

**FLORIDA STATE UNIVERSITY SIGNATURE PAGE
PROPOSAL FOR A COMBINED BACHELOR'S/MASTER'S
PATHWAY**

COLLEGE/DEPARTMENT: _____

BACHELOR'S DEGREE: (incl. C.I.P. Code and Degree Type): _____

MASTER'S DEGREE: (incl. C.I.P. Code and Degree Type): _____

NAME OF COMBINED DEGREE PATHWAY: _____

CONTACT PERSON: _____

COMBINED DEGREE PATHWAY DIRECTOR (print name and email):

APPROVED:

Department/School Curriculum Committee

Date

Department Chair/Director

Date

College Curriculum Committee

Date

Academic Dean

Date

Dean of Undergraduate Studies/UPC

Date

Dean of The Graduate School/GPC

Date

VP for Faculty Development and Advancement

Date

Provost and Executive Vice President for Academic Affairs

Date

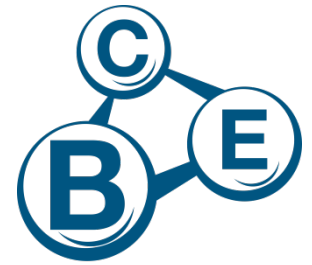
NOTES:

- FSU students normally apply to participate in a combined degree pathway in their junior or senior year, but may apply as early as the second semester of their sophomore year. If accepted, they should take the Graduate Record Examination in the first semester of their senior year. Students should make formal application for admission to graduate school during the last semester of their senior year, although some departments may have an earlier deadline.
- Students in a combined degree pathway must meet the standards, as outlined in the *Undergraduate Bulletin*, for undergraduates to take graduate coursework. Specifically, they must have earned a minimum 3.0 FSU GPA and carry no more than 15 credit hours per semester. As long as students have been admitted to the combined degree pathway, they will be considered pre-approved by the instructor and the dean when requesting graduate course registration from the Registrar's Office.
- The Department must indicate what grades earned in graduate course work taken at the undergraduate level can be double counted towards the student's graduate program. For instance, the Department can indicate a specific average (of not less than 3.0) or specify letter grades (A, A-, B+, B) in graduate course work taken at the undergraduate level.
- Courses to be double-counted should be at the 5000 level or above. Directed Individual Study, internships, or courses given credit-by-examination are not eligible. The credits to be double-counted will be designated as applicable to the graduate program after the student receives the bachelor's degree and matriculates in the graduate degree.

Combined Bachelor's - Master's Degree Program

[BS-BME: Biomedical Engineering → MS-ECH: Chemical Engineering]

Department of Chemical and Biomedical Engineering
FAMU-FSU College of Engineering



Description of the Program

The Department of Chemical and Biomedical Engineering (CBE) is requesting to implement a combined Bachelor of Science and Master of Science (BS-MS) degree program based on the existing Biomedical Engineering BS and Chemical Engineering MS programs. It is the desire of the Department to allow academically talented students to obtain both a bachelor's and a master's degree in a shorter time span, while producing engineers that are fully qualified to enter into a professional practice in industry. Academically talented students will be able to enter the combined BS/MS from any of the majors within the Biomedical BS degree. Graduate courses will be introduced to the student during their fourth year of undergraduate study. In the fifth year, after completing the BS degree, students will take graduate courses exclusively. Students who have graduated with this degree track have been able to find jobs successfully or have pursued advanced degrees in Chemical Engineering, Materials Engineering, Biomedical Engineering, Medicine, Business, Patent Law and other related fields.

The Application Procedure

Students should meet with their academic advisor to determine eligibility for the combined BS-MS degree pathway. Qualified students interested in the combined degree program will submit an application for review by the CBE Graduate Committee. FSU students will apply to participate in the combined degree program in their junior year, but may apply as early as the second semester of their sophomore year. If accepted, students should make a formal application for admission to the graduate school during their senior year, and must fulfill all departmental and university requirements for admission to the graduate program in Chemical Engineering.

