

Mission Statement

We are a Catholic institution of learning dedicated to advancing the frontiers of knowledge in the theoretical and applied fields through quality graduate education that is comprehensive and responsive to the needs of society.

We are committed to the formation of scholars and high-quality professionals who are ethical, competent, compassionate, and committed to the service of their respective professions, the church, the nation, and the global community.

Vision Statement

We envision a Graduate School that stands for excellence and innovation and that is globally recognized for its distinct degree programs and quality research outputs.

Goals and Objectives

The Graduate School commits itself to develop:

1. competent professionals who, inspired by the ideals of St. Antoninus of Florence, promote excellence in the production, advancement, and transmission of specialized knowledge and skills in the sciences, the arts, and community service;
2. scholarly researchers and creative thinkers who, kindled by St. Thomas Aquinas' ardour for truth, aspire to become founts of intellectual creativity and, in their quest for quality research, are proficient and critical in assessing and communicating information in various fields that impact the professions, the church, the nation, and the global community;
3. professional Christian leaders who, touched by St. Dominic de Guzman's apostolic fire and warmed by Mary's motherly care, articulate ethics and truth, high level of moral maturity in resolving issues and promoting social justice and compassion for the poor, and care for the environment;
4. globally engaged citizens who, with ardent advocacy for life, promote a deeper understanding of tolerance and justice as well as linguistic, religious, and cultural diversities as a result of precise evaluation of modern problems and inquiries;
5. committed scholars who, nurtured by the dogmas of Christian faith and values, are dedicated to the pursuit of truth through the promotion of an intellectual culture that values academic rigor and freedom of scientific investigations; and

6. lifelong learners who, empowered by St. Antoninus of Florence's zeal for learning, are committed to the advancement of a higher culture through a continuous search for intellectual inquiries and new knowledge as well as faithfulness to Catholic intellectual traditions.

Program Intended Learning Outcomes (PILO)

Upon successful completion of the MS major in Microbiology Program, the graduate will be able to:

1. Exhibit high level of adeptness and expertise in sourcing, interpreting, and conveying both basic and applied microbiological knowledge before a broad range of audience.
2. Demonstrate critical analysis of current microbiological knowledge in duality with specific problems for the generation of new principles evolved thru the rigors of the scientific method.
3. Manifest the mark of a professional as a scientist in the discipline, able to engage with commitment in personal and collaborative life-centered advocacies for the promotion of societal interest anchored in truth and ethical and moral values.
4. Keep abreast with and be sensitive to changes in various aspects of humane relationships in the context of local and global microbiological milieu.
5. Demonstrate in-depth knowledge and functional understanding of microbiological concepts and principles and their application to microbiology-related problems in industrial, medical and research-oriented professions.
6. Demonstrate infinite desire to learn and master new competence and skills, with the end-in-view to their application in the science and technology of the discipline.

CURRICULUM MASTER OF SCIENCE MAJOR IN MICROBIOLOGY

PRE-REQUISITE COURSES: 9 UNITS

GS 500 – St. Thomas and Critical Thinking

ST. THOMAS ON CRITICAL THINKING is a course on Aristotelian and Symbolic Logic that focuses on the fundamental laws of thought. It provides guiding principles in order to enhance critical and reflective skills that would facilitate correct and responsible judgment and reasoning. It gives an opportunity to be in control of one's thinking activities.

MIC 500 – Biostatistics

This is a competency-oriented course which emphasizes both the theoretical and the practical aspects of biostatistics. This course presents fundamental concepts in descriptive biostatistics, exploratory data analysis, and statistical inference, focusing on probability and analysis of one, two, three or more samples. Topics include discrete and continuous probability models; expectation and variance; central limit theorem; inference, including hypothesis testing and confidence for means, proportions, and counts; maximum likelihood estimation; sample size determinations; elementary non-parametric and parametric methods; graphical displays; and data transformations.

MIC 501 – Research Methodology

The course introduces the student to research concepts relevant to the Natural Sciences. Discussions center on the nature and process of scientific inquiry; the ethical and social responsibilities of the research scientist; and the skills required to do meaningful research in the Natural Sciences. The course also guides the student in the preparation of a scientific review paper or a research project.

CORE COURSES: 12 UNITS

MIC 601 – Advanced Microbiology

This lecture and laboratory course presents advanced studies of microorganisms and their role and applications in the environment, in the human society and in our body. It will discuss different groups of microbial life particularly bacteria, their structural and metabolic diversity, their growth and control, and their genetics and evolution. Particular interests will be given to recent techniques and development in this field of study, more specifically in systematics and evolution, physiology, and ecology.

MIC 602 – Microbial Physiology

This lecture course offers a comparative approach to the study of the morphology and function in the different groups of microorganisms.

MIC 603 – Microbial Genetics

This lecture and laboratory course presents advanced studies of the principles of heredity in microbial systems, particularly bacteria, and its application in other fields of microbiology and molecular biology. It will discuss bacterial genetic elements, flow of genetic information, DNA mutations and repair, and current techniques in the study of microbial genomics and evolution.

