

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:

- 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;
- 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;
- 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;
- 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;
- 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
- 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.

DOCTOR OF PHILOSOPHY MAJOR IN MEDICAL TECHNOLOGY

CORE COURSES: 9 UNITS

Research Management

Research Management course is designed for health professional and research policy developers requiring to further their expertise to support research in the academic sector as well as in clinical practice. Students are expected to design and plan implementation of a research addressing a contemporary healthcare issues and apply research concepts to develop research paper.

Advanced Biostatistics

Advanced Biostatistics course is designed for health professionals to apply advanced biostatistical methods to their public health and clinical research and gain the required statistical skills to write a journal article or a scientific report. The learning method will include formal lectures on the topics, hands-on

problem-solving tutorials and computer laboratory sessions to demonstrate the use of statistical software.

Advanced Chemistry and Immunohistochemistry

The course is an advanced study of the theories and principles of clinical chemistry with emphasis on the correlation of laboratory results and associated disease pathophysiology. It also deals with the current trends of analysis and pathophysiology associated with assays of hormones, therapeutic, and abused drugs. It also includes quality assessment, advanced chemical analyses of body analytes, organ systems, and clinical procedures corresponding to human disease states. It also covers areas unique to clinical chemistry laboratory and professional performance. Moreover, the course also discusses various entities that cause infectious diseases that are identified in formalin-fixed, paraffin-embedded human tissues using primary specific antibodies and immunohistochemical, enhancement techniques, alternative methodologies, and procedures.

Molecular Biochemistry

An advanced course in molecular biology and biochemistry with focus and emphasis on understanding the experimental approaches which have led to recent developments and advancements in the field. Topics include chromosome structure and organization, RNA transcription, selected aspects of the molecular regulation of gene expression, protein synthesis and post-translational regulation, DNA synthesis, repair, and recombination. The course also covers several advanced topics in biochemistry as well as experimental approaches to biological problems.

Philosophy and Ethics in Medical Technology Practice

This course analyzes the important role of ethics in the practice of medical technology and in health technology assessment. It also discusses comprehensive approaches of technology as applied in medical laboratory science/medical technology practice, technical and non-technical issues, and morally problematic issues and implications of technologies.

MAJOR/SPECIALIZATION COURSES: 15 UNITS

Advanced Clinical Toxicology

This course deals with the advanced understanding of toxicology in the occupational environment which includes analysis of target organs, adverse health effects, the systems/organs that are the targets of toxicants and assessments of safety and risk of carcinogenic and non-carcinogenic chemicals.

MT 801 - Advanced Endocrinology – 3 units

This is an advanced course which provides an integrated approach to biochemistry, molecular biology, physiology, pharmacology, and pathology of the endocrine system. Secretion and physiological roles of blood-borne and local hormone mediators, molecular signaling systems, and other mechanisms used by hormones to regulate cell growth, metabolism, reproduction, and other functions are also discussed. The course focuses on selected topics in endocrinology such as the emergence of endocrinology and hormones, evolution of ligand-receptor combinations, ligand exploitation theory and steroid hormone signalling, novel thyroid hormone metabolites and functions, interactions between regulatory systems, endocrines and the nervous system in the digestive tract, endocrines and the immune system: chemokines and cytokines, complexity in endocrine signalling, CRH/ACTH system, melanocortin receptor family, power of comparative endocrinology, PTHrP/PTH, novel hormones: leptin and adipose tissue as an endocrine source.

MT 803 - Current Trends in Clinical Chemistry

The course provides a thorough discussion of timely and relevant topics in clinical chemistry, with emphasis on the interplay between the analytical tools and the clinical information that the clinical tools can provide. The course is offered in a seminar format with the application of some of the new technologies in the laboratory. The laboratory part offers a hands-on experience on the use of current and modern technology in clinical chemistry. As the students develop their skills in the use of advanced technologies in clinical chemistry, they are expected to be able to apply these in the real world-setting.

