixed topics.
Lab and lecture are combined.

Institution	Brookdale CC
Course Title	Astronomy with Laboratory
Course Number	PHYS107 ~~PHYS106~~
Number of Credits	4 ~~3~~
Comments	Emphasis on planetary astronomy. Lab and lecture combined, though there is a separate lecture only course (no separate lab only course).

Institution	Rowan College at Burlington County
Course Title	Introduction to Astronomy
Course Number	PHY 120
Number of Credits	3
Comments	Mixed topics (planetary and stellar) Contact Hours: 3 lecture / 0 lab / 0 practicum

Institution	~~Camden County College~~
Course Title	
Course Number	
Number of Credits	
Comments	

Institution	Rowan College of South Jersey ~~None~~
Course Title	Astronomy
Course Number	PI 115 ~~116~~
Number of Credits	4 ~~3~~
Comments	This entry refers to the Cumberland campus. Mixed topics (planetary and stellar). Lab and lecture are combined. ~~This item appearing in the original course description is for Cumberland County College which no longer exists.~~

Institution	Essex County College
Course Title	Astronomy

Course Number	PHY113
Number of Credits	4
Comments	Mixed topics (planetary and stellar) Lab and lecture are combined.

Institution	Rowan College of South Jersey
Course Title	Modern Astronomy
Course Number	PHY 105
Number of Credits	4
Comments	This entry refers to the Gloucester campus. Mixed topics (planetary and stellar) Contact Hours: 3 lecture / 3 lab Lab and lecture are combined

Institution	Hudson County CC
Course Title	Introduction to Astronomy ~~None~~
Course Number	SCI 105
Number of Credits	4
Comments	Mixed topics (planetary and stellar). Lab and lecture are combined.

Institution	Mercer County CC
Course Title	The Universe
Course Number	PHY 121
Number of Credits	3
Comments	Mixed topics (planetary and stellar). Contact hours: 2 lecture / 2 lab Lab and lecture are combined.

Institution	Middlesex County College
Course Title	Stellar and Galactic Astronomy ~~Planetary Astronomy~~
Course Number	SCI-256 ~~SCI-158~~
Number of Credits	4
Comments	Emphasis on stellar/galactic astronomy. Lab and lecture are combined.

Institution	County College of Morris
Course Title	General ~~Introduction to~~ Astronomy
Course Number	SCI-118 ~~SCI-06~~
Number of Credits	4 ~~3~~
Comments	Mixed topics (planetary and stellar). Contact Hours: LECT 45 hrs, LAB 30 hrs Lab and lecture are combined

Institution	Passaic County CC
Course Title	Astronomy
Course Number	SC-105
Number of Credits	4
Comments	Mixed topics (planetary and stellar). Lab and lecture are combined.

Institution	Raritan Valley CC
Course Title	Introduction to Astronomy
Course Number	PHYS 130
Number of Credits	4
Comments	Mixed topics (planetary and stellar). Contact Hours: 3 lecture 2 lab. Lab and lecture are combined. There is a separate lecture only course (PHYS 120), but no separate lab only course.

Institution	~~Salem CC~~
Course Title	
Course Number	
Number of Credits	
Comments	

Institution	Sussex County CC
Course Title	Introduction to Astronomy
Course Number	PHYS 105L
Number of Credits	
Comments	Emphasis on planetary. Separate lecture: 105

Institution	Union County College
Course Title	Astronomy Beyond ~~of~~ the Solar System
Course Number	AST 102 ~~101~~
Number of Credits	4
Comments	Emphasis on stellar/galactic. Contact Hours: 3 lecture 3 Lab Lab and lecture are combined

Institution	Warren County CC
Course Title	Astronomy ~~None~~
Course Number	PHY 105
Number of Credits	3
Comments	Mixed topics (planetary and stellar/cosmology). Contact Hours: 3 lecture 3 lab Lab and lecture are combined.

Transferability of Course

Georgian Court University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
General Education 3-credits ~~GENED "G6" 4 cr.~~	General Education – Natural Science	

Kean University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
ASTR1100 Intro to Astronomy 4-credits ~~None~~	Major (linked course must complete both lecture & lab or only elective credit is granted)	Will not transfer

Monmouth University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
PH 150 Principles of Astronomy 4-credits ~~4 cr.~~	Major (linked course must complete both lecture & lab or only elective credit is granted) ~~General Education Natural Science~~	

Rowan University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
ASTR 17070 General Education Lab Science Elective 3-credits ~~ASTR17070 (GE Lab Science Elective) - 4 cr.~~	~~GeneralEducation:~~General Education – Lab Science ~~Elective~~	

Rutgers - New Brunswick, Mason Gross School of the Arts

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
01750110 ~~Transfers as~~ Astronomy & Cosmology 3-credits ~~0175019 – 3 cr.~~	General Education ~~Education: Natural Science~~	

Stockton University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
TRCREC Elective Transfer Credit 3-credits ~~TRCREC (ELECTIVE TRANS CREDIT) – 3 cr.~~	Elective	

If not transferable to any institution, explain:

10. Course Learning Outcomes

Learning Outcomes

	Students who successfully complete this course will be able to:
CLO1	Discuss the fundamental concepts, laws, and relationships of astronomy beyond our own solar system, including the characteristics and evolution of stars, our Milky Way galaxy, other galaxies, and the Universe itself.
CLO2	Develop a working knowledge of the instruments and techniques of scientific inquiry and observations pertinent to astronomy, including the use ~~use,~~ and critical analysis of the results, ~~through laboratory exercises,~~ and planetarium observations. ~~demonstrations.~~
CLO3	Demonstrate the skills necessary for scientific inquiry including the application of mathematics through algebra to scientific problems.
CLO4	Discuss how our understanding of the universe is built upon past concepts and the importance of the past in shaping the future of science.

11. Topical Outline

(include as many themes/skills as needed)

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
TO1	Introduction and Scientific Method	1. Reading 2. Class discussion 3. Homework Assignment	1. Test	CLO: 1, 2, 4
TO2	Astronomical Tools	1. Reading 2. Class discussion 3. Homework Assignment ~~Assignment~~ ~~4. Lab Exercise~~	1. Test	CLO: 1, 2, 3, 4
TO3	Atoms and Light	1. Reading 2. Class discussion 3. Homework Assignment	1. Test	CLO: 1, 2, 3, 4

