Department of Biological Sciences
Program Modifications and Change-of-Name
To Update Premedical Biology Option (major code 7027)

I. Introduction
The Department of Biological Sciences proposes to replace the existing option in Premedical Biology (current 7027) with an updated option under a new name. The proposed changes are designed to provide greater flexibility to students enrolled in the option, to ensure that students have the material needed to perform well on the new version of the Medical College Admission Test (MCAT), and to integrate the option better with the new and growing program in Biomedical Engineering (College of Engineering).

II. Programmatic Changes
Some of the courses required in the existing Premedical Biology option will become restricted or technical electives in the new program. These and other changes are outlined on the accompanying flow charts. Courses required in the Premedical Biology option that will become electives include:

- BIO 2010 Microbiology 4 cr.
- BIO 3220 Developmental Biology 4 cr.
- BIO 4550 Comparative Vertebrate Anatomy
- BIO 3210 Mammalian Physiology

BIO 2801 Biometry will move from Spring of the junior year to Spring of the Sophomore year. This change will make the first two years of the new program identical to other departmental options. BIO 2801 will remain the computer-literacy course for the program.
OCN, ENS, and ISC courses will be eliminated as restricted electives because they are not particularly relevant to the intent of the option; instead, BME courses will qualify as restricted electives to broaden the students’ choices for relevant experiences.

The university core will be satisfied by this program, as will be the requirements for computer literacy (BIO 2801) and a Q-course (a choice is offered among the restricted electives, similar to the Aquaculture option). The required courses will include:

- BIO 2110 General Genetics
- BIO 2801 Biometry
- BIO 3201 Anatomy and Physiology I
- BIO 3202 Anatomy and Physiology II
- BIO 4910 Biochemistry I
- BIO 4110 Biochemistry II
- BIO 4301 Cell Biology
- BIO 4305 Molecular Basis of Disease
- BIO 4201 Immunology

There will be no hidden prerequisites. The total credits required will remain at 129.
Florida Institute of Technology

ADDING A NEW MAJOR OR MINOR TO THE CURRICULUM

Please provide the following information when requesting a new major or minor (program or option) to be added to the curriculum. Only new majors, minors and options are assigned a new code and print on the diploma. The code will be assigned by the Office of the Registrar and information emailed to all appropriate personnel.

COLLEGE  Science

DEPARTMENT  Biological Sciences

DELIVERY MODE(S)  Classroom  (classroom, online)

CAPPUSSITE(S)  Melbourne

PROGRAM TO BE ADDED  Option for  B.S. Biological Sciences  (existing degree program)

NOTE: Only Majors, Minors and Options receive new codes and print on the diploma; use Option for new program name to appear with existing degree name.

☐ Associate of Arts (A.A.)  ☐ Master of Business Administration (M.B.A.)  ☐ Educational Specialist (Ed.S.)

☐ Associate of Science (A.S.)  ☐ Master of Education (M.Ed.)  ☐ Doctor of Business Administration (DBA)

☐ Bachelor of Arts (B.A.)  ☐ Master of Public Administration (M.P.A.)  ☐ Doctor of Philosophy (Ph.D.)

☐ Bachelor of Science (B.S.)  ☐ Master of Science (M.S.)  ☐ Doctor of Psychology (Psy.D.)

☐ Master of Arts (M.A.)  ☐ Master of Science in Aviation (M.S.A.)  ☐ Graduate Certificate

Other Addition to the Curriculum (NOTE: Only Majors, Minors and Options receive new codes and print on the diploma; use Concentration or Specialization if the new program represents less than a full degree curriculum.)

