Dentistry (DENT)

Administration
Associate Dean for Research and Graduate Studies: Andrew R. Dentino, D.D.S., Ph.D.

Program Directors
Dental Biomaterials: David Berzins, B.S., Ph.D.
Orthodontics: Dawei (David) Liu, D.D.S., M.S., Ph.D., Certificates
Periodontics: Paul G. Luepke, D.D.S., M.S.
Prosthodontics: Geoffrey Thompson, D.D.S., M.S., Certificate
School of Dentistry website (http://www.marquette.edu/dentistry)

Degrees Offered
Master of Science degrees in five disciplines, Plan A only, with two options (see the Master’s Requirements section for details)

Graduate Program Overview
The School of Dentistry offers graduate programs in dental biomaterials, endodontics, orthodontics, periodontics and prosthodontics. These programs can be modified to allow conjoint interdisciplinary graduate work to be undertaken in any other unit of the university, and a master of science or doctoral degree can be obtained through an appropriate graduate degree-granting department of the university or through the interdisciplinary Ph.D. program. Faculty for each dental graduate program are drawn both from full-time Dental School faculty and from practicing specialists in the field who serve as adjunct faculty (part-time faculty).

The dental biomaterials program is a non-accredited 2-year program leading to a master’s degree.

The master of science programs in endodontics, orthodontics, periodontics and prosthodontics are clinically and research based, offering specialty certification with the master’s degree. Graduates are prepared to handle complex clinical cases and to work effectively with both general dentists and other dental specialists. The endodontics program is a 24-month program, the orthodontics program is a 26.5-month program, and the periodontics and prosthodontics programs are 36 months each. Tuition for the specialty programs is charged at a flat rate as per the Tuition, Fees and Housing section of this bulletin. Any applicable instrument or service fees are charged during the fall term each year.

Course work requirements for each graduate program are determined by the director of the specific program in accordance with accreditation standards. Courses include study in basic health sciences, dental biomaterials, research methodology, clinical dental specialties and other related science disciplines, as appropriate.

Prerequisites for Admission
Selection for admission is based upon the applicant’s academic standing and clinical abilities. Competitive applicants rank high in their dental school classes, have strong clinical skills and experiences and have some experience with research. In general, to be admitted to any of the graduate programs in clinical dentistry, the applicant must have graduated from an accredited dental school.

For the dental biomaterials program, the applicant may be either a dental school graduate or have a baccalaureate degree in science or engineering. In special cases, a student with a baccalaureate degree in another area, but who has an appropriate background, may be admitted to the dental biomaterials program.

Application Deadlines
July 15
For the endodontics program starting in June of the following year.

Aug. 1
For the periodontics program starting in June of the following year.

Sept. 1
For orthodontics and prosthodontics programs starting in June of the following year.

Feb. 1
For the dental biomaterials program starting the following fall term. Applicants are encouraged to have their complete application submitted by February 1 to be considered for the fall entry class. Spring term entry is possible every other year (even years). The program director notifies admitted students regarding the starting date for their program.
Application Requirements

1. Applications for periodontics and prosthodontics programs are initially made through Postdoctoral Application Support Service (PASS) of the American Dental Education Association. A complete PASS application is required for consideration. Once accepted into the program through PASS, applicants need to complete the additional application requirements through Marquette University, listed below.

2. Applicants to the dental biomaterials, endodontics, and orthodontics programs must submit, directly to the Graduate School:
   a. A completed Marquette University application form and application fee online (http://marquette.edu/grad/future_apply.shtml). Applicants must apply through Marquette, or they are not considered for admission. In addition, applicants may also apply through the Postdoctoral Application Support Service (PASS) operated by the American Dental Education Association (ADEA), but it is not required. The endodontics and orthodontics programs do not accept PASS.
   b. Official transcripts from all current and previous colleges/universities except Marquette. International applicants must have course grades converted to numerical values of 4.000, 3.000, 2.000, and 1.000 or to corresponding letter grades of A, B, C, and D, respectively. Where such a conversion is not possible, an explanation of the grading system used in the foreign dental school and undergraduate institution should accompany the official English translation of the grade transcripts.
   c. Undergraduate and dental school grade point averages, and class rank in dental school.
   d. Three letters of recommendation reflecting the applicant's clinical and academic abilities.
   e. Scores from the National Board Dental Examinations, Part I and Part II. Not required from dental biomaterials applicants or from graduates of non-U.S./non-Canadian dental schools.
   f. (For dental biomaterials applicants only) GRE scores strongly recommended (General Test only).
   g. (For orthodontics applicants only) GRE scores (General Test only).
   h. A curriculum vitae and a personal statement.
   i. (For orthodontics and periodontics applicants only) registration with National Matching Service. The orthodontics and periodontics programs are part of the Postdoctoral Dental Matching Program. Details of this program can be obtained through the Departments of Orthodontics and Periodontics.
   j. (For international applicants only) a TOEFL score or other acceptable proof of English proficiency.

Non-Refundable Deposit

The Marquette University School of Dentistry requires that all admitted students to the graduate prosthodontics program submit a non-refundable deposit of $3,000 to the Graduate School in order to guarantee a spot in the program. The deposit is then applied toward tuition after the student registers for the initial summer session.

Non-Degree Students in Dentistry Courses

Normally, students with non-degree status are not permitted to enroll in dentistry courses. Graduate students from approved dental residency programs may enroll in any dental graduate courses but need prior approval from the School of Dentistry’s associate dean for research and graduate studies.

Dental Graduate Didactic Core Curriculum

The Dental Graduate Didactic Core Curriculum (DENT 6001-6003, DENT 6953) is designed to cover all didactic content areas applicable to the advanced practice of general dentistry and to each of the specialty areas of dentistry. The content areas are sequenced to present:

1. material of interest for the general dentist seeking additional training beyond predoctoral dental education
2. material of interest for each of the dental specialty areas
3. advanced material of interest for those intending to pursue academic/research careers.

