

Judaic Studies (JUDS)

Associate Director, Center for Judaic Studies and Contemporary Life: Professor Stuart S. Miller
Offices: Room 154, Thomas J. Dodd Research Center and Room 220, Arjona Building

For more information, please refer to the "College of Liberal Arts and Sciences" section of this *Catalog*.

101. The Land of Israel from Biblical Times to the Present
(Also offered as HEB 101.) Either semester. Three credits. Offered in alternate years. *Miller*

An in-depth look at the history, culture and civilizations of the land of Israel. The importance of the land in Judaism and its significance for Christianity and Islam will be discussed. Lectures and discussion will be enhanced by slide presentations.

103. Literature and Civilization of the Jewish People
(Also offered as HEB 103.) Either semester. Three credits. *Miller*

The major concepts, personalities and literary works of the Hebraic tradition from the Biblical and Talmudic periods to the present. CA 1. CA 4.

104. Modern Jewish Thought
(Also offered as HEB 104.) Second semester. Three credits.

Nationalism, culture, ethics and philosophy in the writings of the major Jewish thinkers from Spinoza to the present. Emphasis will be placed on the work of Moses Mendelssohn, Nachman Krochmal, Ahad Haam, Hermann Cohen, Franz Rosenzweig, Martin Buber and Mordecai Kaplan.

201. Selected Books of the Hebrew Bible
(Also offered as HEB 201.) Either semester. Three credits. Prerequisite: INTD 294 or HIST 213 or HEB 103, which may be taken concurrently or instructor consent. A knowledge of Hebrew is not required. May be repeated with change of content and consent of instructor. *Miller*

Focuses on a biblical book (or books) and emphasizes its literary structure and content using modern approaches as well as midrashic and medieval exegesis. Historical and archaeological material introduced where relevant.

202. Sects and Movements in Judaism
(Also offered as HEB 202.) Either semester. Three credits. Offered in alternate years.

Varieties of Jewish expression and belief from Biblical times to the present. Topics include: the Dead Sea Sect, Pharisees, Sadducees, Karaites, Marranos, Hasidism and the Reform, Conservative, Orthodox and Reconstructionist movements of the modern era.

203. The Holocaust
(Also offered as HEB 203.) Either semester. Three credits.

A discussion of the Holocaust to be preceded by an examination of the roots of anti-semitism and its effect upon the Jewish experience. Special emphasis will be given to the impact of the Holocaust on Jewish and Christian thought.

218. Palestine Under the Greeks and Romans
(Also offered as CAMS 256, HEB 218, and HIST 218.) Either semester. Three credits. Recommended preparation: HIST 213 or 214 or 216 or INTD 294 or HEB 202. *Miller*

The political, historical and religious currents in Greco-Roman Palestine. Includes the Jewish Revolts; sectarian developments, the rise of Christianity and the Talmudic academies.

242. American Jewry
(Also offered as SOCI 242.) Three credits. Either semester. *Dashefsky*

Historical, demographic, organizational, and sociopsychological perspectives.

Korean (KORE)

Head of Department: Professor David K. Herzberger
Department Office: Room 228, J.H. Arjona Building

101-102. Elementary Levels I and II

103-104. Intermediate Levels I and II

101 and 103 are offered in the first semester, and 102 and 104 in the second. Please refer to the Critical Languages course descriptions in this publication. Consult the Program Director in Arjona 128 or at Ed.Benson@UConn.edu for more information.

Latin American Studies (LAMS)

Director, Center for Latin American and Caribbean Studies: Professor Elizabeth Mahan
Office: Room 4, Human Development Center

For major requirements, see the College of Liberal Arts and Sciences section of this *Catalog*. For information about courses on Latin America in other departments consult the list published by the Center before pre-registration each semester.

190. Perspectives on Latin America
Either semester. Three credits.

A multidisciplinary course including geography, indigenous peoples, colonization and nation formation; society, politics, economy, and culture of contemporary Latin America and its place in today's world.

193. Foreign Study
Either or both semesters. Credits and hours by arrangement. May be repeated for credit (to a maximum of 15). Consent of Director of Latin American and Caribbean Studies required before departure.

Course work undertaken within approved Study Abroad programs, usually focusing on the history, culture, and society of a particular Latin American or Caribbean country or countries.

270. Latin American Popular Culture
Second semester, alternate years. Three credits. *Mahan*
Culture, subcultures, and culture industries in Latin America. Conditions that affect the mass production, dissemination and reception of entertainment products.

275. Cinema and Society in Latin America
Either or both semester. Variable credit up to a maximum of three credits. Hours by arrangement. With a change in content, this course may be repeated once for credit.

The aesthetic, social, and political significance of Latin American film.

284. Latin America
Either semester. Credits and hours by arrangement. Open only with consent of instructor and director of the Center for Latin American and Caribbean Studies. This number covers courses in Latin American Studies taken at other Universities by special arrangement for University of Connecticut credit.

290W. Latin American Studies Research Seminar
Either semester. Three credits. Prerequisite: ENGL 105 or 110 or 111 or 250; and instructor consent.

Capstone course in which majors and minors in Latin American Studies design, execute and write up original, library-based research on Latin America. Some readings may be in Spanish or Portuguese.

293. Foreign Study
Either or both semesters. Credits (to a maximum of 17) and hours by arrangement. Consent of Director of Latin American and Caribbean Studies required before departure. May count toward the major with consent of advisor.

Special topics taken in a foreign study program.

295. Variable Topics
Either semester. Three credits. With a change in topic, may be repeated for credit. Prerequisites and recommended preparation vary.

298. Special Topics
Either or both semesters. With a change in topic, may be repeated for credit.

299. Independent Study
Either semester. Credits and hours by arrangement. Open only with consent of instructor. May be repeated for credit. Sponsored by the Center for Latin American and Caribbean Studies.

Study Abroad. The University sponsors academic programs in Mexico at the Universidad de las Américas, Puebla; in the Dominican Republic, at the Pontificia Universidad Católica Madre y Maestra, Santiago de los Caballeros; at the University of Costa Rica, in San José, Costa Rica; at the Pontificia Universidad Católica de Chile and the Universidad de Chile, in Santiago, Chile; and at the Universidad de Buenos Aires, Argentina. Students may go for either a semester or a full academic year. The University also sponsors an academic year and a one-semester program in Brazil at the Universidade de São Paulo. For further information, contact the Center for Latin American and Caribbean Studies or the Study Abroad Office.

Linguistics (LING)

Head of Department: Professor Diane Lillo-Martin
Department Office: Room 332, Arjona Bldg.

For major requirements, see the College of Liberal Arts and Sciences section of this *Catalog*.

101. Language and Mind
Either semester. Three credits.
The special properties of human language and of the human mind that make verbal communication possible. Basic topics in the psychology of language. CA 1.

102. Language and Environment
Second semester. Three credits. *Anderson*
The birth, spread, and death of languages. A basic survey of the effects of geography, society, and politics on language families. CA 2. CA 4-INT.

103. The Diversity of Languages
Either semester. Three credits. *Calabrese, van der Hulst*

An overview of the languages of the world. Language families. Typological classifications of linguistic properties: what can we expect in a structure of a language? Unity and diversity in language systems. Mechanisms of language change and variation. Language myths and realities. CA 2. CA 4.

110. The Science of Linguistics
Either semester. Three credits.
An introduction to linguistics as a science. Methods, findings and theory of linguistic research on the sound system and the structures of human language. The relation between structure and meaning. The basics of linguistic analysis. Applied linguistics.

193. Foreign Study

Either or both semesters. Credits and hours by arrangement. May be repeated for credit. Consent of Department Head or advisor may be required prior to the student's departure.

Special topics taken in a foreign study program.

195. Special Topics Lecture

Either semester. Credits, prerequisites, and hours as determined by the Senate Curricula and Courses Committee. May be repeated for credit with a change in topic.

202. Principles of Linguistics

Either semester. Three credits. Open to sophomores or higher.

A survey of theory, methods and findings of linguistic research: the relation between sound and meaning in human languages; social variation in language; language change over time; universals of language; the mental representation of linguistic knowledge.

205. Phonology

First semester. Three credits. Prerequisite: LING 202. *Calabrese, van der Hulst*

The analysis of sound patterns in language within a generative framework: distinctive features, segmental and prosodic analysis, word formation, the theory of markedness.

206. Syntax and Semantics

Second semester. Three credits. Prerequisite: LING 101 or 202. *Beck, Boskovic, Lasnik, Sharvit*

The analysis of form and meaning in natural languages in a Chomskyan framework: surface structures, deep structures, transformational rules, and principles of semantic interpretation.

208. The Linguistic Basis of Reading and Writing

Semester by arrangement. Three credits. Prerequisite: LING 202. Open to sophomores or higher.

The relationship between writing systems and linguistic structures; the psycholinguistic basis of reading.

215C. Experimental Linguistics

Semester by arrangement. Three credits. Prerequisite: PSYC 132 and LING 101 or 202. *Lillo-Martin, Snyder*

Research methods and laboratory techniques for the study of language acquisition and/or sentence processing. Students design and conduct a study using a computer database of child speech.

225. Second Language Acquisition.

Either semester. Three credits. Prerequisite: LING 101, or 202. *Bar-Shalom*

The relationship between linguistic theory and second language acquisition. Effects of mother tongue and linguistic input. Pedagogical implications of second language acquisition research.

244W. Language and Culture

First semester. Three credits. Prerequisite: ENGL 105 or 110 or 111 or 250. Not open for credit to students who have passed ANTH 244 prior to Fall 1998. *Anderson, Bar-Shalom*

The study of language, culture, and their relationship. Topics include the evolution of the human language capacity; the principles of historical language change including reconstruction of Indo-European and Native American language families; writing systems; linguistic forms such as Pidgins and Creoles arising from languages in contact; the interaction between language and political systems, the struggle for human rights, gender, ethnicity, and ethnobiology. CA 2. CA 4-INT.

293. Foreign Study

Either or both semesters. Credits and hours by arrangement. May be repeated for credit. Consent of Department Head required, normally to be granted prior to the student's departure. May count toward the major with the consent of the advisor.

Special topics taken in a foreign study program.

295. Variable Topics

Either semester. Three credits. With a change in topic, may be repeated for credit. Prerequisites and recommended preparation vary.

298. Special Topics

Either semester. Credits and hours by arrangement. With a change in content, may be repeated for credit. Prerequisites and recommended preparation vary.

299. Independent Study

Either or both semesters. Credits and hours by arrangement. May be repeated for credit.

Management (MGMT)

Head of Department: Professor John F. Veiga

Department Office: Room 336, School of Business

For major requirements, see the School of Business section of this *Catalog*.

Courses in this department are open to juniors and seniors only with the exception of MGMT 198. The School of Business requires students at the Storrs campus to participate in the Mobile Computing Initiative before registering for the courses listed below. See the School of Business *Catalog* section for details about how this program operates. Students not participating in the initiative may be able to register for the following class: MGMT 198.