☐ Concentration or ☐ Specialization for  ________________________  (existing degree program)

PROGRAM TITLE Restricted to 30 characters, including spaces

Biomedical Science

ACADEMIC YEAR TO BE INITIATED: FALL 2016  ADVISOR FOR NEW PROGRAM  Dr. Eric Guisbert

(New programs are available beginning with the fall term in which they appear in the University Catalog)

ROUTING APPROVALS: 1) Department head/program chair and college dean approve and sign form. 2) The vice president for institutional effectiveness reviews and signs form. 3) The executive vice president or his designee approves business plan of the program in terms of financial viability and impact on the university mission and signs form. 4) Graduate Council or Undergraduate Curriculum Committee approves academic and signs form. 5) The vice president for academic affairs reviews and signs form. 6) The executive vice president or his designee gives final approval of program, signs form and forwards to the Catalog & Curriculum Manager.

1)  Richard B. Emerson  9/15/15

2)  Vice President for Institutional Effectiveness  Date

3)  Executive Vice President  Date

4)  Chair, Graduate Council  Date

OR

5)  Vice President for Academic Affairs  Date

6)  Executive Vice President  Date

REGISTRAR'S USE ONLY

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STVMAR  SOACURR  Major Code Assigned

GWVSDAX  CIFC Code  Operator Initials/Date

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150 West University Boulevard, Melbourne, FL 32901-6975 • (321) 674-7399 • Fax (321) 674-7827
Assessment Rubric for Biomedical Science Option
Revised from Premedical Biology Option
Approved 30 September 2015 by Andy Stanfield, Asst. VP for Assessment

Outcomes/Objectives

1. Explain principles of biology (DSK)
   - Graduates will explain fundamental principles of biology
     - Measure: Students will answer embedded questions in exams of General Genetics (BIO 2110) that address principles of inheritance a topic that all biology students should understand. (O: 1)
       - Target: 75% of students will attain a grade of 80% or better on embedded questions in exams of General Genetics (BIO 2110).
     - Measure: Students will answer embedded questions in exams of Biochemistry (BIO 4010) that address principles of metabolic pathways a topic that all biomedical scientists should understand. (O: 1)
       - Target: 75% of students will attain an 80% on embedded questions in exams of Biochemistry (BIO 4010).

2. Demonstrate professionalism in the field of biomedical science (DSK)
   - Graduates will answer embedded questions in exams of core courses in Biomedical Sciences that address fundamental principles that all Biomedical Science students should understand.
     -- Measure: Students will answer embedded questions in exams of Human Anatomy and Physiology I (BIO 3201) and Human Anatomy and Physiology II that address organ system function, fundamental principles that all biomedical students should understand.
       - Target: 75% of students will attain an 80% or better on embedded questions in exams of Human Anatomy and Physiology I and II (BIO 3201 and 3202)
     - Measure: Students will answer embedded questions in exams of core biomedical science courses. These questions will address fundamental principles that all biomedical science students should understand such as mechanisms of metabolic regulation and DNA function. (O: 2)
       - Target: 75% of students will attain a grade of 80% or better on embedded questions in Cell Biology (BIO 4301) and Immunology (BIO 4201).

3. Give effective oral presentation (COM)
   - Graduates will give an effective oral presentation about an aspect of biology learned from the literature or laboratory research.
     - Measure: Students will give an oral presentation in the capstone course in Biomedical Sciences (Molecular Basis of Disease) that will include an introduction to pertinent literature. Presentations will be evaluated using a rubric.
       - Target: 75% of students will attain an 80% or better on the introductory section of their oral presentation for Molecular Basis of Disease (BIO 4305)
     - Measure: Students will give an oral presentation in the capstone course in biomedical science that will include a discussion of the students’ own thoughts or findings in relation to the presentation topic. Presentations will be evaluated using a rubric.
- **Target**: 75% of students will attain an 80% or better on the discussion section of their oral presentation for Molecular Basis of Disease (BIO 4305)

4. **Compose effective written presentation (COM)**

   - **Graduates will compose an effective research paper based on an aspect of biology learned from laboratory or field research.**
     - **Measure**: Students will write a laboratory report for General Genetics (BIO2110) that will include a discussion of their laboratory findings. Reports will be evaluated using a rubric. (O: 4)

