

GRADUATE SCHOOL MISSION STATEMENT

We are a Catholic institution 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 level professionals who are ethical, competent, compassionate and committed to the service of the Church, the Nation and the Global Community.

GRADUATE SCHOOL VISION STATEMENT

We envision a Graduate School that stands for excellence and innovation and that will be globally identified for the distinction of its programs and quality of its research.

GRADUATE SCHOOL GOALS

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 fountains 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.

Program Intended Learning Outcomes (PILO)

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

1. Demonstrate higher order level of skills in analyzing, assessing and communication information in the relevant experimental, theoretical and empirical aspects of chemistry.
2. Demonstrate skills of critical inquiry and creative approaches in the conduct of experimental chemistry researches.
3. Demonstrate the ability to lead and work independently and collaboratively with others and in exercising integrity, responsible conduct and ethical actions in resolving issues in the discovery, validation and dissemination of new knowledge.
4. Demonstrate global awareness and understanding of the diversities of broaden professional foundations in chemical science.
5. Demonstrate updated and in-depth professional and functioning knowledge of chemistry and applying theory to practice across levels and disciplines.
6. Demonstrate initiatives and self-direction to advance one's knowledge and skills in using advanced and emerging chemical information technology tools beyond the program requirements.

CURRICULUM

MASTER OF SCIENCE MAJOR IN CHEMISTRY

PRE-REQUISITE COURSES: 3 UNITS

GS 500 - St. Thomas on 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.

CORE COURSES: 15 UNITS

CHEM 610 - Advanced Inorganic Chemistry

Advanced treatment of atomic and molecular structure, acid-base theories and non-aqueous solvents. Coordination chemistry; theories and application to transition metal compounds.

CHEM 620 - Advanced Organic Chemistry

This course offers an advanced treatment of the principles and application of structure and theory of organic chemistry with emphasis on reaction mechanism. The discussions focus on the chemistry of reactive intermediates, the chemistry of concerted reactions and selected topics in organometallic chemistry.

CHEM 630 - Advanced Analytical Chemistry

Principles of instrumentation and of the instrumental methods of analysis. Principles of analytical chemistry: sampling, measurement, calibration, statistical analysis of results. Introduction to chemometrics.

CHEM 650 - Advanced Physical Chemistry

A course on chemical thermodynamics – the laws and their application in phase and chemical equilibria and in electrochemical cells.

CHEM 660 - Advanced Biochemistry

This course covers in detail the molecular basis of life, which includes the chemistry of biomolecules, structure function relationship, transformation of matter and energy, storage of genetic information, accession and manipulation.

MAJOR COURSES: 9 UNITS

CHEM 721 - Spectroscopic Techniques in Organic Chemistry

A competency-oriented course which emphasizes the principles and applications of Ultraviolet (UV) spectroscopy, Infrared (IR) spectroscopy, Mass Spectrometry (MS), and ¹H and ¹³C- Nuclear Magnetic Resonance (NMR) spectroscopy in the determination of the structure of organic compounds.

CHEM 722 - Chemistry of Natural Products

Classification, structures, properties, reactions and biosynthesis of secondary metabolites: terpenoids, steroids, alkaloids, flavanoids, glycosides and others.

CHEM 723 - Organic Synthesis w/ Lab

This course underscores the study of the basic principles and strategies in the synthesis of organic compounds, with emphasis on mechanistic transformations. In tandem with a laboratory component, this coursework brings together the traditional and the new based on synthetic pathways involving newer synthon-disconnection approaches.

CHEM 724 - Current Topics in Organic Chemistry

Special topics in the recent developments in organic chemistry.

CHEM 731 - Optical Methods of Analysis

Principles, instrumentation and application of atomic and molecular spectroscopic methods of chemical analysis: absorption, emission, luminescence, scattering methods.

CHEM 732 - Chromatographic Methods of Analysis

This course will cover theoretical and practical aspects of chromatographic methods of separation and application of chromatographic methods to the quantitative separation and analysis of selected chemical systems. The fundamentals of gas and liquid chromatography, related instrumentation will be given emphasis.

CHEM 733 - Electroanalytical Chemistry w/ Lab

The course covers the analytical principles that are the bases of measurements of electrical properties, like voltage, current and charge. The types of electrochemical methods, namely Potentiometry, Voltammetry, Coulometry and Electrogravimetry are discussed. The importance, characteristics and applications of these electroanalytical methods are integrated.

CHEM 734 - Current Topics in Analytical Chemistry

Special topics in recent trends in analytical chemistry, such as chemical sensors and biosensors.

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 = 36 Units

SUMMARY OF COURSE REQUIREMENTS

Requirements	M.S. units
Pre-requisites	3
Core Subjects	15
Major Subjects	9
Thesis Writing I	3
Thesis Writing II	3
Thesis Writing III	3
TOTAL	36

SCHOOL CALENDAR

The University of Santo Tomas follows an Academic Year Calendar of two (2) terms and a special term.

Special Term: June - July

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PROFESSORIAL STAFF

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

Master of Science major in
CHEMISTRY