The presentations are organized to emphasize the overlapping nature of scientific foundational material and each of the dental specialties. Additionally, the presentations are designed to accommodate those students entering the program immediately after undergraduate education as well as those students returning from varying years of private dental practice. The course of study is comprised of yearly repeating content cycles (sections) within the summer session and fall/spring terms. The Dental Graduate Didactic Core Curriculum (DENT 6001-6003) is offered from 8-9 a.m. Monday–Friday. Beyond the required classes for their program, students may register for as many DENT 6001-6003 sections as they wish during their graduate education. The sections covered in DENT 6001-6003 are listed below and a detailed description of section content is maintained in the form of comprehensive section syllabi available in the School of Dentistry office of the associate dean for research and graduate studies. Not all specialty/ certificate programs are required to take every content area section of the core, but only those which are required by their CODA standards. Students may register repeatedly for any grading period containing material of interest and are free to rotate in and out of the courses as desired to obtain sections containing such material. Repeated registration for DENT 6001-6003 is differentiated through the use of section numbers that appear on official transcripts. Examinations and credit hours are variable and are determined by selected course sections. Grades for each course section are submitted directly to the Graduate School by course instructors at the end of each term. Official transcripts will designate the specific sections completed and the credit hours associated with those sections.

The content area sections covered annually by the Graduate Didactic Core Curriculum are as follows:
1. Emergency Medicine – A comprehensive review of the pathophysiology and treatment of the most common medical emergency states. Emphasis is placed on prevention, diagnosis, and patient stabilization.

2. Dental Biomaterials – Physical, mechanical, chemical, biologic behavior, properties, characterization, and testing of dental biomaterials. Biocompatibility of dental materials as well as advanced clinical concepts for general dentistry.

3. Prosthodontic Biomaterials – Advanced biomaterials and clinical concepts specific for prosthodontics.

4. Endodontic Biomaterials – Advanced biomaterials and clinical concepts specific for endodontics.

5. Orthodontic Biomaterials – Advanced biomaterials and clinical concepts specific for orthodontics.

6. Interdisciplinary Dentistry – Endodontic techniques as they relate to other areas of dental practice. Structure/function of the periodontium. Periodontal disease and therapy as it relates to all other aspects of dentistry emphasizing surgical approaches, occlusion, splinting, and periodontic/endodontic pathosis. A comprehensive discussion of prosthetic procedures as they relate to other areas of dental practice emphasizing removable complete/partial dentures, fixed partial dentures, maxillofacial prosthetics and implants. A comprehensive discussion of orthodontic techniques as they relate to other areas of dental practice emphasizing cephalometrics, biomechanics of tooth movement, and tissue response to orthodontic procedures.

7. Technology and Informatics – A review of the current computer-based technologies available for independent self-directed learning, research, teaching approaches, patient care and professional communication. Emphasis is placed on biomedical applications and laboratory exercises are included to reinforce didactic concepts.

8. Craniofacial Growth and Development – Dental and facial growth and development from the embryonic period through adult life.

9. Advanced Oral Pathology – Principles and concepts of histopathology presented through review and microscopic study of surgical material and biopsy specimens of craniofacial lesions emphasizing pathogenesis of disease and histologic diagnosis. Laboratory exercises are included to reinforce didactic concepts.

10. Head/Neck Anatomy and Osteology – Systemic and regional approaches to the study of head/neck anatomy. Emphasis is placed on vasculature, musculature, innervation, lymphatic drainage, and morphology/antemorial landmarks of the various bones of the head/neck. Laboratory dissection and demonstration reinforce didactic concepts.

11. Pharmacology and Pain/Anxiety Management – The pharmacology of drugs commonly used for treatment of non-dental conditions that may affect the delivery of dental care either through direct action or through interaction with drugs commonly used in dental care. Emphasizes the neurophysiology of pain, control of pain by various classes of pharmacologic agents, and the behavioral management of dental fears.

12. Research Methodology/Design – An introduction to the research process. The scientific method is discussed. Emphasis is placed on selection of a suitable research topic, research ethics, simple study designs, and thesis preparation.

13. Biostatistics – An introduction to the various aspects of biostatistics. Emphasis is placed on data display and summary, summary statistics, populations and samples, probability and confidence intervals, power, type I and II errors, diagnostic tests, correlation and regression, and various test statistics.

14. Oral Microbiology, Infection, and Immunology – Inflammation, immunity, and oral microbiology emphasizing the mechanisms of microbial colonization and invasion, host response and pathogenesis of dental diseases. Molecular techniques used in diagnostics are also covered in these sections.

15. Biochemistry and Physiology of Mineralized Tissues – The chemical and cellular constituents of mineralized tissues and modern methods for their study. Emphasis is placed on bone physiology and metabolism.

16. Radiology and Imaging – Advanced concepts in radiology and modern imaging techniques applied to all aspects of dentistry.

17. Craniofacial Function and Disorders – Neuromuscular and occlusal physiology, diagnosis, and treatment of functional disturbances involving the craniofacial region.

18. Temporomandibular Disorders in Orthodontics – Neuromuscular and occlusal physiology, diagnosis, and treatment of functional disturbances involving the temporomandibular articulation specific to orthodontics.

19. Oral Pathophysiology – Current topics in salivary function/dysfunction, gingival crevicular fluid, de- and remineralization, and dentin sensitivity, and taste.


22. Speech Pathology – A review of the various speech pathologies emphasizing the interdisciplinary and integrative nature of treatment involving the dental professional.

23. Public Health/Public Service – The epidemiology of dental disease and access to care emphasizing the role of the dental professional in community health. A review of current local, state and federal programs for dental services.


