

## 2011-13 Cal Poly Catalog

### Dairy Science Department

#### DSCI-DAIRY SCIENCE

##### **DSCI 100 Enterprise Project (1-4) (CR/NC)**

Selection and completion of a management/production project under faculty supervision. Project participation is subject to approval by the project supervisor and the Cal Poly Corporation. Degree credit limited to 12 units. Credit/No Credit grading only.

##### **DSCI 101 Dairy Feeds and Feeding (4)**

Introduction to Dairy Cattle/Ruminant Nutrition. Classification and metabolism of nutrients. Nutrient content and identification of feeds common to dairy cattle. Nutrient analysis procedures and requirements. Ration formulation, feeding practices for maximizing growth and milk production. 3 lectures, 1 laboratory.

##### **DSCI 121 Elements of Dairying (4)**

General information on statistics and opportunities in the dairy industry. Dairy cattle record keeping systems and their use in dairy herds. Principles of reproduction management, milking and milking machine function. Principles and practices of the feeding and management of dairy cattle. 3 lectures, 1 laboratory.

##### **DSCI 123 Dairy Science Orientation (1) (CR/NC)**

Curricula, career paths, and opportunities for involvement in the dairy industry. Campus resources and tips for academic success. Student and professional organizations and affiliations. Meet and interact with each member of the faculty, Dairy Club officers, and industry guests. Credit/No Credit grading only. 1 lecture.

##### **DSCI 134 Introduction to Dairy Products Technology (4)**

Science and technology in the development and manufacture of dairy food products. Equipment and dairy processing techniques for fluid milk, butter, cheeses, ice cream, yogurt, concentrated dairy foods and dried dairy foods. 3 lectures, 1 laboratory.

##### **DSCI 200 Special Problems for Undergraduates (1-2)**

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Consent of instructor.

##### **DSCI 202 Dairy Promotion and Marketing (4)**

National and state dairy promotional programs, advertising and merchandising. Marketing and pricing of milk and dairy products at the state and national level. 4 lectures. Recommended prerequisite: DSCI 231.

##### **DSCI 223 Frozen Dairy Foods (4)**

Technology, equipment, mix calculations and preparation required to process, freeze, package, harden and distribute ice cream and related products. 3 lectures, 1 laboratory. Prerequisite: DSCI 231 and DSCI 232, or FSN 125, or FSN 230.

##### **DSCI 230 General Dairy Husbandry (4)**

Selection, breeding, feeding, and management of dairy cattle. Composition and food value of dairy products. Milk pricing, political influences, dairy industry statistics and opportunities. Producing and handling products. Intended as introductory course for non-dairy science majors. 3 lectures, 1 laboratory.

##### **DSCI 231 General Dairy Manufacturing (3)**

Composition and properties of fluid milk and manufactured milk products. Chemistry and microbiology of dairy products. Processes and equipment involved in the manufacture of butter, cheeses, and other fermented dairy products, frozen, condensed, and dried dairy foods. 3 lectures.

##### **DSCI 232 General Dairy Manufacturing Laboratory (1)**

Laboratory to complement DSCI 231 and provide experiences in the processes and equipment involved in the manufacturing of butter, cheeses, and other fermented dairy products, frozen, condensed, and dried dairy foods. 1 laboratory. Concurrent: DSCI 231 for DSCI majors only.

##### **DSCI 233 Milk Processing and Inspection (4)**

Composition and properties of fluid milk and its constituents. Equipment used to handle, process, and distribute fluid milk and related products. California dairy codes used for dairy farms and plants, with practice inspections of dairy farms and factories. 3 lectures, 1 laboratory. Prerequisite: DSCI 231 and DSCI 232, or FSN 125, or FSN 230.

##### **DSCI 234 Dairy Foods Evaluation (2)**

Basic principles of sensory evaluation of dairy foods, physiology of various senses and their relationship to distinguishing the quality of dairy products by

sight, flavor, body and texture. Product defects, causes, and methods of prevention. 1 lecture, 1 laboratory. Prerequisite: DSCI 231, or FSN 125, or FSN 230.

##### **DSCI 241 Dairy Cattle Selection, Breeds, Fitting and Showing (4)**

Selection of dairy cattle on type conformation and the correlation between type and production. Dairy cattle breeds and breed comparisons. Techniques to properly condition, groom and present dairy cattle for evaluation and merchandising. 2 lectures, 2 activities. Prerequisite: DSCI 121 or DSCI 230.

##### **DSCI 270 Selected Topics (1-4)**

Directed group study of selected topics. The Schedule of Classes will list title selected. Total credit limited to 8 units. 1 to 4 lectures. Prerequisite: Open to undergraduate students and consent of instructor.