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
		~~Assignment~~ ~~4. Lab Exercise~~		
TO4	Relativity and Quantum Mechanics	1. Reading 2. Class discussion 3. Homework Assignment ~~Assignment~~ ~~4. Lab Exercise~~	1. Test	CLO: 1, 4
TO5	Stellar Spectra	1. Reading 2. Class discussion 3. Homework Assignment ~~Assignment~~ ~~4. Lab Exercise~~	1. Test	CLO: 1, 2, 3, 4
TO6	Properties of Stars	1. Reading 2. Class discussion 3. Homework Assignment	1. Test 2. Paper	CLO: 1, 2, 3, 4
TO7	The Hertzsprung-Russell Diagram	1. Reading 2. Class discussion 3. Homework Assignment ~~Assignment~~ ~~4. Lab Exercise~~	1. Test	CLO: 1, 2, 3, 4
TO8	Star Formation	1. Reading 2. Class discussion 3. Homework Assignment	1. Test	CLO: 1, 4
TO9	Stellar Evolution	1. Reading 2. Class discussion 3. Homework Assignment ~~Assignment~~ ~~4. Lab Exercise~~	1. Test	CLO: 1, 2, 3, 4
TO10	White Dwarfs, Neutron Stars, and Black Holes	1. Reading 2. Class discussion 3. Homework Assignment ~~Assignment~~ ~~4. Lab Exercise~~	1. Test	CLO: 1, 2, 3, 4
TO11	The Milky Way Galaxy	1. Reading 2. Class discussion 3. Homework Assignment ~~Assignment~~ ~~4. Lab Exercise~~	1. Test	CLO: 1, 2, 3, 4
TO12	Galaxies; Galaxy Evolution, Active Galaxies	1. Reading 2. Class discussion 3. Homework Assignment ~~Assignment~~ ~~4. Lab Exercise~~	1. Test	CLO: 1, 2, 4

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
TO13	Dark Matter; Dark Energy	1. Reading 2. Class discussion 3. Homework Assignment	1. Test	CLO: 1, 2, 4
TO14	Cosmology	1. Reading 2. Class discussion 3. Homework Assignment ~~Assignment~~ ~~4. Lab Exercise~~	1. Test	CLO: 1, 2, 3, 4

12. Methods of Instruction

In the structuring of this course, what major methods of instruction will be utilized?

o Lecture/discussion
o Demonstration ~~o laboratory~~

13. General Education Goals Addressed by this Course (this section is to fulfill state requirements)

Information

Communication-Written and Oral

Related Course Learning Outcome

Related Outline Component

Assessment of General Education Goal (Recommended but not limited to)

Quantitative Knowledge and Skills Yes

Related Course Learning Outcome CLO: 3

Related Outline Component TO: 1, 3

Assessment of General Education Goal (Recommended but not limited to)
1. Test ~~2. Lab Reports~~

Scientific Knowledge and Reasoning Yes

Related Course Learning Outcome CLO: all

Related Outline Component TO: 1-14

Assessment of General Education Goal (Recommended but not limited to)

1. Test
2. ~~Lab Reports3.~~Paper

Technological Competency

Related Course
Learning Outcome

Related Outline
Component

Assessment of General Education Goal (Recommended but not limited to)

Information Literacy

Related Course
Learning Outcome

Related Outline
Component

Assessment of General Education Goal (Recommended but not limited to)

Society and Human Behavior

Related Course
Learning Outcome

Related Outline
Component

Assessment of General Education Goal (Recommended but not limited to)

Humanistic Perspective

Related Course
Learning Outcome

Related Outline
Component

Assessment of General Education Goal (Recommended but not limited to)

Historical Perspective

Related Course
Learning Outcome

Related Outline
Component

Assessment of General Education Goal (Recommended but not limited to)

Global and Cultural Awareness

Related Course Learning Outcome

Related Outline Component

Assessment of General Education Goal (Recommended but not limited to)

Ethical Reasoning and Action	Yes
Related Course Learning Outcome	CLO: 4
Related Outline Component	TO: 1
Assessment of General Education Goal (Recommended but not limited to)	1. Test 2. ~~Lab Reports3.~~Paper

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Independent/Critical Thinking	Yes
Related Course Learning Outcome	CLO: all
Related Outline Component	TO: 1-14
Assessment of General Education Goal (Recommended but not limited to)	1. Test 2. ~~Lab Reports3.~~Paper

14. Needs

Instructional Materials (text etc.):	Textbook, handouts, ~~laboratory exercises,~~ calculator with trigonometric functions
Technology Needs:	The Planetarium Theater is utilized at many stages in this course. Physics laboratory equipment (demonstrations); ~~equipment,~~ Telescopes and accessories
Human Resource Needs (Presently Employed vs. New Faculty):	Peer and professional tutors.
Facility Needs:	
Library needs:	

15. Grade Determinants

The final grade in the course will be the cumulative grade based on the following letter grades or their numerical equivalents for the course assignments and examinations

A: Excellent

B+: Very Good

B: Good

C+: Above Average

C: Average

D: Below Average

F: Failure

I: Incomplete

R: Audit

For more detailed information on the Ocean County College grading system, please see Policy #5154.

16. Board Approval

History of Board approval dates	Board of Trustees Approval Date: June 18, 2006 Board of Trustees Approval Date: March 26, 2012 Board of Trustees Approval Date: February 22, 2018
Reviewer Comments	

Key: 1918

EXHIBIT B-22

Course Change Request

Date Submitted: 06/30/25 11:07 pm

Viewing: PHYS 281 : General Physics I Lecture

Last approved: 02/22/21 4:00 am

Last edit: 07/11/25 4:53 pm

Changes proposed by: Christopher MacDonald (cmacdonald)

Catalog Pages referencing this course	Approved General Education Courses Engineering (ENGR) Physics and Astronomy (PHYS)
Programs referencing this course	AS.CS: Computer Science, Associate in Science AS.CS.CIS: Computer Science with Cyber-Information Security Option, Associate in Science AS.ENGR: Engineering, Associate in Science AS.CS.GDD: Computer Science with Game Development & Design Option, Associate in Science AS.CS.IT: Computer Science with Information Technology Option, Associate in Science AS.CHEM: Chemistry, Associate in Science

Justification for this inactivation request

Learning Outcomes Display (show only)

1. Course Information

Subject	PHYS - Physics and Astronomy
New Subject	
School	Science, Technology, Engineering, Mathematics
Course Title	General Physics I Lecture

2. Hours

Semester Hours	3.00000 ~~4.00000~~	
Lecture		3.00
Lab	0.00 ~~3.00~~	
Practicum		0

In Workflow

1. **STEM Academic Administrator**
2. **STEM Dean**
3. **Executive Director of Curriculum and Program Development**
4. **Curriculum Committee Chair**
5. **Senate Chair**
6. Vice President of Academic Affairs
7. Cabinet
8. President
9. Board of Trustees Chair
10. STEM Academic Administrator
11. Colleague

Approval Path

1. 07/01/25 8:44 am Connor Sampson (csampson): Approved for STEM Academic Administrator
2. 07/01/25 3:53 pm Vandana Saini (vsaini): Approved for STEM Dean
3. 07/07/25 9:58 am James Marshall (jmarshall): Approved for Executive Director of Curriculum and Program Development
4. 07/11/25 3:04 pm Caroline Brittain (cbrittain): Approved for

Curriculum Committee Chair

History

1. Feb 22, 2021 by soconnor

Clinical

Preceptorship

3. Catalog Description

For display in the online catalog	This calculus-based course is a rigorous introduction to the fundamentals of Newtonian mechanics. The course begins with measurements and dimensional analysis, a description of vectors, vector decomposition, and vector arithmetic. The motion of rigid bodies is treated including translational and rotational kinematics, projectile motion, circular and rolling motion; forces, torques, Newton's laws of motion, equilibrium, and dynamics; translational and rotational work and energy; and linear and angular impulse and momentum. Further topics include oscillatory motion, resonance, mechanical waves, sound, standing waves, and superposition; and Newton's law of universal gravitation and orbital motion.

