

 FLORIDA ATLANTIC UNIVERSITY	NEW/CHANGE PROGRAM REQUEST Graduate Programs		UGPC Approval _____ UFS Approval _____ Banner _____ Catalog _____
	Department Biological Sciences College Charles E Schmidt College of Science		
Program Name Professional Science Master (P.S.M.) in Business Biotechnology		<input type="checkbox"/> New Program* <input checked="" type="checkbox"/> Change Program*	Effective Date (TERM & YEAR) Fall 2024
<p>Please explain the requested change(s) and offer rationale below or on an attachment.</p> <p>Adding new Track to Biology Masters Degree</p> <p>Professional Science Master (P.S.M.) in Business Biotechnology (Non-Thesis Option 3)</p> <p>Justification: Grouping the PSM program with the other two non-thesis Masters degree programs in the biological sciences department will make administering the program more efficient and facilitate recruitment of new students.</p>			
<p><small>*All new programs and changes to existing programs must be accompanied by a catalog entry showing the new or proposed changes.</small></p>			
Faculty Contact/Email/Phone David Binninger binninge@fau.edu 561-297-3323		Consult and list departments that may be affected by the change(s) and attach documentation	
Approved by Department Chair <u>Sarah L. Mutton</u> College Curriculum Chair <u>[Signature]</u> College Dean <u>[Signature]</u> UGPC Chair _____ UGC Chair _____ Graduate College Dean _____ UFS President _____ Provost _____		Date <u>8-29-23</u> 8/29/2023 08/29/2023 _____ _____ _____ _____	

Email this form and attachments to UGPC@fau.edu 10 days before the UGPC meeting.

PURPLE- ITEMS TO REMOVE

GREEN- ITEMS TO ADD

MASTER'S PROGRAMS

BIOLOGICAL SCIENCES

MASTER OF SCIENCE (M.S.) ~~OR~~, MASTER OF SCIENCE IN TEACHING (M.S.T.) AND PROFESSIONAL SCIENCE MASTER (P.S.M.) IN BUSINESS BIOTECHNOLOGY

Application Deadline: Spring term - October 1; Fall term - January 15

Departmental Admission Requirements

In addition to meeting all of the University and College admission requirements for graduate study, each applicant for the Master of Science or Master of Science in Teaching degree must have:

1. A minimum 3.0 average for the last 60 credits of undergraduate work;
2. Letters of recommendation: Three are required (letters by previous professors are preferable);
3. Statement of goals and interests;
4. [Graduate Student Biology Faculty Advisor Verification](#) form*;
5. Approval of the Department of Biological Sciences.

*For Biology Faculty Advisor selection suggestions, students should go to the Biology departmental webpages for the **Department of Biological Sciences** to ~~examine~~ **explore** the fields and interests of individual faculty members. Once students find a Biology faculty member in their field of interest, they should contact the faculty member directly.

Degree Requirements

There are ~~three~~ **four** degree programs available: thesis option, non-thesis option 1 ~~and~~ ,non-thesis option 2 **and non-thesis option 3** . Specific requirements for each degree are described below.

BIOLOGICAL SCIENCES

MASTER OF SCIENCE (M.S.)

(Minimum of 36 credits)

Thesis Option

This degree program is designed for students whose career goals include a research emphasis. This option is tailored for students doing research or contemplating graduate work for a Ph.D. degree.

