BIO4209 (Molecular Biology of Plants) was offered for the first time at FIT in the Spring 2014 semester. It has become clear that two adjustments, one relatively major and another fairly minor, would significantly improve the quality and utility of this course for future students. First, it has become clear that BIO4010 (Biochemistry I) is a more appropriate pre- or co- requisite for this course than BIO4301 (Cell Biology) because of the former’s focus on energetics, enzymes, and especially photosynthesis.

It has also become clear that a molecular biology course can be of far greater benefit to students if it included a hands-on component. I am therefore proposing to add an additional credit hour to BIO4209, making it a 4 credit hour course with a lab that will meet once a week for 3-4 hours. In addition to reinforcing key concepts from the lecture such as phytohormone regulation, as well as cell and tissue culture, the lab will provide instruction in common laboratory techniques utilized by plant molecular biologists giving our students a competitive edge.

Here is a short list of available resources that support the viability of the proposed lab topics:
Lab 2 (Detecting GMOs): http://www.greenomes.org/pdf/gmo_complete.pdf
Lab 3 (Agrobacterium transformation): http://www.plantpath.wisc.edu/fac/afb/protocol.html

A modified syllabus is attached for review. BIO4209 is currently co-listed with BIO5014 Plant Biotechnology which will also include this lab section, but will remain as a 3 credit hour course in order to maintain their distinction. Below is the course description for BIO4209 in the 2014-2015 course catalog, along with a proposed change in description which includes the lab.

Original Course catalog description:
BIO 4209 MOLECULAR BIOLOGY OF PLANTS (3 credits) - Overviews the molecular and cellular mechanisms involved in the growth, development and functioning of plants. Stresses strategies for identifying, probing and manipulating these pathways for their beneficial applications (agriculture, bioremediation, drug production) through reviews of current literature.
Proposed revision to course catalog description:

BIO 4209 MOLECULAR BIOLOGY OF PLANTS (4 credits) - Overviews the molecular and cellular mechanisms involved in the growth, development and functioning of plants through reviews of current literature topics. Labs focus on gene transfer (transformation), identification of transgenic plants, phytohormone detection, as well as cell and tissue culture.

Thank you for your time.

Sincerely,

Andrew G. Palmer, PhD
Assistant Professor of Biological Sciences
apalmer@fit.edu
Office #: 7226
Florida Institute of Technology

CHANGING RESTRICTIONS OR CREDITS IN A COURSE

The addition or removal of any restriction or change in credit hours in a course requires that this form, accompanied by any supporting documentation, be completed and approved as indicated below.

COLLEGE Sciences

DEPARTMENT Biological Sciences

REQUEST IS FOR CHANGE IN COURSE B I O 4 2 0 9 Molecular Biology of Plants

Prefix Number Course Title

TO BE INCLUDED IN 20 1 5 / 20 1 6 CATALOG AND EFFECTIVE IN THE BANNER SYSTEM FOR Spring 2015 TERM

Effective term must be a future term for which registration has not begun. Catalog year will be the next printed edition. Earlier terms/years will not be processed.

IS REQUEST FOR A CHANGE IN CREDITS FOR COURSE LISTED ABOVE? ☑ Yes  ☐ No  If yes, current credits 3 requested credits 4

IS REQUEST TO CHANGE RESTRICTIONS FOR COURSE LISTED ABOVE? ☑ Yes  ☐ No  If yes, please check all that apply:

☐ Add  ☑ Remove  ☐ Prerequisite  ☐ Corequisite  B I O 4 3 0 1 ☑ and  ☐ or

Prefix Number

☐ Add  ☐ Remove  ☐ Prerequisite  ☐ Corequisite  B I O 4 0 1 0 ☐ and  ☑ or

Prefix Number

☐ Add  ☐ Remove  ☐ Prerequisite  ☑ Corequisite  B I O 4 0 1 0 ☐ and  ☐ or

Prefix Number

☐ Add  ☐ Remove  ☐ Other Restrictions* ☑ Yes  ☐ No  If yes, please list below:

*Other restrictions may include changing the grades applied to the course (P/F, S/U, A-F, CEU), majors or class levels restricted from registration, or other restrictions.