4. Requisites

Prerequisites	None
Corequisites	MATH 265 or higher For the first attempt PHYS 281L is considered a corequisite. If the student should fail either lecture or lab after the first attempt then they may take the individual failed section.

5. Course Type

Course Type for Perkins Reporting	non-vocational (not approved for Perkins funding)

6. Justification

Describe the need for this course	This course will contribute to the fulfillment of the Lab Science general education requirement for graduation and transfer. The course is required for all students planning to major in engineering, physical science, pre-med, and computer science.

7. General Education

Will the college submit this course to the statewide General Education Coordinating Committee for approval as a course, which satisfies a general education requirement?

Yes

General Education Category	Lab Science

General Education Status: Approved

If the course does not satisfy a general education requirement, which of the following does it satisfy:

8. Consistency with the Vision and Mission Statements, the Academic Master Plan, and the strategic initiatives of the College

Please describe how this course is consistent with Ocean County College's current Vision Statement, Mission Statement, Academic Master Plan, and the strategic initiatives of the College:

	Add item
1	Demonstrating the college's commitment to offer comprehensive educational programs that develop intentional learners of all ages. (Mission Statement)
2	Seeking to ensure that students will thrive in an increasingly diverse and complex world. (Vision Statement)
3	Preparing students for successful transfer to other educational institutions and/or for entrance into the workforce. (Academic Master Plan)
4	Seeking to empower students through the mastery of intellectual and Practical Skills. (Academic Master Plan)

9. Related Courses at Other Institutions

Comparable Courses at NJ Community Colleges

Institution: Brookdale CC
Course Title: General Physics I
Course Number: PHYS121
Number of Credits: 4 ~~(3+2)~~
Comments:

Institution: ~~Mercer County CC~~
Course Title: ~~University Physics I~~
Course Number: ~~PHY 115~~
Number of Credits: ~~4 (3+3)~~
Comments:

Institution: ~~Raritan Valley CC~~
Course Title: ~~ENGINEERING PHYSICS I~~

Course Number	~~PHYS 150~~
Number of Credits	~~4 (3+3)~~
Comments	

Institution	Rowan College at Burlington County
Course Title	General Physics I
Course Number	PHY-210 ~~PHY-210/211~~
Number of Credits	3 ~~3/1~~
Comments	contact hrs: 0 lec/ 2 lab / 0 practicum

Institution	~~County College of Morris~~
Course Title	~~Engineering Physics I~~
Course Number	~~PHY-130~~
Number of Credits	~~4~~
Comments	

Institution	~~Bergen CC~~
Course Title	~~Physics I~~
Course Number	~~PHY-280~~
Number of Credits	~~4 (3+3)~~
Comments	

Institution	County College of Morris
Course Title	Engineering Physics I
Course Number	PHY-130
Number of Credits	4
Comments	No lab corresponding to Engineering Physics I (PHY-130) at CCM.

Institution	Middlesex County College
Course Title	Analytical Physics I Lecture
Course Number	PHY-133
Number of Credits	3
Comments	

Transferability of Course

Georgian Court University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
PH 121 University Physics I 4-credits ~~PH121, GENERAL PHYSICS I, 4~~	Major (linked course must complete both lecture & lab or only elective credit is granted) ~~General Education~~	

Kean University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
PHYS 2095 Physics I 4-credits ~~PHYS2095 ,PHYSICS I, 4~~	Major (linked course must complete both lecture & lab or only elective credit is granted) ~~General Education~~	

Monmouth University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
PH 211 ~~PH211,~~ General Physics with Calculus I 3-credits ~~I, 4~~	Major ~~General Education~~	

Rowan University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
PHYS 00220 Introductory Mechanics 4-credits ~~PHYS00220, INTRODUCTORY MECHANICS~~	Major (linked course must complete both lecture & lab or only elective credit is granted) ~~General Education~~	

Rutgers - New Brunswick, Mason Gross School of the Arts

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
01750203 General Physics I 3-credits ~~01750203/01750205, GENERAL PHYSICS/ GENERAL PHYSICS LABORATORY, 4~~	Major ~~General Education~~	

Stockton University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
PHYS 2220 Physics I 3-credits ~~PHYS2220 "05", Physics I, 4~~	Major ~~General Education~~	

If not transferable to any institution, explain:

10. Course Learning Outcomes

Learning Outcomes

	Students who successfully complete this course will be able to:
CLO1	Use dimensional analysis to perform unit conversions, vet the validity of mathematical expressions representing physical quantities, and to surmise dimensions of unknown quantities.

	Students who successfully complete this course will be able to:
CLO2	Parse pertinent information of physical systems/scenarios and form mathematical descriptions and constraints (including the use of differential and integral calculus) to address applications
CLO3	Analyze conceptually, graphically, and quantitatively (including the use of differential and integral calculus) and address questions and solve for quantities using modeling and problem-solving ~~problem solving~~ methods for a given application pertaining to ~~falling under~~ the topics covered in the course. ~~following topics:~~ ~~o Dimensional Analysis and Uncertainty~~ ~~o Vector arithmetic~~ ~~o 1D and 2D kinematics for constant acceleration~~ ~~o Forces, Torque, Newton's laws of motion (statics and dynamics, translational and rotational motion)~~ ~~o Stress, Strain, and Elasticity~~ ~~o Universal gravitation~~ ~~o Work and energy (translational and rotational motion)~~ ~~o Impulse and momentum (translational and rotational motion)~~ ~~o Fluid statics and Dynamics~~ ~~o Oscillatory Motion~~ ~~o Mechanical Waves and Superposition~~
~~CLO4~~	~~Estimate uncertainties in measured quantities and calculate the propagated uncertainty in calculated quantities and evaluate the strength of experimental conclusions by comparing uncertainty and error.~~
~~CLO5~~	~~Distinguish between accuracy and precision and determine the limiting factors on experimental results based on measurement resolution, experimental design, etc.~~
~~CLO6~~	~~Perform experiments carefully and methodically to reduce uncertainties and exercising practical reasoning to obtain high quality data.~~
~~CLO7~~	~~Interpret graphical data and use it to draw conclusions and infer physical principles.~~

11. Topical Outline

(include as many themes/skills as needed)

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
TO1	Dimensions and Units a. ~~Dimensions, Units, Measurement and~~Uncertainty ~~a.~~Assess the validity of expressions via dimensional analysis b. Express physical quantities in different units, and convert fluently between them ~~c. Propagate the uncertainty for simple arithmetic operations~~	Reading assignment, lecture/class discussion, problem ~~assignment Lecture/class discussion Problem~~ sets	Quizzes, exams ~~Laboratory exercise~~	CLO: 1-3 ~~1, 4-7~~

