



DOCTOR OF PHILOSOPHY PROGRAM IN ORAL BIOLOGY

■ FACULTY OF DENTISTRY

DOCTOR OF PHILOSOPHY PROGRAM IN ORAL BIOLOGY

Oral biology at Naresuan University covers the study of the structure and function of normal and abnormal tissues of the oral cavity and craniofacial complex as well as craniofacial development and anomalies. Our curriculum is highly integrated with in-depth basic science research and development, particularly, focusing on combining technology in molecular biology, orofacial genetics, cell and tissue engineering in craniofacial structure, with biomaterial science in dentistry, to gain insight into new knowledge in oral science and technology applied for diagnosis and performance planning for treatment of the pathologies and anomalies associated with the craniofacial region.



Objectives

The primary mission of the Ph.D. program in oral biology is to prepare individuals for careers in research and education or in industry, particularly in oral health related fields, and to equip these individuals with expertise necessary to become leaders in the field of oral health research.

The program was designed to address critical issues relating to oral biology and medicine. In particular, we have considered possible integration with technology and innovation of oral science.

Our graduates are expected to become capable of in-depth research, integrating up-to-date R&D with biology in oral healing, both in basic and applied inquiries. Additionally, they are prepared to drive public health development forward in the national arena and conduct research with international peers.

Admission

In accordance with the Graduate School Rules and Regulations. The program committee reserves the rights to require more qualifications as deemed appropriate.

Medium of Instruction

Thai and English

Research Focus

The following concentration areas represent the central concepts for in-depth research capacity in the discipline of oral biology. Expertise and authority in these concentration areas are well represented among participating faculty members.

- Molecular Biology
- Craniofacial Development and Anomalies
- Material Science in Dentistry
- Technology in Orofacial Genetics
- Cell and Tissue Engineering in Craniofacial Structure

Requirement for Graduation

In accordance with the Rules and Regulations of the Graduate School.



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Structure of the Program

1. Credit Requirements (Minimum required).

Requirements	Option 2.1	Option 2.2
Coursework	12	24
Core Courses	3	3
Electives	9	21
Required Non-credit Courses	5	10
Dissertation	36	48
Total	48	72

2. Core Courses

Requirements	Option 2.1		Option 2.2	
	Course No.	Credits	Course No.	Credits
Advanced Oral Biology	603601	3	603601	3
Total	1	3	1	3

3. Electives

Requirements	Option 2.1		Option 2.2	
	Course No.	Credits	Course No.	Credits
Craniofacial Development and Anomalies	603610	3	603610	3
Instrumentation for Research in Oral Biology	603611	3	603611	3
Electron Microscopy in Dentistry	603612	3	603612	3
Orofacial Sensation	603613	3	603613	3
Machanism of Jaw Movement	603614	3	603614	3
Biomaterial Sciences	603615	3	603615	3
Tissue and Organ Culture in Dentistry	603616	3	603616	3
Technology in Genetics	603617	3	603617	3
Histochemistry	603618	3	603618	3
Writing Scientific Paper	603619	3	603619	3
Advanced Oral Immunology	603620	3	603620	3
Cell & Tissue Engineering in Craniofacial Structure	603621	3	603621	3
Cell Signaling	603622	3	603622	3
Genomics Proteomics and Epigenetics	603623	3	603623	3
Bioinformatics	-	-	266506	3
Advanced Medical Virology	-	-	266515	3
Advanced Medical Mycology	-	-	266517	3
Biostatistics and Computing Skill	-	-	604500	3
Total	14	≥9	18	≥21

4. Required Non-credit Courses.

Requirements	Option 2.1		Option 2.2	
	Course No.	Credits	Course No.	Credits
Seminar in Oral Biology I	603690	1	603690	1
Seminar in Oral Biology II	603691	1	603691	1
Seminar in Oral Biology III	603692	1	603692	1
Seminar in Oral Biology IV	603693	1	603693	1
Seminar in Oral Biology V	603694	1	603694	1
Seminar in Oral Biology VI	-	-	603695	1
Seminar in Oral Biology VII	-	-	603696	1
Research Methodology in Health Sciences	-	-	604504	3
Total	5	5	8	10

5. Dissertation.

Requirements	Option 2.1		Option 2.2	
	Course No.	Credits	Course No.	Credits
Dissertation 1	603670	4	603680	3
Dissertation 2	603671	8	603681	8
Dissertation 3	603672	8	603682	8
Dissertation 4	603673	8	603683	8
Dissertation 5	603674	8	603684	8
Dissertation 6	-	-	603685	8
Dissertation 7	-	-	603686	5
Total	5	36	7	48

Course Descriptions

266506 Bioinformatics

3(2-3-5)

Extensive study of biological data and data collection, data analysis, data alignment, information technology applications in experimental designs, laboratory diagnosis, genetic relationship of organisms, and other aspects of bioinformatics.

