August 20, 2014

To: Dean Van Galen, Chancellor
    116 North Hall
    University of Wisconsin-River Falls

From: David P. Rainville, Chair
      Faculty Senate
      University of Wisconsin-River Falls

Re: UWRF Faculty Senate Motion 2014-15/5

At the August 20, 2014 meeting of the University of Wisconsin-River Falls Faculty Senate, motion 2014-15/5 was passed and is effective immediately. The motion is forwarded to you for you action.

Program change proposal: Biotechnology Major

Approved ✓

Disapproved

Dean Van Galen, Chancellor

Date 8/29/14
TRANSMITTAL for UNDERGRADUATE PROGRAMS:
Changes or Proposals

I. INFORMATION:
1. Program Title: Biotechnology
2. Department(s): Chemistry
3. College(s): Arts and Sciences
4. Proposal prepared by: Karl P. Peterson Date: 4/7/2014
5. Check all that apply
   - [ ] New program
   - [ ] Existng program
   - [ ] Change in course name
   - [ ] Change in number of credits
   - [ ] Change in major
   - [ ] Change in minor
   - [X] Change in course content
   - [ ] Change in emphasis/option
6. Other Programs/Departments Consulted (Requires letters of comment from all Departments or Programs substantially affected):
   a.) BIOL  
   b.) ANSC  
   c.) Plant & Earth Sci.  
   d.) COMS
7. Catalog year (and semester) of Implementation:
   Semester Fall Year 2014
8. Have all courses in this program been approved? Yes [ ] No [X]
   If "No" which courses have not been approved? changes to BIOT 380 and BIOT 495
9. Attach Request Narrative
   Include in narrative on attached pages a rationale for the requested changes or creation of program.
   Include clarification concerning any courses that have not yet been approved. If requesting a program change also include a listing of course array for both the current and proposed program.
10. UNIT APPROVALS: Requires signatures of all Department Chairs and Deans whose programs will be substantially affected by the changes or proposal. Signature lines for the affected Departments and Colleges (noted in "6" above), are on the addendum to this form. These signatures should be obtained prior to review by all other shared governance levels.

<table>
<thead>
<tr>
<th>Signature</th>
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<tbody>
<tr>
<td>Department Curriculum Committe Chair (optional)</td>
<td>Karl P. Peterson</td>
</tr>
<tr>
<td>Department/Program Chair</td>
<td>4-8-14</td>
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<tr>
<td>College Curriculum Committee Chair</td>
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<td>Alex Tyson</td>
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<td>Chancellor</td>
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*NOTE: The master copy of this transmittal & accompanying documents must be filed in the Provost's office upon final approval. The Provost’s office will notify all appropriate administrative offices [Registrar, Dean(s), Department Chair(s)] of approvals & necessary actions to implement changes.

Revised December 2012
TRANSMITTAL for UNDERGRADUATE PROGRAMS: Changes or Proposals - Addendum

Signatures of Additional Department & Colleges Affected

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    Signature: [Signature]  Date: 4/8/14

    Department/Program Chair
    Signature: [Signature]  Date: 4/23/14

    College Curriculum Committee Chair
    Signature: [Signature]  Date: 4/23/14

    Dean of College
    Signature: [Signature]  Date: 4/30/14

    University Curriculum Cmtt. Chair
    Signature: [Signature]  Date: 5/6/14

    Academic Policy & Program Cmtt. Chair
    Signature: [Signature]  Date: 8/28/14

    Faculty Senate Chair
    Signature: [Signature]  Date: 8/28/14

    Provost / Vice Chancellor
    Signature: [Signature]  Date: 8/29/14

    Chancellor
    Signature: [Signature]  Date: 8/29/14

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Dean of College: [Signature] Date: 4/24/14

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Dean of College: [Signature] Date: 4/24/14

Revised December 2012
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Narrative for Changes to the Biotechnology Major

The Department of Chemistry is in the process of assuming the administration and assessment functions for the Biotechnology Program. Biotechnology will become one of three programs administered by the Department of Chemistry, including the following track options:

Chemistry
- Chemistry-ACS
- Biochemistry-ACS
- Biochemistry-Preprofessional
- Chemistry-Dual Degree in Chemical Engineering

Chemistry Education
- Chemistry-Education
- Chemistry-Broad Field Science Education

Biotechnology

Part of this process included a review of the Biotechnology program curriculum. We herein propose changes to the program requirements. The rationale for the change includes:

1. Organizing the biotechnology program in a similar fashion to our broad field chemistry programs with required courses, required supporting courses and in-depth electives.
2. Streamlining the program to remove the areas of specialization which presented an undue administrative burden on advisors, administrators and students.
3. Including advanced communication courses in the in-depth electives based on feedback from our biotechnology alum.
4. The program is being revised to reflect the current landscape of course offerings by removing courses that are no longer taught and including courses that have been introduced since the previous program revision.