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
	~~(addition and multiplication of quantities, and multiplication by a constant)~~			
TO2	Vectors and Vector Arithmetic a. Depict vectors in graphical form and be able to graphically identify directions and magnitudes b. Represent vectors (algebraically) in different coordinate systems (Cartesian and polar coordinates) c. Perform vector arithmetic; addition, subtraction, dot and cross products algebraically and graphically; use the right-hand rule to determine direction of vectors resulting from cross products	Reading assignment, lecture/class discussion, problem ~~assignment Lecture/class discussion Problem~~ sets	Quizzes, exams ~~Laboratory exercise~~	CLO: 1-3
TO3	Kinematics with Constant Acceleration a. Define and use kinematic quantities algebraically (position, displacement, velocity, acceleration). b. Analyze motion diagrams to characterize motion according to kinematic parameters. c. Mathematically describe the linear motion (position, displacement, velocity, and acceleration) for systems in one and two dimensions undergoing a constant, uniform acceleration	Reading assignment, lecture/class discussion, problem ~~assignment Lecture/class discussion Problem~~ sets	Quizzes, exams ~~Laboratory exercise, exam~~	CLO: 1-3 ~~1-7~~
TO4	Forces and Newton's Law's of Motion a. Construct free body diagrams, depicting the forces acting on a system as well as relevant motion (acceleration, velocity); forces include contact forces with other bodies (Newton's third law) and surfaces (frictional forces and the normal force), given external forces (tension, compression, etc.), and gravity. b. Choose appropriate coordinate	Reading assignment, lecture/class discussion, problem ~~assignment Lecture/class discussion Problem~~ sets	Quizzes, exams ~~Laboratory exercise, exam~~	CLO: 1-3 ~~1-7~~

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
	systems to resolve forces in a free-body diagram, write down equations pertaining to Newton's first (statics) and second laws (dynamics), and solve these equations to find a variety of physical parameters (magnitude and directions of forces, acceleration, velocities, angles of inclination, coefficients of friction, etc.) c. Define elasticity and elastic moduli and relate the (length, shear, volume) stress applied to an object to the resulting strain			
TO5	Work and Energy a. Calculate the work/power performed on a system by a given force b. Identify which forms (kinetic, gravitational/elastic potential) of energy a system possess in different configurations and express these mathematically c. Exploit the work-energy theorem to solve for a variety of physical quantities (velocities, positions, forces, amount of stretching/compression of springs, elevation, etc.)	Reading assignment, lecture/class discussion, problem ~~assignment Lecture/class discussion Problem~~ sets	Quizzes, exams ~~Laboratory exercise, exam~~	CLO: 1-3 ~~1-7~~

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
TO6	Impulse and Momentum a. Determine the momentum of a system in one and two dimensions and relate this to the impulse a system experiences b. Classify collisions as elastic, inelastic, or perfectly inelastic c. Use the impulse-momentum theorem to analyze collisions in one dimension; determine initial and final velocities of constituent bodies, determine initial and final energies, calculate masses, etc. d. Calculate the center of mass or center of gravity of a body and exploit the concept to simplify the analysis of motion of certain systems	Reading assignment, lecture/class discussion, problem ~~assignment Lecture/class discussion Problem~~ sets	Quizzes, exams ~~Laboratory exercise, exam~~	CLO: 1-3 ~~1-7~~
TO7	Rotational Motion a. Calculate the torque about a given axis that a force produces on a system b. Determine if a system is stable, unstable, or neutral given its configuration c. Determine the moments of inertia of simple bodies given their dimensional parameters and use the parallel axis theorem to find moments about different axes d. Mathematically describe the angular motion (angular position, angular displacement, angular velocity, angular acceleration) as a function of time of systems undergoing a constant, uniform angular acceleration (i.e., rotational kinematics, uniform circular motion) e. Analyze systems with the rotational and/or rolling motion form of Newton's second law (using torques and moments of inertia) to solve for a variety of physical quantities (angular and linear position, displacement, velocity, and acceleration,	Reading assignment, lecture/class discussion, problem ~~assignment Lecture/class discussion Problem~~ sets	Quizzes, exams ~~Laboratory exercise, exam~~	CLO: 1-3 ~~1-7~~

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
	torques, lever-arms, magnitudes of forces, etc.) f. Express mathematically the rotational kinetic energy of systems (spin and orbital components of kinetic energy) and use this with the conservation of energy to solve for a variety of physical quantities (both the translational and rotational quantities) in a given system g. Calculate the angular momentum and impulse of systems h. Apply the the angular impulse-momentum theorem to systems to solve for translational and rotational quantities			
TO8	Universal Gravitation a. Use Newton's law of universal gravitation to calculate the force between two massive bodies and use this in the analysis of gravitational systems b. Expand energy and momentum considerations to systems influenced by universal gravitation c. Discuss Kepler's laws of planetary motion and use them to describe satellite motion.	Reading assignment, lecture/class discussion, problem sets ~~Reading assignment~~ ~~Lecture/class discussion~~ ~~Problem sets~~	Quizzes, exams ~~Exam~~	CLO: 1-3
TO9	Oscillatory Motion a. Formulate the condition for simple harmonic to ensue, both in terms of restoring forces and torques b. Describe the motion (position, velocity, acceleration) of simple harmonic oscillators in terms of its frequency, period, amplitude, phase constant, etc. c. Identify systems executing simple harmonic oscillations and determine if systems exhibit these oscillations for small amplitudes d. Calculate the period/frequency of simple harmonic oscillations	Reading assignment, lecture/class discussion, problem ~~assignment~~ ~~Lecture/class discussion~~ ~~Problem~~ sets	Quizzes, exams ~~Laboratory exercise, exam~~	CLO: 1-3 ~~1-7~~

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
	given a system's (e.g., physical pendulums) description e. Qualitatively describe the motion of damped harmonic oscillations; distinguish between undamped, critically damped, and over damped systems. f. Describe resonance and its consequences and applications			
TO10	Mechanical Waves and Sound a. Define mechanical waves and distinguish between longitudinal and transverse waves b. Identify the properties of a waves (wavelength, period, frequency, amplitude, speed of propagation, etc.) c. Relate the phase velocity to a (non-dispersive) wave's frequency and wavelength d. Describe the 1D wave equation and use it to identify a wave's speed of propagation e. Relate the speed of propagation of a wave on a string to its linear mass density and tension f. Identify and apply appropriate boundary conditions for waves encountering interfaces to calculate reflection and transmission coefficients g, Determine the power carried by mechanical waves h. Describe sound as acoustical waves (pressure and displacement) i. Calculate properties of acoustic waves (pressure, intensity, loudness, etc.) j. Use the Doppler effect to relate perceived frequency and the relative velocity between a source and observer	Reading assignment, lecture/class discussion, problem ~~assignment Lecture/class discussion Problem~~ sets	Quizzes, exams ~~Exam~~	CLO: 1-3

