

TO: The Senate

From: Talia Bugel, Chair
Curriculum Review Subcommittee

Date: April 7, 2014

Subj: Bachelor of Science in Biology: Concentration in
Microbiology and Immunology.

The Curriculum Review Subcommittee met on March 19, 2014 to review the attached proposal for a Microbiology and Immunology Concentration for the Bachelor of Science in Biology.

The committee is deeply concerned about the lack of assessment by the proponents of library material and human resources this concentration will need. This lack of serious consideration of actual needs does not allow for the library to plan accordingly, which in the long term impacts the collections and the work of librarians and library staff and thus the library's ability to support the research endeavors of faculty and students at IPFW.

Other than that, the committee finds that the proposed concentrations require no Senate review.

Approving

Non-approving

Absent/Non-voting

Talia Bugel
Craig Hill
Rebecca Jensen
Myeong Hwan Kim
Susan Skekloff

Ron Duchovic

Nancy Jackson Sabbatical
Steve Sarratore (*ex-officio*)

Date: January 27, 2014

To: Steve Sarratore
Associate Vice Chancellor for Academic Programs

From: Carl N. Drummond, Dean

Subj: New COAS-Approved Biology Concentration:
Concentration in Microbiology and Immunology

The Curriculum Committee of the College of Arts and Sciences has reviewed and approved a new Concentration in Biology at their meeting today. Attached you will find documentation (hard copies and email copies being sent).

This new Concentration is being sent to you for the initiation of the remaining steps beyond the college level.

CND/kb

cc: COAS Curriculum Committee
Frank Paladino, Chair, Department of Biology

Pre-Proposal for a Concentration in Microbiology and Immunology Indiana University-Purdue University, Fort Wayne

Tanya Soule, Ph.D., Department of Biology

Shree Dhawale, Ph.D., Department of Biology

Elliott Blumenthal, Ph.D., Department of Biology

1. Name of Proposed New Program:

Bachelor of Science in Biology with a concentration in Microbiology and Immunology

2. Title of Degree to be Conferred:

Bachelor of Science

3. Field of Study, Department, and School Involved:

Microbiology and Immunology, Department of Biology, COAS

4. Proposed Date of Initiation of the New Program:

Fall 2014

5. Rationale and Objectives:

Microbiology and immunology are broad areas of study with sub-disciplines in medicine, molecular biology, and environmental science. This program serves those students who plan to further their education in a professional program such as medical school or medical technology as well as those pursuing a graduate program in basic or applied research. Furthermore, this program will equip our students with the wet lab experience and knowledge that is crucial to many of the jobs in industry and public health.

Relationship of the proposed program to the mission and scope of the campus:

- Department Mission: The study of biology is expected to help students “prepare for careers in research, teaching, industry, government, medicine, medical technology, and several other health-related fields”. This concentration will provide students with the conceptual knowledge and wet-lab skills to enter one of the many career paths in biology where a background in microbiology and/or immunology is essential.
- College Mission: As part of the College of Arts and Sciences, we must “equip students to think critically, communicate effectively, and develop creative solutions to future challenges”. A concentration in microbiology and immunology will inherently challenge students to develop creative solutions for future problems. Examples include problems associated with antibiotic resistance, disease transmission, or vaccine development.
- IPFW Mission: IPFW strives to offer a “broad range of high-quality undergraduate, graduate, and continuing education programs”. By concentrating on a specific area in their program, such as microbiology and immunology, the quality of our graduates will

be enhanced, making IPFW and our students attractive to the community, future employers, and professional schools.

Relationship of the proposed program to already existing programs at the campus:

- Students currently interested in pursuing a specialization in microbiology and immunology in order to make themselves more attractive to professional schools and future employers must simply pick and choose those courses which seem to fit within their interest. This individual approach leaves room for students to miss out on opportunities to maximize their education and will not result in a degree that reflects their decision to specialize in this concentration.

Relationship of this program to similar programs in other regional and Indiana post-secondary educational institutions:

- Biology students at Purdue University, for example, can choose from either a general degree in Biology or up to eight areas of specialization. These areas are diverse and include options in Biochemistry, Biology Teaching, Cell, Molecular, and Developmental Biology, Ecology, Evolution, and Environmental Biology, Genetics, Health and Disease, Microbiology, and Neurobiology and Physiology. Furthermore, the Biology Department at Indiana University offers BS degrees in either Biology or Microbiology.