MT 805 - Advanced Histochemistry and Immunohistochemistry

The course provides a thorough discussion of the types of mucopolysaccharides, proteins and lipids, and enzymes as well as their features and roles in cells and tissues both in the normal and pathological conditions. The course also covers histochemical and immunohistochemical methods (molecular weight sieves, ionexchange chromatography, affinity chromatography, gel precipitation reactions, enzymatic cleavage of antibodies, labeling of antibodies and enzyme immunoassay procedures) to differentiate between types of enzymes, metal, and pigments, and their features in normal and pathological conditions. The students are expected to gain advanced understanding and apply the different methods learned in actual practice.

MT 807 - Microbial Pathogenesis

The course focuses on the molecular and structural principles by which microbes cause disease. It also deals with the analysis of the structural interactions important for microbial pathogenesis and discusses seminal discoveries pertaining to microbial pathogenesis.

MT 808 - Current Trends in Clinical Microbiology

This is a comprehensive course that covers major groups of pathogenic bacteria, fungi, parasites, and mycobacteria. Correct safety procedures, current technological trends in clinical bacteriology related to laboratory automation, high-level information availability, the use and application of antibiotics, antimicrobial susceptibility, epidemiological typing, human parasitic infections, and mycobacterial diseases will also be explored. The students are expected to acquire advanced knowledge regarding the different concepts of clinical microbiology and apply this in medical technology practice.

MT 810 - Molecular Microbiology

The course deals with the intricate bacterial and fungal genetic pathways from a molecular perspective and how this is associated to their cellular biology, environmental survival strategies, and relationship to human infection and treatment of diseases. The course also focuses on the use of these molecular processes through advanced techniques and how these can be utilized for human, societal, environmental, and industrial benefits. Topics such as modern methods of genetic manipulation, environmental sensing, signal transduction, regulation of gene expression, bacterial physiology are also explored.

MT 811 - Advanced Clinical Laboratory Techniques

This course focuses on current trends in laboratory operations, management, equipment, instrumentation, quality control techniques, and safety procedures done in a clinical laboratory. The course addresses identified skills, knowledge, attitudes, and behaviors pertinent to medical technology practice.

MT 812 - Laboratory Informatics and Health Information System

This course deals with the responsible selection and application of Laboratory Information Systems and information technology for the coordination and interface in the different sections and departments of a clinical laboratory for the optimization of laboratory operations. The usefulness of charting, graphing, database analyses, and online services as well as problems concerning needs analysis, cost, and value of the system and communication through computer technology are also tackled. Discussions on the Health Information Management and its roles in healthcare delivery systems. Standards, regulations and initiatives, payment and reimbursement systems, health care

providers, and disciplines as well as electronic health records are also discussed in the course. The students will be able to apply the knowledge and skills learned from the course in the various processes involved in health information management.

MT 813 - Immunology in Health and Disease

This course build on a series of lectures with emphasis on current areas of research that explores clinical immunology, dysfunctions of the immune system and immunity in terms of host-pathogen interactions. This course provides a strong focus on significant clinical problems in immunology. Research and lectures covering topics such as allergy, immunodeficiency, autoimmune disease, and transplantation. Various cellular, autocrine, and exocrine interactions that serve to regulate immunity, receptor-mediated triggering of cellular responses via second messengers, cellular, humoral, and effector mechanisms, tumor immunology, immunotherapy, and tumor vaccines will also be tackled. Topics that will receive extended coverage will include advanced immunological mechanisms, immunopathology of disease, and manipulation of the immune system to protect and fight against infectious and non-infectious diseases. Paper critiquing and project assignment work will reinforce concepts discussed in the course. The students will acquire a deep understanding of the immunological concepts and how these can help explain and be applied in clinical cases.

MT 815 - Current Trends in Immunoematology

This is a comprehensive course on current trends related to laboratory and clinical practice in Immunology, Blood Banking, Transfusion Medicine, and Organ Transplantation. This course reviews blood donation process, testing, safety of blood supply, preparation of blood components, storage requirements and appropriate use for the blood components. It also tackles the need for special blood products in emergency and unique situations. Organ transplantation related topics such as overview of HLA, stem cell collection for transplantation; solid organ transplantation and transfusion support during transplants will also be covered. The laboratory part will provide a hands-on experience on current equipment, methods, and technique used in blood banking. The students will be able to apply the knowledge and skills learned from this course inn doing actual blood banking procedures.