266515 Advanced Medical Virology

3(2-3-5)

Comprehensive inquiry of advanced virology in physical and biological properties, viroid and prion, interactions between viruses and viruses or between viruses and hosts, immune responses to viral infections, antiviral agents, and laboratory techniques in virology.

266516 Advanced Medical Bacteriology

3(2-3-5)

Pathogenic bacteria in humans, mechanisms of pathogenesis, host responses to infections, mechanisms of bacterial resistance to antibiotics and epidemiological typing of pathogenic bacteria at molecular level.

266517 Advanced Medical Mycology

3(2-3-5)

Advanced mycology in pathogenesis, diagnosis, antimicrobial agents produced by fungi, molecular epidemiology, molecular techniques in classification and identification of fungi, and factors controlling virulence of fungal pathogens.

603601 Advanced Oral Biology

3(3-0-6)

Extensive study of the structures and properties of cells and bacteria including organelles in molecular levels, cellular metabolism and bioenergetics; mechanisms and regulations of cell divisions, structures of nucleic acids, structures and organization of genes, gene expressions, DNA replications, mutation, genetic recombination, protein synthesis and folding, and genetic engineering.

603610 Craniofacial Development and Anomalies**3(3-0-6)**

A study of biology of craniofacial development in cellular and molecular levels, heredity, structure of genes, and cell migration for specific organ; inquiry of the biology of craniofacial anomalies in cellular and molecular levels, relationship with systematic and genetic diseases, stem cells anomalies and factors related to anomalies.

603611 Instrumentation for Research in Oral Biology**3(2-3-5)**

An in-depth exploration of the principles and operations of research instruments and equipment for research in oral biology and related physical structure; and instruments for study of structure of cells and biochemical products.

603612 Electron Microscopy in Dentistry**3(2-3-5)**

An examination of the principles, laboratory practices, operations and applications of transmission and scanning electron microscope, tissue preparations of soft and hard tissues from orofacial organs, formation of electron micrograph, photography and micrograph recording, and analysis of electron micrograph for research in dentistry.

603613 Orofacial Sensation**3(3-0-6)**

Functional roles of peripheral and central nervous system in perception, interpretation and orofacial organ responses, mechanisms of metabolism and effective target of neurotransmitter in controlling pain, taste, visceral sensation, saliva secretion, and visceral secretion.

603614 Mechanism of Jaw Movement**3(3-0-6)**

An analysis of the mechanisms of the movement of the temporomandibular joint, muscles of mastication, roles of nervous system in controlling movement and malocclusion, roles of neurotransmitter, and muscle dysfunctions.

603615 Biomaterial Science**3(3-0-6)**

Basic composition of biomaterial with emphasis on atoms, molecules, physical structures and properties of metals, ceramics, and polymers; an investigation of the dynamic properties, responses to applied forces of biomaterial; and mechanisms of production and application of environmental toxicology and standardization of biomaterial.

603616 Tissue and Organ Culture in Dentistr**3(2-3-5)**

An in-depth study of the tissues, organs, and whole embryo culture techniques for research in dentistry, principles of material instrument, types of culture media, and equipment for analysis.

603617 Technology in Genetics**3(2-3-5)**

A scrutiny of the principles and techniques in genetics technology; extraction and analysis of DNA, RNA, and proteins; gene cloning, DNA sequencing, gene mapping, and detection of DNA; and RNA and protein at tissues and cellular levels.

603618 Histochemistry**3(2-3-5)**

A study of morphology of cells and tissues of orofacial organs including their chemical properties; selective chemical materials for reactive products to demonstrate histological features of orofacial tissues for research in dentistry.

603619 Writing Scientific Paper**3(1-6-5)**

An in-depth study on the methods of writing a paper for publication in Thai or in English scientific journals, analysis and evaluation of scientific papers, and practice in writing papers with emphasis on dissertations, original articles, case reports, and miscellanies.

