Biomedical Sciences Pre-dental Enhancement Program

*Chairperson: John R. Mantsch, Ph.D.*

In partnership with the Marquette University School of Dentistry, the Department of Biomedical Sciences in the College of Health Sciences offers a pre-dental enhancement program.

This non-degree program is designed to help students build a more competitive dental school application in 12 months. The program is for students who already have a significant scientific background but seek to strengthen their academic resumes by taking an intensive pre-dental curriculum that includes graduate-level biomedical coursework and exposure to the dental field.

This is a unique opportunity, which not only enhances academic credentials, but also emphasizes the growing public health concerns within the field of dentistry and includes service learning experiences, as well as community health-oriented courses. The program not only brings together the academic and clinical strengths of the Department of Biomedical Sciences and the School of Dentistry, but also educates students about social justice issues in health care and dental health disparities.

Therefore, this program both prepares future health professionals and develops men and women for others who can champion social change in health care.

The program is an intensive, 12-month curriculum with an emphasis on courses that strengthen a student’s academic skills and knowledge of the dental health profession, such that they are well positioned for success in dental school.

The exposure to public health related courses and the service learning experiences are designed to increase students’ awareness and understanding of the challenges and values of diverse and under-served populations. These opportunities are aligned with the increasing involvement of dental schools, including the Marquette University School of Dentistry, in public health dentistry and rural outreach.

- Participation in an intensive pre-dental curriculum that includes graduate-level biomedical coursework and immersion in the dental field through the Marquette University School of Dentistry.
- Personal pre-dental advising that focuses on student success, career advising, assistance with the dental school application process and interview techniques.
- Opportunities for students who meet program standards to receive interviews with the Marquette University School of Dentistry with the possibility for entry upon completion of the program without an additional gap year.

**Program Qualifications**

A qualified applicant to our Biomedical Sciences Pre-Dental (BMPD) enhancement program would already meet minimum qualifications to apply to dental school but needs to strengthen their academic preparation.

Criteria:

1. Completion of all prerequisite course work for dental school admission.
2. Obtained competitive scores on the Dental Admissions Test (DAT) (typically a score of 17 or higher, academic average and all subscores, achieved prior to the start of the program).
3. Have an academic background that is enriched by and not redundant with the program’s curriculum.
4. Have a minimum GPA of 2.750 (based on performance in all undergraduate and post-graduate courses). An applicant with a lower GPA, but who is a strong candidate based on a holistic review of the application, may be considered for admission on probation status.

Application requirements include submission of official transcripts from all colleges/universities attended; DAT scores (may be copies that were sent to you); 3 letters of recommendation. An applicant may request to have application reviewed without DAT scores, but if accepted, a student must have a competitive DAT score by the start of the program.

As an enhancement program, students in the BMPD do not qualify for financial aid. Financial assistance is available for selected applicants from under-represented backgrounds.
Biomedical Sciences Pre-Dental Enhancement Program

A course of study that is a pre-dental enhancement program consisting of three terms of study (summer, fall and spring). This program is not eligible for Title IV federal aid.

Required Course Work:

Biomedical Sciences Core: Students are required to take a minimum of two science courses in the summer term and three science courses in the fall and spring terms. Science content includes dental-related anatomy, nutrition, pathology, physiology, genetics, microbiology, biochemistry, embryology, endocrinology and infectious disease.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BISC 3110</td>
<td>Nutritional Aspects of Health</td>
<td>3</td>
</tr>
<tr>
<td>BISC 3150</td>
<td>General Pathology</td>
<td>3</td>
</tr>
<tr>
<td>BISC 3213</td>
<td>Biochemistry</td>
<td>4</td>
</tr>
<tr>
<td>BISC 4147</td>
<td>Human Physiology Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>BISC 5145</td>
<td>Human Physiology</td>
<td>4</td>
</tr>
<tr>
<td>BISC 5340</td>
<td>Human and Applied Medical Genetics</td>
<td>3</td>
</tr>
<tr>
<td>BISC 7215</td>
<td>Clinical Microbiology with Lab</td>
<td>4</td>
</tr>
<tr>
<td>BISC 7235</td>
<td>Principles of Dental Gross Anatomy</td>
<td>3</td>
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Choose from one of the following:

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>BISC 4120</td>
<td>Pharmacology</td>
</tr>
<tr>
<td>BISC 5140</td>
<td>Functional Neuroanatomy</td>
</tr>
<tr>
<td>BISC 5173</td>
<td>Principles of Human Embryology</td>
</tr>
<tr>
<td>BISC 5325</td>
<td>Endocrinology</td>
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Professional Development Core: Prepares students for a successful application to dental school or other graduate/career path upon completion of the program. Content includes personal statement writing, resume development, interview skills and other aspects of career development.

