# http://www.ric.edu/webcommunications/images/SealWithText_Small_Black.pngUNDERGRADUATE CURRICULUM COMMITTEE (UCC)PROPOSAL FORM

## Cover page roll over blue text to see further important [instructions](#instructions): please read.

**N.B. DO NOT USE HIGHLIGHT, JUST DELETE THE WORDS THAT DO NOT APPLY TO YOUR PROPOSAL**

**ALL numbers in section (A) need to be completed, including the impact ones.**

|  |  |  |
| --- | --- | --- |
| A.1. [Course or program](#Proposal) | **physics 403** |  |
| [Replacing](#Ifapplicable)  |  |  |
| A.2. [Proposal type](#type) | **Course: revision**  |  |
| A.3. [Originator](#Originator) | **Andrea Del Vecchio** | [Home department](#home_dept) | **Physical Sciences** |
| A.4. [Rationale](#Rationale) | **In order to allow the coverage of material through the hydrogen atom in PHYS 307, we will need to move the material on Special Relativity into this course. The increase to four credits would allow the inclusion of this material as well as the inclusion of some computational physics material. The description will be revised to include the added materials.** |
| A.5. [Date submitted](#date_submitted) | **3/31/17** | A.6. [Semester effective](#Semester_effective)  | Fall, 2017 |
| A.7. [Resource impact](#Resource) | *[Faculty PT & FT](#faculty" \o "Need to hire new full-time or part-time faculty? This is where you indicate if this proposal will be affecting FLH in your department/program.)*:  | **One additional load hour every other year** |
|  | [*Library*:](#library) | **None** |
|  | [*Technology*](#technology) | **None** |
|  | [*Facilities*](#facilities): | **none** |
| A.8. [Program impact](#prog_impact) | **This would affect only the physics and physics secondary education programs.** |
| A.9. [Student impact](#student_impact) | **This will allow students to have a see Special Relativity in their undergraduate program.** |
| A.10. The following screen tips are for information on what to do about catalog copy until the new CMS is in place; check the “Forms and Information” page for updates. [Catalog page.](#catalog)  [Where are the catalog pages](#catalog)? [Several related proposals](#catalog)? Do **not** list catalog pages here. **All** catalog copy for a proposal must be contained within a **single** file; put page breaks between sections. Make sure affected program totals are correct if adding/deleting course credits. |

B. [NEW OR REVISED COURSES](#delete_if) **DELETE THE WORDS THAT DO NOT APPLY TO YOUR PROPOSAL within specific categories, but do not delete any of the categories. DO NOT use highlight. Delete this whole page if this proposal does not include a new or revised course.**

|  | Old ([for revisions only](#Revisions)) | New |
| --- | --- | --- |
| B.1. [Course prefix and number](#cours_title)  | **PHYS 403** | **PHYS 403** |
| B.2. Cross listing number if any |  |  |
| B.3. [Course title](#title)  | **Classical Mechanics** | **Classical Mechanics** |
| B.4. [Course description](#description)  | This course covers, at an advanced level, the classical theory of linear and rotational dynamics of particles and continuous media. An introduction to Lagrangian mechanics is included. Lecture. (Formerly Intermediate Mechanics.) | This course covers, at an advanced level, the classical theory of linear and rotational dynamics of particles and continuous media. An introduction to Lagrangian mechanics and special relativity is included. Lecture. (Formerly Intermediate Mechanics.) |
| B.5. [Prerequisite(s)](#prereqs) | **PHYS 201, MATH 314** | **PHYS 201, MATH 314** |
| B.6. [Offered](#Offered) | **Fall** **Even years**  | **Fall** **Even years**  |
| B.7. [Contact hours](#contacthours)  | **3** | **4** |
| B.8. [Credit hours](#credits) | **3** | **4** |
| B.9. [Justify differences if any](#differences) |  |
| B.10. [Grading system](#grading)  | **Letter grade**  | **Letter grade**  |
| B.11. [Instructional methods](#instr_methods) | **Lecture**  | **Lecture**  |
| B.12.[Categories](#required) | **Required for major/minor**  | **Required for major/minor**  |
| B.13. Is this an Honors course? | **NO** | **NO** |
| B.14. [General Education](#ge)N.B. Connections must include at least 50% Standard Classroom instruction. |  **NO**  | **NO****:** |
| B.15. [How will student performance be evaluated?](#performance) | **Attendance | Class participation | Exams | Presentations |Class Work | Quizzes | Projects |**  | **Attendance | Class participation | Exams | Presentations |Class Work | Quizzes | Projects |**  |
| B.16. [Redundancy statement](#competing) |  |  |
| B. 17. Other changes, if any |  |