The Biotechnology program is being reorganized to have a similar structure to our chemistry programs, which include the required courses, required supporting courses (RSC), and in-depth elective courses. The new program will also have Track A and Track B to reflect the two different introductory chemistry options.

The new required courses are very comparable to a combination of the former core and RSC, save the following specific differences:

1. ANSC 257 no longer listed in an ‘or’ statement with BIOL 350, although ANSC 257 and CROP 257 could be allowed as substitutes for BIOL through program exception.
2. BIOT 280 is being eliminated from the new program, with the concomitant change in BIOT 380 from 0.5 cr. to 1 cr.
3. CHEM 246 and 247 are being removed as options. These courses are no longer offered.
4. FDSC 460 is being eliminated from the new program. The course is no longer being offered.
5. HORT 369 and BIOL 463 are being moved to a subcategory within the in-depth electives that also includes BIOL 464.
6. MATH 166 has been moved to the in-depth electives.
7. MATH 231 and ANSC 341 remain in the new RSC.

The former Biotechnology electives have been incorporated into the new in-depth electives.
The new RSC include a statistics course (MATH 231 or ANSC 341; see 7. above) and PHIL 220, which is a very desirable addition to the curriculum. PHIL 220 will also double-count in General Education Goal 5 EC.

The new in-depth electives will replace the former Biotechnology electives and the specialization area. The new in-depth electives area has a required subcategory for a course with tissue culture emphasis (see 5. above), along with 15 addition credits from a variety of options. The removal of the formal specialization will greatly remove an administrative burden for students and advisors, and will impart greater flexibility to students to tailor the program to their individual strengths and interests. We have also incorporated communication courses (COMS 318, ENGL 266, ENGL 367 and ENGL 371) on the advice of our Biotechnology alumni.
Current Biotechnology major

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<td>Core</td>
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<td>Biotech electives</td>
<td>6 cr</td>
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<tr>
<td>Required support course</td>
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<td>Specialization</td>
<td>9 cr</td>
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<td>Completion</td>
<td>116-126 cr</td>
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Biotechnology Core: 40-41 cr. hrs.
- ANSC 222 Introduction to Biotechnology 2 cr.
- BIOL 150 General Biology 3 cr.
- BIOL 240 Cell and Molecular Biology 3 cr.
- BIOL 324 Microbiology 4 cr.
- BIOL 350 Genetics and Evolution (writing intensive) 3 cr.
  - or ANSC 257 Genetics 3 cr.
- BIOL 451 Molecular Biology 4 cr.
- BIOT 280 Sophomore Seminar 0.5 cr.
- BIOT 380 Junior Seminar 0.5 cr.
- BIOT 480 Biotech Seminar 1 cr.
- CHEM 231 Organic Chemistry I 3 cr.
- CHEM 232 Organic Chemistry II 3 cr.
- CHEM 236 Organic Chemistry Lab I 1 cr.
  - or CHEM 246 Synthetic & Analytical Techniques in Organic Chemistry I 2 cr.
- CHEM 237 Organic Chemistry Lab II 1 cr.
  - or CHEM 247 Synthetic & Analytical Techniques in Organic Chemistry II 1 cr.
- CHEM 355 Separation Science Laboratory 1 cr.
- CHEM 361 Biochemistry I 3 cr.
- CHEM 362 Biochemistry II 3 cr.
- CHEM 366 Biochemistry Lab 1 cr.
- FDSC 460 Fermentation Technology 3 cr.
  - or HORT 369 Plant Tissue Culture 3 cr.
  - or BIOL 463 Animal Cell Culture 3 cr.

Biotechnology Electives: 6 cr. hrs.
Choose at least six credits from the following additional courses to obtain additional training in methods and content particularly relevant to biotechnology. Fermentation Technology, Animal Cell Culture or Plant Tissue Culture may be chosen as electives after one of the courses is completed as a core course (no double counting as core and elective).