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
TO11	Super Position and Resonance a. Discuss the additivity and homogeneity of the 1D wave equation and relate it to the superposition principle and apply it to interfering waves b. Exploit the principle of superposition to calculate the resultant of two interfering, phase-shifted sinusoids c. Use superposition and interference to describe standing waves; identify nodes and antinodes d. Enumerate the harmonic series for waves on a string or sound waves in a resonant cavity for different boundary conditions e. Define the beat frequency between two tones of similar amplitude and relate it to the individual tones' frequencies	Reading assignment, lecture/class discussion, problem ~~assignment~~ ~~Lecture/class discussion~~ ~~Problem~~ sets	Quizzes, exams ~~Exam~~	CLO: 1-3
TO12	Fluid Statics and Dynamics a. Calculate the pressure given a force and dimensions of surfaces or the density of a fluid b. Use Archimedes' principle to calculate the buoyant force on submerged bodies c. Apply Pascal's principle, buoyancy, and Newton's laws to analyze systems with fluids to solve for a variety of physical quantities (densities, volumes, forces, etc.) d. Use the continuity equation to solve for initial and final velocities given a system e. Calculate the contributions to Bernoulli's equation (pressure, fluid flow, gravitational potential energy) for systems and use the Bernoulli's equation analyze systems with fluid flow to solve for a variety of physical quantities (densities, final and initial pressures, final and initial fluid velocities, etc.)	Reading assignment, lecture/class discussion, problem ~~assignment~~ ~~Lecture/class discussion~~ ~~Problem~~ sets	Quizzes, exams ~~Exam~~	CLO: 1-3

12. Methods of Instruction

In the structuring of this course, what major methods of instruction will be utilized?	o Lecture/Discussion o Demonstration ~~Laboratory~~

13. General Education Goals Addressed by this Course (this section is to fulfill state requirements)

Information

Communication-Written and Oral

Related Course Learning Outcome

Related Outline Component

Assessment of General Education Goal (Recommended but not limited to)

Quantitative Knowledge and Skills — Yes

Related Course Learning Outcome — CLO: 1-3 ~~1-7~~

Related Outline Component — TO: 1-12 ~~1-10~~

Assessment of General Education Goal (Recommended but not limited to)
Problem sets, quizzes, ~~labs,~~ exams

Scientific Knowledge and Reasoning — Yes

Related Course Learning Outcome — CLO: 1-3 ~~1-7~~

Related Outline Component — TO: 1-12 ~~1-10~~

Assessment of General Education Goal (Recommended but not limited to)
Problem sets, quizzes, ~~labs,~~ exams

Technological Competency

Related Course Learning Outcome

Related Outline Component

Assessment of General Education Goal (Recommended but not limited to)

_____

Information Literacy

Related Course
Learning Outcome

Related Outline
Component

Assessment of General Education Goal (Recommended but not limited to)

_____

Society and Human Behavior

Related Course
Learning Outcome

Related Outline
Component

Assessment of General Education Goal (Recommended but not limited to)

_____

Humanistic Perspective

Related Course
Learning Outcome

Related Outline
Component

Assessment of General Education Goal (Recommended but not limited to)

_____

Historical Perspective

Related Course
Learning Outcome

Related Outline
Component

Assessment of General Education Goal (Recommended but not limited to)

_____

Global and Cultural Awareness

Related Course
Learning Outcome

Related Outline
Component

Assessment of General Education Goal (Recommended but not limited to)

Ethical Reasoning and Action

Related Course Learning Outcome

Related Outline Component

Assessment of General Education Goal (Recommended but not limited to)

Independent/Critical Thinking — Yes

Related Course Learning Outcome — CLO: 1-3 ~~1-7~~

Related Outline Component — TO: 1-12 ~~1-10~~

Assessment of General Education Goal (Recommended but not limited to)
Problem sets, quizzes, ~~labs,~~ exams

14. Needs

Instructional Materials (text etc.):	An appropriate textbook will be selected. Please contact the Department Office for current adoptions. Several physical apparatuses (varies by topic) for in-class demonstrations are needed, as well as the space/utilities to accommodate these. Ample board space for instruction is required.
Technology Needs:	A computer and projector for lecture presentations, as well as a projection surface (separate from the board/writing surface). ~~Additionally, a set of computers for students to use for data acquisition, processing, analysis, and report composition are needed for the lab portion of the course, as well as corresponding hardware/equipment (probes, instruments, detectors, computer interfaces, printers, etc.) and software (Microsoft Office Suite, data analysis, etc.).~~
Human Resource Needs (Presently Employed vs. New Faculty):	Peer and professional tutors.
Facility Needs:	Space at the front of the lecture room, and available power, for potential lecture demonstrations. ~~The laboratory portion requires an appropriate facility to conduct experiments (dry lab).~~
Library needs:	

15. Grade Determinants

The final grade in the course will be the cumulative grade based on the following letter grades or their numerical equivalents for the course assignments and examinations

A: Excellent

B+: Very Good

B: Good

C+: Above Average

C: Average

D: Below Average

F: Failure

I: Incomplete

R: Audit

For more detailed information on the Ocean County College grading system, please see Policy #5154.

16. Board Approval

History of Board approval dates	Board of Trustees Approval Date: November 6, 2006 Board of Trustees Approval Date: September 24, 2007 Board of Trustees Approval Date: September 22, 2008 Board of Trustees Approval Date: March 26, 2012 Board of Trustees Approval Date: March 29, 2018 Board of Trustees Approval Date: May 31, 2018
Reviewer Comments	

Key: 1923

EXHIBIT B-23

Course Change Request

Date Submitted: 06/30/25 11:07 pm

Viewing: PHYS 282 : General Physics II Lecture

Last approved: 02/22/21 4:00 am

Last edit: 07/11/25 4:57 pm

Changes proposed by: Christopher MacDonald (cmacdonald)

Catalog Pages referencing this course	Approved General Education Courses Engineering (ENGR) Physics and Astronomy (PHYS)
Programs referencing this course	AS.CS: Computer Science, Associate in Science AS.CS.CIS: Computer Science with Cyber-Information Security Option, Associate in Science AS.ENGR: Engineering, Associate in Science AS.CS.GDD: Computer Science with Game Development & Design Option, Associate in Science AS.CS.IT: Computer Science with Information Technology Option, Associate in Science AS.CHEM: Chemistry, Associate in Science

Justification for this inactivation request

Learning Outcomes Display (show only)

1. Course Information

Subject	PHYS - Physics and Astronomy
New Subject	
School	Science, Technology, Engineering, Mathematics
Course Title	General Physics II Lecture

2. Hours

Semester Hours	3.00000 ~~4.00000~~
Lecture	3.00
Lab	0.00 ~~3.00~~
Practicum	0

In Workflow

1. **STEM Academic Administrator**
2. **STEM Dean**
3. **Executive Director of Curriculum and Program Development**
4. **Curriculum Committee Chair**
5. **Senate Chair**
6. Vice President of Academic Affairs
7. Cabinet
8. President
9. Board of Trustees Chair
10. STEM Academic Administrator
11. Colleague

Approval Path

1. 07/01/25 8:44 am Connor Sampson (csampson): Approved for STEM Academic Administrator
2. 07/01/25 3:53 pm Vandana Saini (vsaini): Approved for STEM Dean
3. 07/07/25 9:58 am James Marshall (jmarshall): Approved for Executive Director of Curriculum and Program Development
4. 07/11/25 3:04 pm Caroline Brittain (cbrittain): Approved for

Curriculum Committee Chair

History

1. Feb 22, 2021 by soconnor

Clinical

Preceptorship

3. Catalog Description

For display in the online catalog	This calculus-based course covers thermodynamics and electromagnetism. The course begins with a discussion of temperature and heat and a description of ideal gases using the kinetic theory and the Maxwell-Boltzmann distribution. A connection between microscopic and macroscopic states is emphasized. The zeroth, first, and second laws of thermodynamics and entropy are discussed as well as their connection to thermodynamic cycles and engines. The second portion of the course deals with electricity and magnetism, including electrostatics, Gauss's law, magnetostatics, Ampere's law, the Biot Savart law, circuit analysis and Kirchhoff's rules, electromagnetic induction and Faraday's law, Maxwell's equations and electromagnetic waves.

