890. Selected Topics in Plant Pathology
Fall, Winter, Spring. 2 to 5 credits.
Approval of department.
Topics will be selected from the following areas: parasitism, plant viruses, ecology, genetics, nematology, fungidical action, and soil microbiology.

899. Research
Fall, Winter, Spring, Summer. Variable credit. Approval of department.
Research for thesis at the doctoral degree level in one of the following fields: anatomy, cytology, ecology, genetics, physiology, pathology, taxonomy, and professional specialization.

918. Advanced Genetics
Winter of odd-numbered years. 3(3-0)
Approval of department.
Role of the gene in differentiation and development, with special emphasis upon the genetic mechanisms responsible for the control of phenomena.

919. Cytogenetics
Fall. 3(3-0) 918.

920. Advanced Plant Taxonomy
Spring of even-numbered years. 4(4-0)
244, ZOL. 441.
Consideration of the recent scientific developments affecting plant classification.

930. Advanced Plant Ecology
Spring of odd-numbered years. 2(2-4)
415, 450, 524.
Fundamental theories and modern research horizons.

951. Advanced Plant Physiology I
(943.) Fall of even-numbered years. 2(2-0)
Approval of department.
Selected topics concerning absorption and internal nutrition.

952. Plant Physiology and Biochemistry I
(944.) Winter of odd-numbered years. 3(3-0)
Approval of department.
Topics concerning the chemistry, physiology and mechanism of action of plant growth hormones.

954. Advanced Plant Physiology III
(946.) Fall of odd-numbered years. 3(3-6)
Approval of department.
Selected topics from environmental physiology.

955. Plant Physiology and Biochemistry II
(947.) Winter of even-numbered years. 3(3-6)
Approval of department.
Interdepartmental work with and administered by the Biochemistry Department.
Metabolic pathways of unique significance to plants.

958. Advanced Plant Physiology IV
(948.) Spring of even-numbered years. 3(3-0)
Approval of department.
Factors influencing vegetative and reproductive physiology.

999. Research
Fall, Winter, Spring, Summer. Variable credit. Approval of department.
Research for thesis at the doctoral degree level in one of the following fields: anatomy, cytology, ecology, genetics, physi­ology, morphology, paleobotany, path­ology, physiology, and taxonomy.

BUILDING CONSTRUCTION
See Packaging

BUSINESS LAW AND OFFICE ADMINISTRATION

BOA College of Business

201. Shorthand I
Fall, Winter, Spring, Summer. 3(4-0)
234 or 1 term typewriting.
Greff, shorthand theory, dictation and transcription for students with no previous training.

202. Shorthand II
Fall, Winter, Spring. 3(3-1)
201, 234 or 1 term shorthand and typewriting.
Development of theory and transcription competency, speed building.

203. Shorthand III
Fall, Winter, Spring. 3(3-1) 202, 235.
Continuation of 202.

204. Advanced Shorthand
Fall, Winter, Spring. 3(3-1) 236.
Continuation of 203.

234. Typewriting I
Fall, Winter, Spring. 2(2-2)
Approval of department.
Rudimentary keyboard, building speed and accuracy; elementary typewriting problems.

235. Typewriting II
Fall, Winter, Spring. 2(2-2) 234 or approval of department.
Improvement of speed and accuracy; arrangement of business letters, tabulation and manuscripts; production typewriting.

236. Advanced Typewriting
Fall, Winter, Spring. 2(2-1) 235 or 1½ to 2 years typewriting.
Instruction in specialized typewriting problems to develop high-level competency.

309. Secretarial Administration I
Fall, Winter, Spring. 4(4-0) 204,
236, Sophomores.
Development of proficiency in transcription skills.

309. Secretarial Administration II
Fall, Winter, Spring. 4(4-2) 236, Sophomores.
Machine dictation-transcription; duplication and copying processes; machine calculations; record management.

326. Business Writing
Fall, Winter, Spring, Summer. 4(4-0)
Juniors.
Study and analysis of business and industrial communication problems; extensive instruction and practice in writing.

326H. Writing in a Business Culture
Fall, Winter. 4(4-0) Honors College students.
This intensive honors course in business writing ranges from letters to review articles on professional journals. Historical and linguistic study to illuminate business and technological culture.

341. Survey of Business Law
Fall, Winter, Spring, Summer. 4(4-0)
Juniors. Not open to business administration students.
Historical development of the law; courts and court procedures and civil remedies; torts, crimes; contracts, agency, sales, negotiable instruments, real and personal property, including bailments and leases. Textbook and lecture rather than case approach.

370. Office Administration
Fall, Winter, Spring, Summer. 3(3-0)
Juniors.
Analysis of office function and relationship to business organization; information handling and data processing; office design and layout; responsibilities of office administrators.

400H. Honors Work
Fall, Winter, Spring, Summer. 1 to 15 credits.
Approval of department.
Independent and informal study in law, office administration or business communications.