25. Practice Law – A review of the current legal aspects of dental practice for all areas of dentistry emphasizing patient care, infection control and employee relations.

26. Practice Ethics – A review of various ethical dilemmas in practice settings including case studies for group discussion.
27. **Implantology** – Basic concepts for implant placement including review of relevant maxillary/mandibular anatomy, evaluation and screening of patients, augmentation considerations, surgical techniques, surgical complications/management and relevant emergency procedures.

The Graduate School offers the following five master's degrees: Dental Biomaterials, Endodontics, Orthodontics, Periodontics and Prosthodontics.

**Dental Biomaterials Master's Requirements**

Graduate students in dental biomaterials pursue the application of scientific principles to the study of dental biomaterials including relationships among compositions, physical properties and clinical properties for dental biomaterial systems.

A student in the dental biomaterials program must complete a minimum of 30 credit hours of course work, consisting of a curriculum of graduate dental biomaterials courses (23 credits), statistics (1-3 credits) and thesis work (6 credits). The dental biomaterials graduate program is an interdisciplinary program covering principles of materials science, engineering, chemistry, physics, biology and dentistry. Satisfactory completion of the didactic and research components of the program results in a master’s degree through the Marquette University Graduate School. In addition to the courses offered by the School of Dentistry (described in detail under the Dental Biomaterials course description section of this bulletin), master’s candidates may be required by their program adviser to select courses offered through other departments.

A student may choose to take an additional, optional elective for 1 additional credit hour that is not required for the degree. Typically, the topic of this course is tissue engineering within the School of Dentistry's dental graduate core curriculum. Elective courses in other appropriate areas in the dental graduate core curriculum or materials science (from the College of Engineering) may also be selected according to the backgrounds and interests of the individual students.

Master of science degree applicants may only be admitted to the program under Plan A, which has two options: the traditional thesis option and the publication option. In partial fulfillment of the requirements to obtain the master of science degree, all candidates must conduct a research project on an appropriate clinical or basic science topic, and successfully defend their research project. Format and content of the public defense is determined by the advisory committee.

Candidates are encouraged to pursue research that originates in their chosen dental specialty. Research projects are selected in consultation with the graduate program director. Where possible, graduate students are encouraged to do clinically relevant research.

Graduate students who choose the thesis option have their research and thesis preparation supervised by a primary adviser and approved by a thesis advisory committee that consists of at least three members. The publication option, in addition, culminates in the acceptance of a first author, original, peer-reviewed publication based on a research project. Selection of the publication option requires completion of a traditional thesis in the event the submitted manuscript is not accepted by the submission deadline listed in this bulletin. All graduate students are required to present their research formally.

**Graduate Dental Biomaterials courses (23 credits):**

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<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>BIMA 6101</td>
<td>Mechanical Behavior of Dental Biomaterials</td>
<td>3</td>
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<tr>
<td>BIMA 6102</td>
<td>Polymeric Dental Biomaterials</td>
<td>2</td>
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<tr>
<td>BIMA 6151</td>
<td>Dental Cements</td>
<td>2</td>
</tr>
<tr>
<td>BIMA 6201</td>
<td>Dental Metallurgy 1</td>
<td>3</td>
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<tr>
<td>BIMA 6202</td>
<td>Dental Metallurgy 2</td>
<td>3</td>
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<tr>
<td>BIMA 6251</td>
<td>Dental Ceramics</td>
<td>3</td>
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<tr>
<td>BIMA 6570</td>
<td>Biomatериалs Science and Engineering</td>
<td>3</td>
</tr>
<tr>
<td>BIMA 6601</td>
<td>Dental Biomaterials Literature Review 1</td>
<td>1</td>
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<tr>
<td>BIMA 6602</td>
<td>Dental Biomaterials Literature Review 2</td>
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<td>Dental Biomaterials Literature Review 3</td>
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<td>BIMA 6604</td>
<td>Dental Biomaterials Literature Review 4</td>
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<tr>
<td>BIMA 6999</td>
<td>Master's Thesis</td>
<td>6</td>
</tr>
<tr>
<td>MSSC 5720</td>
<td>Statistical Methods</td>
<td>1-3</td>
</tr>
<tr>
<td>DENT 6003</td>
<td>Dental Graduate Didactic Core Curriculum 3 (Biostatistics)</td>
<td>1-3</td>
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**Statistics course (1-3 credits):**

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<th>Course Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>MSSC 5720</td>
<td>Statistical Methods</td>
<td>1-3</td>
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**Total Credit Hours**  

**Endodontics Master's Requirements**

A student in the endodontics program must complete a minimum of 30 credit hours of course work, including four credit hours in clinical practice per academic year (a total of eight credit hours for each program) and six credit hours of thesis work. The remaining credits may be divided among courses specific to the specialty discipline and elective courses. The endodontics program requires two full years of patient care. Satisfactory completion of the didactic and clinical components of the program results in a specialty certification through the Marquette University Graduate School. Satisfactory completion of the research component of the programs results in a master’s degree through the Marquette University Graduate School.
Master of science degree applicants may only be admitted to the program under Plan A, which has two options: the traditional thesis option and the publication option. In partial fulfillment of the requirements to obtain the master of science degree, all candidates must complete the relevant sections of the graduate core curriculum with a grade of B- or above, conduct a research project on an appropriate clinical or basic science topic, and successfully defend their research project. Format and content of the public defense is determined by the advisory committee.

Candidates are encouraged to pursue research that originates in their chosen dental specialty. Research projects are selected in consultation with the graduate program director. Where possible, graduate students are encouraged to do clinically relevant research.

