

BIOMATERIALS SCIENCE (MS)

NYSED: 80132 **HEGIS:** 1224.00 **CIP:** 14.0501

Program Description

The MS degree in Biomaterials Science is awarded by the New York University College of Dentistry (NYU Dentistry) with courses offered by the NYU Dentistry Department of Molecular Pathobiology, Division of Biomaterials.

The mission of the program is to provide education and training in biomaterials science and immersion in state-of-the-art technology, while ultimately contributing to improving human health through biomaterials-based treatment modalities.

The Department is located at the New York University College of Dentistry, a world-class craniofacial research and healthcare institution, and the largest dental school in the world. The Biomaterials Division within the Department of Molecular Pathobiology is uniquely positioned to build upon its existing strengths in biomaterials fabrication, characterization, and testing to achieve the goals of the program and to bridge the gap between bench top research and clinical application. Our new, state-of-the-art facility is located on First Avenue between E. 25th and E. 26th Streets.

Program Overview

The program includes the study of basic material properties and structure of a full range of biomaterials used in medicine and dentistry. The biologic interactions of these materials related to their composition, surface, architectural features and function; and the methods employed to investigate structure, function, and biologic interactions are presented and explored.

Three degree options are available to students depending on their future intentions and requirements:

- One-year non-thesis option
- Two-year thesis option
- Two-year non-thesis option

Admissions

See Master's Degree Programs (<https://dental.nyu.edu/education/masters-degree-programs.html>) for admission requirements and instructions specific to this program.

Program Requirements

One-Year Program

The MS degree in Biomaterials Science is awarded after:

1. The completion of 30 credits* course work with grade point average of B or better, and
2. Satisfactory submission of an approved independent project in biomaterials.

**Of the 30 credits required, 26 must be from the Department of Biomaterials at New York University or from courses taught in conjunction with the department.*

Only 4 credits may be transferred from outside the University and other departments outside NYU College of Dentistry. In these cases, no courses

older than ten years may be transferred. All courses must be approved for transfer by the Associate Dean for Academic Affairs of NYU Dentistry. Application for transfer of courses must be within the first semester of attendance as a matriculant. Courses for which a degree has already been awarded may not be transferred or applied to the Master's program. Permission must be received from the Director of Graduate Studies for any course work taken outside the department. As also mentioned above, it is anticipated that full time students (average 15 credits per semester) would finish the program in one academic year. All students are required to complete the program within five years unless special permission is obtained from the Chair of the Department of Biomaterials or the program director.

| Course | Title | Credits |
|---------------------------|---|-----------|
| Major Requirements | | |
| BIOMS-DN 2001 | Intro to Research | 2 |
| BIOMS-DN 1000 | Principles of Biomaterials Science | 3 |
| BIOMS-DN 1005 | Biomaterials – Tissue Interface I | 3 |
| BIOMS-DN 1006 | Biomaterials – Tissue Interface II | 3 |
| BIOMS-DN 1016 | Imaging Science | 4 |
| BIOMS-DN 3003 | Integrative Seminars in Oral Biology I | 3 |
| BIOMS-DN 1001 | Metal and Ceramic Biomaterials | 3 |
| BIOMS-DN 1002 | Polymers & Biopolymers | 3 |
| BIOMS-DN 3012 | Seminars in Advanced Dental Biomaterials | 3 |
| BIOMS-DN 3000 | Research in Biomaterials (taken for 1 credit) | 1 |
| BIOMS-DN 3001 | Independent Project in Biomaterial | 2 |
| Total Credits | | 30 |

Two-Year Program

Students can complete this program via the Thesis or Non-Thesis track. See track details below.