4. Requisites

Prerequisites	PHYS-281, PHYS-281L, ~~PHYS-281~~ and MATH-265
Corequisites	MATH-266 For the first attempt PHYS 282L is considered a corequisite. If the student should fail either lecture or lab after the first attempt then they may take the individual failed section. ~~MATH-266~~

5. Course Type

Course Type for Perkins Reporting	non-vocational (not approved for Perkins funding)

6. Justification

Describe the need for this course	This course will contribute to the fulfillment of the Lab Science general education requirement for graduation and transfer. The course is required for all students planning to major in engineering, physical science, pre-med, and computer science.

7. General Education

Will the college submit this course to the statewide General Education Coordinating Committee for approval as a course, which satisfies a general education requirement?

Yes

General Education Category	Lab Science

General Education Status: Approved

If the course does not satisfy a general education requirement, which of the following does it satisfy:

8. Consistency with the Vision and Mission Statements, the Academic Master Plan, and the strategic initiatives of the College

Please describe how this course is consistent with Ocean County College's current Vision Statement, Mission Statement, Academic Master Plan, and the strategic initiatives of the College:

	Add item
1	Demonstrating the college's commitment to offer comprehensive educational programs that develop intentional learners of all ages. (Mission Statement)
2	Seeking to ensure that students will thrive in an increasingly diverse and complex world. (Vision Statement)
3	Preparing students for successful transfer to other educational institutions and/or for entrance into the workforce. (Academic Master Plan)
4	Seeking to empower students through the mastery of intellectual and Practical Skills. (Academic Master Plan)
5	Challenging students to transfer information into knowledge and knowledge into action. (Academic Master Plan)

9. Related Courses at Other Institutions

Comparable Courses at NJ Community Colleges

Institution: Brookdale CC

Course Title: General Physics II

Course Number: PHYS122

Number of Credits: 4 (3+2)

Comments:

Institution: ~~Mercer County CC~~

Course Title: ~~University Physics II~~

Course Number: ~~PHY 215~~

Number of Credits: ~~4 (3+3)~~

Comments:

Institution	~~Raritan Valley CC~~
Course Title	~~ENGINEERING PHYSICS II~~
Course Number	~~PHYS 151~~
Number of Credits	~~4 (3+3)~~
Comments	

Institution	Rowan College at Burlington County
Course Title	General Physics II
Course Number	PHY-212 ~~PHY-212/3~~
Number of Credits	3 ~~3/1 (3+3)~~
Comments	contact hours: 3 lecture / 0 lab / 0 practicum

Institution	~~County College of Morris~~
Course Title	~~Engineering Physics II~~
Course Number	~~PHY-133/134~~
Number of Credits	~~4/1 (4+1)~~
Comments	

Institution	~~Bergen CC~~
Course Title	~~Physics II~~
Course Number	~~PHY-290~~
Number of Credits	~~4 (3+3)~~
Comments	

Institution	County College of Morris
Course Title	Engineering Physics II
Course Number	PHY-133
Number of Credits	4
Comments	

Institution	Middlesex County College
Course Title	Analytical Physics II Lecture
Course Number	PHY-134

Number of Credits	3
Comments	

Transferability of Course

Georgian Court University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
PH 122 University Physics II 4-credits ~~PH122, GENERAL PHYSICS II, 4~~	Major (linked course must complete both lecture & lab or only elective credit is granted) ~~General Education~~	

Kean University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
PHYS 2196 Physics II 4-credits ~~PHYS2097, PHYSICS III, 4~~	Kean University PHYS 2196 Physics II 4-credits Major (linked course must complete both lecture & lab or only elective credit is granted) ~~General Education~~	

Monmouth University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
PH 212 ~~PH212/212L,~~ General Physics with Calculus II 3-credits ~~II, 4~~	Major ~~General Education~~	

Rowan University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
PHYS 00222 Electricity & Magnetism 4-credits ~~PHYS00222, INTRO ELECTRICITY/MAGNETISM, 4~~	Major (linked course must complete both lecture & lab or only elective credit is granted) ~~General Education~~	

Rutgers - New Brunswick, Mason Gross School of the Arts

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
01750204 General Physics or 01750227 Analytical Physics IIA 3-credits ~~01750204/ 01750206, GENERAL PHYSICS/ GENERAL PHYSICS LABORATORY~~	Major ~~General Education~~	

Stockton University

Course Code, Title, and Credits	Transfer Category	If non-transferable; select status
PHYS 2230 Physics II 3-credits ~~PHYS2230 "05", Physics II, 4~~	Major ~~General Education~~	

If not transferable to any institution, explain:

10. Course Learning Outcomes

Learning Outcomes

	Students who successfully complete this course will be able to:
CLO1	Use dimensional analysis to perform unit conversions, vet the validity of mathematical expressions representing physical quantities, and to surmise dimensions of unknown quantities.
CLO2	Parse pertinent information of physical systems/scenarios and form mathematical descriptions and constraints (including the use of differential and integral calculus) to address applications
CLO3	Analyze conceptually, graphically, and quantitatively (including the use of differential and integral calculus) and address questions and solve for quantities using modeling and problem solving methods for a given application pertaining to ~~falling under~~ the topics covered in the course. ~~following topics:~~ ~~o Ideal Gasses and Thermodynamics~~ ~~o Electrostatics~~ ~~o Current and Electrical Circuits~~ ~~o Magnetostatics~~ ~~o Electromagnetic Induction~~ ~~o Maxwell's equations and Electromagnetic Waves~~ ~~o Properties of Light, Reflection, Refraction~~ ~~o Geometric optics~~ ~~o Wave optics~~
~~CLO4~~	~~Estimate uncertainties in measured quantities and calculate the propagated uncertainty in calculated quantities and evaluate the strength of experimental conclusions by comparing uncertainty and error.~~
~~CLO5~~	~~Distinguish between accuracy and precision and determine the limiting factors on experimental results based on measurement resolution, experimental design, etc.~~
~~CLO6~~	~~Perform experiments carefully and methodically to reduce uncertainties and exercising practical reasoning to obtain high quality data.~~
~~CLO7~~	~~Interpret graphical data and use it to draw conclusions and infer physical principles.~~

11. Topical Outline

(include as many themes/skills as needed)