This M.S. degree requires a minimum of 36 total credits. Degree requirements include:

1. At least half or 18 credits must be Biology Department courses;
2. 12 credits of graded coursework at the 6000 level (exclusive of any research credits);
3. Before students can register for Master's Proposal Seminar (BSC 6963) (i.e., students formally presenting their research proposal to their committee and subsequent approval by committee), students conducting exploratory research can take up to 6 credits, which can include:
 - a. Up to 3 credits of Directed Independent Research in Biological Sciences (BSC 6917) or up to 3 credits of Directed Independent Study (DIS/DIR), either one taken outside of Biology. Any combination of DIS/DIR credits regardless of source cannot total more than 3 credits that will count toward the degree.
 - b. Up to 3 credits of Master's Thesis (BSC 6971).
4. Master's Thesis Proposal (BSC 6963), 1 credit maximum*;
5. Master's Thesis Defense Seminar (BSC 6975), 1 credit maximum**;
6. Minimum of 6 credits of Master's Thesis (BSC 6971) is required. Note: No more than 12 credits of Master's Thesis can count toward the degree;
7. Maximum of 3 credits in Directed Independent Research in Biological Sciences (BSC 6917) will count toward the degree, or up to 3 credits of Directed Independent Study (DIS/DIR), either one taken outside of Biology. Any combination of DIS/DIR credits regardless of source cannot total more than 3 credits that will count toward the degree.
8. Remaining courses must be 5000 or 6000 level.

* For Master's thesis Proposal Seminar requirements, see [Biology Regulations and Procedures](#).

** For Master's Thesis Defense requirement, see [Biology Regulations and Procedures](#) and the Graduate College for current [University thesis requirements](#).

Non-Thesis Option 1

This degree program is designed for students who wish to improve their knowledge in the biological sciences through a rigorous series of courses and exams or for Integrative Biology Ph.D. students choosing Biology for a [Master's Along the Way](#) degree.

This M.S. degree requires a minimum of 36 credits. Degree requirements include:

1. At least half or 18 credits must be Biology Department courses;
2. Eighteen (18) of the 36 credits must be at the 6000 level or higher; the remaining 18 credits must be at the 5000 or 6000 level;
3. Two (2) of the 36 credits must involve courses in which the student presented a formal seminar;
4. Maximum of 3 credits in Directed Independent Research in Biological Sciences Study (BSC 6917) will count toward the degree, or up to 3 credits of Directed Independent Study (DIS/DIR), either one taken outside of Biology. Any combination of DIS/DIR credits regardless of source cannot total more than 3 credits that will count toward the degree;
5. One of the 36 credits must be the Master's Comprehensive Exam (BSC 6962). Students must take and pass a minimum of three written comprehensive exams given by a committee in designated areas within the microbiology and organismal specialties. Question types require written responses in essay and definition formats. See [FAU Regulations for Biology Master's Degrees](#) for complete requirements to complete the Master's Comprehensive Exam course.

Note: Master's Thesis (BSC 6971), Master's Thesis Proposal (BSC 6963) and Master's Thesis Defense (BSC 6975) do not count toward the M.S. Non-Thesis Option 1 degree.

Integrative Biology PH.D. students choosing Biology for a Master's Along the Way degree will be verified for completion of degree requirements by the Biology Department during the Graduation Audit Check. Consult with the IB Ph.D. advisor early in matriculation to ensure the curriculum followed would satisfy the requirements for the M.S./Non-Thesis Option 1.

BIOLOGICAL SCIENCES

MASTER OF SCIENCE IN TEACHING (M.S.T.)

(Minimum of 30 credits)

Non-Thesis Option 2

This degree program is designed for students who wish to satisfy requirements for teaching in high school or junior college. In addition to regular coursework, students in this option may also elect to complete a Research Report, a short paper describing the results and significance of a circumscribed research project. Depending on background, students may also be required to take 6 credits of an Educational Internship.