Graduate students who choose the thesis option will have their research and thesis preparation supervised by a primary adviser and approved by a thesis advisory committee that consists of at least three members. The publication option, in addition, culminates in the acceptance of a first author, original, peer-reviewed publication based on a research project. Selection of the publication option requires completion of a traditional thesis in the event the submitted manuscript is not accepted by the submission deadline listed in this bulletin. All graduate students are required to present their research formally.

**Orthodontics Master’s Requirements**

The orthodontic program is a 26.5 month program. A student in the orthodontics program must complete a minimum of 30 credit hours of course work, including appropriate credit hours in clinical practice per academic year and six credit hours of thesis work. The remaining credits are divided among courses specific to the specialty discipline and elective courses. Satisfactory completion of the didactic and clinical components of the program results in specialty certification through the Marquette University Graduate School. Satisfactory completion of the research component of the programs results in a master’s degree through the Marquette University Graduate School.

Master of science degree applicants may only be admitted to the program under Plan A, which has two options: the traditional thesis option and the publication option. In partial fulfillment of the requirements to obtain the master of science degree, all candidates must complete the biostatistics and research design and methodology sections of the graduate core curriculum with a grade of B- or above, conduct a research project on an appropriate clinical or basic science topic, and successfully defend their research project. Format and content of the public defense is determined by the advisory committee.

Candidates are encouraged to pursue research that originates in their chosen dental specialty. Research projects are selected in consultation with the graduate program directors. Where possible, graduate students are encouraged to do clinically relevant research.

Graduate students who choose the thesis option will have their research and thesis preparation supervised by a primary adviser and approved by a thesis advisory committee that consists of at least three members. The publication option, in addition, culminates in the acceptance of a first author, original, peer-reviewed publication based on a research project. Selection of the publication option requires completion of a traditional thesis in the event the submitted manuscript is not accepted by the submission deadline listed in this bulletin. All graduate students are required to present their research formally.

**Periodontics Master’s Requirements**

The periodontal program is a three-year program. A student in the periodontics program must complete a minimum of 50 credit hours of course work, including 12 credit hours of clinical practice and six credit hours of thesis work. The remaining credits will be from courses assigned by the course director which are specific to periodontology. The periodontics program requires three full years of direct patient care. Satisfactory completion of the didactic and clinical components of the program results in specialty certification through the Marquette University Graduate School. Satisfactory completion of the research component of the program results in a master’s degree through the Marquette University Graduate School.

Master of science degree applicants may only be admitted to the program under Plan A, which has two options: the traditional thesis option and the publication option. In partial fulfillment of the requirements to obtain the master of science degree, all candidates must complete the appropriate sections of the graduate core curriculum with a grade of B- or above, conduct a research project on an appropriate clinical or basic science topic, and successfully defend their research project. Format and content of the public defense is determined by the advisory committee.

Candidates are encouraged to pursue research that originates in their chosen dental specialty. Research projects are selected in consultation with the graduate program director. Where possible, graduate students in advanced dental specialty programs are encouraged to do clinically relevant research.

Graduate students who choose the thesis option will have their research and thesis preparation supervised by a primary adviser and approved by a thesis advisory committee that consists of at least three members. The publication option, in addition, culminates in the acceptance of a first author, original, peer-reviewed publication based on a research project. Selection of the publication option requires completion of a traditional thesis in the event the submitted manuscript is not accepted by the submission deadline listed in this bulletin. All graduate students are required to present their research formally.

**Prosthodontics Master’s Requirements**

The prosthodontic program is a three-year program. A resident in the prosthodontic program must complete a minimum of 42 credit hours of course work, including 12 credit hours of clinical practice, and six credit hours of thesis work. The remaining credits will be from courses assigned by the
program director. The prosthodontics program requires satisfactory completion of a research project and results in a master's degree through the Marquette University Graduate School.

The master of science degree has two options: the traditional thesis option and the publication option. In partial fulfillment of the requirements to obtain the master of science degree, all residents must complete appropriate sections of the graduate core curriculum with a grade of B- or above, conduct a research project on an appropriate clinical or basic science topic, and successfully defend their research project. Format and content of the public defense is determined by the advisory committee.

Research projects are selected in consultation with the resident, and the graduate program director. Residents are encouraged to do clinically relevant research or pursue the application of scientific principles to the study of dental biomaterials including relationships among compositions, physical properties, and clinical properties.

Residents who choose the thesis option will have their research and thesis preparation supervised by a primary adviser and approved by a thesis advisory committee that consists of at least three members. The publication option, in addition, culminates in the acceptance of a first author, original, peer-reviewed publication based on a research project. Selection of the publication option requires completion of a traditional thesis in the event the submitted manuscript is not accepted for publication at least 60 days before the final day to submit your thesis, to the Graduate School with results and signatures. All graduate students are required to present their research formally.

Dental Biomaterials Courses

**BIMA 6101. Mechanical Behavior of Dental Biomaterials. 3 cr. hrs.**
Basic principles of mechanics, elastic deformation, plastic deformation and fracture. Comparison of mechanical behavior of metallic, ceramic and polymer dental biomaterial systems. Discussion of tension, compression, shear, bending, torsion, hardness and impact tests for dental biomaterials. Includes laboratory exercises.

**BIMA 6102. Polymeric Dental Biomaterials. 2 cr. hrs.**
Compositions and properties of polymers utilized in prosthetic, restorative, orthodontic, preventive, and implant dentistry. The materials include poly(methyl methacrylate), BIS-GMA, polyurethane and polyvinyl products in the form of resins, composites and microfills polymerized by heat, chemicals and ultraviolet or visible lights. Includes laboratory exercises.

**BIMA 6151. Dental Cements. 2 cr. hrs.**
Compositions, setting reactions and properties of zinc phosphate, zinc oxide-eugenol, polycarboxylate, glass ionomer and resin dental cements. Effects of clinical variables and the ADA specifications related to these materials will be included. May include laboratory exercises.

