# 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) | **Physics BS** |  |
| [Replacing](#Ifapplicable)  |  |
| A. 1b. Academic unit | **Faculty of Arts and Sciences**  |  |
| A.2. [Proposal type](#type) | **Program:** [**revision**](#revision) |  |
| 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) | **The physics program has been working with our students over the past year to identify ways we can make the program more flexible and manageable for students while maintaining the academic rigor of the program. We are would like to make the program more flexible in two ways: (1) make the course sequencing less rigid and (2) allow students to tailor the program to their post-college plans. In addition, we would like to increase the possibility of collaboration with the chemistry program in courses that are similar.****These revisions reduce the number of credit hours in the degree from 67-68 to a more manageable 56-61, make the elective structure and the cognates more flexible and change the structure of Thermodynamics and Quantum Mechanics to match the structure of the equivalent courses in Chemistry. In addition, we have made the two one credit courses that help transition students to the upper-level course required rather than elective. This should help with scaffolding from the intro to upper-level courses.****Here is a summary of the changes to the program and the rationale for each:*** ***Add PHYS 103 Calculus Applications in Mechanics and PHYS104 Calculus Applications in Electricity and Magnetism as required courses.* Students have a lot of difficulty transitioning from PHYS 101/102 to the 300 level courses. These two courses are currently electives, but are designed to help with this transition. Making them required will help to scaffold students into the upper-level courses.**
* ***Reduce PHYS 307 Quantum Mechanics and PHYS 311 Thermodynamics to 3 credits, but create 1 credit lab courses to go with them (PHYS 306W and PHYS 310W).* This will align these courses with parallel courses in CHEM I and II in terms of structure and credits. These labs would be both experimental and computational and would provide an explicit home for the Mathematical curriculum which faculty have developed.**
* ***Eliminate PHYS 313 Junior Lab.* This would be replaced by the two labs mentioned above. The Junior/Senior lab sequence is very rigid in its timing and is particularly difficult for transfer students to complete in a timely fashion. With the new structure, these labs could be taken in any order, and all current students will be able to easily make this substitution.**
* ***Eliminate PHYS 312 Math Methods as a required course and instead address these topics as needed in the other courses.* Students rarely take this course at the right time in the program and by and large don’t seem to be able to transfer the skills to the other courses. This will still remain as an elective to cover advanced topics for students who intend to go to graduate school**
* ***Put all the electives in one category*. Students would any three physics electives rather than needing 1 lab and 2 theory courses. Again, this will make the program more flexible for students and allow them to tailor it more to their post-college plans and interests.**
* ***Eliminate MATH 416 Ordinary Differential Equations from the cognates.* This requirement frequently gets waived because the course is not offered every year. For students who are not grad school bound, the differential equations material covered in PHYS 307, 401 and 403 is sufficient. For those who intend to go to graduate school, there is still space in the cognates for them to take this course (with any additional MATH course at the 300-level or above).**
* ***While keeping MATH 212, 213, expand the remaining cognates from just CHEM 103/104 to include other possibilities.* Students could take 2 courses in any STEM discipline rather than just chemistry, such as Biology, or Physical Science. Physics as a field is becoming increasingly interdisciplinary, and students may want to take courses outside the physical sciences. We have, for example, many students interested in minoring in Computer Science. For graduate school bound students who need additional math, they could take two upper-level courses to complete their math minor. Students may select any of the options listed.**

**One last note, some of these courses are required in the Physics Secondary Education program. That program is currently suspended and there is no clear plan for its return. The School of Education has acknowledged these changes, but it does not seem to make sense to make changes to a suspended program.** |
| A.5. [Student impact](#student_impact)Must include to explain why this change is being made? | **These changes should make the program easier for students to navigate and provide more opportunities for students to tailor their program to their post-college plans. The program is more flexible in three ways:**1. ***Junior/ Senior Lab:* 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.**
2. ***Upper level electives:* Currently there are two categories of electives and students must take 1 from one category and 2 from the other. Again, this often leads to delaying student progress if there is no elective in the needed category offered the semester the student needs it. Also, we previously required 2 theory electives and 1 lab elective. This is fine for people who want to go to graduate school, but people who are entering the workforce would probably be better prepared with 2 lab electives (although taking 2 lab electives would not preclude going to graduate school). This gives students more options depending on their interests.**
3. ***Cognates:*  Physics currently has 4 math cognates plus two chemistry cognates. However, our students frequently want to minor in other STEM fields especially Computer Science. By reducing the number of math cognates by one and expanding the other cognates, it will be easier for students to pick up the STEM minor that would be most useful to them. The overall reduction in credits in the major will also give them more time to pursue a minor. This is important because physics is becoming more and more interdisciplinary.**
 |
| A.6. [Impact on other programs](#impact)  | **We are removing one cognate in Mathematics. However, very few students take this course already (typically 1-2 each time the course is offered) so the impact on the Mathematical Sciences is minimal.** |
| A.7. [Resource impact](#Resource) | [*Faculty PT & FT*](#faculty):  | **None** |
| [*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. |