A faculty member will introduce the combined BS-MS program to potential applicants during one or more of the Fall semester (October/November) junior-level courses. In addition to online resources that are readily accessible, an application to the BS-MS program will be distributed to all interested junior-level students. Eligible applicants must have completed the following undergraduate courses before taking any graduate level classes:

- BME 3009 - Introduction to Biomedical Engineering
- BME 3100 - Biomaterials
- BME 3622 - Biothermodynamics
- BME 3631 - Biotransport Phenom
- BME 3702 - BME Computations
- BME 3723 - Biostatistics
- BME 4211 - Biomechanics
- BME 4403C - QtAnatSystPhys I
- BME 4503 - Bioinstrumentation
- BME 4503L - Bioinstrument Lab
- ECH 4267 - Transport Phenomena II

The applications then will be reviewed during the Spring semester by the CBE graduate committee for admissions decisions.

Admissions Requirements:

A student of senior standing or an upper-division honors student may carry graduate courses for undergraduate credit provided the student:

- 1) has earned either a grade point average (GPA) of 3.0 ("B") or better;
- 2) carries a course load of no more than fifteen (15) semester credit hours;
- 3) is enrolled and active in the Cell & Bioprocess major option so as to take ECH 4504 – Kinetics & ReactorDes during their senior year.
- 4) if not enrolled and active in the Cell & Bioprocess major, will need to take as an undergraduate elective ECH 4504 Kinetics & Reactor Design in either the senior year or summer before starting the graduate portion of the program.
- 5) will have taken ECH 4267 - Transport Phenomena II as an extra undergraduate elective during their BS progression, either before and concomitant with graduate courses; and
- 6) has the advance approval of the Dean, the Department Chair, and the instructor offering any graduate course prior to registration. "Student must submit a specified form, appropriately signed, to the Registrar's office, to get approval with regard to taking graduate courses for undergraduate credit."

Upon admission to the graduate program, up to nine (9) graduate credit hours may be counted toward the combined program's master's degree, provided the course has not been counted toward a previous degree – with the exception of the undergraduate degree that is part of the combined master's degree. Interested students should contact an advisor in the Department of Chemical and Biomedical Engineering for specific information.

Overview of Program of Study and Program Requirements

1. BS Biomedical Engineering – MS Chemical Engineering Degree Program Description

Chemical Engineering - Course (non-thesis) Option, (thirty [30] semester hours)

The **course-type** master's degree is awarded upon successful completion of the following requirements:

1. Twelve (12) semester hours of biomedical engineering core courses (see below)
2. Eighteen (18) semester hours of approved electives
3. Registration and attendance at all departmental seminars - ECH 5935, Chemical Engineering Seminar (0)

No course with a grade below "C" will be counted toward fulfillment of degree requirements. No more than one course with a grade of "C" will be counted toward fulfillment of degree requirements.

Note: Departmental support in the form of teaching assistantship and tuition waiver is generally not available for students pursuing a non-thesis master's degree. Depending upon departmental needs and availability of funds, TA's positions may occasionally be available.

Required Chemical Engineering Core Graduate Courses (twelve [12] semester hours)

- ECH 5126 - Advanced Chemical Engineering Thermodynamics I (3)
- ECH 5261 Advanced Transport Phenomena I (3)

- ECH 5840 Advanced Chemical Engineering Mathematics I (3)
- ECH 5852 - Advanced Chemical Engineering Computations (3)

Students transfer three courses (9 credit hours) of approved 5000 electives towards the MS degree.

2. BS Biomedical Engineering – MS Chemical Engineering Degree Program Description Chemical Engineering - Thesis Option, (thirty [30] semester hours)

The **thesis** master's degree is awarded upon successful completion of the following requirements:

1. Fifteen (15) semester hours of biomedical engineering core courses (see below) during the graduate portion of the combined degree
2. Six (6) semester hours of approved electives
3. Nine (9) semester hours of ECH 5971r, Thesis
4. Oral defense of the master's thesis - ECH 8976, Thesis Defense (0) (P/F grade only)
5. Registration and attendance at all departmental seminars - ECH 5935, ChE Seminar (0)

No course with a grade below "C" will be counted toward fulfillment of degree requirements. No more than one course with a grade of "C" will be counted toward fulfillment of degree requirements.

