

# ORAL HEALTH RESEARCH, DOCTOR OF PHILOSOPHY (PH.D.) WITH A CONCENTRATION IN BIOENGINEERING

**Note: Program admission is suspended pending closure.**

The Ph.D. in Oral Health Research with a concentration in bioengineering prepares students for research-oriented careers as independent scientists in academia, government and industry. The curriculum is specifically designed to provide a strong foundation in biochemistry, molecular biology and tissue. Students will develop an understanding of the mechanism of craniofacial tissue damage and healing, and develop therapeutics to regenerate the hard and soft tissue in dental and craniofacial areas.

The program emphasizes independent research culminating in the conduct of an original research project under the supervision of a faculty adviser. Participating faculty are associated with the Philips Institute for Oral Health Research and the College of Engineering.

Ph.D. students are expected to enroll as full-time graduate students in the core Ph.D. program. During the first year, students pursue research rotations, take formal course work and become familiar with current research topics through seminars, discussion groups and lectures by distinguished scientists. By the end of the first year, students choose a faculty adviser, select their concentration and begin dissertation research. Following completion of the research project and defense of the doctoral dissertation, graduates will have acquired the necessary methods, techniques and critical-thinking skills to become the next generation of scientific leaders.

## Student learning outcomes

- Graduates will have acquired fundamental knowledge of oral health research and strength in cutting-edge research that crosses disciplines and fosters the ability of the students to view oral health research questions from a broad perspective.
- Graduates will have an understanding of the structure, function and development of tissues of the oral and craniofacial region.
- Graduates will be able to evaluate the use of bioengineering for diseases of the head and neck and design research programs to improve treatment.
- Graduates will have developed strong practical foundations on which to build research careers.

## VCU Graduate Bulletin, VCU Graduate School and general academic policies and regulations for all graduate students in all graduate programs

The VCU Graduate Bulletin website documents the official admission and academic rules and regulations that govern graduate education for all graduate programs at the university. These policies are established by the graduate faculty of the university through their elected representatives to the University Graduate Council.

It is the responsibility of all graduate students, both on- and off-campus, to be familiar with the VCU Graduate Bulletin as well as the **Graduate School website** and academic regulations in individual school and department publications and on program websites. However, in all cases, the official policies and procedures of the University Graduate Council, as published on the VCU Graduate Bulletin and Graduate School websites, take precedence over individual program policies and guidelines.

**Visit the academic regulations section for additional information on academic regulations for graduate students.**

## Degree candidacy requirements

A graduate student admitted to a program or concentration requiring a final research project, work of art, thesis or dissertation, must qualify for continuing master's or doctoral status according to the degree candidacy requirements of the student's graduate program. Admission to degree candidacy, if applicable, is a formal statement by the graduate student's faculty regarding the student's academic achievements and the student's readiness to proceed to the final research phase of the degree program.

Graduate students and program directors should refer to the following degree candidacy policy as published in the VCU Graduate Bulletin for complete information and instructions.

**Visit the academic regulations section for additional information on degree candidacy requirements.**

## Graduation requirements

As graduate students approach the end of their academic programs and the final semester of matriculation, they must make formal application to graduate. No degrees will be conferred until the application to graduate has been finalized.

Graduate students and program directors should refer to the following graduation requirements as published in the Graduate Bulletin for a complete list of instructions and a graduation checklist.

**Visit the academic regulations section for additional information on graduation requirements.**

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## Admission requirements

Degree:	Semester(s) of entry:	Deadline dates:	Test requirements:
Ph.D.	Fall		

## Special requirements

- Applicants whose native language is not English must submit satisfactory scores from a standardized test commonly used and deemed appropriate for evaluation of English language proficiency, such as the TOEFL. These scores should be 80 minimum for Internet-based tests, 213 minimum for computer-based tests and 550 minimum for paper-based tests.

In addition to the general admission requirements of the VCU Graduate School (<https://bulletin.vcu.edu/graduate/study/admission-graduate->

study/admission-requirements/), the following requirements represent the minimum acceptable standards for admission:

- A minimum GPA of 3.0 on a 4.0 scale
- A personal statement, which should include long-term career goals to assess reasons behind the candidate's application; how a Ph.D. helps achieve those goals; the factors motivating a career in research; research experience, including dates, places and duration
- A current resume or curriculum vita
- Three letters of recommendation that speak to the scientific competency and experience of the applicant

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## Degree requirements

For students with a B.S. degree, the Ph.D. in Oral Health Research will require the completion of a minimum of 102 credits, including a minimum of 35 didactic credit hours comprising seven required courses (12 credits), six core courses (15 credits) and additional electives (eight credits). The remaining 67 credits (at minimum) will be taken in research courses.

Students entering the program with an M.S. will be required to complete a minimum of 81 credits, including a minimum of 23 didactic credit hours comprising six core courses (15 credits) combined with electives (eight credits). These students must also complete the research requirements for a minimum of 58 credits.

Students entering the program with a D.D.S or D.M.D. will be required to complete a minimum of 84 credits, including a minimum of 24 didactic credits comprising five required course (six credits), four core courses (10 credits) and electives (eight credits). These students must also complete the research requirements for a minimum of 60 credits.