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<tbody>
<tr>
<td>BISC 7005</td>
<td>Professional Development 1</td>
</tr>
<tr>
<td>BISC 7006</td>
<td>Professional Development 2</td>
</tr>
<tr>
<td>BISC 7007</td>
<td>Professional Development 3</td>
</tr>
</tbody>
</table>

Public Health and Health Policy Core: Prepare students with the knowledge and cultural competency skills and encourage a personal commitment to serve underserved patients in order to decrease health disparities are key goals of the program. Students therefore not only enhance their academic credentials but also gain valuable experience working with underserved populations that make them both more competitive applicants to dental schools and more empathetic, culturally competent dental health care providers.

<table>
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<tbody>
<tr>
<td>BISC 7160</td>
<td>Foundations in Public Health</td>
</tr>
<tr>
<td>BISC 4461</td>
<td>Comparative Health Politics and Policy (or other course with approval of Program Director)</td>
</tr>
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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>CLLS 2060</td>
<td>Public Health</td>
</tr>
<tr>
<td>BISC 4153</td>
<td>Epidemiology</td>
</tr>
<tr>
<td>BISC 7150</td>
<td>Outbreaks, Epidemics and Pandemics</td>
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Other courses with approval of program director

Dental Foundations Core: These courses are designed to give students basic foundational knowledge in the area of dentistry to facilitate smooth transition to dental school.

<table>
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<tbody>
<tr>
<td>BISC 7001</td>
<td>Principles of Dentistry</td>
</tr>
<tr>
<td>BISC 7002</td>
<td>Dental Health and Society</td>
</tr>
<tr>
<td>BISC 7021</td>
<td>Medical and Dental Terminology</td>
</tr>
</tbody>
</table>

Total Credit Hours 40

To remain in good academic standing and enrolled in the program, students are required to meet a minimum term GPA of 2.400 and C or better in all course work.

Courses

BISC 7001. Principles of Dentistry. 1 cr. hr.
Surveys the dental profession from the perspectives of participating clinicians, residents and students. Included is an introduction to clinical specialties, procedures, practice settings, as well as alternatives to clinical practice. Prereq: Enrolled in the Biomedical Sciences Pre-Dental Enhancement program.

BISC 7002. Dental Health and Society. 1 cr. hr.
An introduction to the field of dentistry with an emphasis on how it can impact an individual’s overall health and address dental health disparities in the country. Prereq: Enrolled in the Biomedical Sciences Pre-Dental Post-Baccalaureate program.
BISC 7005. Professional Development 1. 0 cr. hrs.
Designed to focus on and improve the skills necessary for a successful application to dental school or other graduate/career path upon completion of the program. Focuses on the application building aspect within career development. SNC/UNC grade assessment. Prereq: Enrolled in the Biomedical Sciences Post-Baccalaureate certificate program.

BISC 7006. Professional Development 2. 0 cr. hrs.
Designed to focus on and improve the skills necessary for a successful application to dental school or other graduate/career path upon completion of the program. Focuses on the interview skill aspect of career development. SNC/UNC grade assessment. Prereq: Enrolled in the Biomedical Sciences Post-Baccalaureate certificate program.

BISC 7007. Professional Development 3. 0 cr. hrs.
Designed to focus on and improve the skills necessary for a successful application to dental school or other graduate/career path upon completion of the program. Focuses on the transition from the post-baccalaureate program to the student's future goals. SNC/UNC grade assessment. Prereq: Enrolled in the Biomedical Sciences Post-Baccalaureate certificate program.