##### **DSCI 301 Dairy Cattle Nutrition (4)**

Principles of dairy cattle nutrition and management and their application to economical feeding practices and computerized ration formulation. 3 lectures, 1 activity. Prerequisite: DSCI 101 and DSCI 121 or DSCI 230.

##### **DSCI 321 Lactation Physiology (4)**

Mechanisms of milk component secretion, including protein, lactose and fat metabolism. Disorders of the mammary gland (mastitis) and control strategies. Endocrine aspects of mammary gland development and lactogenesis. 4 lectures. Prerequisite: DSCI 101, DSCI 121/DSCI 230, BIO 111.

##### **DSCI 330 Artificial Insemination and Embryo Biotechnology (4)**

Techniques in the collection, evaluation and processing of semen, along with embryo culturing and manipulation. Insemination procedures, fertility problems, record keeping, estrous synchronization, endocrine control of reproduction, treating reproductive disorders and embryo transfer. 3 lectures, 1 laboratory. Prerequisite: DSCI 121 or DSCI 230 or ASCI 229 or consent of instructor.

##### **DSCI 333 Dairy Cattle Management, Safety and Animal Well-Being (4)**

Modern dairy management techniques, livestock handling and animal comfort. Dairy safety and development of an injury illness prevention program. Animal well-being issues and the Pasteurized Milk Ordinance. 3 lectures, 1 activity. Prerequisite: DSCI 121 or DSCI 230.

##### **DSCI 339 Internship in Dairy Science (1-12) (CR/NC)**

Selected Dairy Science students will spend up to 12 weeks with an approved agricultural firm engaged in production or related business. Time will be spent applying and developing production and managerial skills and abilities. One unit of credit may be allowed for each full week of completed and reported internship. Degree credit limited to 12 units. Credit/No Credit grading only. Prerequisite: Consent of internship instructor.

##### **DSCI 340 Dairy Waste Management and Resource Recovery (3)**

Management of dairy wastes to protect the environment while providing a return on investment. Selection of waste management systems, considering capital and operating costs and benefits from nutrient, biogas, and heat recovery. Best practices that meet current regulatory requirements. 3 lectures. Prerequisite: MCRO 221.

##### **DSCI 400 Special Problems for Advanced Undergraduates (1-2)**

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Consent of instructor.

##### **DSCI 401 Physical and Chemical Properties of Dairy Products (4)**

Composition, structure and properties of milk and milk products. Physical and chemical changes that occur during processing and storage of dairy products. Objective measurement of chemical and physical properties. 3 lectures, 1 laboratory. Prerequisite: CHEM 212 or CHEM 312.

##### **DSCI 402 Quality Assurance and Control of Dairy Products (4)**

Current methods used to evaluate dairy products with respect to plant economics and consumer safety. Accurate procedures for chemical and biological testing, statistical approach to sampling and design and interpretation of HACCP programs for assuring product quality and safety. 3 lectures, 1 laboratory. Prerequisite: DSCI 444.

##### **DSCI 412 Dairy Farm Consultation (4)**

Student consultation teams of three or four students visit dairies and/or attend management training seminars followed by presenting management recommendations to the dairy owners, consultants, and other industry leaders. 1 seminar and supervised work. Prerequisite: DSCI 333.

##### **DSCI 422 Breeding and Genetics of Dairy Cattle (4)**

Evaluation of inherited characteristics in dairy cattle from an economic standpoint. Proving and selecting sires and dams. 4 lectures. Prerequisite: DSCI 241.

**DSCI 432 Advanced Dairy Herd Management (4)**

Dairy herd management skills needed in dairy operations. Instruction and lab experience in management, records, labor, waste management, and milking management. 4 lectures. Prerequisite: DSCI 333.

**DSCI 433 Dairy Plant Management and Equipment (4)**

Basic management principles applied to the dairy industry. Industrial organization and control. Dairy plant design, facilities, layout. Inventory control and records. Milk pooling and stabilization records. Maintenance and operation of equipment. 3 lectures, 1 laboratory. Prerequisite: DSCI 233 and DSCI 434, or FSN 204 and FSN 474.

**DSCI 434 Cheese and Fermented Dairy Foods (4)**

Scientific methods, ingredients, and equipment used in the manufacture of various fermented dairy products, including cheeses, buttermilk, sour cream, and yogurt. 3 lectures, 1 laboratory. Prerequisite: DSCI 231 and DSDI 232 and MCRO 221 or MICRO 224, or consent of instructor.