| Course | Title | Credits |
|---------------------------|--|-----------|
| Major Requirements | | |
| BIOMS-DN 1000 | Principles of Biomaterials Science | 3 |
| BIOMS-DN 1001 | Metal and Ceramic Biomaterials | 3 |
| BIOMS-DN 1002 | Polymers & Biopolymers | 3 |
| BIOMS-DN 1005 | Biomaterials – Tissue Interface I | 3 |
| BIOMS-DN 1006 | Biomaterials – Tissue Interface II | 3 |
| BIOMS-DN 1008 | Intro to Electron Microscopy | 3 |
| BIOMS-DN 1012 | Biostatistics I | 3 |
| BIOMS-DN 1017 | Complex Materials Systems and Biosensors | 3 |
| BIOMS-DN 2001 | Intro to Research | 2 |
| BIOMS-DN 3000 | Research in Biomaterials | 5 |
| BIOMS-DN 3001 | Independent Project in Biomaterial | 2 |
| BIOMS-DN 3012 | Seminars in Advanced Dental Biomaterials | 3 |
| Total Credits | | 36 |

Thesis Track

The MS degree in Biomaterials Science is awarded after:

1. The completion of 36 credits* course work with grade point average of B or better;
2. Satisfactory oral defense of a completed research effort, and
3. Submission of an approved research thesis.

**Of the 36 credits required, 28 must be from the Department of Biomaterials and Biomimetics at New York University or from courses taught in conjunction with the department.*

Only 8 credits may be transferred from outside the University and other departments outside the NYU College of Dentistry. In these cases, no courses older than ten years may be transferred. All courses must be approved for transfer by the Associate Dean for Academic Affairs of NYU Dentistry. Application for transfer of courses must be within the first academic year of attendance as a matriculant. Courses for which a degree has already been awarded may not be transferred or applied to the Master's program. Permission must be received from the Director of Graduate Studies for any course work taken outside the department. As also mentioned above, it is anticipated that full time students (12 – 15 credits per semester) would finish the program in two academic years, depending upon research progress. It is anticipated that part time students should finish the program in three years. All students are required to complete the program within five years unless special permission is obtained from the Chair of the Department of Biomaterials or the program director.

Non-Thesis Track

The MS degree in Biomaterials Science is awarded after:

1. The completion of 36 credits* course work with a grade point average of B or better, and
2. Satisfactory submission of an approved independent project in biomaterials.

**Of the 36 credits required, 28 must be from the Department of Biomaterials at New York University or from courses taught in conjunction with the Department.*

Only 8 credits may be transferred from outside the University and other departments outside NYU Dentistry. In these cases, no courses older than ten years may be transferred. All courses must be approved for transfer by the Associate Dean for Academic Affairs of NYU Dentistry. Application for transfer of courses must be within the first academic year of attendance as a matriculant. Courses for which a degree has already been awarded may not be transferred or applied to the Master's program. Permission must be received from the Director of Graduate Studies for any course work taken outside the department. As also mentioned above, it is anticipated that full time students (12 – 15 credits per semester) would finish the program in two academic years, depending upon overall academic progress. It is anticipated that part time students should finish the program in about three years. All students are required to complete the program within five years unless special permission is obtained from the Chair of the Department of Biomaterials or the program director.

Additional Program Information

First Semester Requirements (all students)

Introduction to Biomaterials Research and Principles of Biomaterials Science. All entering graduate students are required to register in their first Fall semester for BIOMS-DN 2001 Intro to Research, and BIOMS-DN 1000 Principles of Biomaterials Science. These two courses are the foundation for all remaining coursework for all program options.

Special Program Emphasis

Only available for students completing the 2-year option.

Special Program Emphasis may be arranged by the Department Chair or program director for students desiring to participate in a Special

Emphasis research study (eg, concentration in another department of the University, but still related to Biomaterials and Biomimetics (physics, chemistry, biology, etc.). Students working with a Special Program Emphasis may, in consultation with the Director of Graduate Studies, be required to take courses in addition to the 36 credits mentioned above.

Departmental Meetings and Seminars

Mandatory attendance is required of all graduate students to periodic departmental seminars and/or research group meetings and various sessions of Laboratory Safety (see section "Requirements for Participation in Research"). At these seminars and research group meetings, students, faculty and scholars from other institutions discuss their research plans and findings. In addition, the department may co-sponsor special seminars throughout the year for which attendance is also mandatory unless specifically excused by the Director of Graduate Studies.