198. Contemporary Issues in the World of Management

Semester by arrangement. One credit. May be repeated in different sections, in combination with BADM 198, up to a maximum of three credits. May not be used to satisfy Junior-Senior level major requirements of the School of Business.

201. Managerial and Interpersonal Behavior

Either semester. Three credits. Prerequisite or corequisite: ACCT 131, ECON 111 and 112 or 102, ENGL 110 or 111 or 250, or ENGL 105 and 109, MATH 106 or 114 or 116, STAT 100 or 110. Not open to students who have passed or are taking BADM 240.

Topics covered include individual work motivation, interpersonal communications in organizations, team building and group processes, leadership, decision-making, and understanding and managing cultural diversity. Classes will emphasize interpersonal and leadership skill-building through the inclusion of exercises which rely on active participation of class members.

225. International Business

Semester by arrangement. Three credits. Prerequisite: FNCE 201, OPIM 204, MGMT 201, MKTG 201.

An introduction to the basic problems of the manager making decisions involving international trade, payments, and investment. Through extensive use of actual case studies, the special features of decision-making within the multinational enterprise integrating business operations among national economics are given particular attention. Lecturer, discussion, and case analyses.

234. Management of Small Businesses and Venture Enterprises

Semester by arrangement. Three credits. Prerequisite: ACCT 200, FNCE 201, BLAW 271 or 275, OPIM 203, MGMT 201, MKTG 201, and senior standing.

Emphasis on managerial aspects of organizing and operating small firms by means of case discussions and assigned readings. Students can obtain insights regarding opportunities of self-employment in traditional small businesses as well as entrepreneurial careers in more sophisticated business ventures.

235. Entrepreneurship and Venture Management

Semester by arrangement. Three credits. Prerequisite: ACCT 200, FNCE 201, MGMT 201, MKTG 201. Senior standing preferred.

In this field course, students investigate the special problems of newly formed firms. Course emphasis is on the planning skills necessary for start-up operations. The course is designed to acquaint students with the unique strategic problems faced by such firms and to teach them how to evaluate new venture plans.

239. Managing a Diverse Workforce

Semester by arrangement. Three credits.

This course examines issues related to managing an increasingly diverse workforce. Diversity in the workplace may result from differences in individual characteristics such as gender, race, ethnicity, national origin, and physical ability/disability. Diversity-related issues with management implications to be examined include personal identity, recruitment and selection, work group interactions, leadership, career development and advancement, sexual harassment, work and family, accommodation of people with disabilities, and organizational strategies for promoting equal opportunity and a positive attitude toward diversity among all employees.

245. Managerial Behavior in Cross-Cultural Settings

Semester by arrangement. Three credits.

The objective of this course is to introduce the student to the work values and behaviors of individuals in countries around the world. Some of the topics presented in the cross-cultural comparisons discussed in this course will include: approaches to motivation, communication, decision making, and negotiation. Particular emphasis will be placed on the developed and developing parts of the world that are major players in today's global economy.

250. Management Communications

Semester by arrangement. Three credits. Open to Management majors only.

This course has two objectives; to acquaint the student with the functional importance of communication in business management, and to teach the techniques of oral and written communication.

265. The Dynamics of Organization

Semester by arrangement. Three credits.

Dynamics of organization; relationship between people and organization. The organization viewed as a system interacting with a changing environment, as a structure of organized human cooperation, as an instrument of management strategy. Experiential exercises and case studies used to gain a better understanding of organization strategy, design and structure.

270W. Effective Business Writing

Either semester. One credit. Prerequisite: MGMT 201, MKTG 201 or FNCE 201; ENGL 105 or 110 or 111 or 250.

Designed to teach students techniques to improve their written business communication skills. Requires a variety of written assignments and gives special attention to writing tasks that students are likely to encounter early in their careers, such as reports to supervisors, sales proposals, documentation of business

policies, responses to complaints, as well as general business letters and memos. Students will receive critiques of their written assignments and will be required to revise their writing.

271. Human Resources Management

Semester by arrangement. Three credits. Prerequisite: MGMT 201.

Study of the personnel function from the managerial perspective. Emphasizes human resources planning, recruitment, selection, employee and management development, and performance evaluation.

272. Career Development in Business

Either semester. One credit. Meeting once per week for one hour and fifty minutes for 6 weeks (first or second half of semester), plus 2 or 3 evenings or Saturday morning panel discussions. Prerequisite: Sixth or seventh semester standing. Open only to students in the School of Business.

Topics covered include: self-assessment, exploration of career information resources, informational interviewing, development of an individual career plan, development of job search strategies and skills, discussion of career transition issues, overview of the career life cycle, and introduction to career development in organizations.

273. Labor Relations

Semester by arrangement. Three credits. Prerequisite: MGMT 201.

Study of employer-employee relations in unionized settings, both public and private sectors. Covers such areas as the National Labor Relations Act, labor contract negotiation, and administration.

281. Corporate Social Responsibility

Semester by arrangement. Three credits.

This course is designed to help the student relate business and its external culture, the social system, and the total environment. Develops an understanding of the role of the manager as the linking element between the business organization and the social environment.

289. Field Study Internship

Either or both semesters. One to six credits. Hours by arrangement. Prerequisite: Consent of instructor and Department Head. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

This course is designed to provide students with an opportunity for field work relevant to one or more major areas within the Department. Students will work under the supervision of one or more professionals in the specialty in question. Student performance will be evaluated on the basis of an appraisal by the field supervisor and a detailed written report submitted by the student.

290. Strategy, Policy and Planning

Either semester. Three credits. Prerequisite or corequisite: ACCT 200, FNCE 201, OPIM 203 and 204 (or CSE 123 and MEM 211 for MEM majors), MGMT 201, MKTG 201, and either BLAW 271 or 275. Open only to School of Business students with senior class standing. Not open to students who have passed or are taking MGMT 292.

An integrative analysis of the administrative processes of the various functional areas of an enterprise viewed primarily from the upper levels of management. The formulation of goals and objectives and selection of strategies under conditions of uncertainty as they relate to the planning, organizing, directing, controlling and evaluating policies and activities in each of the functional areas separately and jointly to achieve corporate objectives. Developing an integral business perspective is an integral part of the course.

291. Small Business Consulting

Semester by arrangement. Three credits. Hours by arrangement. Prerequisite: 7th semester or higher standing in the School of Business plus a minimum of one course from each of the following areas: ACCT, BLAW, FNCE, MGMT, MKTG and OPIM.

Application of small business management concepts to a consulting project in an on-going small business in Connecticut. Students will be required to take examinations on course content and submit a report on the consulting project.

292. Strategic Analysis

Both semesters. Three credits. Prerequisite or corequisite: ACCT 200, FNCE 201, OPIM 203 and 204, MGMT 201, MKTG 201, and either BLAW 271 or 275. Open only to Business students with senior class standing. Not open for credit to students who have passed or are taking MGMT 290.

Technology is having a profound affect on the rules by which firms plan, organize, and compete. By simulating applications of strategic frameworks in cases, readings, and classroom discussion, this course introduces students to methods that will improve their ability to judge the viability of firm's strategy, and recommend improvements. As such, it builds a valuable knowledge base that is relevant for managing, venturing, going-concern judgments, and investing.

293. Foreign Study

Either or both semesters. Credits and hours by arrangement, up to a maximum of six credits. Consent of Department Head required, prior to the student's departure.

Special topics taken in a foreign study program.

296. Senior Thesis in Management

Either semester. Three credits. Hours by arrangement. Open only to Management Department Honors Students with consent of instructor and Department Head.

298. Special Topics

Semester by arrangement. Credits and hours by arrangement. Prerequisite: Announced separately for each offering. With a change in content, may be repeated for credit.

Classroom course in special topics in management as announced in advance for each semester.

299. Independent Study

Either or both semesters. Credits by arrangement, not to exceed six in any semester. Open only with consent of instructor.

Individual study of special topics in management as mutually arranged between a student and an instructor.

Management and Engineering for Manufacturing (MEM)

Co-Directors: School of Business: Lakshman S.

Thakur, Associate Professor

School of Engineering: Robert G. Jeffers, Associate Professor

151. Introduction to Management and Engineering for Manufacturing Program

Second semester. Three credits.

Introduction to the goals of engineering and management for manufacturing enterprises. Review of the history of technological development, including its effects on new products and processes. Written and oral communication skills will be developed.

210. Manufacturing Equipment Lab

Either semester. One credit. One and one-half hours of laboratory per week. Open to sophomores or higher.

Introduction to machine shop equipment, metrology, general safety, and hands on experience in

machining and fabrication of metals. Topics include: introduction to instrumentation; knee miller, engine lathe, drill press, grinder, and sander operation; welding; chipping; and grinding.

211. Introduction to Manufacturing Systems

Second semester. Three credits. Prerequisite: STAT 110QC. Open to sophomores or higher.

Overview of manufacturing operations management and the systems used in controlling manufacturing enterprises including the concepts of global competition and manufacturing as a competitive weapon.

215W. Advanced Manufacturing Systems

Second semester. Four credits. Two three-hour laboratory periods. Prerequisite: ME 221 and MEM 211; ENGL 105 or 110 or 111 or 250.

Capstone design course for the MEM Program. Design applications involving construction and analysis of manufacturing system models. Students submit write-ups for several small projects. One large project is completed by all students in the course, with a written report and oral presentation. Projects incorporate major concepts studied in prior courses.

221. Introduction to Products and Processes

First semester. Three credits. Prerequisite: MEM 211.

Overview of the factors affecting the design of products and the various processes used in their manufacture. An introduction to manufacturing processes and their capabilities and limitations. Value engineering, methods improvement and simplification techniques will be covered.

225. Advanced Products and Processes

First semester. Three credits. Prerequisite: MEM 221.

Introduction to advanced topics relevant to the design and manufacture of products. Special emphasis on the relationship between manufacturing products and processes. Student projects.

231. Computers in Manufacturing

Second semester. Three credits. Prerequisite: EE 220 and MEM 211, which may be taken concurrently.

The utilization of computers and information systems in manufacturing, with special emphasis placed on Computer Integrated Manufacturing (CIM). The study of actual CIM applications will be incorporated.

296. Manufacturing Internship

One or more summer semesters. No credits. Hours by arrangement. Prerequisite: Consent of instructor and MEM program director. May be repeated. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

This course is designed to educate students in the MEM program with the realities of the manufacturing environment and to provide them with the opportunity to exercise problem solving skills while fulfilling a need of the internship sponsor.

Marine Sciences (MARN)

Department Head: Professor Ann Bucklin

Department Office: Marine Sciences, Avery Point

For major requirements, see the College of Liberal Arts and Sciences section of this *Catalog*.

135. The Sea Around Us

Second semester. Three credits.

