The Division of Translational Science
Rush Medical College
Rush University
Master of Science in Biotechnology

Program Manual

FALL 2025-Spring 2026

Program Director: Edward Barker, Ph.D.

Program Terminal Objectives
Master of Science in Biotechnology

The program's primary objective is to provide science-based biomedical technology training aimed at cultivating research professionals with the capacity to seamlessly integrate into a biomedical research laboratory or pursue advanced studies in medical and biomedical programs.

Goal 1: Build strong knowledge in basic biomedical sciences
Student Learning Outcomes: By the conclusion of the program, students will have the capacity to elucidate and examine the molecular underpinnings of life within living organisms. (DTS 502, DTS 503, and one of the following: DTS 611, DTS 507, DTS 519, or DTS 500)

Goal 2: Build competence in essential laboratory methods in biotechnology
Student Learning Outcomes: By the conclusion of the program, students will have acquired the requisite technical proficiency to autonomously execute and evaluate experiments. (BTN 531-533, and BTN-538)

Goal 3: Develop basic research skills
Student Learning Outcomes: By the end of the program, students will be able to:

1. Develop research strategies and apply the theoretical knowledge acquired in classes, along with the methodology obtained in the laboratory, to solve research problems ethically. (DTS 502, DTS 503, BTN 531-533, BTN 537, BTN 538, BTN 525, DTS 506, DTS 546, one of the following: DTS 525 or DTS 548, and one of the following: DTS 611, DTS 507, DTS 519, or DTS 500)

2. Effectively communicate scientific discoveries and comprehend and utilize scientific literature as a foundation for hypothesis-driven research. (BTN 537, BTN 538, BTN 541 and BTN 540)

Policies and Procedures
Master of Science in Biotechnology

Please refer to the additional Policies and Procedures in the Rush University Bulletin

1. **Program Accreditation**
Rush University has undergone a comprehensive approval process to offer a Master of Science degree in Biotechnology, which has been approved by the State of Illinois Board of Higher Education. The Higher Learning Commission of Colleges and Schools, known for its meticulous evaluation, also includes this program in Rush University's usual accreditation process.

2. **Program Description**
The Biotechnology Program aims to instruct graduate-level science courses and to train students in biomedical research technology along with training and experience in biomedical research. The requirements for the Master of Science degree will be met within a two-semester enrollment of 34 semester hours. Typically, all students follow the same curricular plan, beginning in the Fall Semester. The students will start a Research Capstone (BTN 537) in the Fall and must complete it at the end of the Spring Semester.

3. **Student Performance Requirements**
a. Class attendance
Although attendance in lecture courses is strongly advised. Grades for these courses will be determined by completing assignments, participating in discussions and examinations. All laboratory courses, BTN 531, 532, 533, 537, 538 and 540, and other performance-based courses, DTS 506, DTS 525and BTN 525, and BTN-541 require on-time attendance. Grading is accomplished by evaluating student participation and performance daily and by assignments, presentations, quizzes, and written examinations.

b. Grading
Letter grades of A, B, C, and F can be earned in all courses. A "B" or better letter grade must be maintained for the average of all graded coursework during the two semesters. BTN 537 will be graded as P/NP.

Core Courses (DTS 502, DTS 503, BTN 525, DTS 525, DTS 546, and DTS 506) and elective courses (DTS 611, DTS 519, DTS 507, and DTS-500) will be graded by examining your knowledge learned and applying the knowledge gained throughout these courses. Laboratory theory and practice courses, such as, BTN 531, BTN 532, BTN 533, BTN 540 and BTN 538, will be graded as learning and acquiring skills and evaluated daily during each class session. Students will continue demonstrating their ability to instructors until the performance is acceptable. In some cases, examination by written tests and oral presentations may be included. A letter grade will also be assigned for each of these courses.

c. Consequences of Failure

More time is needed to correct failures. Therefore, the student must try to achieve passing and B-level performance. There are no make-up exams offered to correct for a C grade. A letter grade of A can compensate for a "C" grade in another course with the same credit value. A grade point average of 3.0 must be maintained for good academic standing and graduation from the program. Failure to attend or perform in a laboratory course will require an individual arrangement to demonstrate acceptable performance to the instructor or course director. Multiple failures may interrupt the student's progress in the program, and will be weighed according to the determination of the Biotechnology Program Director, with the advice of the Division of Translational Science Advisory Committee. Each case of impaired performance will be considered individually.

d. The Status of "Good Academic Standing"

Each semester, the Program Director interviews the students. These one-on-one meetings discuss academic progress, concerns, and future plans. These meetings may be more frequent if needed. All students who maintain a B letter grade average while completing the required course sequence with full-time enrollment will be considered in "Good Academic Standing" within the Division of Translational Science and eligible for graduation with the M.S. degree.

Any student who fails to maintain a B-letter average will be considered "In Academic Difficulty" until the deficiency is corrected. The Biotechnology Program Director will determine those requirements with the advice of the Division of Translational Science Advisory Committee. A student "In Academic Difficulty" is not eligible for graduation.

e. Course Evaluation

All courses will offer a student-based course evaluation, which is voluntary and anonymous yet very valuable for course and program development. You will also be invited to complete a graduation survey at the end of the Spring Semester. Your comments will be kept in confidence. Your suggestions are taken seriously and used to shape future offerings of this program.

f. Graduation Requirements

Students may only participate in Commencement if, by the **middle of February of the graduation year**, they are:

- Being in **good academic standing** following the Fall semester.
- Demonstrate evident progress toward completing Spring coursework to ensure **on-time program completion**.

No student may participate in Commencement with **any outstanding requirements**, including incomplete coursework or other academic liabilities.