MIC 604 – Microbial Systematics & Evolution

This lecture course presents advanced studies of microorganisms and their diversity and evolution. It will discuss different groups of microbial life, particularly prokaryotic (bacteria) and eukaryotic (protists, algae, fungi) microorganisms, their genetic and metabolic diversity, and how these are used in their classification, identification and nomenclature.

MAJOR COURSES: 9 UNITS (TRACK-BASED)

1. Basic & Environmental Microbiology

MIC 701 – Virology *

Basic and applied virology and current advances with emphasis on human viruses that are causes of leading viral infections and diseases in the Philippines, epidemiology, immunity, prevention and control.

MIC 702 – Immunology *

Structural, cellular and genetic basis of immune response; basic methods of immunology and immunochemistry.

MIC 703 – Mycology

Survey of the major fungal groups with emphasis on the taxonomy, life histories, developmental morphology, physiology and genetics; economic importance and relationship with other organisms.

MIC 704 – Biology of Myxomycetes *

Advanced studies of myxomycetes and their role and applications in the environment. It will discuss cellular and plasmodial myxomycetes, their growth and life cycles, and their classification, taxonomy and ecology.

MIC 705 – Microbial Ecology

Study of the interaction of microorganisms among themselves and with the various factors in the environment.

MIC 706 – Techniques in Soil/Water Microbiology*

Advanced studies of microorganisms and microbial communities in soil and water habitats and the physical factors affecting their growth. Techniques in bioremediation and solid- and water-waste management will also be discussed.

MIC 711 – Current Topics in Microbiology*

An interactive discussion on current trends and developments in microbiology and other related fields.

2. Industrial & Medical Microbiology

MIC 701 – Virology *

Basic and applied virology and current advances with emphasis on human viruses that are causes of leading viral infections and diseases in the Philippines, epidemiology, immunity, prevention and control.

MIC 702 – Immunology *

Structural, cellular and genetic basis of immune response; basic methods of immunology and immunochemistry.

MIC 707 – Medical Microbiology

The biological properties of pathogenic microorganisms; bacteria, rickettsiae, viruses, actinomycetes and fungi, principles of parasitism; ecology of host-microbe interactions.

MIC 708 – Pharmaceutical Microbiology

A course on the efficacy and safety of consumer preparations and the role of microorganisms: bacteria and fungi in contamination, and quality and safety reduction of these products. It introduces methods to determine preservative efficacy, and of detection, identification, and quantification of contaminating microorganisms and other microbiological analytical systems for cosmetics, pharmaceutical preparations and other consumer products.

MIC 709 – Food and Dairy Microbiology

Major groups of microorganisms associated with foods, their isolation and characterization; the relationship of microorganisms to food manufacture, preservation and processing and to sanitation.

MIC 710 – Microbial Biotechnology

Advanced studies of microorganisms and their application in biotechnology and industrial processes. It will discuss different groups of microbial life, their physiological growth and biotechnological by-products as well as various factors affecting their growth and production. Particular interests will be given

to antibiotic-producing actinomycetes, enzyme-producing fungi, ethanol-producing yeasts and fungi involved in bioremediation.

MIC 711 – Current Topics in Microbiology*

A special course on current trends and developments in microbiology and other related fields.

* No Laboratory

COGNATE COURSES: 3 UNITS

Cell & Molecular Biology, Bioinformatics or any related course that has substantial bearing on Thesis.

OTHER REQUIREMENTS

Written Comprehensive Examinations (WCE)

TW I – 3 units (Thesis Proposal)

TW II – 3 units (Research Colloquium)

TW III – 3 units (Thesis Defense)

Total = 42 Units

Summary of Program Requirements

Degree Requirements	units
Prerequisite Courses	9
Core Courses	12
Specialization Courses	9
Cognate Courses	3
Written Comprehensive Exam	--
Thesis Writing I	3
Thesis Writing II	3
Thesis Writing III	3
TOTAL	42

UST Graduate School Administration Officials and Faculty Set-up

MARILU R. MADRUNIO, Ph.D.
Dean

FR. JOSÉ ANTONIO E. AUREADA, O.P., S.Th.D.
Regent

ALEJANDRO S. BERNARDO, Ph.D.
Faculty Secretary

GRECEBIO JONATHAN D. ALEJANDRO, Dr.rer.nat.
Director for Graduate Research

CHRISTINA A. BINAG, Ph.D.
Program Lead
Natural Sciences

PROFESSORIAL STAFF

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PETER NG, M.D., Ph. D.

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JOHN DONNIE A. RAMOS, Ph. D.



University of Santo Tomas
THE CATHOLIC UNIVERSITY OF THE PHILIPPINES
MANILA, PHILIPPINES
The Graduate School

MASTER OF SCIENCE MAJOR IN
MICROBIOLOGY

AY 2014 - 2017