APPROVALS: Once appropriate department approvals are completed, submit form to Chair, Graduate Council, or Chair, Undergraduate Curriculum Committee for signatures below and forward to Catalog Director.

1) 2) 3) 4)

Origina Name

Date 4/14/14 4/14/14 4/14/14 4/14/14

Chair, Graduate Council

Date

Chair, Undergraduate Curriculum Committee

Date

CATALOG DIRECTOR’S USE ONLY

SCACRISE  SCACREDL  SCAPREQ

SCABASE  SCABRES  Operator Initials  Date

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FLORIDA INSTITUTE OF TECHNOLOGY
BIO 4209 Plant Molecular Biology / BIO5014 Plant Biotechnology

**Lecture:** MWF 3-3:50pm

**Lab:** T 3 hours/wk

**Instructor:** Andrew G. Palmer

Office hours: TBA

**Final Exam Date:** TBA

**Prerequisites/Corequisites:** BIO4010 (Biochemistry I)

**Summary:** An integrated overview of the molecular and cellular mechanisms involved in the growth, development, and functioning of plants. Strategies for identifying, probing, and manipulating these pathways for their beneficial applications (agriculture, bioremediation, pharmaceutical discovery, biodiesel, etc.) will be stressed through examples drawn from primary literature. The historic and continuing contribution of plants to our broader understanding of eukaryotic biology will also be a major focus. The intimate associations between plants and prokaryotes and fungi will also be investigated from a molecular standpoint. Students will present on topics intended to introduce or supplement the lecture materials. An emphasis will be placed on group work for problem solving and discussion. Specific topics include (but are not limited to):

(i) The biosynthesis, transport, and perception of phytohormones like ethylene, cytokinins, and auxins
(ii) Methods for characterizing and manipulating gene expression in plants
(iii) Plants as reservoirs for secondary metabolites with important functions (new pharmaceuticals, etc.)
(iv) Plant-microbial and plant-fungal interactions
(v) Bioremediation using plants
(vi) Mutualistic and Pathogenic interactions with plants
(vii) Plant cell and tissue culture

**Text(s) (Suggested but not required):** Biochemistry and Molecular Biology of Plants  Publisher: Wiley

Selected papers

**Grading** (1000 pts)

- (200) 2 Paper presentations (100 each)
  - (25) Slide design
  - (50) Oral presentation
  - (25) Responses to questions
- (200) Class participation (group discussions and individual contributions)
- (300) Exams (Mid-term: 100pts, Cumulative final exam: 200pts)
- (300) Lab
  - (100) Participation
  - (200) Lab notebook

**Paper presentations:** Each student will present two papers throughout the course of the semester. The first will be picked from a list of pre-selected papers designed to complement specific lecture topics. The second paper will be selected by the student from recent literature (<10 years old) on topics related to the course. This second paper must be approved by the faculty mentor prior to the presentation date. Sign-up sheets will be circulated on the second day of class. Any substitutions of topics and/or dates must be agreed upon by both students involved, as well as the advisor. You are responsible for acquiring a copy of your paper and making the PDF available to all members of the class.

**Class Participation:** Classroom discussions of topics and specific papers are a critical element of this course. As a result, student participation is crucial for success. Attendance is also therefore mandatory.