BISC 7021. Medical and Dental Terminology. 1 cr. hr.
Provides a foundation for the understanding and use of common terminology in the medical field, with particular emphasis on dentistry. Designed to introduce basic prefixes, suffixes, and word roots, and their combining forms, as well as advanced clinical terminology specific to the dental profession. Prereq: Enrolled in the Biomedical Sciences Pre-Dental Preparation program.

BISC 7130. Human Gross Anatomy. 5 cr. hrs.
A human gross anatomy course including lecture and a cadaver dissection laboratory. Anatomy of the limbs, back, thorax, abdomen, pelvis, and head and neck is approached on a regional basis. Lectures emphasize regional anatomical relationships, functional aspects of the systems, and provide a guide to the dissections. Applies toward the Anatomy and Systems Content Area, but only 3 of the 5 credits apply toward the 33 credits required for the major. Prereq: PHTH major; or PHAS major only.

BISC 7150. Outbreaks, Epidemics and Pandemics. 3 cr. hrs.
Through case studies, discussion, group work and service learning students develop an understanding of how infectious disease epidemics occur, what can be done to control them and why control efforts succeed or fail. By exploring the characteristics of pathogens and human hosts that contribute to disease spread, students gain the knowledge and skills to understand the implications of newly emerging pathogens and are able to advocate for what needs to be done to prevent outbreaks. Applies toward the Diseases and Pathology Content Area. Prereq: Enrolled in the Biomedical Sciences Pre-Dental Enhancement program.

BISC 7153. Epidemiology. 3 cr. hrs.
An introduction to the basic concepts of epidemiology. The distribution and determinants of diseases in specified populations and the application to control of health problems. Emphasis is placed on epidemiologic study designs for investigating associations between risk factors and disease outcomes. Epidemiological approaches evaluate health services, population health and policy. Can apply to either the Health and Society cognate, or the BISC major electives, but not both. Prereq: Enrolled in the Biomedical Sciences Post-Baccalaureate certificate program.

BISC 7160. Foundations in Public Health. 3 cr. hrs.
Exploration of select public health issues with an emphasis on dental health disparities. Service learning experiences are incorporated to further the student's integration of public health issues with the dental profession. Prereq: Enrolled in the Biomedical Sciences Pre-Dental Post-Baccalaureate program.

BISC 7180. Clinical Neuroanatomy. 3 cr. hrs.
Fundamental neurocranial anatomical information essential to the practice of medicine. Students develop a 3-dimensional understanding of neurocranial structures, and their relationships, with an emphasis on critical thinking through clinical problem solving. Prereq: PHAS major or cons. of instr.

BISC 7213. Clinical Biochemistry. 4 cr. hrs.
Examines biochemistry of human cells. Examines the chemistry of amino acids, proteins, carbohydrates, lipids, and nucleic acids. Explores the metabolism and metabolic regulation or these molecules, as well as changes in disease states. When necessary, compares and contrasts human biochemistry with that of bacterial cells. Prereq: General and organic chemistry and enrolled in the Biomedical Sciences Pre-Dental Post-Baccalaureate program.

BISC 7215. Clinical Microbiology with Lab. 4 cr. hrs.
Focuses on the general biology of bacterial, viral, fungal and parasitic pathogens of human medical importance and the response of the human host. Laboratory sessions reinforce content from lectures and introduce students to laboratory skills including isolation, cultivation, enumeration, and characterization of bacteria of human medical importance. Utilizes Brightfield microscopy. Specialized techniques include antibiotic susceptibility testing, anaerobic cultivation, biochemical tests and immunological assays. Prereq: Enrolled in the Biomedical Sciences Pre-Dental Post-Baccalaureate program.

BISC 7220. Medical Pharmacology. 4 cr. hrs.
Fundamentals of human pharmacology and basic principles dictating drug actions within the human body with emphasis on applications in general medicine. Focuses on the therapeutic actions and clinical applications of various drug classes. Topics include: cellular mechanisms, physiological responses, adverse reactions, drug-drug interactions, and clinical indications, accompanied by discussion on the pathological conditions for which common therapeutic agents are used. Applications of pharmacology commonly encountered by physician assistants are presented and are reinforced through interactive clinically correlated lectures presented by practicing physicians and physician assistants. Prereq: BISC 4145 and PHAS major.
BISC 7235. Principles of Dental Gross Anatomy. 3 cr. hrs.
Provides students with a foundation in human anatomy, with focus on regions most relevant to dental medicine. Emphasizes correlations between structure, function, and clinical application. Includes laboratory. Prereq: Enrolled in the Biomedical Sciences Pre-Dental Post-Baccalaureate program.