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
TO1	Temperature, thermodynamic equilibrium, and the 0th law of thermodynamics a. Define thermal contact and heat transfer mechanisms b. Relate temperature to thermodynamic equilibrium	Reading assignment, lecture/class discussion, problem ~~assignment~~ ~~Lecture/class discussion~~ ~~Problem~~ sets	Quizzes, exams ~~Laboratory exercise, exam~~	CLO: 1-3 ~~1-7~~

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
	c. Review thermal properties of matter and thermometers			
TO2	Ideal gasses and the ideal gas law a. Describe the ideal gas model b. Enumerate the state parameters of the ideal gas c. Define equations of state and apply the ideal gas law to solve for state parameters of a gas under going various processes	Reading assignment, lecture/class discussion, problem ~~assignment~~ ~~Lecture/class discussion~~ ~~Problem~~ sets	Quizzes, exams ~~Laboratory exercise, exam~~	CLO: 1-3 ~~1-7~~
TO3	Kinetic theory of gasses and the Maxwell Boltzmann distribution a. Connect macroscopic state variables to microscopic parameters describing the ideal gas via the kinetic theory of gases b. Discuss distribution functions and use the Maxwell Boltzmann distribution function to describe ideal gases and extract information pertaining to its state variables	Reading assignment, lecture/class discussion, problem ~~assignment~~ ~~Lecture/class discussion~~ ~~Problem~~ sets	Quizzes, exams ~~Exam~~	CLO: 1-3
TO4	Thermodynamic processes and the first law of thermodynamics a. Distinguish between state variables and transfer variables, define internal energy b. Describe isobaric, isochoric, isothermal, adiabatic processes, and general thermodynamic processes and depict these on PV diagrams c. Calculate the work pertaining to thermodynamic processes and use the first law of thermodynamics to solve for related quantities	Reading assignment, lecture/class discussion, problem ~~assignment~~ ~~Lecture/class discussion~~ ~~Problem~~ sets	Quizzes, exams ~~Exam~~	CLO: 1-3
TO5	Heat Engines and the second law of thermodynamics a. Illustrate heat engines/refrigerators as cycles on a PV diagram b. Calculate the work for Carnot and arbitrary cycles graphically and analytically and determine their efficiencies c. State the second law of	Reading assignment, lecture/class discussion, problem ~~assignment~~ ~~Lecture/class discussion~~ ~~Problem~~ sets	Quizzes, exams ~~Exam~~	CLO: 1-3

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
	thermodynamics in terms of heat engines/refrigerators (Kelvin-Plank and Claudius statements)			
TO6	Entropy a. Given a thermodynamics process, compute the associated change in entropy for an ideal gas b. Define macro- and microstates and relate these to entropy	Reading assignment, lecture/class discussion, problem ~~assignment Lecture/class discussion Problem~~ sets	Quizzes, exams ~~Exam~~	CLO: 1-3
TO7	Electrostatic forces and fields a. Use Coulomb's law to calculate the electrostatic force between point sources and extend it to determine the force between general charge distributions b. Define the electric field and distinguish from the electric force c. Compute the electrostatic field around discrete and one-, two-, and three-dimensional continuous charge distributions using direct integration d. Determine kinematic quantities for charged particles moving in a uniform electrostatic field e. Calculate the electric field for highly symmetric charge configurations using Gauss's law	Reading assignment, lecture/class discussion, problem ~~assignment Lecture/class discussion Problem~~ sets	Quizzes, exams ~~Laboratory exercise, exam~~	CLO: 1-3 ~~1-7~~
TO8	Electric potential energy and electrostatic potential a. Define a potential energy and potential difference for the electric field b. Use energy principles to solve for pertinent quantities of motion for particles moving in electric fields c. Determine the potential energy and potential difference for arbitrary collections of point and continuous charge distributions d. Calculate the capacitance given a configuration of conductors e. Find the equivalent capacitance of simply connected network of capacitors	Reading assignment, lecture/class discussion, problem ~~assignment Lecture/class discussion Problem~~ sets	Quizzes, exams ~~Exam~~	CLO: 1-3

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
	f. Relate the charge, potential, and electric field pertaining to a capacitor to the energy it stores			
TO9	Current and resistivity a. Define current and current density and relate it to properties of materials b. Distinguish between resistance and resistivity c. Express Ohm's law in terms of resistance and distinguish from the definition of resistance d. Define ohmic devices and calculate the current through them, potential across them, and power consumed by them	Reading assignment, lecture/class discussion, problem ~~assignment Lecture/class discussion Problem~~ sets	Quizzes, exams ~~Laboratory exercise, exam~~	CLO: 1-3 ~~1-7~~
TO10	Batteries, DC Circuits, and RC Circuits a. Read and draw circuit schematics and identify circuit elements b. Define emf for batteries and distinguish it from terminal potential c. Determine the power consumed by or delivered by batteries to a circuit d. Find the equivalent resistance of simply connected network of resistors e. Solve circuits using Kirchhoff's rules f. Describe the time dependence of RC circuits; determine appropriate time-dependent parameters for circuit elements in RC circuits	Reading assignment, lecture/class discussion, problem ~~assignment Lecture/class discussion Problem~~ sets	Quizzes, exams ~~Laboratory exercise, exam~~	CLO: 1-3 ~~1-7~~
TO11	Magnetic fields, forces, and torques a. Calculate the force on a charged particle moving through a magnetic field; use the right-hand rule to determine the direction of the force b. Determine the trajectory of a particle moving at constant speed in a uniform magnetic field	Reading assignment, lecture/class discussion, problem ~~assignment Lecture/class discussion Problem~~ sets	Quizzes, exams ~~Laboratory exercise, exam~~	CLO: 1-3 ~~1-7~~

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
	c. Find the force on a current-carrying wire in the vicinity of a magnetic field d. Compute the torque on a current-carrying loop immersed in a magnetic field and use this to solve related equilibrium and rotational dynamics problems e. Determine the magnetic field sourced by moving, charged point particles, moving continuous charge distributions, and conventional currents using the Biot-Savart law f. Find the force (magnitude and direction) between current-carrying wires g. Use Ampère's law to calculate the field sourced by current distributions enjoying high degrees of symmetry			
TO12	Induction and Faraday's law a. Compute the motional emf generated across a conductor moving in a magnetic field b. Use Faraday's law determine the emf generated across closed loops due time-dependent magnetic fluxes c. Calculate non-electrostatic fields sourced by time-varying magnetic fluxes d. Define self-inductance and determine it for a given geometric configuration e. Describe the time dependence of LC circuits; determine appropriate time-dependent parameters for circuit elements in	Reading assignment, lecture/class discussion, problem ~~assignment Lecture/class discussion Problem~~ sets	Quizzes, exams ~~Laboratory exercise, exam~~	CLO: 1-3 ~~1-7~~
TO13	Phasors and AC circuits a. Use phasors to analyze and solve AC circuits b. Analyze LC circuits c. Find resonance frequencies and solve RLC circuits	Reading assignment, lecture/class discussion, problem ~~assignment Lecture/class discussion Problem~~ sets	Quizzes, exams ~~Laboratory exercise, exam~~	CLO: 1-3 ~~1-7~~
TO14	Maxwell's equations a. Define and compute	Reading assignment, lecture/class discussion, problem ~~assignment~~	Quizzes, exams ~~Exam~~	CLO: 1-3

