

**DEPARTMENTAL PLAN FOR ASSESSMENT OF STUDENT LEARNING
2006-2007 ACADEMIC YEAR**

Department: Biochemistry and Molecular Biology

Program: Ph.D. in Biochemistry and Molecular Biology

Mission Statement:

The graduate program in the Department of Biochemistry and Molecular Biology will provide students with formal classroom instruction and mentored research experiences that enable and encourage them to become competent, creative, and independent biomedical scientists.

Student Learning Goal 1: Ph.D. graduates will have a foundational knowledge of biochemistry and molecular biology.

Objective 1.1: Students shall have at their command a broad knowledge of biochemistry and molecular biology. This knowledge shall be sufficient to provide the student a strong foundation for scientific inquiry and provide flexibility for career development.

Objective 1.2: Students shall possess in-depth knowledge in self-identified, specific subject areas. This knowledge shall support the research activity of the student and allow them to make meaningful contributions to larger research teams.

Objective 1.3: Students shall develop the ability and the commitment to use research literature and other resources to keep abreast of major scientific developments and to acquire a working knowledge base in any relevant area. Students shall develop the ability to build on their existing knowledge base as necessary to develop their areas of specialization and to promote integration of knowledge across scientific disciplines.

Student Learning Goal 2: Ph.D. graduates will have the ability to conduct meaningful scientific inquiry.

Objective 2.1: Students will learn to develop clearly stated, meaningful hypotheses that promote scientific inquiry into areas important to human health and the public good.

Objective 2.2: Students will demonstrate the ability to design and apply appropriate experimental approaches to test hypotheses. This ability will depend upon their understanding of the variety of methodologies available to them and their ability to learn new methodologies and apply them in appropriate contexts.

Objective 2.3: Students will demonstrate ability to appropriately analyze data with the degree of rigor required by scientific peers.

Objective 2.4: Students will demonstrate the ability to reach sound conclusions based on their data and knowledge of the field. They shall recognize limitations of their approach and be forthright in acknowledging alternative conclusions. They shall present an analysis of their results within the context of other work in the field, identify the need for additional work, and integrate their findings into larger

bodies of work that collectively make a solid and significant contribution to the furthering of knowledge in that particular area.

Student Learning Goal 3: Ph.D. graduates will possess communication skills necessary to relate the results of their scientific queries clearly and convincingly to others.

Objective 3.1: Students shall develop oral and written communication skills that will allow them to clearly, concisely and accurately present their research rationale, procedures, results and conclusions to a scientific audience of their peers.

Objective 3.2: Students shall develop the ability to, and understand the importance of, relating scientific knowledge to nonscientists in a way that illustrates the importance and accomplishments of scientific research.

Student Learning Goal 4: Ph.D. graduates will appreciate the importance of professional development, ethical behavior and of service to their profession and society.

Objective 4.1: Students shall be enabled to assume responsibility for their own career development. They shall recognize the importance of career planning and have taken an active role in the career development decision-making leading up to their receiving of the Ph.D.

Objective 4.2: Students shall be able to articulate the hallmarks of ethical behavior of biomedical scientists. They will be familiar with the *Code of Ethics* of the American Society for Biochemistry and Molecular Biology and adhere to its tenets in their actions as graduate students.

Objective 4.3: Students shall recognize the importance of using their professional expertise in the service of the scientific community and the rest of society and shall accept opportunities to provide service within their roles as graduate students.

Student Learning Goal 1: Ph.D. graduates will have a foundational knowledge of biochemistry and molecular biology.

Objective 1.1: Students shall have at their command a broad knowledge of biochemistry and molecular biology. This knowledge shall be sufficient to provide the student a strong foundation for scientific inquiry and provide flexibility for career development.