- BIOL 345 Immunology 3 cr.
- BIOL 453 Virology 3 cr.
- BIOT/CSIS 373 Bioinformatics 3 cr.
- BIOT 295 Biotechnology Lab Research 1 cr.
- BIOT 379 Biotechnology Internship 1-4 cr.
- BIOT 495 Biotechnology Thesis 1-3 cr.
- FDSC 335 Food Microbiology 4 cr.
FDSC 460 Fermentation Technology 3 cr.
HORT 369 Plant Tissue Culture 3 cr.
BIOL 463 Animal Cell Culture 3 cr.

**Required Supporting Courses: 23-25 cr. hrs.**
MATH 166 Calculus I 4 cr.
or ANSC 341 Biometrics 3 cr.
or MATH 226 Fundamentals of Statistics 3 cr

CHEM 120 Introduction to General Chemistry 6 cr.
or CHEM 121 General Chemistry I 5 cr.
and CHEM 122 General Chemistry II 5 cr.

**Either sequence A or B below:**

**A.** PHYS 151 Algebra-Based Physics I 4 cr.
PHYS 152 Algebra-Based Physics II 4 cr.
PHYS 156 Algebra-Based Physics Laboratory I 1 cr.
PHYS 157 Algebra-Based Physics Laboratory II 1 cr.

**B.** PHYS 161 Calculus-Based Physics I 4 cr.
PHYS 162 Calculus-Based Physics II 4 cr.
PHYS 166 Calculus-Based Laboratory I 1 cr.
PHYS 167 Calculus-Based Laboratory II 1 cr.

**Specialization Area: 9 cr. hrs.**

In consultation with a biotechnology faculty advisor, the student will develop a plan that includes at least 9 additional credits of specialization. Up to four credits may include an internship in the specialization area. The total number of internship credits distributed between the Biotechnology Electives and Specialization Area may not exceed 4 credits. The plan will be submitted to the Biotechnology Program Director by the end of the first semester of the junior year for recording and approval. The senior seminar should focus on a research project the student worked on or a topic intimately related to the area of specialization.

Production Animal Biotechnology
Production Crop Biotechnology
Business/Management
Computational Biotechnology/Bioinformatics
Criminal Justice/Forensic Biotechnology
Environmental Biotechnology
Food Science Biotechnology
Industrial Biotechnology
Materials Science Biotechnology
Medical Biotechnology
Pharmaceutical Biotechnology
Veterinary Medical Biotechnology
In-Depth Electives (18 credits minimum)

PHIL 220 Bioethics (3 cr)
MATH 241 Biomathematics (3 cr) or ANSC 241 Biomathematics (3 cr)

Required Student Courses: 6 cr

PHYS 131 and PHYS 132 General Physics I, II (calculus-based) (10 cr)
PHYS 131 and PHYS 132 General Physics I, II (algebra-based) (10 cr) or

CHEM 360 Biochemistry Laboratory (1 cr)
CHEM 361 Biochemistry I (3 cr)
CHEM 362 Biochemistry II (3 cr)
CHEM 363 Separation Science Laboratory (1 cr)
CHEM 364 Laboratory Safety (2 cr)
CHEM 371 Organic Chemistry Lab I (1 cr)
CHEM 372 Organic Chemistry II (3 cr)
CHEM 373 Organic Chemistry II (3 cr)
CHEM 374 General Chemistry II (5 cr)
CHEM 375 Introduction to General Chemistry (6 cr)

BIOG 180 Biochemistry Seminar (1 cr)
BIOG 180 Junior Seminar (1 cr)
BIOG 47 Molecular Biology (4 cr)
BIOG 48 Genetics and Evolution (3 cr)
BIOG 49 Microbiology (4 cr)
BIOG 470 General Biology - Research Focus (4 cr) or
BIOG 470 General Biology - Research Focus (4 cr) or

ANSC 222 Introduction to Biotechnology (2 cr)

Track B: Required Courses: 55-56 cr

Completion:

117-125 cr
18 cr
6 cr

Major: 79-80 cr
Liberal Arts: 9-11 cr
Gen Ed: 29-34 cr

Biotechnology Major Track B

Completion: 121-130 cr
18 cr
6 cr

Major: 83-85 cr
Liberal Arts: 9-11 cr
Gen Ed: 29-34 cr

Biotechnology Major Track A
COMS 318 Communication and Leadership (3 cr)

CHEM 461 Pharmacology (3 cr)
CHEM 356 Chemical Instrumentation Lab (1 cr)
CHEM 250 Foundations of Analytical Chemistry (4 cr)

BCH 379 Biochemistry Laboratory (1.5 cr)
BCH 335 Biochemistry Research (1.5 cr)

BIOI 472 Biotechnology Research (3 cr)
BIOI 332 Biotechnology Research (1 cr)

