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

## Cover page scroll over blue text to see further important [instructions](#instructions): [if not working select “COMMents on rollover” in your Word preferences under view] **please read these.**

**N.B. ALL numbered categories in section (A) must be completed. Please do not use highlight to select choices within a category but simply delete the options that do not apply to your proposal (e.g. in A.2 if this is a course revision proposal, just delete the creation and deletion options and the various program ones, so it reads “course revision”) Do not delete any of the numbered categories—if they do not apply leave them blank. If there are no resources impacted please put “none” in each A. 7 category.**

|  |  |  |
| --- | --- | --- |
| A.1. [Course or program](#Proposal) | **PHYS 306W Quantum Mechanics Laboratory** |  |
| [Replacing](#Ifapplicable)  |  |
| A. 1b. Academic unit | **Faculty of Arts and Sciences**  |  |
| A.2. [Proposal type](#type) | **Course: creation**  |  |
| A.3. [Originator](#Originator) | **Andrea Del Vecchio** | [Home department](#home_dept) | **Physical Sciences** |
| A.4. [Context and Rationale](#Rationale) Note: Must include additional information in smart tip for all [new programs](#type) | **For more flexibility for students, we would like to break the previously 3-credit Physics 313 Junior Lab into two one credit labs with the one described here associated with Quantum Mechanics and another one with Thermodynamics (PHYS 313 will be deleted). This will also make a permanent space in the program for the computational physics that we are trying to incorporate across the curriculum. In addition, this will align this course to have the same structure as a similar course in the Chemistry program.**

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| --- |
| **Two-year load for affected courses** |
| Current Program | Revised Program |
| PHYS 313W | Yearly at 6FLH | 12 | PHYS 306W | Odd yrs at 3 FLH | 3 |
| PHYS 307 | Odd yrs. At 4. FLH | 4 | PHYS 307 | Odd yrs at 3 FLH | 3 |
| PHYS 311 | Even yrs. At 4 FLH | 4 | PHYS 310W | Even yrs at 3 FLH | 3 |
|  |  |  | PHYS 311 | Even yrs at 3 FLH | 3 |
|  | TOTAL | 20 |  | TOTAL | 12 |

 |
| A.5. [Student impact](#student_impact)Must include to explain why this change is being made? | **This will give students more flexibility in completing the physics program. The Junior/Senior lab sequence is offered only in the fall. If students get out of sync with their courses this often means they have to stay an extra semester just to complete Senior Lab. This is especially true for transfer students. The new lab courses can be taken in any order.** |
| A.6. [Impact on other programs](#impact)  | **PHYS 313W was a WID course and we will continue to give the same writing instruction in this new course that is covering half of the PHYS 313W material, so we would like to maintain its WID status.** |
| A.7. [Resource impact](#Resource) | [*Faculty PT & FT*](#faculty):  | **This change reduces overall load for the physics program since it replaces a 6 FLH lab (PHYS 313) with a 3 FLH lab. See table above.** |
| [*Library*:](#library) | **None** |
| [*Technology*](#technology) | **None** |
| [*Facilities*](#facilities): | **None** |
| A.8. [Semester effective](#Semester_effective) | **Fall 2023** | A.9. [Rationale if sooner than next Fall](#Semester_effective) |  |
| A.10. INSTRUCTIONS FOR CATALOG COPY: Use the Word copy versions of the catalog sections found on the UCC Forms and Information page. Cut and paste into a single file **ALL the relevant pages from the college catalog that need to be changed.** Use tracked changes feature to show how the catalog will be revised as you type in the revisions. If totally new copy, indicate where it should go in the catalog. If making related proposals a single catalog copy that includes all changes is preferred. Send catalog copy as a separate single Word file along with this form. |
| A.11. List here (with the relevant urls), any RIC website pages that will need to be updated (to which your department does not have access) if this proposal is approved, with an explanation as to what needs to be revised: |
| A. 12 **Check to see if your proposal will impact any of our** [**transfer** **agreements,**](file:///Users/adelvecchio/Downloads/transfer%20agreements) **and if it does explain in what way. Please indicate clearly what will need to be updated.** |
| A. 13 Check the section that lists “Possible NECHE considerations” on the UCC Forms and Information page and if any apply, indicate what that might be here and contact Institutional Research for further guidance. |