Cooperative endeavors explored and/or intended with other institutions particularly those located in the same geographic region:

- This concentration is very conducive to initiating cooperative interactions with other institutions within our geographical area. It will help train students in laboratory techniques that can be used by students as they help with research in the IU Medical School laboratories, and we will invite the Medical School Faculty to collaborate on research projects with the Biology Department. We already have interactions with Parkview Hospital's Medical Technology program, and many of our students enter the MT program at Parkview. These students are required to take microbiology and immunology prior to admission to the MT program. Within the Fort Wayne community we have initiated and will continue to contact local businesses and offer our expertise. We have already interacted with local companies on both microbiological and immunological research that has helped them to grow, and we have been able to utilize their expertise as well.

Need for the concentration in terms of manpower supply and demand:

- According to www.hoosierdata.in.gov the statewide demand in the next five years for employment in the life, physical, and social science occupations is expected to increase by 16.2%. More specifically, for those students specializing in microbiology and immunology, jobs in microbiology should increase by 6.8%, food science by 19.0%, epidemiologists by 4.0%, and medical scientists by 28.8%. More broadly, the demand for biological technicians should increase by 12.4%

6. Course Requirements (Total 107 credits without free electives):

For the core curriculum, this concentration will require 93 credits composed of the core biology, math, statistic, chemistry, physics, and general education courses that are currently required for all biology majors. This also includes CHM 533: Biochemistry 1, as biochemistry integrates with many of the other required and elective courses in the concentration and students should have a firm understanding of biochemical principles.

For the concentration, 16 credits will be required. For eight of these credits, students will be required to take BIOL 437: General Microbiology and BIOL 537/565: Immunobiology, both of which have a lab component. The other eight credit hours will be chosen by the student from the list of approved electives; labs are not required, but may be taken, for these elective courses. Courses were chosen for their relationship to either immunobiology (i.e. BIOL 215) or to the three major areas of microbiology, which were identified as medical (i.e. BIOL 533), molecular (i.e. BIOL 509/584), and ecological (i.e. BIOL 524).

For the general education requirements, please refer to the following abbreviations:

A1: Foundational Intellectual Skills: Written Communication

A2: Foundational Intellectual Skills: Speaking and Listening

A3: Foundational Intellectual Skills: Quantitative Reasoning

B4: Ways of Knowing: Scientific

B5: Ways of Knowing: Social and Behavioral

B6: Ways of Knowing: Humanistic and Artistic

B7: Ways of Knowing: Interdisciplinary or Creative

C8: Capstone

Core Biology (22 credits: Required):

BIOL 117/119/217/218/219/491 (BIOL 491 also fulfills C8)

Core Math and Statistics (12 credits: Required):

MA 153/229(165) (these also fulfill A3), for an optional full year of calculus (MA 229 and 230)

STAT 240/340

Core Chemistry and Physics (27 credits: Required):

CHM 533: Introductory Biochemistry I is a requirement for this concentration

CHM 115/116/255/254/256/258/533 (CHM 115 also fulfills B4)

PHYS 220/221 (PHYS 220 also fulfills B4)

General Education (32 credits: Required):

A1. ENG W131 and W233

A2. COM 114

A3. MA 153 and MA 229

B4. CHM 115 and PHYS 220

B5. Choose at least one

B6. Choose at least one

B7. Foreign Language 111/112 level

C8. BIOL 491

COAS W233 (also fulfills A1)

Foreign Language 111/112 level (also fulfills B7)

Additional 9 credits from Category A or B

Microbiology and Immunology Concentration (8 credits: Required)

Shown as (semester/credits)

The following 2 lab courses are required; A/B structure will not be maintained

BIOL 437: General Microbiology (F/4)

BIOL 537 and 565: Immunobiology with Lab (S/4)

Microbiology Immunology Concentration (8 credits: Electives; choose from any of the following)

Shown as (semester/credits)

BIOL 533: Medical Microbiology (F/3)

BIOL 544: Virology (S/3)

BIOL 595: Emerging Infectious Diseases (F/3)- course number not yet assigned

BIOL 595: Insect-Vectorborne Diseases (F/3)- course number not yet assigned

BIOL 595: Protein Structure and Function (S/3)- course number not yet assigned

BIOL 520: Contemporary Parasitology (F/3)

BIOL 215: Basic Human Anatomy (F/3)

BIOL 516: Molecular Biology of Cancer (F/3)

BIOL 381: Cell Biology (F/3)

BIOL 506: Human Molecular Genetics (F/3)

BIOL 509/584: Molecular Biology and Applications with Lab (F/4)

BIOL 515: Molecular Genetics (frequency is unknown/3)

BIOL 540: Biotechnology (frequency is unknown/3)

BIOL 524: Bacterial Diversity and Systematics (S/3)