MT 816 - Biomedical Engineering

This course integrates physical, mathematical, and computational sciences to develop innovative biologies, materials, implants, devices, and informatics for the prevention, diagnosis, treatment of diseases, and improving health in general. It covers assistive technology which is the research and design of new technologies; bioelectronics which puts emphasis on human-computer interaction system; biomaterials which deals with the synthesis, characterization, and application of biologicals; biomolecular engineering which focuses on the fundamental interactions between molecules, either in isolation or within the cell; and cancer research.

MT 817 - Quality Management in the Clinical Laboratory

This course deals with the implementation of quality improvement principles for the clinical laboratory. It begins with a discussion of quality assurance, the teamwork approach to quality improvement measures. It also explores the discussion of actual case situations through the use of clinical practice guidelines that help to understand the nature of disease processes and outcomes of early intervention. It draws on the experience in the clinical laboratory and provides the students with skills and the ability to evaluate accreditation processes and results. The students are expected to be able to apply and implement quality improvement and quality assurance in the place of work.

MT 818 – Current Trends in Diagnostic Parasitology

This course is intended to introduce advances in the detection of parasites of medical importance. Emphasis is on phenotypic and genotypic as methods of identifying parasites morphology of protozoa and helminths causing human disease, in addition to pathological processes caused by these parasites. Special attention is given to life cycle and methods used in collection and examination

of specimens used for the novel and gold standards in the diagnosis of parasitic diseases.

Dynamics of Clinical Laboratory Management

This course provides coverage of clinical laboratory management as well as managerial leadership skills, personnel management, information management, and regulatory management. The management of valuable administrative resources and ethical aspects and issues in a clinical laboratory are also tackled. Discussions are based on both ISO 15189 and CLSI GP26-A3 documents.

Laboratory Informatics and Health Information System

This course deals with the responsible selection and application of Laboratory Information Systems and information technology for the coordination and interface in the different sections and departments of a clinical laboratory for the optimization of laboratory operations. The usefulness of charting, graphing, database analyses, and online services as well as problems concerning needs analysis, cost, and value of the system and communication through computer technology are also tackled. Discussions on the Health Information Management and its roles in healthcare delivery systems. Standards, regulations and initiatives, payment and reimbursement systems, health care providers, and disciplines as well as electronic health records are also discussed in the course. The students will be able to apply the knowledge and skills learned from the course in the various processes involved in health information management.

COGNATE COURSES: 6 UNITS

Any related course that has substantial bearing on the thesis which is subject to approval by the Program Lead.

Advanced Pharmacology

The course focuses on the role of medical technologists in applying pharmacotherapeutics to the management of health and illness in populations at risk for morbidity and mortality including advanced knowledge of monitoring pharmaceutical and alternative therapeutic agents. Emphasis is placed on synthesis of pharmacokinetics and pharmacodynamics principles for the prevention and treatment of acute and chronic illnesses. Evidence-based outcomes, consensus guidelines, and research studies are critiqued. Ethical, legal, and risk-management issues are discussed. The students are expected to be able to apply knowledge in the monitoring of pharmaceutical and therapeutic agents in diseased states as applied in community and public health.

MT 802 – Cancer Biology and Tumor Markers

This course primarily aims to provide graduate students with a more profound understanding of the nature of cancer at the cellular and molecular level and the impact of applied or translational research in designing novel cancer detection and targeted treatment methods. Discussions and laboratory experiments will focus on the deregulation of essential biological properties such as programmed cell death, cell proliferation, and differentiation; the cellular and molecular hallmarks of cancer and their detection and treatment, and the challenges associated with diagnosing cancers.

MT 804 – Therapeutic Drug Monitoring

Therapeutic drug monitoring provides a rigorous yet practical approach for the application of pharmacokinetic methods, pharmacodynamic principles, and relevant pharmacotherapeutic data to optimize drug therapy for individual patients. It aims to promote optimum drug treatment by maintaining serum drug concentration within a therapeutic range.