<i>Educational Experiences</i>	<i>Assessment Methods</i>	<i>Timeline</i>	<i>Responsibilities</i>
BIMD 500 Cellular and Molecular Foundations	Regular course examinations	Annually in the Fall	BIMD course director Ken Ruit
BIMD 513 Seminar in Biomedical Sciences	Course facilitator evaluation	During Year 1 of study	Jon Jackson
BMB 533 Advanced BMB (multiple 1 credit offerings. Must complete 6 credits)	Regular course examinations, presentations, and written work	Annually in the Spring (Usually 3 offered)	BMB Faculty
All Course Work (BIMD 500, 510, 513, BMB 514, 521, and 533 courses)	Comprehensive Exam A. Written essay questions B. Oral question session	Not before completion of second semester, second year nor more than 3 months after completing 6 credits of BMB 533	A. Subcommittee of four BMB faculty B. Advisory Committee

Objective 1.2: Students shall possess in-depth knowledge in self-identified, specific subject areas. This knowledge shall support the research activity of the student and allow them to make meaningful contributions to larger research teams.

<i>Educational Experiences</i>	<i>Assessment Methods</i>	<i>Timeline</i>	<i>Responsibilities</i>
Dissertation Project	Accomplishment of research	Continuous for four to five years	Research advisor
	Annual Progress Meeting	Annual (usually Spring)	Advisory committee
	Permission to Write Presentation	Three-six months prior to graduation	Advisory Committee
	Final Examination and Dissertation Defense	Conclusion of graduate work	Advisory Committee
Elective coursework	Regular course evaluations	Usually completed by end of second year	Course faculty

Objective 1.3: Students shall develop the ability and the commitment to use research literature and other resources to keep abreast of major scientific developments and to acquire a working knowledge base in any relevant area. Students shall develop the ability to build on their existing knowledge base as necessary to develop their areas of specialization and to promote integration of knowledge across scientific disciplines.

<i>Educational Experiences</i>	<i>Assessment Methods</i>	<i>Timeline</i>	<i>Responsibilities</i>
BMB 514 Current Literature	Oral presentation of article from current literature	Annually in Spring	Narrative evaluation from BMB students and faculty in attendance
BMB 521 Seminar	Oral presentation of topic of current interest in BMB	Annually in Fall	Narrative evaluation from BMB students and faculty in attendance
Dissertation Project	Accomplishment of research Annual Progress Meeting Permission to Write Presentation Final Examination and Dissertation Defense	Continuous for four to five years Annual (usually Spring) Three-six months prior to graduation Conclusion of graduate work	Research advisor Advisory committee Advisory Committee Advisory Committee

Student Learning Goal 2: Ph.D. graduates will have the ability to conduct meaningful scientific inquiry.

Objective 2.1: Students will learn to develop clearly stated, meaningful hypotheses that promote scientific query into areas important to human health and the public good.

<i>Educational Experiences</i>	<i>Assessment Methods</i>	<i>Timeline</i>	<i>Responsibilities</i>
BMB 514 Current Literature	Oral presentation of article from current literature	Annually in Spring	Narrative evaluation from BMB students and faculty in attendance
BMB 521 Seminar	Oral presentation of topic of current interest in BMB	Annually in Fall	Narrative evaluation from BMB students and faculty in attendance
Research Topic Proposal	Written topic proposal	End of first year of study	Research advisor and Advisory Committee
Dissertation Project	Accomplishment of research Annual Progress Meeting Permission to Write Presentation Final Examination and Dissertation Defense	Continuous for four to five years Annual (usually Spring) Three-six months prior to graduation Conclusion of graduate work	Research advisor Advisory committee Advisory Committee Advisory Committee

Objective 2.2: Students will demonstrate the ability to design and apply appropriate experimental approaches to test hypotheses. This ability is dependent upon their understanding of the variety of

methodologies available to them and their ability to learn new methodologies and apply them in appropriate contexts.