### C. [Program Proposals](#program_proposals) **Complete only what is relevant to your proposal. Delete section C if not needed. PLease add in the 2020 CIP number for MAJOR revisions or new programs in C. 2; these can be found at** [**https://nces.ed.gov/ipeds/cipcode/browse.aspx?y=56**](https://nces.ed.gov/ipeds/cipcode/browse.aspx?y=56) **consult with Institutional research to be sure you select the correct one.**

|  | [Old (for revisions only)](#old_program) | New/revised |
| --- | --- | --- |
| C.1. [Enrollments](#enrollments) Must be completed. | **10** | **10** |
| C. 2. [2020 CIP number](#CIPnumber" \o "THESE CAN BE FOUND AT HTTPS://NCES.ED.GOV/IPEDS/CIPCODE/BROWSE.ASPX?Y=56 CONSULT WITH INSTITUTIONAL RESEARCH TO BE SURE YOU SELECT THE CORRECT ONE.) | **40.0801** | **40.0801** |
| C.3. [Admission requirements](#admissions) | **none** | **none** |
| C.4. [Retention requirements](#retention) | **None above college requirements** | **None above college requirements** |
| C.5. [Course requirements](#course_reqs) for each program option. Show the course requirements for the whole program here. | **PHYS 101 – Physics for Science and Math I (4)****PHYS 102 - Physics for Science and Math II (4)****PHYS 307 – Quantum I (4)****PHYS 311 – Thermodynamics (4)****PHYS 312- Math Methods (3)****PHYS 313 – Junior Lab (3)****PHYS 401 – Adv E&M I (4)****PHYS 403 – Classical Mechanics (4)****PHYS 413W – Senior Lab (3)****One course from** **PHYS 315 Optics (4)** **PHYS 320 Analog Electronics (4)** **PHYS 321 Digital Electronics (4)****Two courses from** **PHYS 309 Nanoscience (4)** **PHYS 402 Adv E&M II (3)** **PHYS 407 Quantum Mechanics II**  **(3)** **PHYS 409 Solid State Physics (3)****Cognates:****CHEM 103 General Chemistry I (4)****CHEM 104 General Chemistry II (4)****MATH 212 Calculus I (4)****MATH 213 Calculus II (4)****MATH 314 Calculus III (4)****MATH 416 Ordinary Differential equations (4)** | **PHYS 101 – Physics for Science and Math I (4)****PHYS 102 - Physics for Science and Math II (4)****PHYS 103 Calculus Applications in Mechanics (1)****PHYS 104 Calculus Applications in E&M (1)****PHYS 306 – Quantum Mechanics lab (1)****PHYS 307 – Quantum I (3)****PHYS 310 – Thermodynamics Lab (1)****PHYS 311 – Thermodynamics (3)****PHYS 401 – Adv E&M I (4)****PHYS 403 – Classical Mechanics (4)****PHYS 413W – Advanced Physics Laboratory (3)****THREE COURSES from** **PHYS 309 Nanoscience (4)** **PHYS 312 Math Methods (3)** **PHYS 315 Optics (4)** **PHYS 320 Analog Electronics (4)** **PHYS 321 Digital Electronics (4)** **PHYS 402 Adv E&M II (3)** **PHYS 407 Quantum Mechanics II**  **(3)** **PHYS 409 Solid State Physics (3)****Cognates:****MATH 212 Calculus I (4)****MATH 213 Calculus II (4)****MATH 314 Calculus III (4)****TWO COURSES from****BIOL 111 Intro to Bio I (4)****BIOL 112 Intro to Bio II (4)****CHEM 103 General Chemistry I (4)****CHEM 104 General Chemistry II (4)****CSCI 102 Computer Fundamentals for Cyber Security (4)****CSCI 157 Intro to Algorithmic Thinking in Python (4)****CSCI 211 Computer Programming and Design (4)****PSCI 211 Introduction to Astronomy (4)****PSCI 212 Introduction to Geology (4)****PSCI 217 Introduction to Oceanography (4)****Any additional MATH course at the 300-level or above (3-4)****Note: A second MATH course at the 300-level or above is allowed (3-4), but MATH 491 (1) cannot count for either.** |
| C.6. [Credit count](#credit_count) for each program option | **67-68** | **56-61** |
| C.7. Program Accreditation (if relevant) |  |  |
| C.8 Is it possible that the program will be more than 50% online (includes hybrid)?\* | **NO** | **NO** |
| C.9 Will any classes be offered at sites other than RIC campus or the RI Nursing Ed. Center?\* | **NO** | **NO** |
| C. 10. Do these revisions reflect more than 25% change to the [program?\*](file:///Users/sabbotson/Documents/Curriculum/Program%20goals)  | **NO** | **NO** |
| C.11. [Program goals](file:///Users/sabbotson/Documents/Curriculum/Program%20goals)Needed for all new programs |  |  |
| C.12. Other changes if any |  |  |

\* If answered YES to either of these questions will need to inform Institutional Research and get their acknowledgement on the signature page.

## 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 | 3/6/23 |
| Earl Simson | Dean of Arts and Sciences | Earl Simson | 3/27/23 |
| Suzanne Mello- Stark | Chair of CS/CSIS | \*approved by e-mail | 4/3/23 |
| Rebecca Sparks | Chair of Mathematical Sciences | \*approved by e-mail | 4/3/23 |
| Dana Kolibachuk | Chair of Biology | \*approved by e-mail | 4/3/23 |

##### 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 |
| --- | --- | --- | --- |
| Jeanine Dingus-Eason | Dean of the Feinstein School of Education and Human Development | \*Acknowledged via e-mail | 4/3/2023 |
| Charles McLaughlin | Chair of Educational Studies | \*Acknowledged via e-mail | 4/3/2023 |
| Rudolf Kraus | Coordinator of SED Science | \*Acknowledged via e-mail | 4/3/2023 |