History of ocean exploration, interaction between the oceans and the atmosphere, impact of technology on the marine environment, climate modification and exploitation of ocean resources. CA 3.

170. Introduction to Oceanography

Either semester. Three credits. Three class periods per week and two afternoon cruises per semester. A background in secondary school physics, chemistry or biology is recommended. Not open to students who have passed MARN 171.

Processes governing the geology, circulation, chemistry and biological productivity of the world's oceans. Emphasis is placed on the interactions and interrelationships between physical, chemical, biological and geological processes that contribute to both the stability and the variability of the marine environment. CA 3.

171. Introduction to Oceanography with Laboratory

First semester (Avery Point). Four credits. Three hours lecture and one three-hour laboratory per week. Recommended preparation: A background in secondary school physics, chemistry or biology. Not open to students who have passed MARN 170. *Codiga/P. Kremer*

Processes governing the geology, circulation, chemistry and biological productivity of the world's oceans. Emphasis on the interactions and interrelationships of physical, chemical, biological and geological processes that contribute to both the stability and the variability of the marine environment. Laboratory experiments, hands-on exercises, and field observations including required cruise on research vessel. CA 3-LAB.

172. Oceanography Laboratory

Either semester. One credit. One three-hour laboratory per week. Prerequisite: MARN 170 or equivalent. Not open to students who have passed MARN 171.

Laboratory experiments, hands-on exercises, and field observations (including required cruise on research vessel) that teach fundamental oceanographic concepts emphasizing physical, chemical, biological, and geological processes and their interaction in the marine environment.

200. The Hydrosphere

Either semester. Three credits. *Vlahos*

Interactions of the hydrological, chemical and biological components of the hydrosphere. Transport, reservoirs and dynamics of water in environmental systems.

210. Coastal Systems Science I

Second semester (Avery Point). Three credits. Prerequisite: MARN 170 and any two of the following: BIOL 107, 108, CHEM 127Q, 128Q, PHYS 121Q, 122Q, 131Q, 132Q. Open to sophomores or higher. *J. Kremer*

Biological, chemical, physical, and geological structure and function of coastal systems; a worldwide survey with emphasis on important coastal habitats and processes.

211. Coastal Systems Science II

First semester (Avery Point). Four credits. Three hours lecture and three hours laboratory. Prerequisite: MARN 170 and any two of the following: BIOL 107, 108; CHEM 127Q, 128Q; PHYS 121Q, 122Q, 131Q, 132Q. *Ward*

Biological, chemical, physical and geological structure and function of coastal systems; a worldwide survey with emphasis on important coastal habitats and processes.

212C. Measurement and Analysis in Coastal Ecosystems

First semester (Avery Point). Four credits. Two 1-hour lectures and two 3-hour laboratories. Required field trips. Prerequisite: MARN 170 and any two (2) of the following: BIOL 107, 108; CHEM 127Q, 128Q; PHYS 121Q, 122Q, 131Q, 132Q. *J. Kremer*

Examination of oceanographic processes in local coastal systems; collection and analyses of samples from field trips and lab experiments; data analysis using computers.

220Q. Environmental Reaction and Transport

Second semester. Four credits. Prerequisite: CHEM 127 and one additional semester of CHEM, BIOL or PHYS; one semester of calculus (MATH 112, 115, 118 or 120) or concurrent enrollment in Calculus (115, 118, 120). *Torgersen*

An introduction to the chemical/biological reactions and transport dynamics of environmental systems. Mass balances, elementary fluid mechanics and the coupled dynamics of lakes, rivers, oceans, groundwater and the atmosphere as biogeochemical systems.

230. Coastal Circulation and Sediment Transport

First semester (Avery Point). Three credits. Prerequisite: MARN 210 and 211; MATH 112 or 115 or 118 or 120.

Circulation and mixing in estuaries and the inner continental shelf, including surface gravity waves, tides, and buoyancy and wind-driven circulation. Coastal sediments, geomorphology, and processes of sedimentation, erosion and bioturbation. Required field trips.

235. Environmental Fluid Dynamics

First semester. Three credits. Recommended preparation: PHYS 122 or 132 or 142 or 152; and MATH 220 (may be taken concurrently). *Bogden*

Introduction to fluid dynamics with applications to coastal waters, estuaries, rivers, lakes, and ground water flows. Topics include waves, tides turbulence, mixing, drag, lift, effects on organisms, and wind driven circulation.

236. Marine Microbiology

(Also offered as MCB 236.) First semester (Avery Point) second semester (Storrs). Three credits. Two lecture-discussion class periods and one 2-hour laboratory period for which field trips may be substituted. Prerequisite: MCB 229 or instructor consent. *Visscher*

A general survey of the taxonomy, physiology and ecology of marine microorganisms.

240. Seminar on Marine Mammals

Joint program with Mystic Marinelifelife Aquarium. First semester. Three credits. One 3-hour class period; one field trip. Offered at Mystic Marinelifelife Aquarium. Prerequisite: one year college laboratory biology and permission of instructor.

Instructors from different areas of expertise discuss the natural history, evolution, anatomy, physiology, husbandry, and conservation of marine mammals. Current research is emphasized. (Special registration and fee: Contact Mystic Marinelifelife Aquarium, Mystic, CT 06355. 860-572-5955.)

241. Marine Invertebrate Biology: Adaptations and Community Structure

First semester (alternate years). Three credits. Prerequisites: BIOL 107 and 108. Recommended preparation: MARN 170 or instructor consent. *Ward*

Comparative examination of major adaptations and functional responses of marine invertebrates to biotic and abiotic factors in the marine environment. Field trips required.

242. Environmental Physiology of Marine Animals

First semester (alternate years). Three credits. Prerequisites: BIOL 107 and 108. Recommended preparation: MARN 170 or instructor consent. *Ward*

Introduction to the study of marine environmental physiology; behavioral and physiological adaptations of marine animals to different environments (intertidal, estuarine, coastal, oceanic); compensatory responses to changing ambient conditions; and basic animal energetics. Laboratory exercises focus on food consumption, energy transformations, and principles of physiological measurement.

244. Coastal Ecology

Joint program with Mystic Marinelifelife Aquarium. Summer. Three credits. Offered at Mystic Marinelifelife Aquarium. Prerequisite: One year college laboratory biology and permission of instructor.

A special introductory course providing students with theoretical as well as practical knowledge of ecological sampling techniques, estuarine productivity, and selected continental shelf communities. Laboratory portion of this course consists of a 5-day study cruise in coastal New England waters. (Special registration and fee: contact Mystic Marinelifelife Aquarium, Mystic, CT 06355. 860-536-4208.)

255W. Coastal Studies Seminar

Second semester (Avery Point). Two credits. Prerequisite: MARN 210 and 211 or instructor consent; ENGL 105 or 110 or 111 or 250.

Scientific analysis of coastal zone issues and their interdisciplinary implications. Written analysis and discussion of primary literature.

256. Science and the Coastal Environment

Second semester (Avery Point). Three credits. Prerequisite: MARN 210, 211, and 212; or at least two (2) of the following: MARN 270, 275, and 280. *J. Kremer*

Specific cases of multiple impacts on environmental resources and coastal habitats. Current scientific understanding as a basis for sociopolitical decision-making (e.g., land-use impacts on coastal processes in relation to zoning regulation and water-quality criteria).

260. Biological Oceanography

Second semester. Three credits. Prerequisite: MARN 270 and MARN 280 (both may be taken concurrently) or instructor consent. Open only with permission of department head. *Dam, Lin, Visscher*

An advanced course in biological processes in oceanic and coastal waters. Emphasis is on empirical and theoretical concepts of marine ecosystem dynamics, primary and secondary production and detrital cycling.

265. Molecular Approaches to Biological Oceanography

First semester. Three credits. Two-hour lecture, three-hour lab. Recommended preparation: one of BIOL 108, MARN 260, MCB 204. *Lin*

Principles and technology in nucleic acid purification and manipulation, DNA fingerprinting, gene cloning and sequencing, phylogenetic analysis, and detection of gene expression (mRNA and protein). Application examples in marine ecological studies.

270. Descriptive Physical Oceanography

First semester. Three credits. Prerequisite: PHYS 122, 142 or 152; MATH 114 or 116. *Codiga*

Ocean basin characteristics, properties of sea water, distribution of water masses, oceanic and atmospheric circulation, waves, tides, near-shore circulation, methods and instrumentation.

275. Geological Oceanography

First semester. Three credits. Prerequisite: One year of laboratory science in CHEM, GEOL, MARN and/ or PHYS or instructor consent. *Torgersen*

Basic concepts in geological oceanography, plate tectonics and the role of ocean floor dynamics in the control of the Earth and ocean system.

280. Marine Biogeochemistry

First semester. Three credits. Two 1-hour lectures. Prerequisite: CHEM 128, MATH 114 or 116, PHYS 122 or equivalents. *Fitzgerald*

Composition, origin and solution chemistry of sea water. Marine biogeochemical cycles of water, salt, carbon, nutrients, gases and trace elements. Effects of ocean circulation, biological cycles and crustal exchanges on the distribution and transfer of substances in the marine environment.

282. Coastal Pollution and Bioremediation

First semester (alternate years). Three credits. Two class periods, 1 two-hour lab period. Required preparation: BIOL 107, 108 and CHEM 127-128 or instructor consent. *Visscher*

Overview of processes and compounds leading to pollution in the nearshore marine environment. The impact of pollution on the marine foodweb and its response is emphasized. Alleviation of pollution through metabolism of organisms, including bacteria, seagrasses, and salt marshes.

294. Marine Biology

(Also offered as EEB 294.) First semester (Storrs) second semester (Avery Point). Three credits. Two class periods and one 2-hour laboratory period. Prerequisite: One year of laboratory biology. *Whitlatch/Storrs, McManus/Avery Point*

The study of the kinds and distributions of marine organisms. Particular attention is paid to biotic features of the oceans, organism-habitat and relationships and general ecological concepts influencing marine populations and communities. Field trips are required.

296. Variable Topics

Either semester. Three credits. With a change in topic, may be repeated for credit. Prerequisites and recommended preparation vary.

297. Internship in Marine Sciences

Either semester. Variable credits. With a change in topic, may be repeated for credit, not to exceed 3 credits. Recommended preparation: Nine credits of MARN courses at the Junior - Senior level. Consent of Instructor. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

An internship under the direction of MARN faculty. Placements stress application of academic training. A journal of activities is required. One credit may be earned for each 40 hours of pre-approved activities in a semester to a maximum of three credits.

298. Special Topics

Either semester. Credits and hours by arrangement. With a change in content, may be repeated for credit. Prerequisites and recommended preparation vary.

299. Independent Study

Either or both semesters. Credits and hours by arrangement. Open only with consent of instructor. May be repeated for credit.

Maritime Studies (MAST)

Program Coordinator: Professor Helen Rozwadowski
Office: Avery Point Campus, Academic Building, First Floor

For major requirements, see the College of Liberal Arts and Sciences section of this *Catalog*.