<i>Educational Experiences</i>	<i>Assessment Methods</i>	<i>Timeline</i>	<i>Responsibilities</i>
BMB 514 Current Literature	Oral presentation of article from current literature	Annually in Spring	Narrative evaluation from BMB students and faculty in attendance
BMB 521 Seminar	Oral presentation of topic of current interest in BMB	Annually in Fall	Narrative evaluation from BMB students and faculty in attendance
Dissertation Project	Accomplishment of research Annual Progress Meeting Permission to Write Presentation Final Examination and Dissertation Defense	Continuous for four to five years Annual (usually Spring) Three-six months prior to graduation Conclusion of graduate work	Research advisor Advisory committee Advisory Committee Advisory Committee
All Course Work (BIMD 500, 510, 513, BMB 514, 521, and 533 courses)	Comprehensive Exam A. Written essay questions B. Oral question session	Not before completion of second semester, second year nor more than 3 months after completing 6 credits of BMB 533	A. Subcommittee of four BMB faculty B. Advisory Committee

Objective 2.3: Students will demonstrate ability to appropriately analyze data with the degree of rigor required by their scientific peers.

<i>Educational Experiences</i>	<i>Assessment Methods</i>	<i>Timeline</i>	<i>Responsibilities</i>
BIMD 510 Basic Biomedical Statistics	Course examinations	Spring of Year 1 of study	Dr. Pat Carr
BMB 514 Current Literature Seminar	Oral presentation of article from current literature	Annually in Spring	Narrative evaluation from BMB students and faculty in attendance
BMB 521 Seminar	Oral presentation of topic of current interest in BMB	Annually in Fall	Narrative evaluation from BMB students and faculty in attendance
Dissertation Project	Accomplishment of research Annual Progress Meeting Permission to Write Presentation Final Examination and Dissertation Defense	Continuous for four to five years Annual (usually Spring) Three-six months prior to graduation Conclusion of graduate work	Research advisor Advisory committee Advisory Committee Advisory Committee
All Course Work	Comprehensive Exam	Not before completion	

(BIMD 500, 510, 513, BMB 514, 521, and 533 courses)	A. Written essay questions B. Oral question session	of second semester, second year nor more that 3 months after completing 6 credits of BMB 533	A. Subcommittee of four BMB faculty B. Advisory Committee
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Objective 2.4: Students will demonstrate the ability to reach sound conclusions based on their data and knowledge of the field. They shall recognize limitations of their approach and be forthright in acknowledging alternative conclusions. They shall present an analysis of their results within the context of other work in the field, identify the need for additional work, and integrate their findings into larger bodies of work that collectively make a solid and significant contribution to the furthering of knowledge in that particular area.

<i>Educational Experiences</i>	<i>Assessment Methods</i>	<i>Timeline</i>	<i>Responsibilities</i>
BIMD 516 Responsible Conduct of Research	Class discussion and written summaries	During Year 1 of study	Kathy Sukalski
BMB 514 Current Literature	Oral presentation of article from current literature	Annually in Spring	Narrative evaluation from BMB students and faculty in attendance
BMB 521 Seminar	Oral presentation of topic of current interest in BMB	Annually in Fall	Narrative evaluation from BMB students and faculty in attendance
Dissertation Project	Accomplishment of research Annual Progress Meeting Permission to Write Presentation Final Examination and Dissertation Defense	Continuous for four to five years Annual (usually Spring) Three-six months prior to graduation Conclusion of graduate work	Research advisor Advisory committee Advisory Committee Advisory Committee
All Course Work (BIMD 500, 510, 513, BMB 514, 521, and 533 courses)	Comprehensive Exam A. Written essay questions B. Oral question session	Not before completion of second semester, second year nor more that 3 months after completing 6 credits of BMB 533	A. Subcommittee of four BMB faculty B. Advisory Committee

Student Learning Goal 3: Ph.D. graduates will possess communication skills necessary to relate the results of their scientific queries clearly and convincingly to their peers.

Objective 3.1: Students shall develop oral and written communication skills that will allow them to clearly, concisely and accurately present their research rationale, procedures, results and conclusions to a scientific audience of their peers.