**BIMA 6152. Dental Impression Materials. 2 cr. hrs.**
Classification, composition and properties of the various impression materials used in restorative and prosthetic dentistry. The material systems to be discussed include impression compound, hydrocolloids, polysulfides, polyethers and silicones. May include laboratory exercises.

**BIMA 6153. Dental Casting Procedures. 3 cr. hrs.**

**BIMA 6201. Dental Metallurgy 1. 3 cr. hrs.**
Theory and application of metallurgical principles to the study of dental alloy systems. Dental amalgams, noble and base metal casting alloys, and wrought alloys. Area and extent of study determined by individual needs of student. Includes laboratory exercises.

**BIMA 6202. Dental Metallurgy 2. 3 cr. hrs.**
See BIMA 6201.

**BIMA 6251. Dental Ceramics. 3 cr. hrs.**
Basic principles of ceramic structures and properties. History, properties and technology of dental porcelains, gypsum products and dental casting investments. Includes laboratory exercises.

**BIMA 6501. Advanced Experimental Techniques for Dental Biomaterials Research 1. 1 cr. hr.**
Biomaterials Research 1 laboratory courses. Topics may vary, but will generally include scanning electron microscopy, mechanical testing procedures, and X-ray diffraction. Prereq: Admission to graduate program in dental biomaterials.

**BIMA 6502. Advanced Experimental Techniques for Dental Biomaterials Research 2. 1 cr. hr.**
Biomaterials Research 2 laboratory courses. Topics may vary, but will generally include scanning electron microscopy, mechanical testing procedures, and X-ray diffraction. Prereq: Admission to graduate program in dental biomaterials.

**BIMA 6570. Biomaterials Science and Engineering. 3 cr. hrs.**
Basic and advanced principles of dental biomaterials science. Fundamental scientific principles, and physical, mechanical, chemical and biological properties of restorative and preventive dental biomaterials. Relationships between properties and clinical performance of these materials and methods used for testing them.

**BIMA 6601. Dental Biomaterials Literature Review 1. 1-3 cr. hrs.**
Discussion of current and classic literature in dental biomaterials. Topics and journals discussed are rotated to provide an overview and range of different materials, properties, and applications. Emphasizes class discussion and presentations. Prereq: Grad. stndg. in BIMA graduate program or cons. of dept.
BIMA 6602. Dental Biomaterials Literature Review 2. 1-3 cr. hrs.
See BIMA 6601. Prereq: Grad. stndg. in BIMA graduate program or cons. of dept.

BIMA 6603. Dental Biomaterials Literature Review 3. 1-3 cr. hrs.
See BIMA 6601. Prereq: Grad. stndg. in BIMA graduate program or cons. of dept.

BIMA 6604. Dental Biomaterials Literature Review 4. 1-3 cr. hrs.
See BIMA 6601. Prereq: Grad. stndg. in BIMA graduate program or cons. of dept.

BIMA 6931. Topics in Dental Biomaterials. 1-3 cr. hrs.
Practical laboratory exercises designed to provide the student with specific skill sets and analytic approaches used in modern materials research.

BIMA 6970. Biomaterials Seminar. 1 cr. hr.
Current topics and concepts in materials science.

BIMA 6980. Teaching Experience in Dental Biomaterials. 1-2 cr. hrs.
Teaching and preclinical laboratory assignments in dental biomaterials for undergraduate dental students.

BIMA 6995. Independent Study in Dental Biomaterials. 1-3 cr. hrs.
Course work customized to meet specific student interests/needs. Prereq: Cons. of instr.

BIMA 6999. Master's Thesis. 1-6 cr. hrs.
Credit hours assigned to thesis preparation and scholarship. S/U grade assessment.

BIMA 9970. Graduate Standing Continuation: Less than Half-Time. 0 cr. hrs.
Fee. SNC/UNC grade assessment. Prereq: Cons. of dept. ch.

BIMA 9994. Master's Thesis Continuation: Less than Half-Time. 0 cr. hrs.
Fee. SNC/UNC grade assessment. Prereq: Cons. of dept. ch.

BIMA 9995. Master's Thesis Continuation: Half-Time. 0 cr. hrs.
Fee. SNC/UNC grade assessment. Prereq: Cons. of dept. ch.

BIMA 9996. Master's Thesis Continuation: Full-Time. 0 cr. hrs.
Fee. SNC/UNC grade assessment. Prereq: Cons. of dept. ch.

Dentistry Courses

DENT 6001. Dental Graduate Didactic Core Curriculum 1. 1 cr. hr.
The Dental Graduate Didactic Core Curriculum (DENT 6001-6003) is designed to cover all didactic content areas applicable to the advanced practice of general dentistry and to each of the specialty areas of dentistry. The content areas are sequenced to present: material of interest for the general dentist seeking additional training beyond predoctoral dental education; material of interest for each of the dental specialty areas; and advanced material of interest for those intending to pursue academic/research careers.

DENT 6002. Dental Graduate Didactic Core Curriculum 2. 1 cr. hr.
The Dental Graduate Didactic Core Curriculum (DENT 6001-6003) is designed to cover all didactic content areas applicable to the advanced practice of general dentistry and to each of the specialty areas of dentistry. The content areas are sequenced to present: material of interest for the general dentist seeking additional training beyond predoctoral dental education; material of interest for each of the dental specialty areas; and advanced material of interest for those intending to pursue academic/research careers.

DENT 6003. Dental Graduate Didactic Core Curriculum 3. 1 cr. hr.
The Dental Graduate Didactic Core Curriculum (DENT 6001-6003) is designed to cover all didactic content areas applicable to the advanced practice of general dentistry and to each of the specialty areas of dentistry. The content areas are sequenced to present: material of interest for the general dentist seeking additional training beyond predoctoral dental education; material of interest for each of the dental specialty areas; and advanced material of interest for those intending to pursue academic/research careers.