101. Introduction to Maritime Studies

First semester (Avery Point). Three credits.

An introduction to the interdisciplinary study of maritime-related topics with an examination of the maritime physical environment and maritime cultures, history, literature, and industries.

290. Supervised Internship in Maritime Studies

Either semester. Credits, not to exceed 3, and hours by arrangement. Prerequisite: completion of 9 credits of Maritime Studies core courses, and consent of the program coordinator. May be repeated for credit with change in content and program coordinator's consent.

Internship with institutions, businesses, or agencies engaged in areas directly related to Maritime Studies. Maritime Studies faculty supervisor, student, and field supervisor of host organization will jointly define a specific project to advance student's educational program as well as mission of the host institution. Grades will be based on performance of the learning contract and a final academic product.

297. Maritime Studies Capstone Seminar

Second semester (Avery Point). Three Credits. Prerequisite: MAST 101, MARN 135; open only to Marine Studies majors.

Topical themes related to diverse aspects of society and commerce in coastal and oceanic zones, such as African Americans and the maritime experience; politics and economics of fisheries; or cultural perspectives of Long Island Sound.

Marketing (MKTG)

Head of Department: Professor Susan Spiggle

Department Office: Room 349, School of Business

For major requirements, see the School of Business section of this *Catalog*. The School of Business requires students at the Storrs campus to participate in the Mobile Computing Initiative before registering for the courses listed below. See the School of Business *Catalog* section for details about how the program operates.

201. Introduction to Marketing Management

Either semester. Three credits. Prerequisite: ACCT 131, ECON 111 and 112 or 102, ENGL 110 or 111, or ENGL 105 and 109, MATH 106, or 114 or 116, STAT 100 or 110. Not open to students who have passed or are taking BADM 250.

An introduction to the marketing system, its foundations and institutions. Students are exposed to product, promotion, price, distribution decision areas, strategic alliances, relationship marketing, and total marketing quality.

208. Consumer Behavior

Either semester. Three credits. Prerequisite: MKTG 201. Not open for credit to students who have passed, or are currently enrolled in, MKTG 209.

The analysis of consumer decision processes as they relate to marketing management decision areas. Several models of consumer behavior are studied as are the psychological phenomena of learning, motivation, and attitude development, and the sociological influences of social class, reference groups and culture.

209. Industrial Buyer Behavior

Either semester. Three credits. Prerequisite: MKTG 201. Not open for credit to students who have passed, or are currently enrolled in, MKTG 208.

This course provides an analysis of industrial markets and develops the tools required to thoroughly analyze these markets for marketing strategies. Differences between consumer and industrial products and services will be emphasized. Emphasis will be on high technology products and services.

225. Integrated Marketing Communications

Either semester. Three credits. Prerequisite: MKTG 201 or BADM 250. Not open to students who have passed or are currently enrolled in COMM 280 or COMS 220.

The design, coordination, integration, and management of marketing communications. The course focuses on advertising and sales promotion with an emphasis on the competitive and strategic value of communications in the marketplace.

227. Product and Price Policies

First or second semester. Three credits. Prerequisite: MATH 106 or 114 or 116; STAT 100QC or 110QC; MKTG 201 or BADM 250.

Consideration in depth of the product and price variables as elements of marketing strategy and tactics. Emphasis will be placed on conceptual as well as decision-making aspects. The roles of technology, social change, innovation and creativity are included in the treatment of product. Institutional, behavioral, governmental and economic factors are included in the treatment of price.

241. Retail Management

First or second semester. Three credits. Prerequisite: MKTG 201 or BADM 250.

A study of the management of retail operations, including buying, pricing, inventory control and selling.

252. Professional Selling

Either semester. Three credits. Prerequisite: MKTG 201 or BADM 250.

This course focuses on the tactical and strategic aspects of the professional selling process with particular emphasis upon managing the complex sale. Topics include account entry strategies, effective investigative techniques, objection prevention, the client decision process, negotiation skills, and account development strategies. Learning tools will include: participant interaction, role plays, work groups, and case studies.

253. Sales Force Automation

Either semester. Three credits. Prerequisite: MKTG 201 and 252 and consent of instructor.

This course focuses on using technology to maximize sales force efficiency. Its focus is on enhancing the selling process and includes such topics as: building customer databases, segmenting and targeting high-value customers, forecasting sales opportunities, and communicating with customers efficiently utilizing customer relationship management technology. Learning tools will include: work groups, case studies, and special projects.

254. National/Global Account and Sales Management

Either semester. Three credits. Prerequisite: MKTG 201 or BADM 250 and MKTG 252.

This course focuses on managing large national/global accounts as well as the activities and problems of sales force management. Particular emphasis is placed on organizing the sales force, recruiting, training, compensation, motivation, forecasting, territory design, evaluation, and control. Learning tools include: interaction, role-playing, work groups, case studies, and outside business interactions.

265. Marketing on the Internet

First and/or second semester. Three credits. Prerequisite: MKTG 201 or BADM 250.

Topics include comparisons of business models in physical space and cyberspace and integration of marketing efforts among the world-wide-web, and other means of communications, distribution, and selling. This course relies on the Internet as a teaching tool. Students need access to a computer with an Internet Browser.

270. Global Marketing Strategy

First or second semester. Three credits. Prerequisite: MKTG 201; MKTG 208 or 209; MKTG 280 and senior class standing.

A study of the marketing concepts and analytical processes used in the development of programs in international markets. The course emphasizes comparative differences in markets, marketing functions, and political considerations. It includes the application of a systems approach to the evaluation of opportunity and to the solution of major global marketing problems. Emphasis is placed on the analysis and synthesis of marketing programs to determine the appropriate marketing mix for various international business enterprises.

280. Marketing Research

Either semester. Three credits. Prerequisite: MKTG 201 and OPIM 203.

This course covers strategies and techniques for obtaining and using market information from consumer and business-to-business markets. Emphasis on: translating managerial problems into research questions, designing research, selecting alternate research methods, and analyzing and interpreting market research data. Students gain hands on, computer based experience in analyzing market data.

281. Database Marketing

Either semester. Three credits. Prerequisite: MKTG 280.

The course introduces students to the concepts, technology and quantitative tools for creating, maintaining and exploiting customer databases. The course will have a strong hands-on methodological orientation with emphasis on applications involving real customer data. Students will learn about quantitative tools including those used for experimentation in test markets and measurement of customer lifetime value. Applications will include prospecting, market segmentation and targeting, product customization, cross-selling, brand equity, customer loyalty programs, and valuation of customers. The applications will span several different types of businesses including online retailing, financial services, high tech services, and traditional catalogue companies.

282. Marketing Planning and Strategy

First or second semester. Three credits. Prerequisite: MKTG 201, 208 or 209, 280, and senior class standing.

The application of a systems approach to the evaluation of opportunity and to the solution of major problems from the perspective of the top marketing executive. Emphasis is placed on the analysis and synthesis of marketing programs to determine the appropriate marketing mix for various business enterprises.

289. Professional Practice in Marketing

Either or both semesters. One to three credits. Hours by arrangement. Prerequisite: completion of Freshman - Sophomore level School of Business requirements and consent of instructor and Department Head. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

This course is designed to provide students with an opportunity for supervised field work in relevant major areas within the Department. Students will work with one or more professionals in the field of marketing. Student performance will be evaluated on the basis of an appraisal by the field supervisor and a detailed written report submitted by the student.

293. Foreign Study

Either or both semesters. Credits and hours by arrangement, up to a maximum of six credits. Consent of Department Head required, prior to student's departure.

Special topics taken in a foreign study program.

296. Senior Thesis in Marketing

Either semester. Three credits. Hours by arrangement. Prerequisite: Open only to Marketing Department Honor Students with consent of instructor and Department Head.

298. Special Topics

Either semester. Credits and hours by arrangement. Prerequisite: Announced separately for each offering. With a change in content, may be repeated for credit.

Classroom course in special topics as announced in advance for each semester.

299. Independent Study

Either or both semesters. Credits by arrangement, not to exceed six in any semester. Open only with consent of instructor and Department Head.

Individual study of special topics as mutually arranged between student and instructor.

Mathematics (MATH)

Head of Department: Professor Michael Neumann

Department Office: Room 123, Mathematical Sciences Building

For major requirements, see the College of Liberal Arts and Sciences section of this *Catalog*.

101. Basic Algebra with Applications

Either semester. Three credits. Not open to students who have passed any Q-course. Strongly recommended as preparation for Q-courses for students with a weak algebra background. This course does not count toward the minimum credit requirement for graduation.

Polynomials, exponents, Cartesian coordinate system, linear and quadratic equations, inequalities.

102Q. Problem Solving

Either semester. Three credits. Recommended preparation: MATH 101 or the equivalent. Not eligible for course credit by examination. Not open for credit to students who have passed any mathematics course other than MATH 101, 103, 105, 107, 108, or 109. *Vinsonhaler*

An introduction to the techniques used by mathematicians to solve problems. Skills such as Externalization (pictures and charts), Visualization (associated mental images), Simplification, Trial and Error, and Lateral Thinking learned through the study of mathematical problems. Problems drawn from combinatorics, probability, optimization, cryptology, graph theory, and fractals. Students will be encouraged to work cooperatively and to think independently.

103Q. Elementary Discrete Mathematics

Either semester. Three credits. Recommended preparation: MATH 101 or the equivalent. Not open for credit to students who have passed any mathematics course other than MATH 101, 102, 105, 107, 108, or 109.

Problem solving strategies, solutions of simultaneous linear equations, sequences, counting and probability, graph theory, deductive reasoning, the axiomatic method and finite geometries, number systems.

105Q. Mathematics for Business and Economics

Either semester. Three credits. Recommended preparation: MATH 101 or the equivalent.

Linear equations and inequalities, exponents and logarithms, matrices and determinants, linear programming. Applications.

106Q. Calculus for Business and Economics

Either semester. Three credits. (One credit for students who have passed MATH 113, 115, or 120.) Recommended preparation: MATH 101 or the equivalent and MATH 105. Not open for credit to students who have passed MATH 118.

Derivatives and integrals of algebraic, exponential and logarithmic functions. Functions of several variables. Applications.

107Q. Elementary Mathematical Modeling

Either semester. Three credits. Recommended preparation: MATH 101 or the equivalent. Not open to students who have passed any mathematics course other than MATH 101, 102, 103, 105, or 108. This course and MATH 109 cannot both be taken for credit. This course should not be considered as adequate preparation for MATH 106, 112, 115, or 120.

Use of algebraic and trigonometric functions with technology to analyze quantitative relationships and illustrate the role of mathematics in modern life; graphical numerical and symbolic methods. Most sections require a graphing calculator; some require work with a computer spreadsheet.

