

### 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

To realize this mission-vision, the Graduate School commits itself within the next five (5) years:

- To develop the intellect and creativity through excellence in instruction, research, and extension work.
- To form scholars and high level professionals in the arts and humanities, the natural and allied health sciences, the social and management sciences who are ethical and who demonstrate competencies functional in both the local and global workplace.
- To hone the professional and social skills, and critical capabilities of students enabling them to become responsible leaders in their careers and community.
- To provide students opportunities to serve the larger community through extension work and community service.
- To produce quality research in the various fields of knowledge that is internationally recognized.

- To recruit Faculty who are acknowledged experts in the field and to complement the teaching staff by inviting international scholars in the various disciplines.
- To build partnerships and linkages between the Graduate School and academic institutions, industry and government entities at the local and international level.
- To enhance the image and visibility of the Graduate School and its work in both the local and global community.

### APPLICATION PROCEDURES

- A. Application for admission to the UST Graduate School is until October 15 for October enrollees, April 5 for Summer enrollees and May 25 for June enrollees.
- B. Application forms for Admission are available at the UST Graduate School, UST Admissions Office & at the UST Graduate School Web Site – <http://www.ust.edu.ph>

### REQUIREMENTS:

Certified true copy of Transcript of Records, one (1) colored passport size, recent photo (if any) document(s) attesting to passing a Bar/Board Exam, or being a scholar of any agency.  
Two (2) Referral Forms: One(1) for the current (immediate) superior (or Dean, in the case of a school); and the other, for the professor in one specialization (major) subject.

### For Foreigners:

**All of the above and;**  
TOEFL English Proficiency and Student Visa Requirements.

### ADMISSION REQUIREMENTS

1. Bachelor's Degree in Chemistry or related courses with a general average of at least 2.0/85% or B.
2. Complete accomplished application and referral forms.

### PHILOSOPHY & OBJECTIVES

The graduate program in the Sciences are designed to nurture graduates committed to the advancement of scientific knowledge and research.

Consistent with this philosophy, the Master of Science programs aim to

- a. hone the critical capabilities of students for scientific inquiry by producing quality research that is globally recognized,
- b. contribute to the development of high level Science and Technology manpower in the country.

### CURRICULUM

#### **MASTER OF SCIENCE MAJOR IN CHEMISTRY**

#### **PRE-REQUISITE SUBJECTS: 6 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.

#### **GS 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 SUBJECTS: 12 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 of organic chemistry with emphasis on

mechanism and synthesis. The discussions focus on the chemistry of carbanions and carbocations, 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 SUBJECTS : 12 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 <sup>1</sup>H and <sup>13</sup>C 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**

A competency-oriented course that underscores the study of the basic principles and strategies in the synthesis of organic compounds, as well as the advanced treatment of the principles of organic chemistry with emphasis on mechanism and synthesis. Focus is on the carbanion and carbonium ion chemistry, organometallic chemistry, and

chemistry of concerted reactions. This course brings together the traditional and the new by combining the approach based on synthetic methods involving the more recent synthon-disconnection ideas.

#### 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

Chromatographic methods of analysis.

#### CHEM 733 - Electroanalytical Chemistry w/ Lab

The course covers the principles of analytical that bring about measurements of electrical properties, like voltage, current and coulomb. The types of electrochemical methods, namely Potentiometry, Voltammetry, Coulometry and Electro gravity are discussed. The importance, sensitivity and applications of these electro analytical methods are integrated.

#### CHEM 734 - Current Topics in Analytical Chemistry

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

#### CHEM 761 - Molecular Biotechnology

Biochemistry of important biotechnology methods, such as DNA technology and genetic engineering, environmental remediation, molecular diagnosis.

#### CHEM 762 - Bio-Inorganic and Bio-Organic Mechanisms

Study of biological systems from the view of organic and inorganic chemical theories.

#### CHEM 763 - Current Topics in Biomolecular Science

#### CHEM 771 - Environmental Chemistry

The course introduces the student to the scientific principles and processes that govern the behavior of chemical species in the air, water and soil

environments and the influence of human activities on these processes

#### CHEM 781 - Special Topics

##### COGNATE SUBJECTS: 3 UNITS

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

##### UST GRADUATE SCHOOL ADMINISTRATION OFFICIALS AND FACULTY SET-UP

LILIAN J. SISON, Ph.D.  
*Dean*

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

MICHAEL ANTHONY C. VASCO, Ph.D.  
*Faculty Secretary*

CARLOS P. GARCIA, Ph.D.  
*Director for Graduate Research*

GRECEBIO JONATHAN ALEJANDRO, Ph.D.  
*Supervising Scientist, Science Laboratories*

ROMUALDO DEL ROSARIO, Ph.D.  
*Supervising Scientist, UST Botanical Garden*

FORTUNATO SEVILLA, III, Ph.D.  
*Consultant for Biology, Chemistry,  
Microbiology & Mathematics*

##### PROFESSORIAL STAFF

ALICIA AGUINALDO, Ph.D.  
ARISTEA BAYQUEN, Ph.D.  
CHRISTINA BINAG, Ph.D.

BENILDA EBARVIA, Ph.D.  
CORAZON MENGUITO, Ph.D.  
MARIBEL NONATO, Ph.D.  
MA. CRISTINA R. RAMOS, Ph.D.  
FORTUNATO SEVILLA, Ph.D.  
LILIAN SISON, Ph.D.  
BERNARDO TONGOL, Ph.D.  
MAFEL YSRAEL, Ph.D.

##### SUMMARY OF COURSE REQUIREMENTS

Requirements	M.A. units
Pre-requisites	6
Core Subjects	12
Major Subjects	12
Cognates	3
Thesis Writing I	3
Thesis Writing II	3
Thesis Writing III	3
<b>TOTAL</b>	<b>42</b>

##### SCHOOL CALENDAR

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

Summer Term: April-May

For further information, please call,  
Tele-Fax: (632) 740-9732 or  
Tel. No. (632) 786-1611 loc 8247; 731-5396  
Web-http://graduateschool.ust.edu.ph  
E-mail: odgs@mnl.ust.edu.ph  
or write to:

The Dean/Faculty Secretary  
UST Graduate School  
España, Manila, Philippines 1008

University of Santo Tomas

GRADUATE SCHOOL



GRADUATE PROGRAM

AY 2006 – AY 2011

Master of Science  
major in  
Chemistry

España, Manila