DENT 6953. Seminar in Interdisciplinary Dentistry. 1 cr. hr.
Provides training in the discipline of clinical dentistry using a seminar format of content delivery. The postgraduate students learn the importance of interdisciplinary treatment of patients and enhance communication between all specialties in the Dental School. Focuses on case presentation skills, diagnostic and therapeutic decision making, outcomes assessment and knowledge of the relevant literature.

DENT 6980. Teaching Experience in Dentistry. 1 cr. hr.
Assigned teaching duties in the didactic, preclinical, and clinical dental sciences.

DENT 6995. Independent Study in Dentistry. 1-3 cr. hrs.
Customized to meet specific student interests/needs. Prereq: Cons. of instr.

DENT 6999. Master's Thesis. 1-6 cr. hrs.
Credit hours assigned to thesis preparation and scholarship. S/U grade assessment.

DENT 9970. Graduate Standing Continuation: Less than Half-Time. 0 cr. hrs.
Fee. SNC/UNC grade assessment. Prereq: Cons. of dept. ch.
DENT 9994. Master’s Thesis Continuation: Less than Half-Time. 0 cr. hrs.
Fee. SNC/UNC grade assessment. Prereq: Cons. of dept. ch.

DENT 9995. Master’s Thesis Continuation: Half-Time. 0 cr. hrs.
Fee. SNC/UNC grade assessment. Prereq: Cons. of dept. ch.

DENT 9996. Master’s Thesis Continuation: Full-Time. 0 cr. hrs.
Fee. SNC/UNC grade assessment. Prereq: Cons. of dept. ch.

Endodontics Courses

ENDO 6000. Clinical Patient Care-Endodontics. 1-7 cr. hrs.
Designed to account for time dental graduate residents spend providing patient care. Ranges from 1-7 credit hours per term. S/U grade assessment.

ENDO 6301. Endodontics Clinic and Case Review 1. 4 cr. hrs.
Complete diagnosis and treatment of clinic cases using all available diagnostic aids and treatment modalities. Endodontic surgical cases are performed. Clinical cases are presented for discussion. Prereq: Admitted to Endodontics program.

ENDO 6302. Endodontics Clinic and Case Review 2. 4 cr. hrs.
Continuation in clinic and case review series. Complete diagnosis and treatment of clinic cases using all available diagnostic aids and treatment modalities. Endodontic surgical cases are performed. Clinical cases are presented for discussion. Prereq: Admitted to Endodontics program.

ENDO 6303. Endodontics Clinic and Case Review 3. 6 cr. hrs.
Continuation in clinic and case review series. Complete diagnosis and treatment of clinic cases using all available diagnostic aids and treatment modalities. Endodontic surgical cases are performed. Clinical cases are presented for discussion. Prereq: Admitted to Endodontics program.

ENDO 6304. Endodontics Clinic and Case Review 4. 6 cr. hrs.
Continuation in clinic and case review series. Complete diagnosis and treatment of clinic cases using all available diagnostic aids and treatment modalities. Endodontic surgical cases are performed. Clinical cases are presented for discussion. Prereq: Admitted to Endodontics program.

ENDO 6371. Endodontics Literature and Book Review 1. 1 cr. hr.
Discussion of current and classic literature, library research; review current textbooks, conventions and dental meetings. Some lectures by graduate students relating endodontics to the other disciplines, systemic health and potential areas of research. Prereq: Admitted to Endodontics program.

ENDO 6372. Endodontics Literature and Book Review 2. 1 cr. hr.
Continuation in literature and book review series. Discussion of current and classic literature, library research; review current textbooks, conventions and dental meetings. Some lectures by graduate students relating endodontics to the other disciplines, systemic health and potential areas of research. Prereq: Admitted to Endodontics program.

ENDO 6373. Endodontics Literature and Book Review 3. 1 cr. hr.
Continuation in literature and book review series. Discussion of current and classic literature, library research; review current textbooks, conventions and dental meetings. Some lectures by graduate students relating endodontics to the other disciplines, systemic health and potential areas of research. Prereq: Admitted to Endodontics program.

ENDO 6374. Endodontics Literature and Book Review 4. 1 cr. hr.
Continuation in literature and book review series. Discussion of current and classic literature, library research; review current textbooks, conventions and dental meetings. Some lectures by graduate students relating endodontics to the other disciplines, systemic health and potential areas of research. Prereq: Admitted to Endodontics program.

Orthodontics Courses

ORTH 6000. Clinical Patient Care-Orthodontics. 1-7 cr. hrs.
Designed to account for time dental graduate residents spend providing patient care. Ranges from 1-7 credit hours per term. S/U grade assessment.

ORTH 6101. Clinical Orthodontics 1. 4 cr. hrs.
Lectures, laboratory and clinical treatment of patients with various types of malocclusion. Prereq: Admitted to Orthodontics program.

ORTH 6102. Clinical Orthodontics 2. 4 cr. hrs.
Lectures, laboratory and clinical treatment of patients with various types of malocclusion. Prereq: Admitted to Orthodontics program.

ORTH 6103. Clinical Orthodontics 3. 6 cr. hrs.
Lectures, laboratory and clinical treatment of patients with various types of malocclusion. Prereq: Admitted to Orthodontics program.

ORTH 6104. Clinical Orthodontics 4. 6 cr. hrs.
Lectures, laboratory and clinical treatment of patients with various types of malocclusion. Prereq: Admitted to Orthodontics program.

ORTH 6110. Histopathology of Tooth Movement. 1 cr. hr.
Histological and pathological aspects of tooth movement emphasizing tissue response to orthodontic forces. Prereq: Admitted to Orthodontics program.

