

	NEW/CHANGE PROGRAM REQUEST Graduate Programs		UGPC Approval _____ UFS Approval _____ Banner _____ Catalog _____
	Department <u>Biological Sciences</u> College <u>Charles E. Schmidt College of Science</u>		
Program Name Bachelor of Science (B.S) to Master of Science (M.S) Combined Program		<input type="checkbox"/> New Program* <input checked="" type="checkbox"/> Change Program*	Effective Date (TERM & YEAR) Fall 2025
<p>Please explain the requested change(s) and offer rationale below or on an attachment.</p> <p>Change Program name to: Bachelor of Science (B.S.) to Master of Science (M.S.) Combined Program Business Biotechnology Professional Science (P.S.M)</p> <p>Current Program with Emphasis: BS to MS Combined program which emphasis in Biotechnology</p> <p>Change Program Emphasis: BS Bachelor of Science (B.S) to Master of Science (M.S) Combined Program with emphasis in Business Biotechnology .</p> <p>The change to a Business Biotechnology emphasis will broaden the students academic education by giving the students an opportunity to explore both the business and science side of the Biotechnology industry. The student will be given the option to do either a Science or Business internship which gives them the opportunity for jobs in the field in whichever side of the Biotechnology industry they choose. Internships have open job opportunities for students for they receive valuable work experience</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 Dr. David Binninger/binninge@fau.edu/ 561-297-3323		Consult and list departments that may be affected by the change(s) and attach documentation Business College	
Approved by Department Chair <u>Sarah L. Mathison</u> College Curriculum Chair <u>[Signature]</u> College Dean <u>[Signature]</u> UGPC Chair _____ UGC Chair _____ Graduate College Dean _____ UFS President _____ Provost _____		Date _____ Oct 21, 2024 10/21/1024 _____ _____ _____ _____ _____	

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

On Sep 10, 2024, at 11:41 AM, Ethlyn Williams <ewilliam@fau.edu> wrote:

Hi David:

This sounds like a good program. The courses you mentioned are all offered regularly with the exception of MAN 3611 which is offered less often, but because it is an elective it will not be a problem. Management Programs supports this initiative.

Best,

Ethlyn Williams

Ethlyn Williams, PhD
Professor of Management
Chair, Department of Management Programs
Florida Atlantic University
College of Business
777 Glades Road
Boca Raton, FL 33431
Phone: 561-297-3654
Email: ewilliam@fau.edu

From: Roland Kidwell <kidwellr@fau.edu>
Sent: Tuesday, September 10, 2024 11:33 AM
To: David Binninger <binninge@fau.edu>
Cc: Ethlyn Williams <ewilliam@fau.edu>
Subject: Re: Proposed BS/MS option for the PSM in business biotechnology graduate program

Hi David,

This idea has a great deal of potential. I'm surprised that ENT 4024 (Entrepreneurship) is not on the list either as required or as an elective. 😊

As I am no longer department chair of management programs as of August 2023, I have copied Dr. Ethlyn Williams, the department chair. She should be the person you contact regarding these approvals. I copied her on this email.

Best wishes,

Roland

From: David Binninger <binninge@fau.edu>
Sent: Tuesday, September 10, 2024 8:49 AM

To: Roland Kidwell <kidwellr@fau.edu>

Subject: Proposed BS/MS option for the PSM in business biotechnology graduate program

Good morning Roland,

We would like to expand the Professional Science Masters (PSM) in business biotechnology to include a BS/MS fast-track option. As part of the application, we must provide evidence that the department(s) in the College of Business that offers the courses agrees to allow biology majors to take the classes. I am writing to you since the curriculum we will be submitting for approval includes courses that are listed under Management, International Business and Entrepreneurship in the online FAU catalog.

More specifically, the curriculum would require Introduction to Business (GEB 2011) and Introduction to Management and Organizational Behavior (MAN 3025). The student would then select two elective business courses from the following: Cross Cultural Human Relations and Negotiations (MAN 3611), Strategic Human Resource Management (MAN 4301), Leading Change and Development (MAN 4350), Global Human Resource Management (MAN 4610), Leading People and Projects (MAN 4046) or a special topics (MAN 4930) when available.