108QC. Mathematical Modeling in the Environment

Either semester. Three credits. Recommended preparation: MATH 101 or the equivalent. A solid background and good performance in high school algebra are highly recommended.

An interdisciplinary approach to environmental issues, such as: ground water contamination, air pollution, and hazardous materials handling. Emphasis on mathematical models, social and ethical implications, and physical and chemical principles. Includes a spread sheet program for water and air pollution data; a computer modeling package to analyze hazardous materials emergencies; creative use of the internet and field research.

109Q. Precalculus

Either semester. Three credits. Recommended preparation: MATH 101 or equivalent. Not open for credit to students who have passed MATH 112, 115, or 120. Students may not receive credit for this course and MATH 107.

Preparation for calculus. Review of algebra. Functions and their applications; in particular, polynomials, rational functions, exponentials, logarithms, and trigonometric functions.

112Q. Introductory Calculus 1

Either semester. Four credits. Four class periods. Recommended preparation: MATH 101 or the equivalent. Students cannot receive credit for MATH 112 and either MATH 115 or 120. Students who have not passed the Calculus Readiness Test take this course rather than MATH 115 or 120.

Limits, derivatives, and extreme values of algebraic functions, with supporting algebraic topics.

113Q. Introductory Calculus 2

Either semester. Four credits. Four class periods. Prerequisite: MATH 112. Recommended preparation: A grade of C- or better in MATH 112. Students cannot receive credit for MATH 113 and either MATH 115 or 120. May be used in place of MATH 115 or 120 to fulfill any requirement satisfied by MATH 115 or 120.

Limits, derivatives, and extreme values of trigonometric functions, with supporting trigonometric topics; anti-derivatives of algebraic and trigonometric functions; the definite integral and applications.

114Q. Introductory Calculus 3

Either semester. Four credits. Four class periods. Prerequisite: MATH 113. Recommended preparation: A grade of C- or better in MATH 113. Note: MATH 115 is not adequate preparation for MATH 114. Not open for credit to students who have passed MATH 116 or 121.

The transcendental functions, formal integration, polar coordinates, infinite sequences and series, lines and planes in three dimensions, vector algebra.

115Q or QC. Calculus I

Either semester. Four credits. Four class periods. Prerequisite: Passing score on the Calculus Readiness Test. Students cannot receive credit for MATH 115 and either MATH 112, 113, or 120. Suitable for students with some prior calculus experience. May be used in place of MATH 112 or 120 to fulfill any requirement satisfied by MATH 112 or 120.

Limits, continuity, differentiation, antidifferentiation, definite integrals, with applications to the physical and engineering sciences. Sections with QC credit integrate computer-laboratory activity.

116Q or QC. Calculus II

Either semester. Four credits. Four class periods. Prerequisite: MATH 113 or 115 or 120, or advanced placement credit for calculus (a score of 4 or 5 on the Calculus AB exam or a score of 3 on the Calculus BC exam). Recommended preparation: A grade of C- or better in MATH 113 and 115. Not open to students who have passed MATH 114 or 121. Substitutes for MATH 114 or 121 as a requirement.

Transcendental functions, formal integration, polar coordinates, infinite sequences and series, vector algebra and geometry, with applications to the physical sciences and engineering. Sections with QC credit integrate computer-laboratory activity.

118Q. A Survey of Calculus with Applications I

Either semester. Three credits. Recommended preparation: MATH 101 or the equivalent. Not open for credit to students who have passed MATH 106, 113, 115, or 120.

Derivatives and integrals of elementary functions including the exponential and logarithm functions; applications include optimization, marginal functions, exponential growth and decay, compound interest.

120Q. Enhanced Calculus I

Either semester. Four credits. Four class periods. Prerequisite: Passing score on the Calculus Readiness Test. Students cannot receive credit for MATH 120 and either MATH 113 or 115. May be used in place of MATH 113 or 115 to fulfill any requirement satisfied by MATH 113 or 115. Intended to provide superior preparation for prospective mathematics, science and engineering majors. Recommended for those who have taken a semester of calculus in high school.

The subject matter of MATH 115 in greater depth, with emphasis on the underlying mathematical concepts.

121Q. Enhanced Calculus II

Either semester. Four credits. Four class periods. Prerequisite: MATH 120 or advanced placement credit for calculus (a score of 4 or 5 on the calculus AB examination or a score of 3 on the Calculus BC examination). Not open for credit to students who have passed MATH 114 or 116. May be used in place of MATH 114 or 116 to fulfill any requirement satisfied by MATH 114 or 116. Intended to provide superior preparation for prospective mathematics, science and engineering majors. Recommended for those who have taken a semester of calculus in high school.

The subject matter of MATH 116 in greater depth, with emphasis on the underlying mathematical concepts.

193. Foreign Study

Either or both semesters. Credits and hours by arrangement. May be repeated for credit (to a maximum of 15 for MATH 193 and 293 together). Consent of the Department Head or Undergraduate Coordinator required, normally before the student's departure.

195. Special Topics Lecture

Either semester. Credits, prerequisites, and hours as determined by the Senate Curricula and Courses Committee. May be repeated for credit with a change in topic.

200. Undergraduate Seminar I

Either semester. One credit. Prerequisite: MATH 210 or 220; and MATH 211 or 221.

The student will attend 6-8 seminars per semester and choose one mathematical topic to investigate in detail. The student will write a well-revised, comprehensive paper on this topic, including a literature review, description of technical details, and a summary and discussion.

201W. Undergraduate Seminar II

Either semester. One credit. Prerequisite: MATH 200; ENGL 105 or 110 or 111 or 250.

The student will attend 6-8 seminars per semester and choose one mathematical topic to investigate in detail. The student will write a well-revised, comprehensive paper on this topic, including a literature review, description of technical details, and a summary and discussion, building upon the writing experience in MATH 200.

202W. Pedagogical Seminar

Either semester. One credit. Corequisite: MATH 210. Prerequisite: ENGL 105 or 110 or 111 or 250. Open to sophomores or higher.

Weekly seminars and short essays reflecting on the learning experiences and content of MATH 210.

204. Introduction to Mathematical Modeling

Either semester. Three credits. Prerequisite: MATH 221; or MATH 211 and 227. Knowledge of a programming language is strongly recommended. Not open for credit to students who have passed MATH 304 or 305, CHEM 305, or PHYS 305.

Construction of mathematical models in the social, physical, life and management sciences. Linear programming, simplex algorithm, duality. Graphical and probabilistic modeling. Stochastic processes, Markov chains and matrices. Basic differential equations and modeling.

210Q. Multivariable Calculus

Either semester. Four credits. Four class periods. Prerequisite: MATH 116 or 121 or a score of 4 or 5 on the Advanced Placement Calculus BC exam. Recommended preparation: A grade of C- or better in MATH 116. Not open for credit to students who have passed MATH 220. Open to sophomores or higher.

Two- and three-dimensional vector algebra, calculus of functions of several variables, vector differential calculus, line and surface integrals.

211Q. Elementary Differential Equations

Either semester. Three credits. Prerequisite: MATH 116 or 121. Recommended preparation: A grade of C- or better in MATH 116; and MATH 210 or 220. Not open for credit to students who have passed MATH 221. Open to sophomores or higher.

Introduction to ordinary differential equations and their applications, linear differential equations, systems of first order linear equations, numerical methods.

213. Transition to Advanced Mathematics

Either semester. Three credits. Prerequisite: MATH 210 or 220 or instructor consent. Open to sophomores or higher. Not open for credit to students who have passed MATH 214 or CSE 254. Students intending to major in mathematics should ordinarily take this course or MATH 214 during the third or fourth semester.

Basic concepts, principles, and techniques of mathematical proof common to higher mathematics. Logic, set theory, counting principles, mathematical induction, relations, functions. Concepts from abstract algebra and analysis.

214. Introduction to Discrete Systems

Either semester. Three credits. Prerequisite: CSE 111 or 130C or instructor consent. Open to sophomores or higher. Not open for credit to students who have passed MATH 213 or CSE 254. Students who intend to major in mathematics should ordinarily take this course or MATH 213 during the third or fourth semester.

Mathematical methods for characterizing and analyzing discrete systems. Modern algebraic concepts, logic, set theory, grammars and formal languages, and graph theory. Applications to the analysis of computer systems and computational structures.

215. Abstract Linear Algebra

Either semester. Alternate years. Three credits. Prerequisite: MATH 227 and MATH 213 or 214.

Vector spaces and linear transformations over fields.

216. Abstract Algebra I

Either semester. Three credits. Prerequisite: MATH 213 or 214. Recommended preparation: MATH 215 or 227.

The fundamental topics of modern algebra including elementary number theory, groups, rings, polynomials and fields.

217. Abstract Algebra II

Either semester. Three credits. Prerequisite: MATH 216.

Topic chosen from modules, linear algebra, geometric algebra, extension fields, algebraic coding, algebraic combinatorics.

220Q. Enhanced Multivariable Calculus

Either semester. Four credits. Prerequisite: MATH 121 or instructor consent. Open to sophomores or higher. Not open to students who have passed MATH 210. MATH 220 satisfies any requirement met by MATH 210, and provides superior preparation for prospective mathematics, science, and engineering majors.

The subject matter of MATH 210 in greater depth, with emphasis on the underlying mathematical concepts.

221Q. Enhanced Differential Equations

Either semester. Three credits. Prerequisite: MATH 121 or instructor consent. Not open to students who have passed MATH 211. Open to sophomores or higher. MATH 221 satisfies any requirement met by MATH 211, and provides superior preparation for prospective mathematics, science, and engineering majors.

The subject matter of MATH 211 in greater depth, with emphasis on the underlying mathematical concepts.

223Q. Geometry

Either semester. Three credits. Prerequisite: MATH 113 or 115 or 120. MATH 113 may be taken concurrently. Open to sophomores or higher.

Deductive reasoning and the axiomatic method, Euclidean geometry, parallelism, hyperbolic and other non-Euclidean geometries, geometric transformations.

224. Projective Geometry

Either semester. Three credits. Prerequisite: MATH 213.

Finite and infinite geometries as logical systems based on axioms. Synthetic and analytic projective geometry.

225. Differential Geometry

Either semester, alternate years. Three credits. Prerequisite: MATH 210 and 211, and MATH 213 or 214.

The in-depth study of curves and surfaces in space.

227Q. Applied Linear Algebra

Either semester. Three credits. Prerequisite: MATH 116 or 121. Recommended preparation: A grade of C- or better in MATH 116. Not open for credit to students who have passed MATH 215. Open to sophomores or higher.

Systems of equations, matrices, determinants, linear transformations on vector spaces, characteristic values and vectors, from a computational point of view. The course is an introduction to the techniques of linear algebra with elementary applications.

231. Probability

Either semester. Three credits. Prerequisite: MATH 210 or 220, which may be taken concurrently with the consent of the instructor.

Introduction to the theory of probability. Discussion of some of the probability problems encountered in scientific and business fields.

