

PROGRAM DESCRIPTION AND EXPLANATIONS

- 1) **Institution:** Illinois State University
- 2) **Responsible department/ school or administrative unit:** Department of Biological Sciences
- 3) **Proposed Program Title:** Ph.D. Sequence in Molecular and Cellular Biology (MCB)
- 4) **Previous Program Title (if applicable):** Not Applicable
- 5) **CIPS Classification (applicable to new program):** 26.0101
- 6) **Date of Implication:** Academic Year of Approval
- 7) **Description of Proposed Program or Name Change:**

The Ph.D. sequence in MCB is being proposed by the Department of Biological Sciences. The aim of the program is to build an interactive and innovative program in the theoretical and applied aspects of molecular and cellular biology for training a new generation of research scientists. It will utilize current faculty expertise in molecular biology, cell biology, genetics, microbiology, parasitology, immunology, neurobiology, physiology, developmental biology, and biochemistry. Thus, the structure of the MCB Sequence is designed to enhance the student's competency in molecular and cell biology principles, techniques, and their application for becoming leaders in solving tomorrow's problems in molecular cell biology.

We proposed that MCB Ph.D. students take a limited number of 'core' courses (8 hrs) and at least 3 graduate elective courses from area of student's specialization/ interest which will be decided by the student in consultation with his/her advisor and /or student dissertation committee.

MCB core

Advanced Cell Biology (BSC 415), Molecular Biology of Gene (BSC 419), and Seminar in Cell and Molecular Biology (BSC 420.37).

MCB Elective Courses (minimum of three courses comprising 9-12 hours credit)

Elective courses will be selected from the area of the student's specialization and will be decided by the student in consultation with his/her advisor and /or student dissertation committee. Elective courses may be selected from among, but not limited to the following representative courses: BSC 321 Molecular and Developmental Genetics (4 hr), BSC 325 Ecological Physiology of Animals (3 hr), BSC 329 Human Genetics (3 hr), BSC 330 Phycology (4 hr), BSC 343 Introduction to Neurobiology (3 hr), BSC 345 Introduction to Endocrinology (3 hr), BSC 350 Molecular Biology (3 hr), BSC 353 Biotechnology Laboratory I: DNA Techniques (3 hr), BSC 354 Biotechnology Laboratory II: Cell Biology Techniques (3 hr), BSC 355 Genomics and Bioinformatics (3 hr), BSC 361 Microbial Pathogens (4 hr), BSC 367 Immunology (4 hr), BSC 368 Virology (4 hr), BSC 383 Parasitology (4 hr), BSC 389.26

Industrial Microbiology (3 hr), BSC 411 Confocal Microscopy in Biology (1 hr), BSC 418 Biological Microscopy (4 hr), BSC 466 Microbial Physiology (3 hr), BSC 467 Microbial Genetics (3 hr), BSC 470 Evolution (3 hr), BSC 471 Evolutionary Population Genetics (3 hr) CHE 342 General Biochemistry I (3 hr), CHE 343 Biochemistry Lab (2 hr), CHE 344 General Biochemistry II (3 hr), CHE 440 Topics in Biochemistry (1-3 hr), CHE 442 Proteins (3 hr), CHE 444 Lipids (3 hr).

8) Rationale for Proposal:

The Department of Biological Sciences has a graduate program and consisting of approximately 80 students (currently 41 M.S. and 37 Ph.D.). The department is divided into three main sections based on subject specialty: 1) Genetics and Microbiology (GM), 2) Cell Biology, Physiology and Developmental Biology (CPD), and 3) Behavior Evolution Ecology and Systematics (BEES).

Currently we have three MS sequences, Biotechnology, Conservation Biology, and BEES. The MS biotechnology sequence has been a very successful program as most of the graduated students have been successful in obtaining high-paid employment in biotechnology/ pharmaceutical companies including Abbott Laboratory, Nalco, Genome Systems, Monsanto, Sigma Chemicals, Eli Lilly, DuPont, Pioneer Seed, Affymetrix, Ribozyme, Nanosphere, Millennium Pharmaceuticals, Vertex, Millipore Corp., IDXX, and Baxter, and in national laboratories including the USDA, the NIH, Argonne lab, and the CDC. Thus, the MS sequence in biotechnology has greatly increased students' job opportunities.