<i>Educational Experiences</i>	<i>Assessment Methods</i>	<i>Timeline</i>	<i>Responsibilities</i>
BMB 514 Current Literature	Oral presentation of article from current literature	Annually in Spring	Narrative evaluation from BMB students and faculty in attendance
BMB 521 Seminar	Oral presentation of topic of current interest in BMB Written abstract of the presentation	Annually in Fall	Narrative evaluation from BMB students and faculty in attendance
Preparation of posters or oral presentations for scientific meetings		As opportunities present themselves	Research Advisor
Annual Progress Meeting	Research advisory committee feedback on written document and oral presentation	Annually (usually in the spring)	Advisory Committee
All Course Work (BIMD 500, 510, 513, BMB 514, 521, and 533 courses)	Comprehensive Exam A. Written essay questions B. Oral question session	Not before completion of second semester, second year nor more than 3 months after completing 6 credits of BMB 533	A. Subcommittee of four BMB faculty B. Advisory Committee

Objective 3.2: Students shall develop the ability to, and understand the importance of relating scientific knowledge to nonscientists in a way that illustrates the importance and accomplishments of scientific research.

<i>Educational Experiences</i>	<i>Assessment Methods</i>	<i>Timeline</i>	<i>Responsibilities</i>
BIMD 513 Seminar in Biomedical Sciences	Course facilitator evaluation	During Year 1 of study	Jon Jackson
BIMD 515 Steps to Success in Graduate School	Class discussion and written summaries	During Year 1 of study	To Be Determined
BIMD 516 Responsible Conduct of Research	Class discussion and written summaries	During Year 1 of study	Kathy Sukalski

Student Learning Goal 4: Ph.D. graduates will appreciate the importance of professional development, ethical behavior and of service to their profession and society.

Objective 4.1: Students shall be enabled to assume responsibility for their own career development.

<i>Optional Educational Experiences</i>	<i>Assessment Methods</i>	<i>Timeline</i>	<i>Responsibilities</i>
BIMD 515 Steps to	Class discussion and	During Year 1 of study	All faculty and students

Success in Graduate School	written summaries		
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Objective 4.2: Students shall be able to articulate the significant hallmarks of ethical behavior of biomedical scientists. They will be familiar with the Code of Ethics of the American Society for Biochemistry and Molecular Biology and adhere to its tenets in their actions as graduate students.

<i>Educational Experiences</i>	<i>Assessment Methods</i>	<i>Timeline</i>	<i>Responsibilities</i>
BIMD 516 Responsible Conduct of Research	Class discussion and written summaries	During Year 1 of study	Kathy Sukalski
All professional experiences as graduate student	Daily conduct in the professional arena	As opportunities present themselves	Feedback from research mentor, departmental students and faculty

Objective 4.3: Students shall recognize the importance of using their professional expertise in the service of the scientific community and the rest of society and shall accept opportunities to provide service within their roles as graduate students.

<i>Optional Educational Experiences</i>	<i>Assessment Methods</i>	<i>Timeline</i>	<i>Responsibilities</i>
Service on some SMHS committees	Reports from committee chairs	As opportunities present themselves	All faculty and students
Graduate student recruiting activities	Reports from host institutions or traveling colleagues	As opportunities present themselves	All faculty and students
Science fairs advisors or judges, science in K-12 involvement, etc.	Reports of event organizers	As opportunities present themselves	All faculty and students
All of above	Participation in Wm. E. Cornatzer Award Process	Annual	All faculty and students

Use of Results and Process for Documentation and Decision-Making:

An annual Graduate Faculty Retreat will be held in August of each year. At the retreat, outcomes of the courses offered the previous year will be reviewed. The progress of individual students will be summarized by their research advisors. Decisions on curricular or program changes will be made by the faculty based on the data. Summaries of assessment activities and decisions made (if any) will be included in the Departmental Annual Report due October 15.