I don't know the typical size of these classes, but I anticipate there would be maybe 2-5 students maximum in any of these classes. Can you give approval for biology students to take these courses? If not, to whom should I send this request? Please let me know if you have questions or concerns.

Thanks,

David

David Binninger, PhD
Associate Professor and Associate Chair
Biological Sciences Department
and
Center for Molecular Biology and Biotechnology
Charles E Schmidt College of Science
Florida Atlantic University
777 Glades Road
Boca Raton, FL 33431
(561) 297-3323

BIOLOGICAL SCIENCES

~~BACHELOR OF SCIENCE (B.S.) TO MASTER OF SCIENCE (M.S.) COMBINED PROGRAM~~

(Minimum of 153-156 credits required)

~~This combined degree program leads to both bachelor's (B.S.) and master's (M.S.) degrees in Biological Sciences with an emphasis in molecular biology and biotechnology. It is a laboratory-intensive curriculum that provides hands-on training for students who are interested in a career in the rapidly expanding field of biotechnology. This program will also provide excellent preparation for pursuing advanced degree studies.~~

~~The combined degree program is 153-156 credits, 120 for the undergraduate degree and 33-36 for the master's degree. Students complete the undergraduate degree first, taking no more than 12 credits of graduate coursework in their senior year, which will then be used to satisfy both degrees. See specific program requirements below.~~

~~Prerequisite Coursework for Transfer Students~~

~~Students transferring to Florida Atlantic University must complete both lower-division requirements (including the requirements of the General Education Program) and requirements for the college and major. Lower-division requirements may be completed through the A.A. degree from any Florida public college, university or community college or through equivalent coursework at another regionally accredited institution. Before transferring and to ensure timely progress toward the baccalaureate degree, students must also complete the prerequisite courses for their major as outlined in the [Transition Guides](#).~~

~~All courses not approved by the Florida Statewide Course Numbering System that will be used to satisfy requirements will be evaluated individually on the basis of content and will require a catalog course description and a copy of the syllabus for assessment.~~

~~Requirements and Eligibility~~

~~Students would typically begin taking graduate courses in their senior year that would apply to both their B.S. and M.S. degrees. The program can be completed in five years by allowing 12 credits of graduate-level courses to fulfill course requirements for both the B.S. and M.S. degrees. Students must maintain a minimum GPA of 3.0 to remain in the program.~~

~~The program requires completion of a research project (6 credits). While there is no formal requirement for a thesis, the research must be described in both a written report and an oral presentation to an advisory committee.~~

~~Students are expected to work in a research lab during their last two years of the program completing Directed Independent Study and Thesis credits. The research may be~~

completed in the laboratory of any member of the Center for Molecular Biology and Biotechnology (CMBB). Additionally, the research may be done under the direction of a faculty member in Biological Sciences if the project is appropriate to molecular biology and biotechnology. Faculty in other departments may mentor students with approval of the director or the chair.

Prospective students must formally apply to this graduate program and meet all admission requirements: a minimum undergraduate science GPA of 3.0 and GRE scores of at least 151 (verbal) and 148 (quantitative). Students should take the GRE before the end of their junior year.

Curriculum

The core curriculum for students in the combined B.S./M.S. degree program is the same as for all Biological Sciences students in a Bachelor of Science (B.S.) program. The difference in this combined program is the emphasis on Molecular Biology and Biotechnology.

Molecular Biology and Biotechnology Core and Elective courses

Laboratory Methods in Biotechnology	BSC 4403L
Organic Chemistry 2	CHM 2211
Organic Chemistry Lab	CHM 2211L
General Microbiology	MCB 3020
General Microbiology Lab	MCB 3020L
Genetics	PCB 3063
Practical Cell Neuroscience	PCB 4843C
Molecular Genetics	PCB 4522
Genetics Lab	PCB 4067L
Molecular Genetics of Aging	BSC 4022
Immunology	PCB 4233
Cellular Neuroscience and Disease	PCB 4842
Plant Biotechnology	BOT 4734C

Completion of the courses listed above as well general education courses required of all students will fulfill the requirements for the B.S. in Biological Sciences with emphasis on Molecular Biology and Biotechnology in addition to the 15 credits identified in the [Biotechnology certificate program](#). Those six courses must also be taken to fulfill the B.S./M.S. program.