   - **Target**: 75% of students will attain an 80% or better on the discussion section of the laboratory report for General Genetics (BIO2110).
     - **Measure**: Students will write a research paper in the core course in biomedical science that will include a discussion of their research findings. Papers will be evaluated using a rubric. (O: 4)

   - **Target**: 75% of students will attain an 80% or better on the discussion section of their research paper for Human Anatomy and Physiology II (BIO 3202)

5. **Demonstrate problem solving skills (CT)**

   - **Graduates will demonstrate an ability to solve problems in biology.**
     - **Measure**: Students will answer embedded problem solving questions in exams of General Genetics (BIO 2110). (O: 5)

   - **Target**: 75% of students will attain an 80% or better on embedded problem solving questions in exams of General Genetics (BIO 2110).
     - **Measure**: Students will answer embedded problem solving questions in the capstone course Cell Biology.

   - **Target**: 75% of students will attain an 80% or better on embedded problem solving questions in exams of CellBIology

6. **Ability to integrate biological principles in problem solving (CT)**

   - **Graduates will demonstrate the ability to effectively integrate biological principles into solving research related problems.**
     - **Measure**: Students will develop a research project and write a paper based on their findings in Human Anatomy and Physiology II (BIO 3202). Papers will be evaluated using a rubric.

   - **Target**: 75% of students will attain an 80% or better on the project development section of their research paper Human Anatomy and Physiology II (BIO 3202).
III. New Name for the Program

The new name of the program will be BIOMEDICAL SCIENCE (major code XXXX). There are three strategic rationales for the name. The first is to increase enrollment. Anecdotal information from the Office of Admission and other sources suggests that prospective students who wish to enter the medical field shy away from the Premedical Biology option because they presume that if they are not admitted to medical school, their career options will be limited by the title of their degrees. Second, students interested in pursuing a career in Biomedical Science, but who do not wish to go to a health professions school will now see a biology option that is appropriate for them. Third, the new name is intended to integrate the option with the College of Engineering’s program in Biomedical Engineering (BME). Biomedical Science will complement BME. The heads of BME and BIO, Drs. Ted Conway and Rich Aronson, agree that such a move would be beneficial to both programs and the University at large.

IV. Assessment

A revised rubric for assessment accompanies this proposal.
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*AP, advanced placement by testing, equivalency exam, etc.;
†Free Elective for exempted transfer students;
TC, transfer credit
§BIO/CHM/ENS/OCN/PHY/PSY-2442/PSY-3423/PSY-3531/PSY-4521
* must be a course that bears the Q designation
‡BIO/CHM/ENS/OCN/PHY/PSY-2442/PSY-3423/PSY-3531/PSY-4521

TOTAL CREDITS REQUIRED: 129

SIGNATURES:

Student: ____________________________
Advisor: ____________________________
Department Head: ____________________

REMARKS/EXTRA COURSES: ____________________________
INSTRUCTIONS AND GUIDELINES FOR COMPLETING FLOWCHART FOR BIOLOGICAL SCIENCES/PREMEDICAL BIOLOGY OPTION (7027)

Complete all parts in ink except for advisor's temporary notes in pencil, erased before submission.

Use the flowchart for the year that represents the student's academic peer group based on majority of curriculum (mainly biology and chemistry courses) satisfied upon entry to FIT.

Enter full name and full student number.

The only entries under "GRADE" column are earned grades: A–F; TC (official transfer credit); AP (official advanced placement); EE (FIT equivalency exam). If student re-took course, entry might appear as "F/C".

The only entries under "SUBSTITUTION" are alphanumeric FIT course numbers either from transfer credit evaluation cr or courses taken at FIT; no substitutions allowed for named required courses (except as noted below under "TRANSFER STUDENTS").

TRANSFER STUDENTS: students formerly matriculated at other colleges and universities (not high-school students with college credit) exempt from ASC-1000, enter "EX", indicating exemption, under "SUBSTITUTION" column and enter a 1-credit-hour free elective; entry might appear as "EX/FREE: BIO-4991 (1 of 3 cr); if awarded AA degree (NOT AS degree) on transfer evaluation sheet. HU electives may substitute for HUM-2051 and HUM-2052 if no transfer credit for them; entry might appear as "AA EX/HU: LNG-1301"; only use of SCI transfer credits is for free elective; all actions require submission of a substitution form.