BIOI 469 Stem Cells and Regenerative Medicine (3 cr)
BIOI 439 Animal Cell Culture (3 cr)
BIOI 433 Virology (3 cr)
BIOI 336 Developmental Biology (3 cr)

BIOI 334 Animal Physiology (3 cr)
BIOI 335 Microbiology (3 cr)
BIOI 332 General Microbiology (3 cr)
BIOI 234 Plant Physiology (3 cr)
BIOI 332 Plant Physiology (3 cr)

BIOI 3239 Animal Anatomy (3 cr)
BIOI 3249 Food and Nutrition (3 cr)

ASNC 445 Animal Reproduction (3 cr)
ASNC 442 Animal Physiology (3 cr)
ASNC 441 Animal Nutrition (3 cr)
ASNC 440 Animal Genetics (3 cr)

Additional in-depth electives

BCH 379 Biochemistry Laboratory (1.5 cr)
BCH 335 Biochemistry Research (1 cr)

BIOI 469 Stem Cells and Regenerative Medicine (3 cr)
BIOI 439 Animal Cell Culture (3 cr)
BIOI 433 Virology (3 cr)

IN-DEPTH ELECTIVES Track A and B: 18 credits minimum

1. Required by many Graduate and Professional Programs.
2. Requires at least one course involving tissue culture.
3. ANSC 27Y and CRSP 27Y may substitute for BIOI 350.

WAEC 160 Calculus (4 cr)

HORT 420 Plant Physiology (4 cr)
HORT 369 Plant Tissue Culture (3 cr)
HORT 320 Plant Propagation (3 cr)

ESM 413 Environmental Analysis (4 cr)
ESM 423 Food and Transport (4 cr)

ENGL 311 Proposal Writing, Change Through Rhetoric (3 cr)
ENGL 321 Technical Writing (3 cr)
ENGL 266 Business Writing (3 cr)

CRSP 421 Irrigated Pest Management (4 cr)
CRSP 435 Crop Physiology (4 cr)
CRSP 430 Plant Breeding and Crop Improvement (3 cr)
CRSP 345 Weed Control (3 cr)
Karl Peterson

From: Mark Bergland
Sent: Monday, April 07, 2014 7:05 PM
To: Karl Peterson
Subject: Re: Biotechnology

Hi Karl,

Speaking on behalf of the Biology Department, I support the changes that you have proposed in the existing Biotechnology major.

Regards,

Mark

Mark Bergland, Chair
Biology Department, AGS 410
University of Wisconsin - River Falls
River Falls, WI 54022
mark.s.bergland@uwrf.edu
715-425-3591 (office) or 715-529-8845 (cell)

From: Karl Peterson <karl.peterson@uwrf.edu>
Date: Friday, March 28, 2014 4:31 PM
To: Gary Onan <gary.onan@uwrf.edu>, Donavon Taylor <donavon.h.taylor@uwrf.edu>, Mark Bergland <mark.s.bergland@uwrf.edu>, Marshall Toman <marshall.toman@uwrf.edu>
Cc: David Zlesak <david.zlesak@uwrf.edu>, Kari Ekenstedt <kari.ekenstedt@uwrf.edu>, Bradley Caskey <bradley.i.caskey@uwrf.edu>
Subject: Biotechnology

Dear Gary, Don, Mark and Marshall

Attached please find the final version of the proposed Biotechnology program revisions and the supporting narrative. I do not believe that there are any significant changes since you last saw the document. I have also attached the summary of the current biotechnology program for comparison. I would like to get this information, including e-mails of support to the CAS Dean’s office by next Wednesday, if possible. Please let me know if you have any questions or concerns.

Thank you,

Karl

Karl P. Peterson, Ph.D.
Professor and Chair
Department of Chemistry
University of Wisconsin-River Falls
715-425-3523
Hi Karl,

The Math Department does not have any concerns about your proposal.

Bob

---

Hi Bob

Attached please find the proposed changes to the Biotechnology major and the supporting narrative. We decided to keep the statistics courses (MATH 231 or ANSC 341) in the required supports course area and decouple them from MATH 166, which is now in the allowed electives. I apologize for not consulting you earlier in the process. Please review the changes and let me know if you have any questions or concerns. If there are none, then I would appreciate a brief letter of support to accompany the proposal through the approval process.