Graduate courses that may count toward both B.S. and M.S. requirements – 12 credits

Students may choose 12 credits from the graduate courses listed below:

Advanced Biochemistry	BCH 6740
Bioinformatics	BSC 6458C
Directed Independent Study	BSC 6905
Instrumentation	CHM 6157
Advanced Molecular Genetics of Aging	PCB 5246
Advanced Immunology	PCB 6236

Cellular and Molecular Neuroscience	PSB-6345
Systems and Integrative Neuroscience	PSB-6346
Neurophysiology	PCB-6835C
Advanced Neurophysiology Lab	PCB-6837L
Cellular Neuroscience and Disease	PCB-6849
Principles of Neuroscience	PSB-6037
Practical Cell Neuroscience	BSC-6417C
Human Neuroanatomy	ZOO-6748

Students who complete these courses but decide not to pursue the M.S. degree would be required to take one additional 3-credit elective (approved by their faculty advisor) to fulfill the B.S. requirements.

Additional graduate-level courses – 15 credits

In addition to the 12 credits of graduate courses that fulfill requirements for the B.S. degree, the student must take an additional 15 credits of graduate courses from the list shown above or other graduate courses approved by their advisory committee.

Research – 6 credits

An important element of this program is the hands-on laboratory experience. This requirement is met by the formal laboratory courses as well as individual training in a research laboratory, an experience that cannot be duplicated in laboratory courses. Six credits of Master's Thesis (BSC-6971) must be completed. A formal thesis is not required, but the research must be presented as both a written report and oral presentation to an advisory committee.

Comments on Total Credits

A student could complete the requirements of this program and earn both the B.S. and M.S. degree with a minimum of 153–156 credits. Many students will likely finish with more credits.

Biological Sciences

Bachelor of Science (B.S.) to Master of Science (M.S.) Combined Program
Business Biotechnology Professional Science Master (P.S.M)

(Minimum of 152 credits required)

This combined degree program leads to both bachelor's (B.S.) and Business Biotechnology Professional Science Masters. This Program is intended as a terminal degree for students interested in entering the workforce following completion of the Degree. This Program includes traditional classroom courses in both business and science and the student can choose to do either a Business or Science Internship. This program is tailored for the student who is primarily interested in working in the business or science side of the emerging biotechnology industry.

The combined degree program is **152** credits, 120 for the undergraduate degree and 32 for the master's degree. Students complete the undergraduate degree first, taking no more than 12 credits of graduate coursework in their senior year, which will then be used to satisfy both degrees. See specific program requirements below.

Prerequisite Coursework for Transfer Students

Students transferring to Florida Atlantic University must complete both lower-division requirements (including the requirements of the Intellectual Foundations Program) and requirements for the college and major. Lower-division requirements may be completed through the A.A. degree from any Florida public college, university or community college or through equivalent coursework at another regionally accredited institution. Before transferring and to ensure timely progress toward the baccalaureate degree, students must also complete the prerequisite courses for their major as outlined in the [Transition Guides](#).

All courses not approved by the Florida Statewide Course Numbering System that will be used to satisfy requirements will be evaluated individually on the basis of content and will require a catalog course description and a copy of the syllabus for assessment.

Requirements and Eligibility

Students would typically begin taking graduate courses in their senior year that would apply to both their B.S. and M.S. degrees. The program can be completed in five years by allowing 12 credits of graduate-level courses to fulfill course requirements for both the B.S. and M.S. degrees. Students must maintain a minimum GPA of 3.0 to remain in the program.

