NEW COURSE PROPOSAL GUIDELINES

- A. **NEW COURSE PROPOSAL FORM:** Use this for establishing a new undergraduate or graduate course as a program requirement or elective.
- B. **PROPOSAL SUBMISSION BY THE DEAN OR CHAIR TO PROVOST'S OFFICE**: Proposals originating from the academic unit are to be submitted electronically to the Provost Office/Executive Director of Academic Programs by the Dean or Chair on behalf of the department.
- C. **LETTERS OF SUPPORT FROM DEANS OF AFFECTED DEPARTMENTS:** If the Curriculum Committee requests these letters, attach them to the back of your proposal.
- D. **COURSE PROPOSAL SUBMISSION DATE**: Proposals may be submitted throughout the year, but *they must be received no later than November 15 if they require action for implementation for the following academic year.* Proposals received after the deadline may not be acted upon in time for implementation the next academic year.
- E. **CURRICULUM COMMITTEE MEETINGS:** The Curriculum Committee meets on the fourth Tuesday of each month.
- F. **2nd TUESDAY OF THE MONTH.** Proposals submitted to the Provost's Office/ on or before the second Tuesday of the month will be on that month's agenda. The last possible date to submit a new course proposal for the academic year is the 2nd Tuesday in January.

New Course Proposal

Prepare course proposal in accordance with the guidelines below and the format shown on the following pages.

COURSE PROPOSAL NUMBER: Click or tap here to enter text.

REVISION (label Revision #1, #2, etc.): Click or tap here to enter text.

SECTION 1: PROPOSAL INFORMATION

| Name: | April Townsend |
|-----------------|----------------------------------|
| Title: | Assistant Professor of Physics |
| E-mail Address: | April.townsend@fairmontstate.edu |
| Phone Number: | 304-367-4008 |

| College: | College of Science & Technology |
|--------------------------------|---------------------------------|
| Department: | Natural Sciences |
| Program Level: | Undergraduate |
| Date Originally Submitted: | Click or tap to enter a date. |
| Implementation Date Requested: | 8/1/2025 |

APPROVAL

The Deans of the affected colleges must sign below to indicate their notification and departmental support of this new course proposal. Should this new course affect any other department or program in another college, a memo must be sent to the Dean of each college impacted and a copy of the letters(s) or email(s) of support must be included with this proposal.

By signing below, you are indicating your college and department(s)'s approval of this proposal.

| College | Dean's Signature |
|----------------------|------------------|
| Science & Technology | Deb Henner |
| | |
| | |
| | |

ADDITIONAL COMMENTS:

New Course Proposal

SECTION 2: COURSE CATALOG INFORMATION

| 1. | Course Subject Prefix and number (e.g., ENGL 1101): Course number/prefix combinations may be used only once, and <u>may not be recycled</u> ; please check with the Registrar's Office to get a list of available, valid course numbers. | PHYS 3320 |
|-----|---|--|
| 2. | Course Title: The title of the course as it will appear in the course catalog. | Mechanics and Thermodynamics |
| 3. | Number of Credit Hours: Indicate the total number of credit hours for the course. If you are proposing a course with variable credit options, explain that here. | 3 |
| 4. | Repeatability (number of repeat credit hours): Students can repeat the course for credit. | 0 |
| 5. | Course Prerequisites: Include subject prefix and course number. List only immediate prerequisites (not prerequisites for other prerequisite courses). | PHYS 1102 or PHYS 1116 MATH 2502 or TECH 3300 |
| 6. | Course Co-requisites: Include subject prefix and course number. | None |
| 7. | Course Cross-listings (e.g., PSYC 2230 and SOCY 2230) | None |
| 8. | Course Restrictions (e.g., Seniors only) | None |
| 9. | Grade Type: Indicate whether students will be assigned a standard A-F final grade, a Pass/Fail (P/F) grade, or No Grade (NG). | Standard A-F |
| 10. | Requirements: Will the course be a required or elective course? What course requirements will this course satisfy? Indicate specific major, minor, or College/Department requirement(s). | One of several possible required courses for Physics Minor and Physics Grades 9-Adult Specialization, BA |
| 11. | Course Terms: In what semester(s) will the course be offered? (e.g., Fall only, Summer) | Any semester |
| 12. | Writing Intensive: Does this course fulfill the Writing Intensive major requirement? | No |
| 13. | Core Curriculum: Will the course be reviewed and considered as a University Core Curriculum course offering? If yes, you will need to submit a separate Core Curriculum application to the General Studies Committee. | No |

SECTION 3: CURRICULUM-BASED RATIONALE

What is the reason for developing the proposed course? Explain how the course fits into the curriculum. For example, is it a required or elective course for any specific program (if so, which one)? Which students will be taking this course? If there are already similar courses offered, explain why the needs of the program cannot be satisfied by an existing course. The curriculum-based rationale should be brief and to the point.