232. Elementary Stochastic Processes

(Also offered as STAT 235.) Either semester. Three credits. Prerequisite: STAT 220 or 224 or 230 or MATH 231. Not open for credit to students who have passed STAT 235.

Conditional distributions, discrete and continuous time Markov chains, limit theorems for Markov chains, random walks, Poisson processes, compound and marked Poisson processes, and Brownian motion. Selected applications from actuarial science, biology, engineering, or finance.

235. Introduction to Mathematical Logic

Either semester, alternate years. Three credits. Prerequisite: MATH 213 or 214 or CSE 207. PHIL 211 is recommended.

Formalization of mathematical theories, elementary model theory with applications to algebra, number theory, and non-standard analysis. Additional topics: Elementary recursion theory and axiomatic set theory. Emphasis on the applications of logic to mathematics rather than the philosophical foundations of logic.

237. Theory of Computability

Either semester, alternate years. Three credits. Prerequisite: MATH 213 or 214 or CSE 254.

Finite automata and regular languages, pushdown automata and context-free languages and grammars. Turing machines, recursively enumerable sets and grammars, Church's thesis, the halting problem, and other undecidable problems. Computational complexity and NP-completeness.

242W. History of Mathematics

Either semester, alternate years. Three credits. Prerequisite: MATH 210 and 211, or 221; ENGL 105 or 110 or 111 or 250. This course may not be counted in any of the major groups described in the Mathematics Departmental listing.

A historical study of the growth of the various fields of mathematics.

247Q-248Q. Fundamentals of Algebra and Geometry

Either semester. Three credits each semester. Prerequisite: PSYC 132 and three credits of Mathematics other than MATH 101. Not open for credit to students who have passed MATH 210 or 211 or 220. This course may not be counted in any of the major groups described in the Mathematics Departmental listing.

The development of the number system with applications to elementary number theory and analytic geometry. This course is recommended for students in elementary education.

250. Elements of Topology

Either semester, alternate years. Three credits. Prerequisite: MATH 213 or 214.

Metric spaces, topological spaces and functions, topological properties, surfaces, elementary topics in geometric topology.

252. Introduction to Complex Variables

(Also offered as MATH 352.) Either semester. Three credits. Prerequisite: MATH 210 and 211, or 221. Not open for credit to students who have passed MATH 352.

Functions of a complex variable, integration in the complex plane, conformal mappings.

255. Principles of Computer Graphics

Either semester. Three credits. Prerequisite: CSE 111 or 130, MATH 227 or 215, MATH 210, and consent of instructor. Not open for credit to students who have passed CSE 275.

Representation of two- and three-dimensional data, internal representation of data structures, transformations, mapping of functions to graphics screen, graphics hardware. Programming projects assigned.

258. Introduction to Number Theory

Either semester, alternate years. Three credits. Prerequisite: MATH 213 or 214.

Congruences, unique factorization, primitive roots, numerical functions, quadratic reciprocity and other selected topics, with emphasis on problem solving.

272. Differential Equations for Applications

Either semester. Three credits. Prerequisite: MATH 210 and 211, or 221. Not open for credit to students who have passed MATH 279.

Series solutions of differential equations, Bessel functions, Fourier series, partial differential equations and boundary value problems, nonlinear differential equations.

273-274. Analysis

Either semester. Three credits each semester. Prerequisite: MATH 213 or 214, and 211 or 221.

Introduction to the theory of functions of one and several real variables.

277. Applied Analysis

(Also offered as MATH 377.) Either semester. Three credits. Prerequisite: MATH 272. Offered in alternate years. Not open for credit to students who have passed MATH 377.

Convergence of Fourier Series, Legendre and Hermite polynomials, existence and uniqueness theorems, two point boundary value problems, and Green's functions.

278. Partial Differential Equations

(Also offered as Mathematics 378.) Either semester, alternate years. Three credits. Prerequisite: MATH 272 or its equivalent. Not open for credit to students who have passed MATH 378.

Solution of first and second order partial differential equations with applications to engineering and the sciences.

279. Introduction to Field Theory

Either semester. Three credits. Prerequisite: MATH 210 and 211. Not open for credit to students who have passed MATH 272.

Vector analysis in rectangular, circular-cylindrical and spherical coordinates, postulational derivation of the partial differential equations of classical physics, Fourier series, Bessel and Legendre functions, solutions of Laplace, Poisson, diffusion and scalar and vector wave equations.

281. Numerical Analysis I

Either semester. Three credits. Prerequisite: MATH 210Q, 211Q, and either 215 or 227Q; and knowledge of at least one programming language.

Analysis of numerical methods associated with linear systems, eigenvalues, inverses of matrices, zeros of non-linear functions and polynomials. Roundoff error and computational speed.

282. Numerical Analysis II

Either semester. Three credits. Prerequisite: MATH 281.

Approximate integration, difference equations, solution of ordinary and partial differential equations.

283. Calculus and Probability Problems

Either semester. One or two credits. Hours by arrangement. Prerequisite: MATH 210 and 231.

Problems in calculus and probability designed to help students prepare for the first actuarial examination.

285. Financial Mathematics I

(Also offered as MATH 365.) Either semester. Three credits. Prerequisite: MATH 114, 116, or 121.

The mathematics of measurement of interest, accumulation and discount, present value, annuities, loans, bonds, and other securities.

286. Introduction to Operations Research

(Also offered as STAT 286 and STAT 356.) Either semester. Three credits. Prerequisite: MATH 231 or STAT 220 or 230. Not open for credit to students who have passed STAT 286 or 356.

Introduction to the use of mathematical and statistical techniques to solve a wide variety of organizational problems. Topics include linear programming, network analysis, queueing theory, decision analysis.

287-288. Actuarial Mathematics

(Also offered as MATH 387-388.) Either semester. Three credits each semester. Prerequisite: MATH 231 or STAT 230; and MATH 285, which may be taken concurrently.

Survival distributions, claim frequency and severity distributions, life tables, life insurance, life annuities, net premiums, net premium reserves, multiple life functions, and multiple decrement models.

289. Financial Mathematics II

Either semester. Three credits. Prerequisite: MATH 285. Also ACCT 131, which may be taken concurrently.

The continuation of MATH 285. Measurement of financial risk, the mathematics of capital budgeting, mathematical analysis of financial decisions and capital structure, and option pricing theory.

290. Field Study Internship

Either or both semesters. One to three credits. May be repeated for credit (to a maximum of 6 credits). Consent of the Department Head, Director of the Actuarial Program, or the Undergraduate Coordinator required. Prerequisite: Completion of Freshman - Sophomore level requisite courses in the major. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

292W. Senior Thesis in Mathematics

Either semester. Three credits. Prerequisite: ENGL 105 or 110 or 111 or 250. Open only by consent of Department Head or Departmental Honors Committee.

The student should define a general subject area for the thesis before choosing a thesis advisor and seeking consent at the time of registration. The student should submit a written proposal for the senior thesis to the advisor by the end of the semester preceding enrollment for thesis credit.

293. Foreign Study

Either or both semesters. Credit and hours by arrangement. May be repeated for credit (to a maximum of 15 for MATH 193 and 293 together). Consent of the Department Head or Undergraduate Coordinator required, normally before the student's departure. May count toward the major with consent of the Advisor and either the Department Head or Undergraduate Coordinator.

295. Variable Topics

Either semester. Three credits. With a change in topic, may be repeated for credit. Prerequisites and recommended preparation vary.

296. Problem Seminar

Either semester. One credit. One class period. Prerequisite: MATH 114, 116, or 121. Open to sophomores or higher. This course, with a change of topic, may be repeated for credit.

Problem sequences selected from algebra, geometry, calculus, combinatorics, and other branches of mathematics, designed to introduce mathematical concepts and to give experience in problem solving.

297. Undergraduate Seminar

Either semester. Three credits. Open only with consent of instructor. This course, with a change of topic, may be repeated for credit.

298. Special Topics

Either semester. Credits and hours by arrangement. With a change in content, may be repeated for credit. Prerequisites and recommended preparation vary.

299. Independent Study

Either semester. Credits and hours by arrangement. Open only with consent of instructor. This course, with a change of topic, may be repeated for credit.

Mechanical Engineering (ME)

Head of Department: Professor Ranga Pitchumani
Department Office: Room 480, United Technologies Engineering Building

For major requirements, see the School of Engineering section of this *Catalog*.

214. Dynamics of Particles and Rigid Bodies

Second semester. Three credits. Prerequisite: CE 212.

Kinematics and dynamics of particles. Motion relative to translating and rotating observers; inertial reference systems; central forces and orbits. Kinematics and dynamics of groups of particles and rigid bodies. Lagrangian description of motion.

217. Metal Cutting Principles

First semester. Three credits. Two class periods and one 2-hour laboratory period. Prerequisite: CE 287 and MMAT 202 which may be taken concurrently.

Examination of metal cutting processes including turning, shaping, drilling, grinding. Mechanics of two and three dimensional cutting. Principles and mechanisms of wear. Tool materials. Theoretical prediction of surface finish. Chemistry of cutting fluids. Laboratory period includes operation of

machine tools. Experimental determination of cutting energies forces, stresses and strains. The interrelationship between these and practical metal cutting conditions.

218. Manufacturing Systems

Second semester. Three credits. Two class periods and one 2-hour laboratory period. Prerequisite: ME 217, which may be taken concurrently.

A study of process aspects of manufacturing with particular references to metal joining and casting. Relationship between manufacturing process and product design. Basic elements of numerically controlled metal processing systems. Organization required to manufacture.

220. Dynamics of Mechanical Systems

Second semester. Three credits. Prerequisite: MATH 210 and 211 and CE 215 or 212.

Free and forced vibrations, with damping, of linear systems with one and two degrees of freedom. Transient vibrations. Vibration isolation. Rigid rotor balancing. Elements of Laplace transforms.

221. Manufacturing Automation

First semester. Three credits. Prerequisite: Consent of instructor. Not open to students who have passed ME 386.

Introduction to Computer Integrated Manufacturing (CIM). Fundamentals of automated manufacturing; Computer Numerical Control (CNC); production economics and optimization of production systems.

222. Production Engineering

Second semester. Three credits. Prerequisite: Consent of instructor. Not open to students who have passed ME 387.

Introduction to the modern techniques of Production Systems including the Decision-Making Process, Economic Analysis, Demand Forecasting, Production and Process Design and Optimization, Production Scheduling, and Statistical Quality Control.

224. Analysis and Design of Mechanisms

First semester. Three credits. Prerequisite: MATH 210 and 211 and CE 211.

Application of kinematics in the analysis and synthesis of mechanisms. Type and dimensional design of linkages, cams and gears based on motion requirements and kinetostatic force transmission, in contrast to the strength requirements. Graphical, analytical and computer methods in analysis and design of mechanisms. Design considerations in mechanism synthesis. Design project.