Prospective students must formally apply to this graduate program and meet all admission requirements: a minimum undergraduate science GPA of 3.0 – The 12 credits of Graduate level work that count toward both the undergraduate and graduate level must be a B or better in order to count toward the Master's Degree.

Curriculum

The core curriculum for students in the combined B.S./M.S. degree program is the same as for all Biological Sciences students in a Bachelor of Science (B.S.) program. The difference in this combined program is the emphasis on Biotechnology and Business Courses

Business (6) Core Courses		
Introduction to Business	GEB 2011	3
Introduction to Management and Organization Behavior	MAN 3025	3
Biotechnology (14) Core Courses		
Biochemistry Lab	BCH 3103L	3
Laboratory Methods in Biotechnology	BSC 4403L	3 or
Plant Biotechnology	BOT 4734C	
General Microbiology	MCB 3020	3
General Microbiology Lab	MCB 3020L	1
Genetics	PCB 3063	4

The above Biotechnology core courses also fulfill the requirements for the Biotechnology Certificate Program.

Biotechnology and Business Elective courses 12 credits		
6 credits must be taken in biology electives		
6 credits must be taken in Business elective		
Biology Courses electives		
Plant Biotechnology	BOT 4734C	3
Introduction to Biological Research	BSC 3453	1
Special Topics	BSC 4930	3
Seminar	BSC 4932	1
Molecular Genetics of Aging	BSC 4022	3
Cell Biology	PCB 3023	3
Genetics Lab	PCB 4067L	3
Genes and Development	PCB 4594	3
Immunology	PCB 4233	3
Cellular Neuroscience and Disease	PCB 4842	3
Practical Cell Neuroscience	PCB 4843C	3
Molecular Genetics	PCB 4522	3
Business course electives		
Cross Cultural Human Relations and Negotiations	MAN 3611	3
*Human Resource Management	MAN 4301	3
*Human Resource Development	MAN 4350	3
*Managing Human Resources Globally	MAN 4610	3
*Leadership, Supervisory Skill, and Team Development	MAN 4046	3
Special Topics	MAN 4930	1--4
Entrepreneurship	ENT 4024	3

Note: No more than 2 credits of a seminar course (BSC 4932) may be used to fulfill biology degree program requirements.

Completion of the courses listed above as well general education courses required of all students will fulfill the requirements for the B.S. in Biological Sciences with emphasis Biotechnology and Business

Graduate courses that may count toward both B.S. and M.S. requirements (12 credits) Must receive a B or better in all courses in order to count toward the Master's Degree.

Students take 6 elective Credits in Science Courses and 6 elective credits in Business course from list below.

Science Elective Courses (select 6 credits)		
Advanced Biochemistry	BCH 6740	3
Bioinformatics	BSC 6458C	4
Instrumentation	CHM 6157	3
Advanced Molecular Genetics of Aging	PCB 5246	3
Advanced Immunology	PCB 6236	3
Cellular and Molecular Neuroscience	PSB 6345	3
Systems and Integrative Neuroscience	PSB 6346	3
Neurophysiology	PCB 6835C	3
Advanced Neurophysiology Lab	PCB 6837L	3
Cellular Neuroscience and Disease	PCB 6849	3
Principles of Neuroscience	PSB 6037	3
Practical Cell Neuroscience	BSC 6417C	3
Human Neuroanatomy	ZOO 6748	3
Business elective Courses (select 6 credits)		
Financial Accounting Concepts	ACG 6027	3
Technology Commercialization Strategies	ENT 6186	3
Developing and Marketing Innovations	MAR 6837	3
Advanced Marketing Management	MAR 6815	3
Marketing Functions/Processes	MAR 6055	3
Entrepreneurship Venture Capital	ENT 6426	3
Leadership and Organizations	MAN 6296	3
Human Resources Management	MAN 6156	3
Advanced Business Plan Development	ENT 6116	3
Cross Cultural Management	MAN 6609	3
Project Management	MAN 6581	3

Students who complete these courses but decide not to pursue the M.S. degree would be required to take one additional 3-credit elective (approved by their faculty advisor) to fulfill the B.S. requirements.