ORTH 6953. Orthodontics Seminar 1. 1 cr. hr.
Combines basic/applied techniques and maintenance of normal occlusal development. Students learn the fabrication and biomechanics of various appliances used in prevention and interception of malocclusions. Concurrently, students are taught in the theory of normal occlusal development, diagnosis, prevention, and interception of certain malocclusions. Prereq: Admitted to Orthodontics program.
ORTH 6954. Orthodontics Seminar 2. 1 cr. hr.
A continuation of a series of courses beginning with ORTH 6953. Prereq: Admitted to Orthodontics program.

ORTH 6955. Orthodontics Seminar 3. 1 cr. hr.
A continuation of a series of courses beginning with ORTH 6953. Prereq: Admitted to Orthodontics program.

ORTH 6956. Orthodontics Seminar 4. 1 cr. hr.
A continuation of a series of courses beginning with ORTH 6953. Prereq: Admitted to Orthodontics program.

**Periodontics Courses**

**PERI 6000. Clinical Patient Care-Periodontics. 1-7 cr. hrs.**
Designed to account for time dental graduate residents spend providing patient care. Ranges from 1-7 credit hours per term. S/U grade assessment.

**PERI 6411. Periodontics Clinic 1. 1 cr. hr.**
The clinical program (first of six) develops competency to collect, organize, analyze, and interpret data to formulate a diagnosis, prognosis, and treatment plan for each patient. The resident discusses the rationale and indication of therapy, then critically evaluates the results of the therapy. The resident develops, implements, and evaluates a periodontal maintenance plan. Prereq: Admitted to the Periodontics program.

**PERI 6412. Periodontics Clinic 2. 1 cr. hr.**
The clinical program (second of six) develops competency to collect, organize, analyze, and interpret data to formulate a diagnosis, prognosis, and treatment plan for each patient. The resident discusses the rationale and indication of therapy, then critically evaluates the results of the therapy. The resident develops, implements, and evaluates a periodontal maintenance plan. Prereq: Admitted to the Periodontics program.

**PERI 6413. Periodontics Clinic 3. 2 cr. hrs.**
The clinical program (third of six) develops competency to collect, organize, analyze, and interpret data to formulate a diagnosis, prognosis, and treatment plan for each patient. The resident discusses the rationale and indication of therapy, then critically evaluates the results of the therapy. The resident develops, implements, and evaluates a periodontal maintenance plan. Prereq: Admitted to the Periodontics program.

**PERI 6414. Periodontics Clinic 4. 2 cr. hrs.**
The clinical program (fourth of six) develops competency to collect, organize, analyze, and interpret data to formulate a diagnosis, prognosis, and treatment plan for each patient. The resident discusses the rationale and indication of therapy, then critically evaluates the results of the therapy. The resident develops, implements, and evaluates a periodontal maintenance plan. Prereq: Admitted to the Periodontics program.

**PERI 6415. Periodontics Clinic 5. 2 cr. hrs.**
The clinical program (fifth of six) develops competency to collect, organize, analyze, and interpret data to formulate a diagnosis, prognosis, and treatment plan for each patient. The resident discusses the rationale and indication of therapy, then critically evaluates the results of the therapy. The resident develops, implements, and evaluates a periodontal maintenance plan. Prereq: Admitted to the Periodontics program.

**PERI 6416. Periodontics Clinic 6. 2 cr. hrs.**
The clinical program (last of six) develops competency to collect, organize, analyze, and interpret data to formulate a diagnosis, prognosis, and treatment plan for each patient. The resident discusses the rationale and indication of therapy, then critically evaluates the results of the therapy. The resident develops, implements, and evaluates a periodontal maintenance plan. Prereq: Admitted to the Periodontics program.

**PERI 6421. Advanced Moderate Sedation 1. 2 cr. hrs.**
An in-depth, comprehensive assessment of pain control in dentistry (first of two). Begins with neuroanatomy and pain, then builds a valid foundation in basic science before advancing to a panoramic discussion of techniques in anxiety management and pain control. Emphasizes behavioral management and conscious sedation techniques review. Accompanied by demonstration, patient cases, and certification. Prereq: Admitted to the Periodontics program.

**PERI 6422. Advanced Moderate Sedation 2. 1 cr. hr.**
An in-depth, comprehensive assessment of pain control in dentistry (last of two). Begins with neuroanatomy and pain, then builds a valid foundation in basic science before advancing to a panoramic discussion of techniques in anxiety management and pain control. Emphasizes behavioral management and conscious sedation techniques review. Accompanied by demonstration, patient cases, and certification. Prereq: Admitted to the Periodontics program.

**PERI 6431. Endosseous Dental Implants 1. 1 cr. hr.**
Concepts of dental implants (first of two). Examines the use of osseointegrated, root-form, endosseous implants, which has revolutionized the dental professional's ability to treatment plan and restore the partially and completely edentulous patient. Studies the historic, simple, advanced, and complex use of today's implants as well as site development and treatment of peri-implantitis. Prereq: Admitted to the Periodontics program.

**PERI 6432. Endosseous Dental Implants 2. 1 cr. hr.**
Concepts of dental implants (last of two). Examines the use of osseointegrated, root-form, endosseous implants, which has revolutionized the dental professional's ability to treatment plan and restore the partially and completely edentulous patient. Studies the historic, simple, advanced, and complex use of today's implants as well as site development and treatment of peri-implantitis. Prereq: Admitted to the Periodontics program.