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
	displacement currents b. Use Ampère's law with Maxwell's correction to solve for a variety of related quantities c. State Maxwell's equations in point and differential form in vacuum	~~Lecture/class discussion~~ ~~Problem~~ sets		
TO15	Electromagnetic waves in free space a. Use Maxwell's equations to arrive at the 3D wave equation for electric and magnetic fields in free space b. Ascribe appropriate wave parameters/properties to electromagnetic waves c. Distinguish characteristics of waves in each part of the electromagnetic spectrum d. Calculate related dynamical parameters for electromagnetic waves (power delivered, intensity, pressure, momentum, etc.)	Reading assignment, lecture/class discussion, problem ~~assignment~~ ~~Lecture/class discussion~~ ~~Problem~~ sets	Quizzes, exams ~~Exam~~	CLO: 1-3
TO16	Reflection, Refraction, and Snell's law a. Distinguish between diffuse and specular reflection b. Use the law of reflection to relate angles and incidence and reflection and solve a for a variety of related parameters c. Define refraction and use Snell's law to relate angles of incidence and refraction; use Snell's law to calculate the speed of light in different media given indices of refraction d. Define total internal reflection and frustrated total internal refection e. Relate Huygen's and Fermat's principles to the law of reflection and Snell's law	Reading assignment, lecture/class discussion, problem ~~assignment~~ ~~Lecture/class discussion~~ ~~Problem~~ sets	Quizzes, exams ~~Laboratory exercise, exam~~	CLO: 1-3 ~~1-7~~
TO17	Geometric optics a. Distinguish between types and mirrors and assign appropriate parameters	Reading assignment, lecture/class discussion, problem ~~assignment~~ ~~Lecture/class discussion~~ ~~Problem~~ sets	Quizzes, exams ~~Laboratory exercise, exam~~	CLO: 1-3 ~~1-7~~

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
	b. Use the mirror equation to relate object and image distances to properties of a given mirror c. Distinguish between types of lenses and assign appropriate parameters d. Use the thin lens equation to relate object and images distances to properties of a given thin lens e. Use ray tracing to form ray diagrams to predict the size and location of images formed by a given configuration of optical elements f. Use the mirror or thin lens equation to solve for final image locations and magnifications given compound optical systems			
TO18	Wave optics a. Find appropriate constructive/destructive interference conditions for double slit interference b. Determine phase shifts arising from reflections from media with different indices of refraction c. Calculate the wavelength of reflected/transmitted/absorbed light undergoing thin film interference d. Find appropriate constructive/destructive interference conditions for (rectangular) single slit diffraction e. Describe the intensity pattern for multiple slits of finite width f. Use Rayleigh's criteria for circular widths to discern the resolution of sources g. Find appropriate constructive interference conditions for diffraction gratings h. Apply Bragg's law to determine x-ray diffraction maxima i. Determine the angle of polarization of reflected light via Brewster's law	Reading assignment, lecture/class discussion, problem ~~assignment~~ ~~Lecture/class discussion~~ ~~Problem~~ sets	Quizzes, exams ~~Laboratory exercise, exam~~	CLO: 1-3 ~~1-7~~

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
	j. Distinguish between ordinary and extraordinary rays and how these affect the polarization of reflected and transmitted light			

12. Methods of Instruction

In the structuring of this course, what major methods of instruction will be utilized?

o Lecture/Discussion
o Demonstration ~~Laboratory~~

13. General Education Goals Addressed by this Course (this section is to fulfill state requirements)

Information

Communication-Written and Oral

Related Course Learning Outcome

Related Outline Component

Assessment of General Education Goal (Recommended but not limited to)

Quantitative Knowledge and Skills Yes

Related Course Learning Outcome CLO: all

Related Outline Component TO: all

Assessment of General Education Goal (Recommended but not limited to)
Problem sets, quizzes, exams

Scientific Knowledge and Reasoning Yes

Related Course Learning Outcome CLO: all

Related Outline Component TO: all

Assessment of General Education Goal (Recommended but not limited to)
Problem sets, quizzes, exams ~~Reading assignment Lecture/class discussion Problem sets Lab exercise Exam~~

Technological Competency

Related Course
Learning Outcome

Related Outline
Component

Assessment of General Education Goal (Recommended but not limited to)

_____

Information Literacy

Related Course
Learning Outcome

Related Outline
Component

Assessment of General Education Goal (Recommended but not limited to)

_____

Society and Human Behavior

Related Course
Learning Outcome

Related Outline
Component

Assessment of General Education Goal (Recommended but not limited to)

_____

Humanistic Perspective

Related Course
Learning Outcome

Related Outline
Component

Assessment of General Education Goal (Recommended but not limited to)

_____

Historical Perspective

Related Course
Learning Outcome

Related Outline
Component

Assessment of General Education Goal (Recommended but not limited to)

_____

Global and Cultural Awareness

Related Outline Component

Assessment of General Education Goal (Recommended but not limited to)

_____

Ethical Reasoning and Action

Related Course Learning Outcome

Related Outline Component

Assessment of General Education Goal (Recommended but not limited to)

_____

Independent/Critical Thinking — Yes

Related Course Learning Outcome — CLO: all

Related Outline Component — TO: all

Assessment of General Education Goal (Recommended but not limited to)

Problem sets, quizzes, exams ~~Reading assignment Lecture/class discussion Problem sets Lab exercise Exam~~

14. Needs

Instructional Materials (text etc.):	An appropriate textbook will be selected. Please contact the Department Office for current adoptions. Several physical apparatuses (varies by topic) for in-class demonstrations are needed, as well as the space/utilities to accommodate these. Ample board space for instruction is required.
Technology Needs:	A computer and projector for lecture presentations, as well as a projection surface (separate from the board/writing surface). Additionally, a set of computers for students to use for data acquisition, processing, analysis, and report composition are needed for the lab portion of the course, as well as corresponding hardware/equipment (probes, instruments, detectors, computer interfaces, printers, etc.) and software (Microsoft Office Suite, data analysis, etc.).
Human Resource Needs (Presently Employed vs. New Faculty):	Peer and professional tutors.
Facility Needs:	The laboratory portion requires an appropriate facility to conduct experiments (dry lab).
Library needs:	

15. Grade Determinants

The final grade in the course will be the cumulative grade based on the following letter grades or their numerical equivalents for the course assignments and examinations

A: Excellent

B+: Very Good

B: Good

C+: Above Average

C: Average

D: Below Average

F: Failure

I: Incomplete

R: Audit

For more detailed information on the Ocean County College grading system, please see Policy #5154.

16. Board Approval

History of Board approval dates	Board of Trustees Approval Date: November 6, 2006 Board of Trustees Approval Date: September 22, 2008 Board of Trustees Approval Date: March 26, 2012 Board of Trustees Approval Date: March 29, 2018 Board of Trustees Approval Date: May 31, 2018
Reviewer Comments	

Key: 1924