**Exams:** In addition to their paper presentations and participation in class discussions, student comprehension of course materials will be assessed by two exams (mid-term and final exam).
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<td>2</td>
<td><strong>Lab 1</strong> – Tissue Culture: Reagent and sample preparation</td>
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<td>3</td>
<td><strong>Lab 1</strong> – Tissue Culture: Sterile transfer</td>
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<td>4</td>
<td><strong>Lab 2</strong> – Detecting GMOs by DNA analysis (Wet lab)</td>
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<td>5</td>
<td><strong>Lab 2</strong> – Detecting GMOs by DNA analysis (Bioinformatics)</td>
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<td>6</td>
<td><strong>Lab 1</strong> – Tissue Culture: Establishing root and shoot cultures</td>
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<td><strong>Lab 3</strong> – Genetic Engineering by <em>Agrobacterium tumefaciens</em> (Preparing bacterial cultures)</td>
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<td>8</td>
<td><strong>Lab 3</strong> – Genetic Engineering by <em>Agrobacterium tumefaciens</em> (Plasmid isolation)</td>
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<td><strong>Lab 3</strong> – Genetic Engineering by <em>Agrobacterium tumefaciens</em> (Transformation)</td>
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<td>10</td>
<td><strong>Lab 4</strong> – Protoplasts (construction and isolation)</td>
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<td>11</td>
<td><strong>Lab 5</strong> – Monitoring phytohormone regulation by GUS staining or GFP.</td>
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<td><strong>Lab 3</strong> – Genetic Engineering by <em>Agrobacterium tumefaciens</em> (Screening transformed plants)</td>
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<td><strong>Lab 1</strong> – Tissue Culture: Final analysis of plant regeneration</td>
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<td>16</td>
<td>CHECKOUT</td>
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</table>
MEMORANDUM

To: Curriculum Committee
From: Julia Grimwade
     Program Chair, Premedical Biology
     Director of Premedical Studies.

Subject: removal of the requirement for BIO 1200 for premedical biology majors

I propose eliminating the Intro to Health Professions course from the Premedical Biology option. The course would no longer be taught, but would be replaced with a series of group meetings each semester. The meetings would be geared toward different class levels and so would give students relevant information at the time in their studies that it would help them the most. The meetings would not be part of a formal course, and would not be required. The original purpose of BIO 1200 was to advise first year pre-medical students about their career options in the health professions, and to give them information regarding the criteria needed to be admitted to a health professions graduate program. The objective was to help students prepare for a career in the health professions beginning early in their academic career.

The reason for the change is that the course is not meeting this objective. The course is intended for first year students, but I have found that the students need more frequent reminders and guidance throughout the first 3 years. Transfer students tend to delay taking the course, and so are taking it after the material would benefit them. Also, the course no longer reaches all pre-med students on campus. In particular, any premed students majoring in BME have difficulty fitting it into their program of study. Based on national averages, we estimate that approximately 25%-30% of BME students will wish to attend medical school.

The proposed change would affect curricula in the Chemistry and Physics Premedical options, since BIO 1200 is also required in these majors. Both Chemistry and Physics have agreed to the changes, and plan to adjust their program plans accordingly.
Florida Institute of Technology

CHANGING GRADUATION REQUIREMENTS IN A MAJOR/MINOR

The addition or removal of any graduation requirement in a major or minor requires that this form, accompanied by supporting documentation, be completed and approved as indicated below. Incomplete or incorrect forms will not be processed.

COLLEGE: Science

DEPARTMENT: Biological Sciences

DEGREE LEVEL: B.S.

PROGRAM TITLE: Pre-Medical Biology

TO BE INITIATED WITH CATALOG YEAR: 20_14 / 20_15

CHANGE REQUESTED FOR: ☑ major program ☐ minor program

7017

Major/Minor Code

Date change to be initiated must be for a future academic year.

DESCRIPTION OF REQUESTED CHANGES: Attach a more detailed description and any supporting documentation

Remove requirement for BIO 1200.
Change number of credit hours required for degree from 129 to 128.

Approvals: On completion of appropriate department approvals, submit form to Chair, Graduate Council, or Chair, Undergraduate Curriculum Committee, for approval below and forward to the Office of the Registrar

Chair, Graduate Council

Date

Chair, Undergraduate Curriculum Committee

Date

Dean or Associate Dean

Date

REGISTRAR’S USE ONLY

University Catalog

☐ Yes ☐ No

Academic Year

☐ Yes ☐ No

Update completed Date Initials

CAPP / Degree Evaluation

☐ Yes ☐ No

Academic Year

☐ Yes ☐ No

Update completed Date Initials

Catalog / Policy Mgmt. System

☐ Yes ☐ No

Academic Year

☐ Yes ☐ No

Update completed Date Initials

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