860. Soil Biochemistry
Fall, Spring of even-numbered years. 4 credits, CSS 850; MPH 442.
Biochemical transformations of mineral nutrients and of natural and exotic organic materials in soils, considered in relation to chemical, physical and ecological properties of the soil environment.

870. Origin and Classification of Soils
Winter, 4(3-2) CSS 470, CSS 840, or approval of department.

899. Master's Thesis Research
Fall, Winter, Spring, Summer. Variable credit. Approval of department.

920. Design and Analysis of Agronomic Experiments
Spring, 3(3-0) STT 423 or approval of department.
Consulting and analyzing designs for experimental investigations in the biological sciences.

951. Cytogenetics in Plant Breeding
Winter of odd-numbered years, 3(3-0) BOT 427, BOT 528, or approval of department.
Interdepartmental with the Department of Horticulture.
Application of cytogenetic principles to plant breeding. Significance of recombination, role of induced mutations, polyploidy, chromosome substitution, and aneuploidy analyses as they apply to the field of plant breeding.

952. Plant Breeding Biometrics
Winter of even-numbered years, 4(3-2) BOT 427, BOT 828, or approval of department.
Interdepartmental with the Department of Horticulture.
Biometrical genetics as it applies to plant breeding. Includes studies of path coefficients, partitioning of variance, and the principles of selection in a changing environment.

999. Doctoral Dissertation Research
Fall, Winter, Spring, Summer. Variable credit.

DAIRY SCIENCE

DRY
College of Agriculture and Natural Resources

1005. Dairy Career Alternatives
Fall, 1(1-0) Credits earned in this course are included in computation of GPA and MAPS but are not included in the 180 credits required for graduation.
Career and employment options for dairy majors including research, education, farming, agribusiness, government, and financial, including self-instructional unit on career planning.

214. Dairy Production

250. Dairy Physiology and Management
Fall, 4(3-2) or B S 210 or B S 211; DRY 1005 or approval of department.
Basic reproductive and lactational physiology; management practices for maximum productive performance and maximum production of high quality milk.

314. Dairy Herdsman Techniques
Winter, 20(0-4) DRY 214, majors only.
Herds health and management procedures, disease prevention and detection, equipment maintenance and record systems for dairy herds.

315. Dairy Herd Management
Spring, 4(4-0) DRY 250.
Dairy herd management practices, dairy records systems, housing, milking, reproduction and feeding systems. Economic and efficient usage of inputs.

322. Dairy Cattle Judging
Spring, 3(3-0) Desired type in dairy cattle. Judging and showing procedures. Competitive judging. Teams selected to represent Michigan State University in national competition.

371. Seminar
Spring, 1(1-0) Juniors.
Major issues pertinent to the dairy industry are described by authorities from MSU and the dairy industry of Michigan. Students are provided an opportunity for an exchange in ideas.

424. Dairy Cattle Breeding
Spring, 4(2-4), ANS 361.
Applications of population genetics to improving dairy cattle. Use of selection, add to selection, and systems of mating to formulate breeding plans. Inheritance of economic traits. Breed improvement programs.

433. Ruminant Nutrition
Winter, 4(3-2) ANS 325.
Interdepartmental with Animal Science.
Principles of ruminant nutrition and application to actual feeding practices in commercial dairy and beef operations. Rumen fermentation as related to feed utilization, growth, milk production and milk composition.

444. Mammary Physiology
Winter, 4(3-2) PSL 240; BCH 200.
Interdepartmental and administered jointly with the Department of Physiology.

445. Endocrinology and Reproductive Physiology
Fall, Spring, 4(3-2) PSL 240.
Interdepartmental and administered jointly with the Department of Physiology.
Processes of reproduction and endocrinology with special emphasis on anatomy of reproductive systems, folliculogenesis, gametogenesis, reproductive cycle, fertilization, sex determination, gestation and artificial regulation of these reproductive events for economic benefit.

450. Toxicology of Food Producing Animals
Spring, 4(4-0) PSL 240, BCH 200.
Interdepartmental with and administered by the Department of Animal Science.
Fate and effects of toxic chemicals in food-producing animal; impact on animal production, residues in food products, safety assessment and control methods.

460. Special Problems
Fall, Winter, Spring, Summer.
Variable credit. May reenroll for a maximum of 10 credits. Approval of department.

1DC. The Impact of Animal Resource Management Upon the World's Developing Nations
For course description, see Interdisciplinary Courses.

850. Topics in Dairy Science
Fall, Winter, Spring. Variable credit.
May reenroll for credit. Approval of department.
Topics from breeding, management, nutrition or physiology, changing from term to term to include recent technical advances.

899. Master's Thesis Research
Fall, Winter, Spring, Summer.
Variable credit. Approval of department.

925. Advanced Ruminant Nutrition
Fall of even-numbered years, 4(4-0) BCH 453; PSL 301 or approval of department.
Microbiology, physiology and biochemistry of ruminant digestion and the absorption and metabolism of ruminant fermentation products.

945. Physiology of Mammalian Reproduction
Winter of odd-numbered years, 4(3-0) DRY 445 or PSL 445 or approval of department.
Interdepartmental with the Department of Physiology.
Chemistry and biosynthesis of reproductive hormones. Gonadal, hypothalamic and pituitary development of reproductive potential. Ovulation, fertilization, implantation and placenta will be studied. Relationships of concepts, uterus and corpus luteum. Parturition.

999. Doctoral Dissertation Research
Fall, Winter, Spring, Summer.
Variable credit. Approval of department.

EARTH SCIENCE

See Geology.