225. Computer-Aided Design, Modeling, and Graphics

Both semesters. Three credits. Prerequisite: CSE 123, CE 287, MATH 210 and consent of instructor.

Introduction to computer-aided graphics, modeling and design. Applications of graphics software and hardware with mini- and micro-computer systems. Interactive computer graphic techniques. Extensive laboratory study of wire-frame and raster computer graphics. Static and dynamic graphic presentation methods.

227. Design of Machine Elements

First semester. Three credits. Prerequisite: CE 287.

Application of the fundamentals of engineering mechanics, materials and manufacturing to the design and analysis of machine elements.

228. Introduction to Fatigue in Mechanical Design

Second semester. Three credits. Prerequisite: CE 287. Not open to students who have passed ME 365.

Design calculation methods for fatigue life of engineering components. Crack initiation and crack propagation fatigue lives; introduction to current literature in the field. Emphasis on finite life prediction by strain life methods.

229. Machine Design

Second semester. Three credits. Prerequisite: CE 287. This course and CE 289 may not both be taken for credit.

Torsion of machine members with noncircular cross sections. Elastic stability and buckling. General methodology of stress analysis. Introduction to the theory of elasticity. Beams on elastic foundation. The energy method.

230. Linear Automatic Control Systems

Semester by arrangement. Three credits. Prerequisite: MATH 210 and 211.

Consolidated treatment of system analysis including modelling of electromechanical, pneumatic, hydraulic, thermal, and mechanical systems and their components. Closed loop control concepts related to these systems. Stability, instability issues. Basic treatment of Routh analysis, root locus, Bode, and Nyquist criterion. A hands-on open-ended control design project.

233. Thermodynamic Principles

Second semester. Three credits. Prerequisite: CHEM 127Q, PHYS 151Q and MATH 210Q which may be taken concurrently. Open to sophomores or higher.

Introduction to the First and Second Laws of Thermodynamics. Thermodynamic properties of pure substances and ideal gases. Analysis of ideal and real processes – including turbines, pumps, heat exchangers, and compressors.

234. Applied Thermodynamics

First semester. Three credits. Prerequisite: ME 233 or CHEG 211. Open to sophomores or higher.

Thermodynamic first and second law analysis of vapor and gas cycles, property relations for simple pure substances, properties of ideal gas mixtures, psychrometry, fundamentals of combustion thermodynamics, application of thermodynamics in the design of thermal engineering systems.

239. Pollution from Combustion

Either semester. Three credits. Prerequisite: ME 234.

Introduction to combustion processes and chemical kinetics. Mechanism of the formation of pollutants such as nitrogen oxides, carbon monoxide, soot, and unburned hydrocarbons in stationary and vehicular power plants.

240. Principles of Combustion

First semester. Three credits. Prerequisite: ME 234, and 250, or equivalent.

A first course in combustion introducing some basic chemical thermodynamics and chemical kinetics principles as a background for an elementary treatment of flame propagation in pre-mixed mixtures, diffusion flames, explosions and detonations. Some aspects of coal combustion will also be discussed.

242. Heat Transfer

First semester. Three credits. Prerequisite: ME 233, and 250.

Fundamentals of conduction, convection and radiation heat transfer. Application of the general laws of heat transfer, and heat exchange to a wide variety of practical problems. The analytical, numerical, and graphical solution of one, two, and three dimensional problems.

245. Aerodynamics

Semester by arrangement. Three credits. Prerequisite: MATH 210 and 211 and either ME 250 or CE 297.

Application of fluid mechanics to the aerodynamics of flight. Classical inviscid theory for two-dimensional shapes and finite-span wings.

250. Fluid Dynamics I

Second semester. Three credits. Prerequisite: ME 233, and MATH 210 and 211. This course and CE 297 may not both be taken for credit.

Laws of conservation of mass, momentum, and energy in fluid systems, fluid statics, dimensional analysis, incompressible, inviscid and viscous flows, steady and unsteady flows, internal and external flows.

251. Fluid Dynamics II

Either semester. Three credits. Prerequisite: ME 250 or CE 297.

One-dimensional compressible flow with applications to propulsion systems and gas-dynamic testing devices. Flows with friction and heat addition. Normal and oblique shock waves. Prandtl-Meyer flow. Selected topics in liquid flow.

253. Linear Systems Theory

First semester. Three credits. Prerequisite: CE 212 and MATH 211Q.

Mathematical modeling of dynamic systems, linearization of nonlinear behavior, Laplace domain representation of dynamics, transfer functions, block diagram algebra, signal-flow graphs, Mason's rule, transient analysis of system response, convolution integral, Duhamel's integral, Green's function, stability of linear systems, Routh-Hurwitz method, root locus, frequency response, Bode and polar representations, introduction to feedback systems.

255. Computational Mechanics

First semester. Three credits. Prerequisite: MATH 211Q and CE 287.

Topics include elementary numerical analysis, finite differences, initial value problems, ordinary and partial differential equations and finite element techniques. Applications include structural analysis, heat transfer, and fluid flow.

257. Mechanical Engineering Analysis

Either semester. Three credits. Three class periods. Prerequisite: MATH 211Q.

Introduction to the applied mathematical techniques in mechanical systems, heat transfer, fluid mechanics, and thermodynamics. Methods involving the application of partial differential equations, linear algebra, Fourier series, Bessel functions and Laplace transform will be treated within the context of mechanical engineering. Case studies will be employed where appropriate.

260W. Measurement Techniques

Second semester. Three credits. Two class periods and one 2-hour laboratory period. Prerequisite: ECE 220; ENGL 105 or 110 or 111 or 250.

Theory and practice of measurement including analysis and application of electromechanical transducers. Methods of measuring length, area, time, pressure, temperature, force and strain. The determination of the phase relation between a driving potential and the response of a system. The application of statistical methods to analysis of experimental data.

262. Introductory Thermo-Fluids Laboratory

First semester. Three credits. One class period and one 3-hour laboratory period. Prerequisite and corequisite: ECE 220 and ME 233.

Introduction to experimental methods in Mechanical Engineering. Review and use of pressure, temperature, and flow measuring devices. Data acquisition and analysis including use of computers. Principles of good experimental design. Experiments selected mainly from within the thermo-fluids area.

263. Experimental Mechanical Engineering I

(Formerly offered as ME 264W.) First semester. Four credits. Two class periods and one 3-hour laboratory period. Prerequisite: ME 242 and ME 250, both of which may be taken concurrently.

Analyses of basic engineering problems with subsequent verification of the analyses.

270. Engineering Design Project

Second semester. Four credits. Two 3-hour laboratory periods. Prerequisite: ME 227.

Design of a device, machine, process, or system. Students working singly and in small groups produce a solution to an engineering design problem, from first concepts through preliminary sketches, analysis, construction, evaluation and report. A written report and oral presentation of the design project are required. Shop safety qualification is required.

272. Senior Design Project I

First semester. Three credits. Prerequisite: ME 250; ME 227, may be taken concurrently.

This course is the first part of the senior design experience. It will cover topics on design process, planning, and costs. Design for manufacture and assembly will be covered. Both oral and written reports are required.

273W. Senior Design Project II

Second semester. Three credits. Prerequisites: ME 272, 260, and 262; ENGL 105 or 110 or 111 or 250.

Projects which have started in the previous semester will be completed. The project analysis, design, and manufacture stages will take place. Both written and oral reports will be required.

295. Special Topics in Mechanical Engineering

Semester, credits and hours by arrangement or as announced. Prerequisite and/or consent: Announced separately for each course. This course, with a change in topic, may be repeated for credit.

A classroom course on special topics as announced.

298. Mechanical Engineering Undergraduate Seminar

Second semester. One credit. One class period. Open only to seniors in mechanical engineering.

Presentation and discussion of advanced topics in mechanical engineering.

299. Problems in Mechanical Engineering

Semester and hours by arrangement. Credits by arrangement, not to exceed four. Open only to seniors in mechanical engineering. This course, with a change in topic, may be repeated for credit.

This course is designed primarily for students who wish to pursue a special line of study or investigation. The program of study is to be approved by the head of the department and by the instructor before registration is completed.

Medical Laboratory Sciences Programs (MLS)

Cytotechnology Program Director: Nancy Smith
Office: University of Connecticut Health Center, Farmington Campus

See Susan Gregoire, Director of Academic Affairs for program information, Room 327, Koons Hall.

Diagnostic Genetic Sciences Program Director: Martha B. Keagle

Diagnostic Genetic Sciences Program Office: Room 222, Koons Hall

Medical Technology Program Director: Rosanne Lipcius

Medical Technology Program Office: Room 214, Koons Hall

For major requirements, see the School of Allied Health section of this *Catalog*.

200. Basic Laboratory Techniques in Medical Laboratory Sciences

First semester. Three credits. One 2-hour lecture and one 2-hour laboratory period. Open to students in the following majors: Cytotechnology, Medical Technology, and Diagnostic Genetic Science.

Introduction to diagnostic genetic sciences, diagnostic molecular technologies, cytotechnology and medical technology, microscopy, laboratory safety, medical terminology, staining theory and technique, hematopoiesis, phlebotomy, laboratory equipment and volumetrics, quality assurance, interdisciplinary case studies.

206. Anatomy and Physiology for the Medical Laboratory Sciences

First semester. Two 1-1/2-hour lectures and one two-hour laboratory period. Prerequisite: CHEM 128Q; and two of the following four courses: BIOL 103, BIOL 107, BIOL 108, PNB 264; one of which may be taken concurrently. Open to students in the following majors: Cytotechnology, Medical Technology, and Diagnostic Genetic Science; others with consent of instructor. Not open for credit for students who have passed PNB 265.

A systemic approach to the study of anatomy and physiology specific to the Medical Laboratory Sciences. The structure and function of each organ system will be discussed.

208. Immunology for the Medical Laboratory Sciences

Second semester. Three credits. Three hours of lecture. Recommended preparation: MT 210 or MCB 229 which may be taken concurrently. Open to students in the following majors: Cytotechnology, Medical Technology, and Diagnostic Genetic Science; others with consent of instructor.

Mechanisms of innate and acquired immunity, antigen-antibody interactions, function of the human immune system in normal and diseased states.

208W. Immunology for the Medical Laboratory Sciences

Prerequisite: ENGL 105 or 110 or 111 or 250. Open to students in the following majors: Cytotechnology, Medical Technology, and Diagnostic Genetic Science; others with consent of instructor.

298. Special Topics

Either semester. Credits and hours by arrangement. Prerequisite: The completion of all Freshman - Sophomore level requirements in Medical Laboratory Sciences. Open only with consent of instructor. May be repeated for credit.

Application of the scientific method of inquiry to planning, implementing, evaluating and reporting a study of a problem related to the medical laboratory.

299. Independent Study for Undergraduates

Either semester. Credits and hours by arrangement. Open only with consent of the instructor. May be repeated for credit.