415. Secretarial Administration III: Seminar
Winter, Spring. 4(4-0) Seniors or approval of department.
Analysis of the role of the executive secretary.

427. Business and Technical Reports
Fall, Spring. 4(4-0) Juniors.
Preparation and presentation of report writing techniques; study of use, form, and structure of different types; practice in preparing the most frequently used. One complete research report required.

440. Law and Society
Fall, Winter, Spring, Summer. 4(4-0) Seniors or approval of department.
Legal reasoning and legal institutions. Court systems and court procedures. Relationships of citizens and businesses to governmental agencies. Torts, crimes.

441. Law of Contracts and Business Organizations
Fall, Winter, Spring. 5(5-0)
Law of contracts, including the concept of freedom of contract and its importance as the focal point of business transactions. Study of the legal framework within which formal business organizations must operate.

453. Property, Sales, Negotiable Instruments
Spring. 4(4-0) 441.
Law of real and personal property, including bailments, liens and security transactions, sales, and negotiable instruments. Case study method used.

445. Real Estate Law
Winter. 3(3-0) 441.
Law of real and personal property, including fixtures, easements, land descriptions, titles, deeds, recording requirements, brokers, land contracts, escrows, closing of sales, abstracts, mortgages, mechanics liens, co-ownership, descent and distribution, administration of estates, zoning, taxes, landlord and tenant. Combined text and case approach.

446. Interstate and International Business Law
Spring. 3(3-0) 341, 440 or 441.
447. Hotel Law
Winter, Spring. 4(4-0) 440.
Negotiable instruments, warranties, property, torts, civil rights, agency, partnerships, corporations as applied to hotel and restaurant management.

465. Field Studies
Fall, Winter, Spring, Summer. Variable credit. May re-enroll for a maximum of 8 credits. Business majors and approval of department required.
Planned program of observation and work in selected business firms. Analysis and reports.

549. Legal Environment of International Business
Spring, Summer. 4(4-0)
Critical examination of the environment in which business operates. Analysis of the complex elements of the legal environment of business and the structural framework in which legal functions operate.

587. Seminar: Office Management
Winter, Summer. 3 credits. May re-enroll for a maximum of 6 credits. Approval of department required.
Problems, practices, and policies involved in office administration. Methods of establishing, analyzing, standardizing, and controlling administrative systems and procedures in the office.

871. Seminar: Office Management
Fall, Spring. 4(4-0) 301

878. Seminar in Business Law
Winter, Summer. 4(4-0)
Solution of problems relating to departmental research.

CHEMICAL ENGINEERING CHE
College of Engineering

201. Chemical Engineering Calculations
Fall, Winter. 3(3-0) CEM 153; MTH 214; PHY 287 or concurrently.
Chemical engineering calculations. Organization of calculations. Material balances, energy balances, behavior of gases, equilibrium relations and reaction rates.

202. Thermodynamics for Chemical Engineering
Winter, Spring. 3(3-0) 201, MTH 215 or concurrently.
First and second laws. Internal energy, enthalpy, entropy, free energy, and work functions. Application to batch and flow processes, open and closed systems, reacting and nonreacting systems. Interrelationships of thermodynamic properties for perfect gases and for real substances.

215. Interdepartmental and Jointly
Fall, Winter, Spring. 1 to 9 credits.
Seminars, approval of department.

404. Chemical Engineering Operations
Spring. 3(3-0) 303 or concurrently.
Solution of engineering problems using the general equations of change for transport of momentum, heat, and mass in an arbitrary continuum. Interphase transport.

405. Process Optimization Methods
Fall. 3(3-0) 363, 361
Application of chemical engineering principles in design calculations. Selection of the optimum design for equipment, functional units, and for the overall process. Influence of design on capital investment, operating cost, product loss, and product quality.

406. Process Design
Spring. 3(1-6) 361
Integrated design of the complete chemical engineering process. Process engineering, project engineering, procurement, instrumentation, and layout.

415. Transport Phenomena
Fall. 3(3-0) 361
Solution of engineering problems involving the general equations of change for transport of momentum, heat, and mass in an arbitrary continuum. Interphase transport.

419. Advanced Chemical Engineering Calculations I
Fall. 3(3-0) 303, 361; CEM 461
Chemical engineering applications of advanced mathematical methods. Formulation and solution of mathematical equations which describe physical problems. Computer solutions.

420. Advanced Chemical Engineering Calculations II
Winter. 3(3-0) 801
Continuation of 801.

421. Advanced Chemical Engineering Thermodynamics I
Fall. 3(3-0) 203, 361; CEM 461
Advanced treatment of the laws of thermodynamics. Cryogenic processes. Corresponding state and higher parameters in computing properties of chemical compounds and solutions.

422. Advanced Chemical Engineering Thermodynamics II
Winter. 3(3-0) 428

423. Advanced Chemical Reactions Engineering
Winter. 3(3-0) 428
Theory and design of nuclear research and power reactors. Nuclear transmutation, fission, and energy conversion. Derivation of chain