Student Advisory Committee

1. Purpose:

The Student Advisory Committee (SAC) consults with the Head of the Division of Translational Science (DTS), or their designees, on matters affecting students across all programs. The group ensures that student perspectives are represented in decision-making processes and fosters an open dialogue between students and the administration.

1. Key Responsibilities:

- **Consultation:** Offer input and advice to the Head of DTS on policies, initiatives, or issues affecting students when requested.
- **Feedback Collection:** Collect and share feedback from students in their respective programs, ensuring a variety of student voices are heard.
- **Communication:** Serve as a liaison between the student body and DTS leadership to promote transparency and collaboration.
  Initiative Support: Engage in the development or review of student-focused projects, events, or policies within the Division.

3. Accountability:

The SAC will report directly to the Head of DTS and, as necessary, provide recommendations and insights through verbal feedback or written reports.

4. Membership:

- The SAC will include one student representative from each master's program and two PhD students (one representing years 1-2 and the other representing years 3-5). Their mandate lasts for one academic year.
- Members are elected by their peers as stipulated in section v.

5. Student Advisory Committee (SAC) Nomination and Election Process

- Students interested in serving on SAC should nominate themselves by the deadline specified by DTS. As part of the nomination process, candidates must submit a brief statement (no more than half a page) explaining their reasons for running. Submission is solicited by the Manger of Academic and Student Affairs of DTS.
- Once all nominations are received, DTS compiles and distributes the list of candidates to students for voting. After the voting process is complete, DTS announces the elected SAC members.

6. Meeting Schedule:

Depending on requests or emerging student-related issues, the committee will meet as needed.

Curriculum 2025-2026
Master of Science in Biotechnology

The Division of Translational Science offers a two-semester, non-thesis master's degree program to prepare students for a research career in the pharmaceutical and biotechnology industries or the university laboratory. This program is also an excellent preparation for additional graduate-level training toward a Ph.D., M.D., D.D.S., PharmD, or other advanced degrees.

Coursework for this program is provided in the attached Table, which contains the course titles and numbers. Biotechnology students will take the Division of Translational Science's Core Curriculum series of molecular biology, genetics, and cell biology as well as an elective course in a specific biomedical science area. Additional courses are explicitly designed to prepare the student for competency in research and a career in the laboratory; these include Research Ethics, Biomedical Statistics and Bioinformatics, and Experimental Design and Data Management in Research.

At the center of this program is a series of hands-on laboratory courses designed to cover the most essential techniques and methods employed in biomedical research today. These laboratory experiences ensure proficiency in various techniques, making students highly competitive in this ever-changing and understaffed job market.

The program culminates in a capstone research experience, where students use their combined theoretical and practical knowledge to complete a small research project.

Coursework for BTN MS program 2025-26

2025-26	CrH	Course Director
Year 1 Fall Semester		
BTN-531 Advanced Cell Bio Techniques	2	Carl Maki
BTN-532 Advanced Mol Bio Techniques and Applications	2	Joao Mamede
BTN-537 Biotech Research Capstone	4	Ed Barker
DTS-502 Adv Cell Biology	2	Jitesh Pratap
DTS-503 Adv Molecular Biology and Gene Regulation	2	Joao Mamede
DTS-546 Principles of Biostatistics I	2	Sanjib Basu
DTS-506 Biomedical Ethics	1	Josefina Ramos-Franco
BTN-525 Experimental Design and Disease Modeling	2	Jennilee Wallace
Choose 1 from the following:		
DTS-548 Introduction to Biomedical Informatics	1	Carlos Santos
DTS-525 Biomedical Informatics: Genomic & Microbiome	1	Stefan Green
CrHs	***18***	
Year 1 Spring Semester		
BTN-533 Advanced Histotechnology and Immunofluorescence Techniques	2	Jitesh Pratap
BTN-537 Biotech Research Capstone	4	Ed Barker
BTN-538 Advanced Experimental Techniques in Biomedical Research	2	Ed Barker
BTN-540 Experiential Learning: Proficiency in Targeted Science Techniques	2	Ed Barker
BTN-541 Pre-professional Preparation for Career Advancement	3	Ed Barker
Choose 1 from the following:		
DTS-611 Advanced Cancer Biology and Therapeutic Mechanisms	3	Carl Maki
DTS-507 Advanced Immunology and Immune System Dynamics	3	Amanda Marzo
DTS-519 Advanced Neurobiology	3	Brian David
DTS-500 Advanced Musculoskeletal Biology	3	Frank Ko
CrHs	***16***	
Total CrHs	***34***	

CrH=Credit Hour

Faculty Roster
Master of Science in Biotechnology

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Manager for Student Affairs: **Kelly Boles, MBA, MS**
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Laboratory Coordinators:
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Course Directors:

BTN–531 **Carl Maki, Ph.D.**
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BTN-532 **Joao Mamede, Ph.D.**
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BTN-533 **Jitesh Pratap, Ph.D.**
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DTS-503 **Joao Mamede, Ph.D.**
The same contact information as under BTN-532

DTS-502 **Jitesh Pratap, Ph.D.**
The same contact information as under BTN-533

DTS-506 **Josefina Ramos-Franco, Ph.D.**
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DTS-546 **Sanjib Basu, Ph.D.**
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DTS-548 **Carlos Santos, Ph.D.**
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DTS-525 **Stefan Green, Ph.D.**
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BTN-525 **Jennilee Wallace, Ph.D.**
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BTN – 537 **Edward Barker, Ph.D.**
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BTN – 538 **Edward Barker, Ph.D.**
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BTN-540 **Edward Barker, Ph.D.**
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BTN-541 **Edward Barker, Ph.D.**
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DTS- 611 **Carl Maki, Ph.D.**
See BTN-531 for contact information

DTS-507 **Amanda Marzo, Ph.D.**
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DTS-500 **Frank Ko, Ph.D.**
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