

DESCRIPTION OF GRADUATE COURSES

FDE 500 M.S. Thesis NC

Program of research leading to M.S. degree, arranged between student and a faculty member. Students must start registering to this course no later than second semester of the program and do so in all semesters while the research program or write-up thesis is in progress.

FDE 508 Microbial Genotyping in Food Microbiology(3-0)3

Basics of molecular methods; Genotyping of foodborne pathogens; DNA sequence databases used in food microbiology; Applications of subtyping methods in food microbiology; Epidemiology in food science; Case control studies in foodborne outbreaks

FDE 510 Total Quality Management for the Food Industry (3-0)3

The philosophy and importance of Total Quality Management in food industry. Application of its tools and techniques: Quality Function Deployment, Benchmarking, Continuous Improvement, Deming Cycle, Statistical Process Control as well as Hazard Analysis and Critical Control Points to dairy, fermentation, meat and beverage industries. TQM applications in novel food processing techniques. Comparative study on real-life situations and problems in a typical food plant.

FDE 511 Non-Thermal Processing Technology in Food Industry (3-0)3

Principles of non-thermal processing foods. High hydrostatic (HHP), Pulsed Electric Field (PEF), Pulsed Light and Ozone applications. The theory of engineering systems and effects on microbiological, structural and biochemical systems of foods. Quality and shelf-life evaluations.

FDE 515 Enzyme Engineering (3-0)3

A biochemical engineering course on the production, purification and use of enzymes. The application of enzymatic processes in the food, pharmaceutical and chemical industries. The engineering principles involved in the analytical and industrial use of the immobilized enzymes.

FDE 516 Magnetic Resonance in Food Science (3-0)3

Understanding the physicochemical aspects of food systems by using Magnetic Resonance. NMR Relaxation phenomena and imaging sequences. Introduction to 1D and 2D NMR Relaxometry: T1, T2 Diffusion, T1-T2, T2-D, T2-T2 analysis. Applications of magnetic resonance imaging and NMR Relaxometry to food systems. Applications related to fruits and vegetables meats, dairy products, cereals, food emulsions and food rheology.

FDE 519 Transport Phenomena in Food Engineering (3-0)3

Microscopic and macroscopic balances for momentum, energy and mass transport. Solutions of the equations for rheological systems with emphasis on food materials.

FDE 525 Kinetic Analysis of the Glycolytic Pathway of Fungi (3-0)3

Understanding the most common pathways in nature through a better known organism, yeast. The enzymatic structure of the pathway. Modeling of the pathway through kinetics of the individual enzymes. The implications in the wine, beer and industrial alcohol production and bakers yeast production. Review of information in how the process is controlled by the inherent yeast mechanisms and how these mechanisms are utilized for the above mentioned processes.

FDE 561 Food Engineering Analysis (3-0)3

Formulation of mathematical models describing food processing operations. Applications of numerical differentiation, integration; finite differences and regression analysis of food engineering problems.

FDE 570 Research Methods & Ethics in Food Engineering NC

Introduction to the scientific research and ethical behavior. carrying out literature search and acquiring knowledge from scientific articles. Formulating research goals and making a plan to reach these goals. Writing an independent research proposal. Ethical behavior in research process and in presentation of results. Quality in research and ability to reason in critical manner. Quality control and improving the knowledge in scientific literature in a specific research area.

FDE 571 Advanced Food Biochemistry (3-0)3

Advanced food chemistry with emphasis on proteins and enzymes. Protein interactions and their effect on the physical and chemical characteristics of foods. Preparation and kinetic properties of enzymes and their uses.

FDE 572 Advanced Food Microbiology (3-0)3

The interaction of microorganisms in foods and their role in food spoilage and bioprocessing. Bacterial sporulation, germination and physiological properties of bacterial spores and food safety.

FDE 576 Industrial Microbiology (3-0)3

Microbial processes involved in food and pharmaceutical processes, such as amino acids, nucleotides, vitamins, enzymes, antibiotics. Regulation of cellular activity. Molecular strain improvement technologies.

FDE 579 Food Additives, Contaminants and Toxicology (3-0)3

Intentional and non-intentional additives, natural toxic constituents of plant and animal foods. Mycotoxins, detoxification processes, package-food interactions. Food-drug interactions, residue analysis in foods.

FDE 580 Food Packaging (3-0)3

Requirements and functions of containers, types of containers, packaging materials; metal, glass, paper, plastics and films, laminates, edible films. Package testing, environmental issues.

FDE 581 Biochemical Engineering (3-0)3

Review of biological processes of engineering interest. Kinetics of enzyme catalyzed reactions. Kinetics of substrate utilization, biomass and product formation. Transport phenomena in microbial systems. Design and analysis of mixed culture systems. Isolation of biologically active materials.

FDE 582 Thermal Process Engineering (3-0)3

General principles of heat transfer. Conduction and thermal conductivity. Experimental methods for the determination of thermal conductivity, methods of analysis. Steady and unsteady state conduction. Analytical and numerical solutions. Thermal methods applied in food processing.

FDE 585 Engineering Properties of Foods (3-0)3

Critical review of various procedures for measurement and estimation of engineering properties of relevance to the design of food processing operations.

FDE 587 Rheological Methods in Food Engineering (3-0)3

The theory of rheological testing and determination of rheological properties of foods from experimental data. Stress and strain. Solid and fluid behaviours. Tube and rotational viscometry. Extensional flow. Transient and oscillatory testing for viscoelasticity.

FDE 589 Microwave Processing of Foods (3-0)3

Principles of microwave heating. Microwave processing: drying, baking, blanching, thawing, sterilization and cooking of foods. Modeling microwave heating characteristics. Development of microwavable foods.

FDE 591 Seminar I NC

M.S. students present their thesis proposal. Students must register to this course in the second semester of the program.

FDE 600 Ph.D. Thesis NC

Program of research leading to Ph.D. degree, arranged between student and a faculty member. Students must start registering to this course no later than the second semester of the program and do so in all semesters while the research program or write-up thesis is in progress.

FDE691 Seminar for Ph.D. Students NC

Ph.D. students present a seminar about their thesis subject.

FDE 7XX Special Topics in Food Engineering (3-0)3or (2-2)3

Courses not listed in catalogue. Contents vary from year to year according to interests of students and instructors in charge. Typical contents include Food Engineering, Food Processing, Food Science, Food Technology, Biotechnology etc.

FDE 8XX Special Studies (4-2) NC

M.S. students choose and study a topic under the guidance of faculty member, normally his/her advisor.

FDE 9XX Advanced Studies (4-0) NC Graduate students as a group or a Ph.D. student choose and study advanced topics under the guidance of faculty member, normally his/her advisor.