## Curriculum requirements for students entering with a B.S.

Course	Title	Hours
<b>Required courses</b>		
BIOC 530 & BIOC 531 & BIOC 532 & BIOC 533	Biochemistry, Cell and Molecular Biology Module 1: Protein Structure and Function and Biochemistry, Cell and Molecular Biology Module 2: Basic Metabolism and Biochemistry, Cell and Molecular Biology Module 3: Central Dogma of Molecular Biology and Biochemistry, Cell and Molecular Biology Module 4: Lipids/Membranes and Bioenergetics	5
or BIOC 503	Biochemistry, Cell and Molecular Biology	
BIOS/STAT 543	Graduate Research Methods I	3
BNFO 653	Advanced Molecular Genetics: Bioinformatics	3
OVPR 601	Scientific Integrity	1
or OVPR 602	Responsible Scientific Conduct	
or OVPR 603	Responsible Conduct of Research	
<b>Core courses</b>		
OCMB 701	Oral Microbiology and Disease	2
OCMB 702	Infection, Immunology and Oral Cancer	2

OCMB 703	Research Topics in Oral Biology	1
OCMB 704	Oral Biology Seminar Series (one-credit course taken eight semesters)	8
OCMB 706	Proposal Preparation	1
OCMB 707	Research Skills and Career Development	1
<b>Electives</b>		
Choose a minimum of eight credit hours		8
EGRB 513	Cellular Signal Processing	
EGRB 517	Cell Mechanics and Mechanobiology	
EGRB 613	Biomaterials	
EGRB 616	Cell Engineering	
EGRB 619	Computational and Experimental Models of Cellular Signal Transduction	
<b>Research requirement</b>		
OCMB 705	Oral Biology Directed Research (taken for a minimum of 67 credits)	67
<b>Total Hours</b>		<b>102</b>

**For these students, the minimum total of graduate credit hours required for this degree is 102.**

## Curriculum requirements for students entering with an M.S.

Course	Title	Hours
<b>Core courses</b>		
OCMB 701	Oral Microbiology and Disease	2
OCMB 702	Infection, Immunology and Oral Cancer	2
OCMB 703	Research Topics in Oral Biology	1
OCMB 704	Oral Biology Seminar Series (one-credit course taken eight semesters)	8
OCMB 706	Proposal Preparation	1
OCMB 707	Research Skills and Career Development	1
<b>Electives</b>		
Choose a minimum of eight credit hours		8
EGRB 513	Cellular Signal Processing	
EGRB 517	Cell Mechanics and Mechanobiology	
EGRB 613	Biomaterials	
EGRB 616	Cell Engineering	
EGRB 619	Computational and Experimental Models of Cellular Signal Transduction	
<b>Research requirement</b>		
OCMB 705	Oral Biology Directed Research (taken for a minimum of 58 credits)	58
<b>Total Hours</b>		<b>81</b>

**For these students, the minimum total of graduate credit hours required for this degree is 81.**

## Curriculum requirements for students entering with a D.D.S. or D.M.D

Course	Title	Hours
<b>Required courses</b>		
BIOC 530 & BIOC 531 & BIOC 532 & BIOC 533	Biochemistry, Cell and Molecular Biology Module 1: Protein Structure and Function and Biochemistry, Cell and Molecular Biology Module 2: Basic Metabolism and Biochemistry, Cell and Molecular Biology Module 3: Central Dogma of Molecular Biology and Biochemistry, Cell and Molecular Biology Module 4: Lipids/Membranes and Bioenergetics	5
or BIOC 503	Biochemistry, Cell and Molecular Biology	
OVPR 601	Scientific Integrity	1
or OVPR 602	Responsible Scientific Conduct	
or OVPR 603	Responsible Conduct of Research	
<b>Core courses</b>		
OCMB 703	Research Topics in Oral Biology	1
OCMB 704	Oral Biology Seminar Series (one-credit course taken seven semesters)	7
OCMB 706	Proposal Preparation	1
OCMB 707	Research Skills and Career Development	1
<b>Electives</b>		
Choose a minimum of eight credit hours		8
EGRB 513	Cellular Signal Processing	
EGRB 517	Cell Mechanics and Mechanobiology	
EGRB 613	Biomaterials	
EGRB 616	Cell Engineering	
EGRB 619	Computational and Experimental Models of Cellular Signal Transduction	
<b>Research requirement</b>		
OCMB 705	Oral Biology Directed Research (taken for a minimum of 60 credits)	60
<b>Total Hours</b>		<b>84</b>

**For these students, the minimum total of graduate credit hours required for this degree is 84.**

Students who complete the requirements for this concentration will receive a Doctor of Philosophy in Oral Health Research.

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## D.D.S.-Ph.D. opportunity

Students with an interest in academic and research careers are afforded the opportunity to undertake advanced degree training while in dental school by combining doctoral study in oral health research with a professional degree in dentistry. The program seeks to train students interested in translating oral research to the clinic. These clinician-scientists will help bridge the gap between basic and clinical science in the field of dentistry. For more information, see the dual degree program page (<https://bulletin.vcu.edu/graduate/dual-degree-opps/dds-ohr-phd/>).

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### Contact

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**Program website:** [dentistry.vcu.edu/programs/oralhealthphd](http://dentistry.vcu.edu/programs/oralhealthphd) (<http://dentistry.vcu.edu/programs/oralhealthphd/>)