This course will replace PHYS 3325 – Advanced Physics 1 as a required course for the Physics Minor. The course description will be the same as PHYS 3325 except that the course will no longer have a lab component and so will be reduced to three credits. This is consistent with upper-level physics courses at other universities, where theory-based courses do not have a lab component.

SECTION 4: COURSE SYLLABUS

Catalog Course Description:

An in-depth, rigorous, calculus-based treatment of thermodynamics, mechanics (including Newtonian mechanics, one-dimensional dynamics, oscillatory motion, vector analysis and central forces) and wave motion.

Course Learning Outcomes:

At the end of this course, students will be able to:

- Understand the relationship between different thermodynamic quantities including temperature, pressure, heat, entropy, Helmholtz free energy, and Gibbs free energy
- Apply the laws of thermodynamics to describe physical systems
- Apply thermodynamics to describe engines and refrigerators
- Apply Newton's laws to understand the relationship between forces, motion, energy, and momentum
- Describe motion in two dimensions using calculus-based kinematics equations, including the motion of particles experiencing air resistance
- Understand the relationship between forces and energy, and apply conservation of energy to multi-particle systems
- Describe the motion of objects undergoing simple harmonic motion and damped oscillations
- Solve two-body central force problems

Assessment:

Students will be assessed via exams that include conceptual and quantitative questions on course material.

Course Outline:

- 1. Fundamentals of Thermodynamics
 - a. Thermal Equilibrium
 - b. Ideal Gas
 - c. Heat and Work
 - d. Entropy
- 2. Engines and Refrigerators
 - a. Heat Engines
 - b. Refrigerators
 - c. Carnot Cycle
 - d. Free Energy
- 3. Newton's Laws of Motion
 - a. First Law
 - b. Second Law
 - c. Third Law
- 4. Projectile Motion
 - a. Trajectory
 - b. Linear Air Resistance
 - c. Quadratic Air Resistance
- 5. Energy
 - a. Relationship between force and energy
 - b. Time-dependent potential energy
 - c. Energy of Multi-particle Systems
- 6. Oscillations
 - a. Hooke's law and Simple Harmonic Motion
 - b. 2D oscillators
 - c. Damped oscillations
- 7. Central Force Problems
 - a. Center of Mass and Reduced Mass
 - b. Equations of Motion
 - c. Orbits

CURRICULUM REVISION PROPOSAL GUIDELINES

- A. **CURRICULUM CHANGE FORM:** Use this form for substantive changes to a single program (degree, major, concentration, teaching specialization, minor, certificate). Substantive changes include:
 - 1. Adding existing or new course(s) to the program. If adding a brand-new course, complete a separate new course proposal form and attach to this proposal.
 - 2. Changes in course requirements for majors, minors, concentrations, certificates.
 - 3. Adding a concentration and using existing courses at Fairmont State.
 - 4. Changes to program credit hours.
 - 5. Other substantive curriculum changes.

B. APPROVAL STEPS

- College Dean
- Curriculum Committee
- Faculty Senate
- C. **DEPARTMENT REVIEW OF PROPOSALS:** Submitted proposals must have been carefully reviewed by the department as well as affected departments where applicable.
- D. **PROPOSAL SUBMISSION BY THE DEAN OR CHAIR TO PROVOST'S OFFICE**: Proposals originating from the academic unit are to be submitted electronically to the Provost's Office/Associate Provost by the Dean or Chair on behalf of the department.
- E. **MEMO OF SUPPORT FROM DEANS OF AFFECTED DEPARTMENTS:** If the Curriculum Committee requests these letters, attach them to the back of your proposal.
- F. **PROPOSAL SUBMISSION DATE**: Proposals may be submitted throughout the year, but they must be received no later than **November 15** if they require action for implementation for the following academic year. Proposals received after the deadline may not be acted on in time for implementation the next academic year.
- G. **CURRICULUM COMMITTEE MEETINGS:** The Curriculum Committee meets on the fourth Tuesday of each month. Proposals submitted to the Provost's Office/Associate Provost on or before the second Tuesday of the month will be on that month's agenda.