BIOL 543: Population Ecology with Lab (S/4) BIOL

580: Evolution (F/3)

Microbiology Immunology Free Electives (n/a: Recommended Non-Biology Free Elective)

CHM 534: Introductory Biochemistry (S/3)

CHM 535: Introductory Biochemistry Lab (S/1)

7. 4-Year Plan:

** denotes a course with a lab component*

Year 1: Fall	17
BIOL 117*	4
CHM 115*	4
ENG W131	3
MA 229	3
COM 114	3
Year 1: Spring	14
BIOL 119*	4
CHM 116*	4
ENG W233	3
GenEd B5 or B6	3

Year 2: Fall	15
BIOL 217*	3
CHM 255/254*	4
Foreign Lang I	4
BIOL 437*	4
Year 2: Spring	15
BIOL 218*	4
CHM 256/258*	4
Foreign Lang II	4
STAT 240	3
Year 3: Fall	16/17
PHYS 220*	4
BIOL 219*	3
STAT 340	3
BIOL Elective 215/381/516/509/584*/533/580/595/506	3/4
GenEd B5 or B6	3
Year 3: Spring	14
PHYS 221*	4
BIOL 537/565*	4
GenEd A or B to complete learning outcomes	3
BIOL elective 524/540/543*/544/595	3
Year 4: Fall	15/16
GenEd A or B to complete learning outcomes	3
GenEd A or B to complete learning outcomes	3
BIOL Elective 215/381/516/509/584*/533/580/595/520/506	3/4
CHM 533	3
Free elective	3
Year 4: Spring	12
BIOL 491	3
BIOL elective 524/540/543*/544/595 or CHM 534/535*	3
Free elective	3
Free elective	3

8. Additional Resources:

The department currently has the resources to support this proposed concentration.

When developing a new degree program, certificate, minor, or concentration, please review the questions below when developing your response to the library or additional resources sections. Please consult your liaison librarian for assistance.

Library Resources

Address the following issues regarding the impact of the new program on the library's budget and personnel. Please respond to each item below indicating the library sources and services required to support the proposed program.

The Microbiology and Immunology Concentration is nested within the Biology B.S. It draws from elective courses that are routinely taught in the department but packages them in specific way to form the concentration. Hence, we anticipate no change in the use of library resources as a result of the concentration since there is no addition of courses to the current curriculum. We provide this as context for answers to the specific questions below.

- Which databases/indexing sources will be used by the courses in this program?
 - PubMed
 - Scopus
 - Biological Sciences Collection (ProQuest)
 - Google Scholar
 - Web of Science
- What are the journals that will be used by students completing library research in this program? Please list three to five titles. Is there an expectation that access to new journals will need to be purchased for students in this program?

American Society for Microbiology Journals from ASM Press. Examples include J Bacteriol, J Virol, Appl Env Microbiol. These are open-source 6 months after publication, it is anticipated that the frequency of requests for articles within the firsts 6 months should not increase.

Additional journal subscriptions are not necessary.

- Are there any specific reference sources (e.g. encyclopedias, handbooks, standards, etc.) required to support the new program?

No.

- Is there an expectation for additional books to be purchased? What about DVD or audio/visual materials? What is the estimated dollar amount needed yearly to support this program with new books and media materials?

No additional materials will be necessary beyond the allocation provided to the Department of Biology.

- Will the new program use the Library's Document Delivery Services? Costs for this service come out of the Library's budget. What types of materials would the program be requesting through DDS?

Document Delivery Service requests are not expected to increase as a result of the proposed concentration.

- Who is the liaison librarian for this program? The liaison librarian provides support through involvement in Blackboard-supported classes, one-on-one research consultations, in-class instructional sessions, and tailored course guides for research assignments. Which of these librarian services do you anticipate will be utilized in the new program?

David Dunham is the liaison for Biology and would serve the concentrations within the major.

At this time none of the specific services described are anticipated. While there may be some student research consulting, the demand should not increase beyond the current usage.

- Is there an accrediting body that will be overseeing this program? What are the statements of the accrediting body related to the library, e.g. holdings, personnel, services?

Accreditation of the Biology B.S. is part of the IPFW accreditation by the North Central Association of Colleges and Schools, Higher Learning Commission. In their "Criteria for Accreditation" (Number CRRT.B.10.010) it is stated in component 3.D.4 that:

The institution provides to students and instructors the infrastructure and resources necessary to support effective teaching and learning (technological infrastructure, scientific laboratories, **libraries**, performance spaces, clinical practice sites, museum collections, as appropriate to the institution's offerings).