We are proposing a Ph.D. sequence in Molecular and Cellular Biology. Students admitted to this sequence will take 8 hrs of core courses and at least three courses from the electives in his/her area of research specialization. This framework will provide students with formal training that includes a broad, conceptual overview of the area covered by cell and molecular biology. We feel that students need to develop a solid conceptual foundation to become successful scientists. Thus, the rationale for the proposal of the PhD sequence in MCB will be to strengthen the training of students in their area of interest, and to assist in attracting a new pool of outstanding students.

9) Expected Impact of the Proposal on Existing Campus Programs:

The Ph.D. sequence in MCB will have a positive impact on the existing doctoral program in the Department of Biological Sciences. The Ph.D. sequence in MCB will help to attract talented and meritorious students (2-3 per year), which will subsequently strengthen our existing PhD program in the Department of Biological Sciences. The proposed sequence will not have any negative impact on other programs at Illinois State University.

10) Expected Curricular Change, Including New Courses:

The primary curricular change will be to create a new "PhD sequence in Molecular and Cellular Biology" in the Biology doctoral program. The courses that make up the 'Core Course Requirement' as well as 'Elective Courses' are currently being offered.

11) Anticipated Staffing Arrangements:

As mentioned above all courses required for the proposed sequence are being offered on a regular basis in the Department of Biological Sciences. Therefore, there is no need for any additional staffing.

12) Anticipated Funding Needs and Source of Funds:

No funding is requested for the establishment of the proposed sequence.

Catalogue copy:

Ph.D. in Biological Sciences

...comprehensive universities. Course work will include BSC 420-Seminar (4 semester hours.) Doctoral students may design an individual plan of study in consultation with advisors, or they may elect to pursue a sequence within the Ph.D. Program in (1) Behavior, Ecology, Evolution, and Systematics (BEES) or (2) Molecular and Cellular Biology, each of which includes specific requirements (see below). Students receive a Ph.D. in Biological Sciences. The sequence title appears on the transcript, but not the diploma. ...

Molecular and Cellular Biology (MCB): Students pursuing the Ph.D. may elect to pursue a sequence in Molecular and Cellular Biology. The sequence is designed to enhance the student's competency in molecular and cellular biology principles, techniques, and their application for becoming leaders in solving tomorrow's problems in molecular cell biology. In addition to 4 hours of BSC 420 and 15 hours of dissertation research (BSC 599), students are required to take 8 hours of core courses (BSC 415, BSC 419, BSC 420.37) and at least 3 graduate elective courses (9-12 hours). Elective courses will be selected from the area of the student's specialization and will be decided by the student in consultation with his/her advisor and /or student dissertation committee. Elective courses may be selected from among, but not limited to the following representative courses: BSC 321, 325, 329, 330, 343, 345, 350, 353, 354, 355, 361, 367, 368, 383, 389.26, 411, 418, 466, 467, 470, 471, CHEM 342, 343, 344, 440, 442, 444. For further information, see the Department Web site at www.bio.ilstu.edu.

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September 25, 2006

Professor R. K. Jayaswal
Department of Biology
ISU

Dear Professor Jayaswal:

In response to your plan to identify certain chemistry courses as electives for a "PhD Sequence in molecular and Cellular Biology," the list below indicates the frequency of our offering the courses you mentioned. We have no objection to including them as electives.

Sincerely yours,

Clifford E. Dykstra, Chair
Department of Chemistry

CHE342 (General Biochemistry I) is offered every semester.

CHE343 (General Biochemistry Laboratory) is offered every semester.

CHE344 (General Biochemistry II) is offered each spring.

Generally one of the other courses (440, 442 and 444) listed is offered each semester.

We tend to cycle through the 400 level courses one per semester.