CURRICULUM
MASTER OF SCIENCE MAJOR IN
MICROBIOLOGY

PRE-REQUISITE COURSES:
UNIT 3:
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.

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 (particular 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 systematic 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.

MICROBIOLOGY:
UNIT 1:
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, immunology, 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 Unit
Cell & Molecular Biology, Bioinformatics or any related course that has substantial bearing on Thesis.

Thesis 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

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<th>Degree Requirements</th>
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<td>Prerequisite Courses</td>
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<tr>
<td>Core Courses</td>
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<tr>
<td>Specialization Courses</td>
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<td>Cognate Courses</td>
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<td>Written Comprehensive Exam</td>
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<td>Thesis Writing I</td>
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