MT 806 – Microbial Genetics

The course deals with advanced concepts of microbial genetics, bacterial genomes and functions, microbial replication, transcription and translation, microbial gene organization, operon, plasmid, transduction, transposition, transformation, conjugation, DNA mutation and DNA repair.

MT 814 – Medical Forensics

This course deals with the application of techniques in Medical Laboratory Science/Medical Technology in aid of proper legal proceedings through valid and accurate laboratory diagnosis. The course explores the history and future of forensic medicine, use of libraries and IT resources as well as legal and investigative research skills. It also covers substance abuse and misuse, mental health, deaths, injuries, scene of crime and investigation, forensic science, drugs and alcohol, adult and child sexual offenses, domestic violence, vulnerable witnesses, infectious diseases, occupational and public health as well as the law and legislation, legal implications, ethical aspects of medical forensics and the important and vital roles that medical technologists/medical laboratory scientists play in medical forensics. The students are expected to be able to explain and apply the knowledge and skills gained from the course in relation to laboratory work.

MT 809 – Advanced Analytical Microbiology

This course deals with processes, methodologies, developments, and approaches involved in microbiological, antibiotic, amino acid assays, and dilution methods. The most widely applied instrumental chemical techniques such as gas chromatography, mass spectrophotometry, high performance liquid chromatography, as well as the GG-MS, HPLC-MS, and MS-MS in the identification of monomers, oligomers, or polymers derived from microorganisms are also covered. The benefits from the information derived from these analyses in medicine, ecology, biotechnology, pharmaceutical industry, and food industry will also be tackled. The students are expected to be able to apply the skills learned in doing microbiological procedures.

OTHER REQUIREMENTS:

MT 819 – Graduate Seminar – 3 Units

The course facilitates widening of graduate students’ perspectives and awareness regarding relevant topics of interest in Medical Technology through seminars and special lectures offered by faculty, visiting professors, and invited guests from industry, government, business and academia.

MT 820 – Medical Technology Field Research – 5 Units

This course is research based and geared to produce outputs related to the field of specialization of the candidate. The field research can be done in any partner institution, research center, and university local and international which is duly approved by the Program Lead for Medical Technology of the UST Graduate School.

TERMINAL REQUIREMENTS:

Written Comprehensive Examinations (WCE)
Dissertation Writing I
Dissertation Writing II
Dissertation Writing III
Dissertation Writing IV

Total = 50 Units

Summary of Program Requirements

Degree Requirements	units
Core Courses	9
Specialization/Major Courses	15
Cognate Courses	6
Graduate Seminar	3
Field Research (Output Based)	5
Written Comprehensive Exam	—
Dissertation Writing I	6
Dissertation Writing II	
Dissertation Writing III	3
Dissertation Writing IV	3
TOTAL	50

UST Graduate School Administration
Officials and Faculty Set-up

MICHAEL ANTHONY C. VASCO, PH.D.
Dean

FR. RODEL E. ALIGAN, O.P.
Regent

CAMILLA J. VIZCONDE, PH.D.
Assistant Dean

ELIZABETH HASHIM-ARENAS, PH.D.
Faculty Secretary

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

ALETH THERESE L. DACANAY, Ph.D.
Program Lead
Pharmacy & Medical Technology

PROFESSORIAL STAFF

PIA S.P. ALBANO, PH.D.
LEILANI B. ASIS, PH.D.
SUPACHAI A. BASIT, PH.D.
MINERVA P. CALIMAG, PH.D.
MINERVA L. DAYA, PH.D.
THOMAS EDISON E. DELA CRUZ, PH.D.
KULACHART JANGPATARAPONGSA, PH.D.
MA. FRIEDA Z. HAPAN, PH.D.
EDILBERTO P. MANAHAN, PH.D.
ROBERTO G. MANAOIS, PH.D.
GREGORIO L. MARTIN I, PH.D.
MARIA RUTH B. PINEDA-CORTELL, PH.D.
JOHN DONNIE A. RAMOS, PH.D.
LIBRADO A. SANTIAGO, PH.D.
ROZZ D. VASQUEZ, PH.D.
OLIVER B. VILLAFLORES, PH.D.



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

DOCTOR OF PHILOSOPHY MAJOR IN

Medical Technology