

## RATIONALE

**Food science** is a discipline concerned with all technical aspects of food. It is a highly interdisciplinary applied science and incorporate concepts from many different fields including microbiology, chemical engineering, chemistry, biochemistry, and many others.

Food science includes the development of new food products, design of processes to produce these foods, choice of packaging materials, shelf-life studies, sensory evaluation of the product with trained expert panels or potential consumers, as well as microbiological, chemical testing and production of particular food product and its properties.

The graduate program leading to Master of Science major in Food Science is designed to produce leadership and research positions in the food sectors, food projects of the government, private institution and the food industry. This program will focus on recent trends in the food industry such as functional foods, nutraceuticals, molecular gastronomy, innovative culinary technology and food tourism.

## 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 Food Science, Food Technology, Nutrition, Dietetics, Home Economics, Chemistry, Chemical Engineering, Biological Sciences, Agriculture, Hotel and Restaurant Services or related courses with a general average of at least 2.0/85% or B.
2. Complete accomplished application and referral forms.

## PHILOSOPHY OF OBJECTIVES

The graduate program in the Sciences is 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. Contributes to the development of high level Science and Technology manpower in the country.

## CURRICULUM

### **MASTER OF SCIENCE MAJOR IN FOOD SCIENCE**

#### 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

##### **FT 610 – Advanced Food Processing**

Theoretical and practical consideration in the processing of selected foods. Biochemical characteristics, functions, regulation and impact of components in raw and processed foods of plant origin. Fundamentals and commercial practice of heat treatment, drying, freezing, canning, irradiation, and microwaves.

##### **FT 620 – Food Engineering**

Application of engineering principles applied to food processing. Relationship of Newtonian and non-

Newtonian fluid properties to heat and momentum transfer. Application of mass transfer in controlling kinetics and quality changes of foods.

##### **FT 630 – Advanced Food Analysis**

Physical and chemical methods in the analysis of foods. It covers the application of chemical analysis techniques to food. Food composition analysis (lipids, proteins, carbohydrates) and measurements of chemical reactions in foods (browning, lipid oxidation, starch hydrolysis, protein denaturation) are studied. It also focuses upon the maintenance of food quality during processing and storage.

##### **FT 640 – Advanced Food Microbiology**

Discusses factors affecting microbial growth in foods. It covers methods of enumeration of food-borne pathogens and their control, microbial spoilage, foods and ingredients from fermentation, the microbiology of food and beverage fermentations, and sanitation and HACCP in processing. Significance of microbial spoilage of food products, detection methods, and preservation by canning, drying, fermentation, freezing, additives and radiation.

##### **FT 650 – Advanced Food Chemistry**

Covers chemical and physical behaviour of food constituents and application of physicochemical principles to processed food systems. It also covers the chemical properties of food constituents as influenced by processing and storage. Include topics on water, carbohydrates, lipids, proteins, vitamins, and minerals in foods; biochemical and functional properties, enzymes, food additives (emulsifiers, pigments, colors, flavors, preservatives, and sweeteners) and texture as related to properties in food systems and during processing.

#### MAJOR SUBJECTS : 12 UNITS (TRACK-BASED)

##### **FT 711 – Nutrition Impacts of Food Processing Methods**

Covers the effect of processing on foods emphasizing nutritional and chemical aspects. Includes synthetic foods, food additives, current food processing methods, nutrition policy, consumer dietary patterns, and food production trends. Changes in proteins, nutrients, toxic constituents, and other compounds during storage, heating, freezing,

dehydrating, and concentrating of food materials. It also covers the physiological mechanism involved in thirst and appetite, digestion, absorption, utilization of nutrients, respiration, and body temperature regulation.

#### **FT 716 – Functional Foods and Nutraceuticals**

Innovation and recent advances in functional, health foods and nutraceuticals. It covers health benefit of foods, prevention and health enhancing compounds contained in many foods. Understanding how diet affects disease, and aging. Potential market for functional foods and natural health products. Explore partnership and research opportunities, regulations and development of functional foods and nutraceuticals.

#### **FT 721 – Fruits and Vegetables Processing**

Principles underlying newer techniques of processing tropical fruits and vegetables. Fruit and vegetable composition and quality indices. Harvest technology, postharvest physiology, and preparatory systems. Principles and application of thermal processing, freezing, transport, storage and specialized techniques.

#### **FT 731 – Molecular Gastronomy and Food Tourism**

Covers the application of scientific principles to the understanding and improvement of domestic and gastronomic food phenomena, scientific study of deliciousness, choosing, preparing and eating good food. It also includes investigation on the social phenomena linked to culinary activity. Understanding of the food tourism experience; and discuss core issues that confront both the operation and development of food tourism businesses.

#### **FT 736 – Sensory Evaluation of Foods**

Principles and procedures for sensory evaluation of food, methods of test analyses, panel selection and training, taste sensation theory, consumer testing methods. Appropriate uses of specific tests are discussed, along with physiological, psychological, and environmental factors affecting sensory verdicts. Principles of measurement of color, texture, and flavour of foods by sensory and instrumental methods. Advanced statistical analysis of relationship of processes food parameters to perception of appearance, texture, and flavour.

#### **FT 741 – Food Packaging and Shelf-Life Evaluation**

Study of food packaging and its multiple roles in protecting packaged food and beverage products and facilitating distribution and communication with retailers, consumers, and users. Study of the relationship between food packaging and health, safety, and economic well-being. Use of technology and its integration with products, distribution, and marketing. Advanced study of shelf life evaluation of foods.

#### **FT 751 – Food Quality Assurance Management**

Principles and applications of Hazard Analysis Critical Control Points. Statistical tools for the control and improvement of food quality and method validation. Definition of grades and standards of quality by chemical, physical, and sensory techniques.

#### **FT 756 – Meat and Seafood Processing**

Advanced study of meat and seafood processing technology. Covers food handling and safety practices in meat and seafood industry; freezing canning, packaging; mixing/blending process; extrusion; heat treatment; and retort process operation.

#### **FT 771 – Current Topics in Food Science**

Covers current topics of interest in food science.

#### **FT 781 – Special Topics**

Formal courses given on a topical or special interest subject who may be offered infrequently; several different topics may be taught in one year or semester.

#### **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**

MARILU R. MADRUNIO, Ph.D.  
**Dean**

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**

ERIC B. ZERRUDO, MA  
**Director, Center for Conservation of Cultural Property and Environment in the Tropics**

SUSAN F. BALDIA, Ph.D.  
**Supervising Scientist, Science Laboratories**

OPHELIA S. LAURENTE, MS  
**Supervising Scientist, UST Botanical Garden**

CRISTINA A. BINAG, Ph.D.  
**Program Lead, Sciences**

#### **PROFESSORIAL STAFF**

JOSÉ ANTONIO E. AUREADA, O.P., S.Th.D.  
EUFEMIO G. BARCELON, Ph.D.  
SONIA DE LEON, Ph.D.  
PHILIPINA A. MARCELO, Ph.D.  
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LUTGARDA PALOMAR, Ph.D.  
JOSE PERALTA, Ph.D.  
CAMILO POLINGA, Ph.D.  
ROSARIO SAGUM, Ph.D.  
TRINIDAD P. TRINIDAD, Ph.D.

UNIVERSITY OF SANTO TOMAS  
THE CATHOLIC UNIVERSITY OF THE PHILIPPINES  
MANILA, PHILIPPINES  
**THE GRADUATE SCHOOL**



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