| B.18**.** [**Course learning outcomes**](#outcomes) | [**Standard(s)**](#standards) | [**How will they be measured**](#measured)**?** |
| --- | --- | --- |
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| B.19. [**Topical outline**](#outline) |
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| 1. Newton’s Laws of Motion
	1. Mass and force
	2. Newton’s First and Second Laws and inertial reference frames
	3. Newton’s Third Law and Conservation of Momentum
	4. Newton’s Second Law in Cartesian and Polar Coordinates
2. Projectiles and Charged Particles
	1. Linear air resistance
	2. Quadratic air resistance
	3. Motion of a charge in a uniform magnetic field
3. Momentum and Angular Momentum
	1. Conservation of Momentum
	2. Center of Mass
	3. Angular momentum for a single particle and a system of particles
4. Energy
	1. Kinetic energy and work
	2. Potential energy and conservative forces
	3. Force as the gradient of potential energy
	4. Time dependent potential energy
	5. Energy for one dimensional systems
	6. Central forces
	7. Two particle and multiparticle systems
5. Oscillations
	1. Hooke’s Law
	2. Simple harmonic motion
	3. Two dimensional oscillations
	4. Damped and driven oscillations
	5. Resonance
6. Calculus of Variations and Lagrange’s Equations
	1. The Euler-Lagrange equation
	2. Applications of the Euler-Lagrange equation
	3. Lagrange’s equations for unconstrained motion
	4. Constrained motion
	5. Generalized momentum and ignorable coordinates
7. Two Body Central Force Problems
	1. Reduced mass
	2. Equations of motion
	3. Equivalent one dimensional problem
	4. Kepler orbits
8. Mechanics in Non-inertial Frames
	1. Acceleration without rotation
	2. The tides
	3. Time derivatives in a rotating frame
	4. Newton’s Second Law in a rotating Frame
	5. The centrifugal force and the Coriolis force
9. Special Relativity
	1. Galilean relativity
	2. The postulates of Special Relativity
	3. Time dilation and length contraction
	4. The Lorentz Transformation
	5. Relativistic velocity addition
	6. Four dimensional space
	7. The light cone
	8. The Doppler effect
	9. Mass, velocity, momentum and energy
	10. Collisions
	11. Force in Relativity
	12. Photons
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|  |

## D. Signatures

##### D.1. Approvals

* Changes that affect General Education in any way MUST be approved by ALL Deans and COGE Chair.
* Changes that directly impact more than one department/program MUST have the signatures of all relevant department chairs, program directors, and relevant dean (e.g. when creating/revising a program using courses from other departments/programs). Check UCC manual 4.2 for further guidelines on whether the signatures need to be approval or acknowledgement.
* Proposals that do not have appropriate approval signatures will not be considered.
* Type in name of person signing and their position/affiliation.
* Send electronic files of this proposal and accompanying catalog copy to curriculum@ric.edu and a printed or electronic signature copy of this form to the current Chair of UCC. Check UCC website for due dates.

| Name | Position/affiliation | [Signature](#_Signature" \o "Insert electronic signature, if available, in this column) | Date |
| --- | --- | --- | --- |
| Dr. Peter Meyer | Chair of Physical Sciences |  |  |
| Dr. Earl Simson | Dean of Arts of Sciences |  |  |
| Dr. Donald Halquist | Dean of the Feinstein School of Education and Human Development |  | Tab to add rows |

##### D.2. [Acknowledgements](#acknowledge)

| Name | Position/affiliation | [Signature](#Signature_2) | Date |
| --- | --- | --- | --- |
| Dr. Gerri August | Chair of Educational Studies |  |  |
|  |  |  |  |
|  |  |  | Tab to add rows |