603620 Advanced Oral Immunology	3(3-0-6)
Advanced immunology of oral immune defense against oral microbes with emphasis on pathogens causing gingivitis, periodontitis, dental caries, pulpal and periapical tissue infections; transplant immunity, tumor immunity, HIV immunity, immune defects, and immunological techniques.	
603621 Cell and Tissue Engineering in Craniofacial Structure	3(3-0-6)
Basic knowledge in tissue engineering for developing materials that have biocompatibility with stem cells and craniofacial structures such as teeth, jaw bones, periodontium, and oral mucosa.	
603622 Cell Signaling	3(3-0-6)
A study of system communications that regulates basic cellular activities and coordinates cell to cell interactions.	
603623 Genomics Proteomics and Epigenetics	3(3-0-6)
An inquiry on the heritable changes caused by modification of DNA sequences and non DNA sequences.	
603670 Dissertation I, Option 2.1	4 Credits
Identifying the research question; nomination of the supervisory committee to the Graduate School; and submission of the dissertation to the advisors.	
603671 Dissertation II, Option 2.1	8 Credits
Conducting a preliminary research and reporting the research progress to the dissertation advisors.	
603672 Dissertation III, Option 2.1	8 Credits
Conducting an extensive research, submission of the research progress to the dissertation advisors, and passing the dissertation proposal defense examination.	

603673 Dissertation IV, Option 2.1**8 Credits**

Conducting an extensive research and preparation of a scientific manuscript for publication under a standard peer-review process.

603674 Dissertation V, Option 2.1**8 Credits**

Summary of all research data, passing the dissertation defense, compliance with dissertation corrections if any, and submission of the completed dissertation to the Graduate School.

603680 Dissertation I, Option 2.2**3 Credits**

Identifying the research question, nomination of the supervisory committee to the Graduate School; and submission the dissertation to the advisors.

603681 Dissertation II, Option 2.2**8 Credits**

Conducting a preliminary research and reporting the research progress to the dissertation advisors.

603682 Dissertation III, Option 2.2**8 Credits**

Conducting an extensive research, submission of the research progress to the dissertation advisors, and passing the dissertation proposal defense examination.

603683 Dissertation IV, Option 2.2**8 Credits**

Conducting a research report and reporting the research progress to the dissertation advisors.

603684 Dissertation V, Option 2.2**8 Credits**

Conducting a research report and reporting the research progress to the dissertation advisors.

603685 Dissertation VI, Option 2.2**8 Credits**

Conducting an extensive research and preparation of a scientific manuscript for publication under a standard peer-review process.

603686 Dissertation VII, Option 2.2**5 Credits**

Summary of all research data, passing the dissertation defense, compliance with dissertation corrections if any, and submission of the complete dissertation to the Graduate School.

603690 Seminar in Oral Biology I**1(0-2-1)**

Seminar and discussion of advanced knowledge in oral biology, cellular and molecular levels, related research on the dissertation proposal, and research development.

603691 Seminar in Oral Biology II**1(0-2-1)**

Seminar and discussion on selected and current trends in biology which are beneficial for research proposal writing and conducting research.

603692 Seminar in Oral Biology III**1(0-2-1)**

Seminar and discussion on selected topics in biology related to writing the dissertation proposal and conducting research.

603693 Seminar in Oral Biology IV**1(0-2-1)**

Seminar and discussion on selected topics in biology related to writing the dissertation proposal and conducting research.

603694 Seminar in Oral Biology V**1(0-2-1)**

Seminar and discussion of research related to writing the dissertation and planning and writing the expected outcomes of the research.

603695 Seminar in Oral Biology VI**1(0-2-1)**

Seminar and discussion of research related to writing the dissertation and planning and writing the expected outcomes of the research.

603696 Seminar in Oral Biology VII**1(0-2-1)**

Seminar and discussion of research related to writing the dissertation and planning and writing the expected outcomes of the research.

604500 Biostatistics and Computing Skills**3(2-2-5)**

Basic knowledge in statistics, data collection, analysis and interpretation for decision making in dental research, descriptive statistics, hypothesis testing, inferential statistics, choice of statistics, and practices of computer package for statistical analysis.

604504 Research Methodology in Health Sciences**3(3-0-6)**

Definitions, characteristics and goals of research, research methodologies, types of research, determination of research questions, variables and hypothesis, data collection, data analysis, research proposal and research report writing, research evaluation, research applications, ethics in research, and advanced research techniques in health sciences.