# 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) | **Biot 370 Techniques in Biotechnology** |  |
| [Replacing](#Ifapplicable)  |  |
| A. 1b. Academic unit | **Faculty of Arts and Sciences**  |  |
| A.2. [Proposal type](#type) | **Course: creation**  |  |
| A.3. [Originator](#Originator) | **Dana Kolibachuk** | [Home department](#home_dept) | **Biology** |
| A.4. [Context and Rationale](#Rationale) Note: Must include additional information in smart tip for all [new programs](#type) | **This course is the second of two biotechnology-specific lecture/lab courses required for the Biotechnology BS degree. It is expected that students will take this course in their third year, after BIOT 270W (though we have not made 270W a prerequisite to ease progression through the program should students get a semester off track). BIOT 270W is much more introductory in nature and emphasizes the essential writing skills for the biotechnology industry, particularly in the area of drug development. This course focuses upon protein expression techniques and principles emphasizing those commonly used for the manufacture of biological drug products. Because the topics covered between BIOT 270W and this course (BIOT 370) are very different, students should not be at a disadvantage if they take this course before they take BIOT 270W. Both courses have the same prereqs- BIOL 314 and CHEM 205W- and this course could additionally serve as an upper-level elective for the Biology BS program, a feature that should increase enrollment.** **It is expected that this course will be offered for the first time in Spring 2025.** |
| A.5. [Student impact](#student_impact)Must include to explain why this change is being made? | **To provide foundational material in biotechnology, this course is required for the Biotechnology BS program (proposed).** |
| A.6. [Impact on other programs](#impact)  | **Because CHEM 205W and BIOL 314 (both included in the program) are listed as prerequisites to BIOT 370W, it is anticipated that additional seats will be needed in these and prerequisite courses in Biology and Chemistry.**  |
| A.7. [Resource impact](#Resource) | [*Faculty PT & FT*](#faculty):  | **One new full time faculty member is being funded by the state of RI. A search commences Spring 2023.** |
| [*Library*:](#library) | **None** |
| [*Technology*](#technology) | **None** |
| [*Facilities*](#facilities): | **Space in Fogarty Life Science is being remodeled for Biotechnology laboratory courses and is funded by the state of RI.** |
| A.8. [Semester effective](#Semester_effective) | **Fall 2023** | A.9. [Rationale if sooner than next Fall](#Semester_effective) | **n/a** |
| 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 new entry for BIOT-Biotechnology courses the Courses listing, after BIOL-Biology<https://ric.smartcatalogiq.com/en/2022-2023/Catalog/Courses/BIOL-Biology>to include this and the other proposed BIOT courses. |
| A. 12 **Check to see if your proposal will impact any of our** [**transfer** **agreements,**](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)  |  | **BIOT 370** |
| B.2. Cross listing number if any |  | **n/a** |
| B.3. [Course title](#title)  |  | **Techniques in Biotechnology** |
| B.4. [Course description](#description)  |  | **Emphasis is on protein expression techniques and principles important for the manufacturing of biological drug products. Students will also cover the regulatory framework for drug manufacturing. Lecture and laboratory. 6 contact hours.** |
| B.5. [Prerequisite(s)](#prereqs) |  | **BIOL 314 with a grade of C or better and CHEM 205W.** |
| B.6. [Offered](#Offered) |  | **Spring**  |
| B.7. [Contact hours](#contacthours)  |  | **6 (3 lecture, 3 lab)** |
| B.8. [Credit hours](#credits) |  | **4** |
| B.9. [Justify differences if any](#differences) | This is the typical lecture/lab allocation in Biology.  |
| B.10. [Grading system](#grading)  |  | **Letter grade** |
| B.11. [Instructional methods](#instr_methods) |  | **Laboratory | Lecture**  |
| B.11.a [Delivery Method](#instr_methods) |  | **On campus**  |
| B.12. CATEGORIES 12. a. [How](#required) to be used |  | **Required for major** |
|  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**  |
|  12. d. Writing in the  Discipline (WID) |  | **NO** |
| B.13. [How will student performance be evaluated?](#performance) |  | **Exams | Presentations |Papers |** **Lab Work | Quizzes**  |
| B.14 [Recommended class-size](#class_size" \o "Check appendix XVIII in the UCC Manual for Best Practices) |  | **24** |
| B.15. [Redundancy statement](#competing) |  | **n/a** |
| 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)**?** |
| --- | --- | --- |
| 1. Describe the basic regulatory framework for Good Manufacturing Practices (GMP) and Good Laboratory Practices (GLP)
 |  | B.13. |
| 1. Describe and perform basic cell culture techniques including cell enumerations and dilutions, aseptic technique and basic cell passage/maintenance, and media requirements for growth.
 |  | B. 13 and competency-based lab practical |
| 1. Explain the fermentation bioreaction designs (for example, fed-batch and continuous) and general operating constraints.
 |  | B.13 |
| 1. Describe and perform protein expression assays in cell-based system.

  |  | B.13, competency-based lab practical, multi-part lab report, and presentation. |
| 1. Describe and perform protein purification techniques used in manufacturing.
 |  | B.13, competency-based lab practical, multi-part lab report, and presentation. |
| 1. Describe and perform analytical methods used to quantify protein levels and purity.
 |  | B.13, competency-based lab practical, multi-part lab report, presentation. |
| 1. Demonstrate bioreactor use for protein production.
 |  | Competency-based lab practical. |
| 1. Describe packaging and stability testing.
 |  | B.13 |

| 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.** |
| --- |
| 1. Regulatory framework for the manufacturing of biologic drugs
2. In vivo protein expression systems
	1. Cell culture
	2. Cell line generation
	3. Primary cell culture
	4. Growth constraints (adherent, non-adherent, contact inhibition)
	5. Cell culture kinetics
	6. Recombinant cell lines
3. Protein purification and activity
	1. Validation assays
	2. Analytical methods
	3. Purification techniques
4. Protein scale-up and production
	1. Bioreactors used for manufacturing
	2. Bioprocess optimization procedures and models
	3. Fed-batch vs. continuous cell culture
	4. Workflow development and GMP manufacturing
	5. Quality control and testing
	6. Batch uniformity constraints
5. Drug finishing
	1. Drug delivery systems
	2. Drug formulation
	3. Stability testing: real-time and forced degradation studies
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## 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 |
| --- | --- | --- | --- |
| Earl Simson | Dean of FAS | \*approved by email | 2/24/2023 |
| Dana Kolibachuk | Chair of Biology | \*approved by email | 2/24/2023 |
| Andrea Del Vecchio | Chair of Physical Sciences | \*approved by email | 3/3/2023 |

##### 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 |
| --- | --- | --- | --- |
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|  |  |  | Tab to add rows |