**DSCI 435 Concentration/Fractionation and Butter Technology (4)**

Technology of evaporation, drying and membrane separation processes applied to dairy fluids. Design and performance of evaporators, driers, and membrane processing systems. Equipment, ingredients, and methods needed to manufacture butter and dairy spreads. 3 lectures, 1 laboratory. Prerequisite: DSCI 233 or FSN 204.

**DSCI 444 Dairy Microbiology (4)**

Microorganisms involved in the fermentation and ripening processes in the dairy industry, as well as those involved in spoilage of milk and dairy products, in the transmission of disease through these products, and indicator systems used to determine sanitary quality of these products. 3 lectures, 1 laboratory. Prerequisite: DSCI 233, and MCRO 221 or MCRO 224, and STAT 130 or STAT 218, or consent of instructor.

**DSCI 461 Senior Project (3)**

Selection and completion of a project under faculty supervision. Projects are typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal written report. 2 lectures and supervised work. Prerequisite: Junior standing.

**DSCI 463 Undergraduate Seminar (2)**

Reports on student papers, bulletins, periodical articles, and dairy research experiments. Sources of dairy husbandry information. Practice in oral reporting. Recent developments and research work in the dairy industry. 2 seminars.

**DSCI 470 Selected Advanced Topics (1-4)**

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. The Schedule of Classes will list title selected. Total credit limited to 8 units. 1 to 4 lectures. Prerequisite: Consent of instructor.

**DSCI 471 Selected Advanced Laboratory (1-4)**

Directed group laboratory study of selected topics for advanced students. Open to undergraduate and graduate students. The Schedule of Classes will list title selected. Total credit limited to 8 units. 1 to 4 laboratories. Prerequisite: Consent of instructor.

**DSCI 500 Individual Study in Dairy Science (1-6)**

Advanced independent study planned and completed under the direction of a member of the Dairy Science faculty. Total credit limited to 6 units. Prerequisite: Consent of department head, graduate advisor and supervising faculty member.

**DSCI 522 Bioseparation Processes in Dairy Product Technology (4)**

Physical and chemical principles governing bioseparation processes in dairy product technology. Factors influencing mass transport phenomena as it relates to filtration, chromatography, ion exchange, dialysis, centrifugation, adsorption, crystallization and other unit operations. Laboratories to emphasize application of bioseparations of commercial importance. Field trips to be required. 3 lectures, 1 laboratory. Prerequisite: DSCI 401, FSN 444.

**DSCI 539 Graduate Internship in Dairy Science (1-9)**

Application of theory to the solution of problems of agricultural production or related business in the field of Dairy Science. Analyze specific management problems and perform general management assignments detailed in a contract between the student, the firm or organization, and the faculty advisor before the internship commences. Degree credit limited to 6 units. Prerequisite: Consent of internship instructor.

**DSCI 560 Recent Developments in Dairy Science and Technology (1-3)**

Presentation and critical review of current research publications. Methodological advances and applications in dairy food systems. The Schedule of Classes will

list topic selected. Total credit limited to 6 units. 1-3 seminars. Prerequisite: Senior or graduate standing and approval of instructor.

**DSCI 570 Selected Topics in Dairy Science (1-4)**

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. The Schedule of Classes will list title selected. Total credit limited to 12 units. 1 to 4 seminars. Prerequisite: Graduate standing or consent of instructor.

**DSCI 571 Selected Advanced Laboratory in Dairy Science (1-4)**

Directed group laboratory study of selected topics for advanced students. Open to undergraduate and graduate students. The Schedule of Classes will list title selected. Total credit limited to 8 units. 1-4 laboratories. Prerequisite: Consent of instructor.

**DSCI 581 Graduate Seminar in Dairy Science (1-3) (CR/NC)**

Current findings and research problems in the field and their application to industry. Group study of current problems of industry. Current experimental and research findings as applied to production and marketing. Credit/No Credit grading only. 1 or 3 seminars. Prerequisite: Graduate standing or consent of instructor.

**DSCI 585 Cooperative Education Experience in Dairy Science (1-6) (CR/NC)**

Advanced study, analysis and part-time work experience in the field; current innovations, practices, and problems in administration, supervision, and organization of business, industry, and government. Must have demonstrated ability to do independent work and research in career field. Total credit limited to 9 units. Credit/No Credit grading only. Prerequisite: Graduate standing and consent of instructor.

**DSCI 599 Thesis in Dairy Science (1-9)**

Systematic research of a significant problem in Dairy Science. Thesis will include problem identification, significance, methods, data analysis, and conclusion. Students must enroll every quarter in which facilities are used or advisement is received. Degree credit limited to 6 units. Prerequisite: Graduate standing and consent of instructor.