Meetings with Program Administrator

All students are required to schedule regular meetings with the Program Administrator in order to keep current regarding course requirements, regulatory status, research requirements, research progress, thesis defense preparations, and if applicable, visa status.

Sample Plan of Study

One-Year Plan

| Course | Title | Credits |
|--------------------------|--|-----------|
| 1st Semester/Term | | |
| BIOMS-DN 2001 | Intro to Research | 2 |
| BIOMS-DN 1000 | Principles of Biomaterials Science | 3 |
| BIOMS-DN 1005 | Biomaterials -- Tissue Interface I | 3 |
| BIOMS-DN 1016 | Imaging Science | 4 |
| BIOMS-DN 3003 | Integrative Seminars in Oral Biology I | 3 |
| Credits | | 15 |
| 2nd Semester/Term | | |
| BIOMS-DN 1006 | Biomaterials -- Tissue Interface II | 3 |
| BIOMS-DN 1001 | Metal and Ceramic Biomaterials | 3 |
| BIOMS-DN 1002 | Polymers & Biopolymers | 3 |
| BIOMS-DN 3012 | Seminars in Advanced Dental Biomaterials | 3 |
| BIOMS-DN 3000 | Research in Biomaterials | 1 |
| BIOMS-DN 3001 | Independent Project in Biomaterial | 2 |
| Credits | | 15 |
| Total Credits | | 30 |

Two-Year Plan

| Course | Title | Credits |
|--------------------------|--|-----------|
| 1st Semester/Term | | |
| BIOMS-DN 1000 | Principles of Biomaterials Science | 3 |
| BIOMS-DN 1005 | Biomaterials -- Tissue Interface I | 3 |
| BIOMS-DN 1008 | Intro to Electron Microscopy | 3 |
| BIOMS-DN 2001 | Intro to Research | 2 |
| Credits | | 11 |
| 2nd Semester/Term | | |
| BIOMS-DN 1001 | Metal and Ceramic Biomaterials | 3 |
| BIOMS-DN 1002 | Polymers & Biopolymers | 3 |
| BIOMS-DN 1006 | Biomaterials -- Tissue Interface II | 3 |
| Credits | | 9 |
| 3rd Semester/Term | | |
| BIOMS-DN 1012 | Biostatistics I | 3 |
| BIOMS-DN 1017 | Complex Materials Systems and Biosensors | 3 |

| | | |
|--------------------------|--|-----------|
| BIOMS-DN 3000 | Research in Biomaterials | 3 |
| Credits | | 9 |
| 4th Semester/Term | | |
| BIOMS-DN 3000 | Research in Biomaterials | 2 |
| BIOMS-DN 3001 | Independent Project in Biomaterial | 2 |
| BIOMS-DN 3012 | Seminars in Advanced Dental Biomaterials | 3 |
| Credits | | 7 |
| Total Credits | | 36 |

Learning Outcomes

Students who have completed the Master's in Biomaterials Science Program will be well prepared to apply their state-of-the-art biomaterials knowledge in careers in dentistry, medicine, the medical device industry, or in biomaterials research.

1. Graduates just entering dental school will be able to utilize their biomaterials knowledge in their dental education.
2. Graduates who are already dental faculty will be able to conduct research and teach dental biomaterials at their universities.
3. Graduates will be able to enter the medical device industry and apply their knowledge in the design and fabrication of medical devices.
4. Graduates with plans to continue their educations will be able to use this program as a step toward a PhD or other degrees in medicine or engineering.

Policies

NYU Policies

University-wide policies can be found on the New York University Policy pages (<https://bulletins.nyu.edu/nyu/policies/>).

School of Dentistry Policies

A full list of related academic policies can be found on the School of Dentistry Academic Policies page (<https://bulletins.nyu.edu/graduate/dentistry/academic-policies/>).