**PERI 6441. Supervised Teaching 1. 1 cr. hr.**
Provides residents teaching experience (first of three). Residents, assigned to various clinics, develop their skills teaching clinical periodontology to predoctoral students. Periodontal faculty provide supervision and evaluation of teaching performance. Prereq: Admitted to the Periodontics program.
PERI 6442. Supervised Teaching 2. 1 cr. hr.
Provides residents teaching experience (second of three). Residents, assigned to various clinics, develop their skills teaching clinical periodontology to predoctoral students. Periodontal faculty provide supervision and evaluation of teaching performance. Prereq: Admitted to the Periodontics program.

PERI 6443. Supervised Teaching 3. 1 cr. hr.
Provides residents teaching experience (last of three). Residents, assigned to various clinics, develop their skills teaching clinical periodontology to predoctoral students. Periodontal faculty provide supervision and evaluation of teaching performance. Prereq: Admitted to the Periodontics program.

PERI 6953. Seminar in Periodontics 1. 2 cr. hrs.
In-depth review of current and classical literature, medical emergencies, periodontal lectures, case presentation, mock boards and an oral evaluation exam. Prereq: Admitted to the Periodontics program.

PERI 6954. Seminar in Periodontics 2. 2 cr. hrs.
A continuation of a series of courses beginning with PERI 6953. Prereq: Admitted to the Periodontics program.

PERI 6955. Seminar in Periodontics 3. 2 cr. hrs.
A continuation of a series of courses beginning with PERI 6953. Prereq: Admitted to the Periodontics program.

PERI 6956. Seminar in Periodontics 4. 2 cr. hrs.
A continuation of a series of courses beginning with PERI 6953. Prereq: Admitted to the Periodontics program.

PERI 6957. Seminar in Periodontics 5. 2 cr. hrs.
A continuation of a series of courses beginning with PERI 6953. Prereq: Admitted to the Periodontics program.

PERI 6958. Seminar in Periodontics 6. 2 cr. hrs.
A continuation of a series of courses beginning with PERI 6953. Prereq: Admitted to the Periodontics program.

Prosthodontics Courses

PROS 6000. Clinical Patient Care-Prosthodontics. 1-7 cr. hrs.
Designed to account for time dental graduate residents spend providing patient care. Ranges from 1-7 credit hours per term. S/U grade assessment.

PROS 6201. Clinical Prosthodontics 1. 4 cr. hrs.
Clinical treatment concepts in basic and advanced restorative procedures. Prereq: Admitted to Prosthodontics program.

PROS 6202. Clinical Prosthodontics 2. 4 cr. hrs.
Continuation of PROS clinic series. Clinical treatment concepts in basic and advanced restorative procedures. Prereq: PROS 6201, and admitted to Prosthodontics program.

PROS 6203. Clinical Prosthodontics 3. 4 cr. hrs.
Continuation of PROS clinic series. Clinical treatment concepts in basic and advanced restorative procedures. Prereq: PROS 6202, and admitted to Prosthodontics program.

PROS 6204. Clinical Prosthodontics 4. 4 cr. hrs.
Continuation of PROS clinic series. Clinical treatment concepts in basic and advanced restorative procedures. Prereq: PROS 6203, and admitted to Prosthodontics program.

PROS 6205. Clinical Prosthodontics 5. 6 cr. hrs.
Complete dentures, fixed and removable partial dentures, implant prosthodontics, maxillofacial prosthodontics and associated clinical disciplines of dentistry involved in comprehensive rehabilitation of the oral cavity. Prereq: PROS 6204, and admitted to Prosthodontics program.

PROS 6206. Clinical Prosthodontics 6. 6 cr. hrs.
Continuation of PROS 6205. Complete dentures, fixed and removable partial dentures, implant prosthodontics, maxillofacial prosthodontics and associated clinical disciplines of dentistry involved in comprehensive rehabilitation of the oral cavity. Prereq: PROS 6205, and admitted to Prosthodontics program.

PROS 6953. Seminar in Complete Denture Prosthodontics. 1 cr. hr.
In-depth review and discussion of complete denture literature and its theoretical, technical, and clinical application. Includes regularly-scheduled diagnosis and treatment planning sessions in all phases of prosthodontics. Prereq: Admitted to Prosthodontics program.

PROS 6954. Seminar in Removable Partial Denture Prosthodontics. 1 cr. hr.
In-depth review and discussion of removable partial dentures literature and its theoretical, technical, and clinical application. Includes regularly-scheduled diagnosis and treatment planning sessions in all phases of prosthodontics. Prereq: Admitted to Prosthodontics program.

PROS 6955. Seminar in Fixed Partial Denture Prosthodontics. 1 cr. hr.
In-depth review and discussion of fixed partial denture and rehabilitation literature, and its theoretical, technical, and clinical application. Includes regularly-scheduled diagnosis and treatment planning sessions in all phases of prosthodontics. Prereq: Admitted to Prosthodontics program.

PROS 6956. Seminar in Maxillofacial Prosthetics and Related Disciplines. 1 cr. hr.
In-depth literature review and discussion of theoretical, technical, and clinical application of maxillofacial prosthetics, surgical and radiation oncology, speech pathology, and other related disciplines. Includes regularly-scheduled diagnosis and treatment planning sessions in all phases of prosthodontics. Prereq: Admitted to Prosthodontics program.
PROS 6957. Seminar in Implant Prosthodontics. 1 cr. hr.
In-depth review and discussion of complete and partial fixed, single tooth and removable implant rehabilitation literature and its theoretical and clinical applications. Includes regularly-scheduled diagnosis and treatment sessions in all phases of prosthodontics. Prereq: Admitted to Prosthodontics program.

PROS 6958. Seminar in Occlusion/TMD. 1 cr. hr.
In-depth review and discussion of concepts of occlusion and articulation, occlusal analysis, diagnosis and treatment of facial pain and temporomandibular disorders. Includes regularly-scheduled diagnosis and treatment planning sessions in all phases of prosthodontics. Prereq: Admitted to Prosthodontics program.