Additional graduate-level courses (20 credits)

In addition to the 12 credits of graduate courses that fulfill requirements for the B.S. degree, the student must fulfill the following requirements.

Core Courses (8 credits required)		
Venture Creation	ENT 6016	3
Biotechnology Business Development	ENT 6196	3
Choose one of the below Internships		
Professional Science Master's (P.S.M.) in Business Biotechnology - Scientific Internship	BSC 6946	2
Or		
Professional Science Master's (P.S.M.) in Business Biotechnology - Business Internship	MAN 6946	2

Science internship: science oriented with the student working directly with research scientists.

Business Internship: 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 (select 9 credits from the list below. May require instructor permission or prerequisites)		
Biochemistry of the Gene	BCH 5415	3
Advanced Biochemistry	BCH 6740	3
Advanced Plant Biotechnology	BOT 6735C	3
Practical Cell Neuroscience	BSC 6417C	3
Lab Methods In Biotechnology	BSC 6408L	3
Computer Graphics for Biologists	BSC 6455	3
Bioinformatics	BSC 6458C	4
Scientific Communication (Note: Priority enrollment given to Integrative Biology Ph.D. students)	BSC 6846	3
Advanced Molecular Genetics of Aging	PCB 5245	3
Advanced Genetics Lab	PCB 5064L	3
Genes and Development	PCB 6595	3
Advanced Cell Physiology	PCB 6207	3
Advanced Immunology	PCB 6236	3
RNS Biology and Disease	PCB 6525	3
Reproductive Endocrinology	PCB 6804	3
Neurophysiology	PCB 6835C	3
Advanced Neurophysiology Lab	PCB 6837L	3
Cellular Neuroscience and Disease	PCB 6849	3
Special Topics, including Macromolecular Structure and Function and Protein Misfolding and Disease (3 credits each)	PCB 6933	6
Principles of Neuroscience	PSB 6037	3
Developmental Neurobiology	PSB 6515	3
Human Neuroanatomy	ZOO 6748	3
Advanced Drug Development	CHM 6277C	3
Drug Design	CHM 6278	3
Advanced Drug Formulation	CHM 6279C	3
Advance Topics in Biochemistry	BCH 6930	3
Advanced Topics in Organic Chemistry	CHM 6380	3
Structural Biochemistry	CHM 6351	3
Instrumentation	CHM 6157	3
Macromolecules and Human Disease	GMS 6301	3
Pharmacology	GMS 6513	3
Special Topics	PCB 6933	1-8
Host Defense and Inflammation	MCB 6208	3
Advanced Molecular and Cell Biology	PCB 5532	3
Human Genetics	PCB 6665	3
Autonomic Function and Diseases	BMS 6523	3

Molecular Basis of Disease and Therapy	GMS 6302	3
Neurobiology of Addiction	PCB 5844	3
Molecular Basis of Human Cancer	PCB 6235	3
Problem-Based Immunology	PCB 6238	3
Tumor Immunology	PCB 6239	3
Adult Neurogenesis	PCB 6846	3
Brain Diseases: Mechanism and Therapy	BMS 6736	3

** 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 courses can be substituted with the approval of the faculty advisor.

Business Courses (3 credits required, choose from list below))		
Financial Accounting Concepts	ACG 6027	3
Technology Commercialization Strategies	ENT 6186	3
Developing and Marketing Innovations	MAR 6837	3
Advanced Marketing Management	MAR 6815	3
Marketing Functions/Processes	MAR 6055	3
Entrepreneurship Venture Capital	ENT 6426	3
Leadership and Organizations	MAN 6296	3
Human Resources Management	MAN 6156	3
Advanced Business Plan Development	ENT 6116	3
Cross Cultural Management	MAN 6609	3
Special Topics	MAN 6933	1-3
Project Management	MAN 6581	3
Special Topics	ACG 6935	1-3

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.

Comments on Total Credits

A student could complete the requirements of this program and earn both the B.S. and M.S. degree with a minimum of 152 credits.