FREE ELEC: any course taken at FIT or by transfer credit at 1000-level or above.

HUM CORE: HUM-2052, 2142, 2212, 2213, 2331, 2332, or 3333.

HUM ELEC: any FIT course (taken at FIT or by transfer credit) with "HU" at end of course description in FIT catalog; also, MSC-4002; or any transfer course designated "HUM XXXX Humanities Elective" (or similar) on Registrar's transfer credit evaluation sheet.

LIB ARTS ELEC: any course covered here under "HUM ELEC" and "SOC SCI ELEC"; all non-required courses with prefixes COM, HUM, LNG, PSY; BUS-1801, BUS-2801, BUS-3404, BUS-3501, BUS-3801, BUS-4503, BUS-4520; EDS-1005, EDS-1502, EDS-1503, EDS-2502, EDS-2503, EDS-3131, EDS-4081; up to 6 credits of MSC-XXXX.

REST ELEC: approved subjects: BIO, CHM, PHY; BME; courses designated as non-majors not allowed; 1000-level courses not allowed except the few allowable 1-credit courses, usable only twice as restricted electives unless taken as the laboratory component with its lecture component: BIO-1500, BIO-2332 (if MTH-2332 not used); BIO-4990, CHM-1091, CHM-4901, COM-2012; up to 4 credits of restricted elective usable from the following: PSY-2442, PSY-3423, PSY-3531, PSY-4521.

SOC SCI ELEC: any FIT course (taken at FIT or by transfer credit) with "SS" at end of course description in FIT catalog; also, MSC-4002; or any transfer course designated "S S XXXX Social Science Elective" (or similar) on Registrar's transfer credit evaluation sheet.

TECH ELEC: approved subjects: AHF, AVS, BCM, BIO, BME, CHE, CHM, CIS, CON, CSE, CVE, ECE, ENS, ISC, MAE, MET, MTH, OCE, OCN, ORP, PHY, SPC, SPS, SWE, SYS; PSY-3423, PSY-4521; courses designated as non-majors (e.g., BIO-3010) not allowed; approved levels include 3000 and 4000 as well as graduate courses; levels 1000 and 2000 allowed except: AVS-1101, AVS-1102, AVS-1202, BIO-1162, BIO-1XXX transfer credit; BIO-2332 if MTH-2332 used for graduation credit; CHM-1100, CSE-1101, CSE-2234, CSE-2400 (or any other statistics course); MTH-1000, MTH-1603, MTH-1701, MTH-1702, MTH-1801, MTH-2332 if BIO-2332 used for graduation credit; MTH-2401.

Be certain to submit substitution forms immediately for elective courses, any substitutions, and special situations.
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*AP, advanced placement by testing, equivalency exam, etc.;
†Free Elective for exempt transfer students TC, transfer credit
§BIO/CHM/ENS/ISC-4000/ISC-5016/OCN/PHY
‡BIO/CHM/ENS/OCN/PHY/FSY-2442/PSY-3423/PSY-3531/PSY-4521

SIGNATURES:
Student: _____________________________
Advisor: _____________________________
Department Head: _____________________________

REMARKS/EXTRA COURSES: _____________________________
INSTRUCTIONS AND GUIDELINES FOR COMPLETING FLOWCHART FOR BIOLOGICAL SCIENCES/PREMEDICAL BIOLOGY OPTION (7027)

Complete all parts in ink except for advisor's temporary notes in pencil, erased before submission.

Use the flowchart for the year that represents the student's academic peer group based on majority of curriculum (mainly biology and chemistry courses) satisfied upon entry to FIT.

Enter full name and full student number.