Thank you,

Karl

Karl P. Peterson, Ph.D.
Professor and Chair
Department of Chemistry
University of Wisconsin-River Falls
715-425-3523
To: Karl Petersen, Chair
Department of Chemistry

From: Marshall Toman, Chair
Department of English

Date: March 29, 2014

Subject: Addition of English Courses to the Biotechnology Major

The Department of English fully supports the addition of

ENGL 266: Business Writing,
ENGL 367: Technical Writing, and
ENGL 371: Proposal Writing: Change through Rhetoric

to the Biotechnology Major.

Additionally, the inclusion of ENGL 371 has prompted us to look into the prerequisites for this 300-level course. It was originally designed for students in our Professional Writing programs. We plan to see whether it is feasible to make this useful course more accessible to other majors, particularly science majors, in a manner that is likely to still ensure student success.
TO: Karl Peterson, Chair, Chemistry Department

FROM: Gary Onan, Chair, Animal & Food Science Department

RE: Biotechnology Program

The Animal and Food Science Department supports the proposed changes in the Biotechnology Program including assumption of program administration by the Chemistry Department and the proposed curricular modifications.
Karl Peterson

From: Donavon Taylor
Sent: Monday, March 31, 2014 1:45 PM
To: Karl Peterson
Subject: RE: Biotechnology

Hi Karl,

The Department of Plant and Earth Science supports the changes proposed to the Biotechnology Major.

Thanks,
Donavon Taylor, Chair
Department of Plant and Earth Science

From: Karl Peterson
Sent: Friday, March 28, 2014 4:32 PM
To: Gary Onan; Donavon Taylor; Mark Bergland; Marshall Toman
Cc: David Zlesak; Kari Ekenstedt; Bradley Caskey
Subject: Biotechnology

Dear Gary, Don, Mark and Marshall

Attached please find the final version of the proposed Biotechnology program revisions and the supporting narrative. I do not believe that there are any significant changes since you last saw the document. I have also attached the summary of the current biotechnology program for comparison. I would like to get this information, including e-mails of support to the CAS Dean’s office by next Wednesday, if possible. Please let me know if you have any questions or concerns.

Thank you,

Karl

Karl P. Peterson, Ph.D.
Professor and Chair
Department of Chemistry
University of Wisconsin-River Falls
715-425-3523
Hi Karl,

Grace and I have looked this over, and we fully support the incorporation of COMS 318 into the in-depth electives. Good luck with your new curriculum!

Jennifer

Jennifer Willis-Rivera
Co-Chair
Communication Studies & Theatre Arts

Professor
Communication Studies

University of Wisconsin – River Falls
River Falls, WI 54022

Hello Jennifer,

I just wanted to follow up with you on the Biotechnology Program changes which included having COMS 318 in the in-depth electives. We also discussed the inclusion in the future of a new COMS course that is being developed. Please let me know if you have any questions or concerns. If there are none, then I would appreciate a brief note of support to accompany the program change.

Thank you,

Karl

Karl P. Peterson, Ph.D.
Professor and Chair
Department of Chemistry
University of Wisconsin-River Falls
715-425-3523
Karl Peterson

From: Hossein Najafi
Sent: Wednesday, April 16, 2014 12:37 PM
To: Karl Peterson
Subject: Re: Biotechnology program changes

Karl,

Sorry for the late response. I had to give the department sometime to think about this.

Although we find this to be a very important course for the program, given the limited resources available to the department, the department is OK with the proposed changes. We should coordinate offering the course when you feel there is a demand for it. Perhaps, a summer or j-term offering may remedy the resource issues.

Cheers,
“Hossein

Hossein Najafi, PhD
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715-425-3335

From: Karl Peterson <karl.peterson@uwrf.edu>
Date: Sunday, March 30, 2014 at 1:23 PM
To: Hossein Najafi <hossein.najafi@uwrf.edu>
Subject: Biotechnology program changes

Dear Hossein

Attached please find the proposed revision to the Biotechnology major and the supporting narrative. We decided to place the BIOT/CSIS 373 in the in-depth elective area at this time. We do feel that bioinformatics is an important topic for our students, but given the uncertainty with future offerings of the course due to staffing and enrollment requirements, we were hesitant to make the course required. I, along with Mark Bergland from Biology, are committed to working with Tony and you to revisit the course and the role that it can play for all three programs (BIOT, BIOL and CSIS). We did not want to delay the program changes while the future of BIOT/CSIS 373 was being re-evaluated.

Please review the program changes and let me know if you have any questions or concerns. If there are none, then I would appreciate a brief letter of support.

Thank you,

Karl

Karl P. Peterson, Ph.D.
Professor and Chair