The M.S.T. degree requires a minimum of 30 credits if the student has two years of teaching experience at a secondary or junior college level. The M.S.T. degree requires

36 credits if the student has not completed the student teaching requirement. Degree requirements include:

1. At least half or 15 credits must be Biology Department courses;
2. Fifteen (15) of the 30 credits must be at the 6000 level or higher; the remaining 15 credits must be at the 5000 or 6000 level;
3. Two (2) of the 30 credits must involve courses in which the student presented a formal seminar;
4. Maximum of 3 credits in Directed Independent Research in Biological Sciences Study (BSC 6917) will count toward the degree, or up to 3 credits of Directed Independent Study (DIS/DIR), either one taken outside of Biology. Any combination of DIS/DIR credits regardless of source cannot total more than 3 credits that will count toward the degree;
5. One of the 30 credits (or 36 credits for students without two years prior teaching experience) must be the Master's Comprehensive Exam (BSC 6962). Students must take and pass a minimum of three written comprehensive exams given by a committee in designated areas within the microbiology and organismal specialties. Question types require written responses in essay and definition formats. See [FAU Regulations for Biology Master's Degrees](#) for complete requirements to complete the Master's Comprehensive Exam course;

Note: Master's Thesis (BSC 6971), Master's Thesis Proposal (BSC 6963) and Master's Thesis Defense (BSC 6975) do not count toward the M.S. Non-Thesis Option 1 degree.

6. Students must take 6 credits of approved graduate courses in education or another cognate field if they plan to teach in high school and hold a Rank III secondary certificate (obtained independently from this M.S.T. degree), or if the student intends to teach at the college level;
7. Six (6) additional credits of Internship (EDG 6940) are required, except for those with two years of teaching experience at a secondary school or junior college level. Such internships can be completed in the following manner. Students enrolled in EDG 6940 (6 credits) may choose one of the following to fulfill the course requirements:
 - a. Do an internship with one of the local public schools (verified by local school contacts). There is no form to be completed, but rather the student independently lines up an internship opportunity. Once confirmed, the Biology Department will contact the FAU Education Department requesting permission for the student to register for the Internship, EDG 6940. At the end of the term in which the student registers for the internship, the FAU Education Department will contact the Biology Department to verify the student has completed the internship successfully so that a satisfactory grade can be applied. This latter confirmation is done based on the teacher/school in which the

- student does the internship and who verifies in writing that the internship was completed;
- b. Teach a laboratory course in the Biology Department (verified by the lab coordinator for time, effort and teaching responsibilities).

~~BUSINESS BIOTECHNOLOGY PROFESSIONAL SCIENCE MASTER (P.S.M.)~~

~~PROFESSIONAL SCIENCE MASTER (P.S.M.) IN BUSINESS BIOTECHNOLOGY~~

(Minimum of 34 credits required)

~~NON-THESIS OPTION 3~~

Application Deadline: Spring term October 1; Fall term January 15

The Professional Science Master (P.S.M.) in Business Biotechnology is a terminal degree for students interested in entering the workforce directly following completion of the degree. The 34-credit program is tailored for the student with undergraduate training in biology or chemistry who is primarily interested in working in the business side of the emerging biotechnology and pharmaceutical industries. This interdisciplinary program, provided in conjunction with the College of Business, includes traditional classroom courses in both business and science, culminating in two internship experiences. One internship provides experience working side-by-side with a research scientist. The second internship exposes the student to the business side of the biotechnology industry.

Departmental Admission Requirements

- ~~1. Baccalaureate degree in biology or chemistry. Degrees in other scientific areas can be considered on an individual basis;~~
- ~~2. Graduating undergraduate science GPA of 3.0 or higher;~~
- ~~3. Minimum scores of 151 (verbal) and 148 (quantitative) on the GRE. GRE scores more than five years old will not be accepted;~~
- ~~4. Personal statement of career goals and how the applicant feels this training will help achieve those goals;~~
- ~~5. Three letters of recommendation with at least one from a former professor;~~
- ~~6. [Graduate Student Biology Faculty Advisor Verification form](#);~~
- ~~7. Approval of the Department of Biological Sciences.~~

Degree Requirements

The program requires a total of 34 credits. Student curriculum degree requirements include:

Core Courses - 10 credits required

Venture Creation	ENT 6016
Biotechnology Business Development	ENT 6196
Professional Science Master's (P.S.M.) in Business Biotechnology - Scientific Internship	BSC 6946
Profession a Science Master's (P.S.M.) in Business Biotechnology - Business Internship	MAN 6946

* Each internship will last one semester. One internship will be science oriented with the student working directly with research scientists. The second will involve working on the business and administrative side of the company or institute, including technology transfer and business development offices. The goal is to place students in one of the biomedical institutes (e.g., Scripps Florida and the Max Planck Institute) or an emerging biotechnology business.