The only entries under "GRADE" column are earned grades: A–F; TC (official transfer credit); AP (official advanced placement); EE (FIT equivalency exam). If student re-took course, entry might appear as "F/C".

The only entries under "SUBSTITUTION" are alphanumeric FIT course numbers either from transfer credit evaluation or for courses taken at FIT; no substitutions allowed for named required courses (except as noted below under "TRANSFER STUDENTS").

TRANSFER STUDENTS: students formerly matriculated at other colleges and universities (not high-school students with college credit) exempt from ASC-1000; enter "EX", indicating exemption, under "SUBSTITUTION" column and enter a 1-credit-hour free elective; entry might appear as "EX/FREE: BIO-4991 (1 of 3 cr); if awarded AA degree (NOT AS degree) on transfer evaluation sheet. HU electives may substitute for HUM-2051 and HUM-2052 if no transfer credit for them; entry might appear as "AA EX/HU: LNG-1301"; only use of SCI transfer credits is for free elective; all actions require submission of a substitution form.

FREE ELEC: any course taken at FIT or by transfer credit at 1000-level or above.

HUM CORE: HUM-2052, 2142, 2212, 2213, 2331, 2332, or 3333.

HUM ELEC: any FIT course (taken at FIT or by transfer credit) with "HU" at end of course description in FIT catalog; also, MSC-4002; or any transfer course designated "HUM XXXX Humanities Elective" (or similar) on Registrar's transfer credit evaluation sheet.

LIB ARTS ELEC: any course covered here under "HUM ELEC" and "SOC SCI ELEC"; all non-required courses with prefixes COM, HUM, LNG, PSY; BUS-1801, BUS-1801, BUS-3404, BUS-3501, BUS-3801, BUS-4503, BUS-4520; EDS-1005, EDS-1502, EDS-1503, EDS-2502, EDS-2503, EDS-3131, EDS-4081; up to 5 credits of MSC-XXXX.

REST ELEC: approved subjects: BIO, CHM, ENS, ISC-4000, ISC-5016, OCN, PHY; courses designated as non-majors not allowed; 1000-level courses not allowed except the few allowable 1-credit courses, usable only twice as restricted electives unless taken as the laboratory component with its lecture component: BIO-1500, BIO-2332 (if MTH-2332 not used), BIO-4990, CHM-1091, CHM-4901, COM-2012, ENS-3105, ENS-4901, ENS-4911, OCN-3111, OCN-3211, OCN-3311, OCN-3411, OCN-3433, OCN-4901, OCN-4911; up to 4 credits of restricted elective usable from the following: PSY-2442, PSY-3423, PSY-3511, PSY-4521; up to 4 credits of a transfer course in human anatomy and physiology (SCI-XXXX) usable as restricted elective if required by the intended graduate professional school.

SOC SCI ELEC: any FIT course (taken at FIT or by transfer credit) with "SS" at end of course description in FIT catalog; also, MSC-4002; or any transfer course designated "S S XXXX Social Science Elective" (or similar) on Registrar's transfer credit evaluation sheet.

TECH ELEC: approved subjects: AHF, AVS, BCM, BIO, BME, CHE, CHM, CIS, CON, CSE, CVE, ECE, ENS, ISC, MAE, MET, MTH, OCE, OCN, ORP, PHY, SPC, SPS, SWE SYS; PSY-3423, PSY-4521; courses designated as non-majors (e.g., BIO-3010) not allowed; approved levels include 3000 and 4000 as well as graduate courses; levels 1000 and 2000 allowed except: AVS-1101, AVS-1102, AVS-1202, BIO-1162, BIO-1XXX transfer credit. BIO-2332 if MTH-2332 used for graduation credit, CHM-1100, CSE-1101, CSE-2234, CSE-2400 (or any other statistics course), MTH-1000, MTH-1533, MTH-1701, MTH-1702, MTH-1801, MTH-2332 if BIO-2332 used for graduation credit, MTH-2401.

Be certain to submit substitution forms immediately for elective courses, any substitutions, and special situations.