BISC 7410. Microbiology. 4 cr. hrs.
Focuses on infectious agents of human medical importance and on the host pathogen interaction. Topic areas include: the general characteristics of bacteria, viruses, fungi and parasites as well as the etiology, pathogenesis, laboratory identification and epidemiology of selected diseases. Control of microorganisms is discussed in terms of sterilization, disinfection, chemotherapy and immunization. The immune system and the immune response are discussed. Applies toward the Cell and Molecular Content Area. Prereq: School of Dentistry or PHAS major.

BISC 7514. General Histology. 4 cr. hrs.
This course is a study of the normal microscopic structure and function of human cells, tissues and organs. The structural basis for various physiological and pathological processes such as inflammation and endocrine cycles is presented. The student is also introduced to tissues of the oral region that are studied in detail in DENT 7121. Laboratory exercises promote visual identification of structure. Prereq: School of Dentistry only.

BISC 7515. Biomedical Systems 1. 3 cr. hrs.
Provides an introduction to human anatomy of the head and neck region. Topics include the skull, temporomandibular joint, muscles of mastication and facial expression and an overview of the orbital and cervical regions. Structural and functional relationships between the cranial nerves and central neuroanatomical pathways are presented along with selected clinical correlations. Begins to build the foundational knowledge of the biomedical systems that is necessary for dental students as they start patient rounds during the first semester. Applies toward the Anatomy and Systems Content Area. Prereq: School of Dentistry.

BISC 7516. Biomedical Systems 2. 4 cr. hrs.
A human gross anatomy course for dental students that integrates lecture with a cadaver dissection laboratory. Follows the neurocranial anatomy course with expanded topics and detailed dissections of the head and neck regions. Lectures and dissections of the thorax, abdomen and pelvis, along with lectures on the upper and lower extremities are included. Part of a biomedical systems course sequence integrating anatomy, physiology, pathology, and dental clinical correlates. Prereq: School of Dentistry only.

BISC 7517. Biomedical Systems 3. 4 cr. hrs.
Module 3 of a systems-based course integrating anatomy, physiology and pathology including dental clinical correlates. Prereq: School of Dentistry only.

BISC 7518. Biomedical Systems 4. 4 cr. hrs.
Module 4 of a systems-based course integrating anatomy, physiology and pathology including dental clinical correlates. Prereq: School of Dentistry only.

BISC 7520. Dental Pharmacology. 4 cr. hrs.
Fundamentals of human pharmacology and basic principles dictating drug actions within the human body with emphasis on applications in dentistry. Focuses on the therapeutic actions and clinical applications of various drug classes. Topics include: cellular mechanisms, physiological responses, adverse reactions, drug-drug interactions, and clinical indications, accompanied by discussion on the pathological conditions for which common therapeutic agents are used. Applications of pharmacology commonly encountered by dentists are presented and are reinforced through interactive clinically correlated lectures presented by dental professionals. Prereq: School of Dentistry only.

BISC 7550. Remediation. 0-6 cr. hrs.
Variable credits. Variable titles.0 credit will be SNC/UNC grade assessment; 1-6 credits will be graded. Prereq: Cons. of dept. ch. only.

BISC 7931. Topics in Biomedical Sciences. 1-3 cr. hrs.
Selected topics in biomedical sciences. Specific topics will be designated in the Schedule of Classes.

BISC 7995. Independent Study in Biomedical Sciences. 1-6 cr. hrs.
Research on a selected topic under the direction of a faculty member of the Department of Biomedical Sciences. Can be taken for a maximum total of 6 credits, maximum of 3 credits can be applied towards BISC major.

BISC 9002H. Honors Student Study/Research Placeholder in Biomedical Sciences. 0 cr. hrs.
Used to enroll a honors student who is not enrolled in the term, but is on campus for an educational experience other than academic credit, such as work in a lab or clinic. Used for tracking purposes only. SNC/UNC grade assessment. Prereq: cons. of dpt. ch.