Science Courses

Choose 15 credits from the list below. May require instructor permission or prerequisites. **

Biochemistry of the Gene	BCH 5415
Advanced Biochemistry	BCH 6740
Laboratory Methods in Biotechnology	BSC 6408L
Practical Cell Neuroscience	BSC 6417C
Computer Graphics for Biologists	BSC 6455
Bioinformatics	BSC 6458C
Scientific Communication (Note: Priority enrollment given to Integrative Biology Ph.D. students)	BSC 6846
Special Topics	BSC 6936
Advanced Molecular Genetics of Aging	PCB 5245
Advanced Genetics Lab	PCB 5064L
Genes and Development	PCB 6595
Advanced Cell Physiology	PCB 6207
Advanced Immunology	PCB 6236
Climate Change: Ecosystems to Human Health	PCB 6409
RNS Biology and Disease	PCB 6525
Reproductive Endocrinology	PCB 6804
Advanced Neurophysiology Lab	PCB 6837L
Cellular Neuroscience and Disease	PCB 6849
Special Topics, including Macromolecular Structure and Function and Protein Misfolding and Disease (3 credits each)	PCB 6933

Principles of Neuroscience	PSB 6037
Developmental Neurobiology	PSB 6515
Human Neuroanatomy	ZOO 6748
Structural Biochemistry	CHM 6351
Instrumentation	CHM 6157
Macromolecules and Human Disease	GMS 6301
Host Defense and Inflammation	MCB 6208
Advanced Molecular and Cell Biology	PCB 5532
Human Genetics	PCB 6665
Autonomic Function and Diseases	BMS 6523
Molecular Basis of Disease and Therapy	GMS 6302
Neurobiology of Addiction	PCB 5844
Molecular Basis of Human Cancer	PCB 6235
Problem-Based Immunology	PCB 6238
Tumor Immunology	PCB 6239
Adult Neurogenesis	PCB 6846
Advanced Topics in Biochemistry	BCH 6930
Brain Diseases: Mechanism and Therapy	BMS 6736
Advanced Plant Biotechnology	BOT 6735C
Advanced Drug Development	CHM 6277C
Drug Design	CHM 6278
Advanced Topics in Organic Chemistry	CHM 6380
Advanced Drug Formulation	CHM 6279C
Pharmacology	GMS 6513
Special Topics	ISC 6930
Neurophysiology	PCB 6835C
Special Topics	PCB 6933

**** The science courses are electives, and their selection will vary depending on student demand, resources, faculty, and new courses being developed. The list of science courses above would be appropriate for a student in this program. Other science courses can be taken as science electives with the approval of the faculty advisor.**

Business Courses - 9 credits required
Choose from list below.

Financial Accounting Concepts	ACG 6027
Technology Commercialization Strategies	ENT 6186
Developing and Marketing Innovations	MAR 6837
Advanced Marketing Management	MAR 6815
Marketing Functions/Processes	MAR 6055
Entrepreneurship and Venture Capital	ENT 6428

Leadership and Organizations	MAN 6296
Human Resources Management	MAN 6156
Advanced Business Plan Development	ENT 6116
Project Management	MAN 6581
Cross-Cultural Management and Human Resources	MAN 6609

Important comment about courses. The list of business courses shown above reflect those currently listed in the University Catalog. Availability will vary depending on the offerings in each department. New courses may have been added since this information was published. Appropriate business courses can be taken as business electives with the approval of the student's graduate program advisor.

For additional information about this degree program, contact David Binninger, binninge@fau.edu.