Note: Departmental support in the form of teaching assistantship and tuition waiver is generally is not available for students pursuing a non-thesis master's degree. Depending upon departmental needs and availability of funds, TA's positions may occasionally be available.

Required Chemical Engineering Core Graduate Courses (Fifteen [15] semester hours)

- ECH 5052 - Research Methods in Chemical Engineering (3)
- ECH 5126 - Advanced Chemical Engineering Thermodynamics I (3)
- ECH 5261 - Advanced Transport Phenomena I (3)
- ECH 5840 - Advanced Chemical Engineering Mathematics I (3)
- ECH 5852 - Advanced Chemical Engineering Computations (3)

Students transfer two courses (6 credit hours) of approved 5000 electives towards the MS degree.

3. Department Graduate Electives:

- ECH 5XXX Molecular Dynamics (3)
- ECH 5XXX Petroleum Processing (3)
- ECH 5052 Research Methods in Chemical Engineering (3)
- ECH 5262 Advanced Transport Phenomena II (3)
- ECH 5526 Advanced Reactor Design (3)
- ECH 5740 Fundamentals of Biomolecular Engineering (3)
- ECH 5828 Polymer Science & Engineering (3)
- ECH 5841 Advanced Chemical Engineering Mathematics II (3)
- ECH 5852 Advanced Chemical Engineering Computations (3)
- ECH 5934/7 Structural Characterization of Materials (3)
- ECH 5934/7 Electrochemical Engineering (3)
- ECH 5934 Environmental Engineering (3)
- ECH 6272 Molecular Transport Phenomena (3)

The credits that are double-counted will be designated as applicable to the graduate program after the student receives the bachelor's degree and matriculates.

Outline of the BS-MS Program of Study (typical course layout, course-based):

JUNIOR YEAR (3RD)		SENIOR YEAR (4TH)		GRADUATE YEAR (1)	
Fall Semester	16	Fall Semester	13	Fall Semester	9
BME 3622 - Biothermodynamics	3	BME 4332 – Cell & Tissue Engineering	3	ECH 5261 - Advanced Transport Phenom. I	3
BME 3631 - Biotransport Phenom. I	4	BME 4332L – Cell & Tissue Engineering Lab	1	ECH 5840 - Advanced ChE Math	3
BME 3702 - BME Computations	3	BME 4801 - BME Design I	3	ECH 5852 - Advanced ChE Computations	3
BME 4403c – QtAnatSystPhys I	3	ECH 4504 – Kinetics & Reactor Design	3	ECH 5935, ECH Seminar	0
General Education Requirement	3	5000-level Chemical Engr. Elective #1	3		
Spring Semester	16	Spring Semester	13	Spring Semester	12
BME 3100 – Biomaterials	3	BME 4744C - Biodynamics&Control W/ Lab	4	ECH 5126 - Advanced ChE Thermodynamics I	3
BME 3723 – Biostatistics	3	BME 4802 - BME Design II	3	5000-level Chemical Engr. Elective #5	3
BME 4211 – Biomechanics	3	5000-level Chemical Engr. Elective #2	3	5000-level Chemical Engr. Elective #6	3
BME 4503 – Bioinstrumentation	3	5000-level Chemical Engr. Elective #3	3	5000-level Chemical Engr. Elective #7	3
BME 4503L – Bioinstrumentation Lab	1			ECH 5935, ECH Seminar	0
ECH 4267 – Transport Phenomena II	3				
Summer Semester	0	Summer Semester	0	Summer Semester	0

- ❖ Indicates those courses that are double-counted for both the undergraduate and graduate degrees
- ❖ Indicates required graduate core courses
- ❖ Indicates graduate course electives

Combined Bachelor's/Master's Pathway: NON-THESIS OPTION

Bachelor's Major Program Courses

Credits from Bachelor's Degree: _____

Graduate Courses taken as an Undergraduate

Total Shared Credits: _____
limit 12 credits

Master's Degree Program Courses

Credits from Master's Degree: _____
(Must be at least 30 unduplicated credit hours)

Total Combined Pathway Credit Hours: _____