B. [NEW OR REVISED COURSES](#delete_if)  **Delete section B if the proposal does not include a new or revised course. As in section A. do not highlight but simply delete suggested options not being used. Always fill in b. 1 and B. 3 for context. NOTE: course learning outcomes and topical outlines only needed for new or substantially revised courses.**

|  | Old ([for revisions only](#Revisions))ONLY include information that is being revised, otherwise leave blank.  | NewExamples are provided within some of the boxes for guidance, delete just the examples that do not apply. |
| --- | --- | --- |
| B.1. [Course prefix and number](#cours_title)  |  | **PHYS 306W** |
| B.2. Cross listing number if any |  |  |
| B.3. [Course title](#title)  |  | **Quantum Mechanics Laboratory** |
| B.4. [Course description](#description)  |  | **Students investigate quantum mechanical phenomena both experimentally and computationally, including the failures of classical physics and wave functions. Lab skills such as laboratory notebook maintenance and data analysis are introduced. Laboratory. Three contact hours** |
| B.5. [Prerequisite(s)](#prereqs) |  | **Completed or concurrent enrollment in PHYS 307** |
| B.6. [Offered](#Offered) |  | **Spring | Odd years** |
| B.7. [Contact hours](#contacthours)  |  | **3** |
| B.8. [Credit hours](#credits) |  | **1** |
| B.9. [Justify differences if any](#differences) | This is Standard credit for a 3 hour lab. |
| B.10. [Grading system](#grading)  |  | **Letter grade** |
| B.11. [Instructional methods](#instr_methods) |  | **Laboratory** |
| B.11.a [Delivery Method](#instr_methods) |  | **On campus** |
| B.12. CATEGORIES 12. a. [How](#required) to be used |  | **Required for major/minor |** |
|  12 b. Is this an Honors  course? |  | **NO** |
|  12. c. [General Education](#ge) N.B. Connections must include at  least 50% Standard Classroom instruction. |  | **NO** **category:** |
|  12. d. Writing in the  Discipline (WID) |  | **YES**  |
| B.13. [How will student performance be evaluated?](#performance) |  | **Attendance | Class participation | Presentations |Papers |** **Class Work |**  |
| B.14 [Recommended class-size](#class_size" \o "Check appendix XVIII in the UCC Manual for Best Practices) |  | **24** |
| B.15. [Redundancy statement](#competing) |  |  |
| B. 16. Other changes, if any |  |

| B.17**.** [**Course learning outcomes**](#outcomes)**: List each one in a separate row** | [**Professional Org.Standard(s)**](#standards)**, if relevant** | [**How will each outcome be measured**](#measured)**?** |
| --- | --- | --- |
| Students understand source of error in an experiment and can do simple error calculations. |  | Lab reports |
| Students can maintain a professional lab notebook. |  | Class work |
| Students can write a standard lab report. |  | Lab reports |
| Students can use Mathematic to make quantum mechanical calculations |  | Class work |

| B.18. [**Topical outline**](#outline)**: DO NOT INSERT WHOLE SYLLABUS, JUST A TWO-TIER TOPIC OUTLINE suitable for the contact hours requested. Proposals that ignore this request will be returned for revision.** |
| --- |
| Fundamentals of physics lab* Measurements and dimensional analysis
* Lab book writing and data management

Failures of classical physics and birth of quantum physics* Photoelectric effect experiment
* Millikan’s oil drop experiment
* Atomic spectra experiment

Computational exploration of quantum physics* Introduction to Mathematica
* Waves and Fourier transformations
* Differential equations: particle in a non-rigid box
* Hydrogenic wave functions

Light and Magnetism* Wave interference and diffraction experiments
* Speed of light experiments
* Zeeman effect experiment
 |

## D. Signatures

* **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 their 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 to the current Chair of UCC. Check UCC website for due dates. Do NOT convert to a .pdf.

##### D.1. Approvals: required from programs/departments/deans who originate the proposal. THESE may include multiple departments, e.g., for joint/interdisciplinary proposals.

| Name | Position/affiliation | [Signature](#_Signature" \o "Insert electronic signature, if available, in this column) | Date |
| --- | --- | --- | --- |
| Andrea Del Vecchio | Chair of Physical Sciences | Andrea Del Vecchio | 3/26/23 |
| Earl Simson | Dean of Arts and Sciences | Earl Simson | 3/27/23 |

##### D.2. [Acknowledgements](#acknowledge): REQUIRED from OTHER PROGRAMS/DEPARTMENTS (and their relevant deans if not already included above) that are IMPACTED BY THE PROPOSAL. SIGNATURE DOES NOT INDICATE APPROVAL, ONLY AWARENESS THAT THE PROPOSAL IS BEING SUBMITTED. CONCERNS SHOULD BE BROUGHT TO THE UCC COMMITTEE MEETING FOR DISCUSSION; all faculty are welcome to attend.

| Name | Position/affiliation | [Signature](#Signature_2) | Date |
| --- | --- | --- | --- |
| Michael Michaud | Chair of the Writing Board | \*Acknowledged by e-mail | 4/3/23 |
|  |  |  |  |
|  |  |  | Tab to add rows |