This course is designed primarily for students who wish to extend their knowledge in some specialized area in the field of cytology, diagnostic genetic sciences, clinical laboratory medicine or medical technology.

Medical Technology (MT)

Medical Technology Program Director:

Rosanne Lipcius

Program Office: Room 214, Koons Hall

For major requirements, see the School of Allied Health section of this *Catalog*.

210. Infectious Disease Process I

First semester. Four credits. One 2-hour lecture, 4 hours of laboratory. Prerequisite: CHEM 141 or MCB 203 or MCB 204 which may be taken concurrently. Open only to Medical Technology majors; others with consent of Medical Technology Program Director. Not open for credit for students who have passed MCB 229.

Fundamentals of microbial classification, structure, growth and metabolism. Principles of disease and epidemiology, mechanisms of pathogenicity and identification of bacteria causing human disease.

213. Clinical Immunology and Virology

Either semester. Three credits. Prerequisite: To enroll in the course the student must earn a "C" or better in MLS 208 or 208W, which may be taken concurrently. Open only to Medical Technology majors; others with consent of Medical Technology Program Director.

Immune responses in normal and diseased states; methods for the detection of antigens and antibodies in blood and body fluids; introduction to virology and immunology methods for the diagnosis of viral diseases.

215. Molecular Techniques for Medical Technologists

Second semester. Two credits. Prerequisite: BIOL 107 and CHEM 127 and 128. Open only to Medical Technology majors. *Lipcius*

Theory and techniques of molecular diagnostic testing in clinical settings, including DNA isolation, blotting techniques and polymerase chain reaction.

250. Clinical Chemistry and Instrumentation

Either semester. Five credits. Prerequisite: MCB 203. Open only to Medical Technology majors; others with consent of Medical Technology Program Director.

Manual and automated methods for the biochemical analysis of blood and body fluids; principles of operation, maintenance, and troubleshooting of laboratory instruments. Evaluation of test results in normal and diseased states.

251. Clinical Chemistry Laboratory

Both semesters. Three credits. Prerequisite: To enroll in the course the student must earn a "C" or better in MT 250. Open only to Medical Technology majors; others with consent of Medical Technology Program Director.

Application of the theory and techniques learned in MT 250 to the clinical laboratory setting. Understanding work flow, teamwork, evaluation of normal and abnormal results; instrumentation and quality assurance in the general laboratory environment.

252. Infectious Disease Process II

Either semester. Two credits. Prerequisite: To enroll in the course the student must earn a "C" or better in MT 210. Open only to Medical Technology majors; others with consent of Medical Technology Program Director.

Isolation and identification of pathogenetic and opportunistic fungi that infect humans, pathogenesis and identification of human parasites and correlation of organisms to disease states.

260. Theory of Phlebotomy

Either semester. One credit. Prerequisite: To enroll in the course the student must earn a "C" or better in MLS 200. Open only to Medical Technology majors; others with consent of Medical Technology Program Director. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Venipuncture and special phlebotomy techniques, safety, ethics, and management of phlebotomy services.

261. Phlebotomy Laboratory

Either semester. One credit. Prerequisite: To enroll in the course the student must earn an "S" or better in MT 260. Open only to Medical Technology majors; others with consent of Medical Technology Program Director. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Application of the theory and techniques learned in MT 260 to the clinical laboratory setting. Understanding work flow, scheduling, teamwork, and quality assurance in the general laboratory environment.

264. Hematology

Both semesters. Three credits. Prerequisite: To enroll in the course the student must earn a "C" or better in MLS 200. Open only to Medical Technology majors; others with consent of Medical Technology Program Director.

Principles of hemostasis, blood cell formation, morphology, function and kinetics; pathophysiology of coagulation and blood cell disorders; principles and procedures used to evaluate coagulation and blood cells in blood and body fluids; laboratory practice in microscopic evaluation.

266. Clinical Microbiology

Both semesters. Four credits. Prerequisite: To enroll in the course the student must earn a "C" or better in MT 210. Open only to Medical Technology majors; others with consent of Medical Technology Program Director.

Isolation and identification of normal flora and clinically significant bacteria and fungi from clinical specimens, correlation of the organisms isolated to disease states, and susceptibility testing of bacteria.

267. Clinical Microbiology Laboratory

Both semesters. Four credits. Prerequisite: To enroll in the course the student must earn a "C" or better in MT 266. Open only to Medical Technology majors; others with consent of Medical Technology Program Director.

Application of the theory and techniques learned in MT 252 and MT 266 to the clinical laboratory setting. Understanding work flow, teamwork, evaluation of normal and abnormal results, instrumentation, and quality assurance in the general laboratory environment.

269. Clinical Immunology Laboratory

Both semesters. One credit. Prerequisite: To enroll in the course the student must earn a "C" or better in MT 213. Open only to Medical Technology majors; others with consent of Medical Technology Program Director.

Application of the theory and techniques learned in MT 213 to the clinical laboratory setting. Understanding work flow, teamwork, evaluation of normal and abnormal results, instrumentation, and quality assurance in the general laboratory environment.

270. Transfusion Services

Both semesters. Two credits. Prerequisite: To enroll in the course the student must earn a "C" or better in MLS 208 or 208W. Open only to Medical Technology majors; others with consent of Medical Technology Program Director.

Human blood groups, HLA antigens, compatibility testing, donor selection, and their relationship to transfusion and transplantation. Evaluation of laboratory results for selection of blood components for therapy.

272. Urinalysis

Both semesters. One credit. Prerequisite: To enroll in the course the student must earn a "C" or better in MLS 200. Open only to Medical Technology majors; others with consent of Medical Technology Program Director.

Renal physiology, chemical and microscopic examination of urine, correlation of results with disease states, chemical analysis of feces.

273. Urinalysis Laboratory

Both semesters. One credit. Prerequisite: To enroll in the course the student must earn a "C" or better in MT 272. Open only to Medical Technology majors; others with consent of Medical Technology Program Director.

Application of the theory and techniques learned in MT 272 to the clinical laboratory setting. Understanding work flow, teamwork, evaluation of normal and abnormal results, instrumentation and quality assurance in the general laboratory setting environment.

274. Hematology Laboratory

Both semesters. Three credits. Prerequisite: To enroll in the course the student must earn a "C" or better in MT 264. Open only to Medical Technology majors; others with consent of Medical Technology Program Director.

Application of the theory and techniques learned in MT 264 to the clinical laboratory setting. Understanding work flow, teamwork, evaluation of normal and abnormal results, instrumentation and quality assurance in the general laboratory environment. Correlation of blood cell morphology and laboratory data in normal and disease states.

275. Transfusion Services Laboratory

Both semesters. Two credits. Prerequisite: To enroll in the course the student must earn a "C" or better in MT 270. Open only to Medical Technology majors; others with consent of Medical Technology Program Director.

Application of the theory and techniques learned in MT 270 to the clinical laboratory setting. Understanding work flow, teamwork, evaluation of normal and abnormal results, instrumentation and quality assurance and preparation of blood components in the general laboratory environment.

280. Seminar in Medical Technology

Both semesters. Two credits. Prerequisite: To enroll in the course the student must earn a "C" or better in AH 241W. Open only to Medical Technology majors; others with consent of Medical Technology Program Director.

Examination of case studies integrating all areas of the clinical laboratory in the prevention, diagnosis, and treatment of disease. Design and implementation of a research project or investigation of a topic in medical technology. Oral and written presentation of research project or topic.

298. Special Topics

Either semester. Credits and hours by arrangement. Prerequisite: The completion of Freshman - Sophomore requirements in the Medical Technology Program. Open only with consent of instructor. May be repeated for credit.

Application of the scientific method of inquiry to plan, implement, evaluate and report a study of a problem in medical technology or investigation of a special topic not covered in undergraduate medical technology courses.

299. Independent Study for Undergraduates

Either semester. Credits and hours by arrangement. Open only with consent of instructor. May be repeated for credit.

This course is designed primarily for students who wish to extend their knowledge in some specialized areas in the field of Medical Technology.

Metallurgy & Materials Engineering (MMAT)

Interim Department Head: Professor Leon Shaw
Department Office: Room 111, Institute of Materials Science Building

For major requirements, see the School of Engineering section of this *Catalog*.

(Metallurgy & Materials Engineering courses were formerly offered under the MTGY department abbreviation using the same course numbers.)

201. Materials Science & Engineering I

Both semesters. Three credits. Prerequisite: CHEM 127Q or 129Q. Open to sophomores or higher. Not open to students who have passed MMAT 243.

Relation of crystalline structure to chemical, physical, and mechanical properties of metals and alloys. Testing, heat treating, and engineering applications of ferrous and non-ferrous alloys.

202. Materials Science & Engineering Lab

Both semesters. One credit. One 3-hour laboratory period. Prerequisite: MMAT 201, which may be taken concurrently.

Experiments will illustrate the relationships between processing, properties and microstructure for common industrial materials. Topics include sample preparation techniques, quantitative metallography, x-ray diffraction, light and electron microscopy, tensile and fatigue testing, phase transformations, heat treatment, corrosion.

207. Failure Analysis

Second semester. Three credits. Prerequisite: MMAT 201 or 243.

Methods for determining the nature and cause of materials failure in structures and other mechanical devices. Analysis of case histories.

219. Materials Joining

Either semester. Three credits. Prerequisite: MMAT 201 or 243. *Kattamis*

Basic materials principles applied to fusion and solid phase welding, brazing and other joining processes. Effects of joining process and process variable values on microstructure, soundness and mechanical properties of as-processed joints. Treatment and properties of joints and joined assemblies. Joining defects and quality control.

229. Physical Ceramics

Semester and hours by arrangement. Three credits. Prerequisite: CHEM 128 or 130 and PHYS 152. *Kattamis*

Microstructure of crystalline ceramics and glasses and role of thermodynamics and kinetics on its establishment. Effect of process variables on microstructure and ultimately on mechanical, chemical and physical properties.

230. Introduction to Composite Materials

Either semester by arrangement. Three credits. Prerequisite: MMAT 266.

Principles and applications of manufacturing and mechanics of polymer-matrix, and ceramic-matrix composites. Processing and properties of fibers. Interface characteristics. Design of components using composite materials.

232. Introduction to High Temperature Materials

Semester by arrangement. Three credits. Prerequisite: MMAT 201 or 243.

Plastic deformation of metals and other solid materials at elevated temperatures. Dislocation mechanisms; creep processes; oxidation. Strengthening mechanism, including ordering and precipitation hardening.

234. Materials Protection

Semester by arrangement. Three credits. Not open to students who have passed MMAT 343. *Greene*

Corrosion and materials protection designed for engineering students. Principles of materials degradation, extensive case histories and practical applications. Selection of metals, alloys, ceramics and polymers for atmospheric, soil, marine and chemical environments. Evaluation methods, protective measures and the techniques of failure analysis.

236. Materials Characterization

Semester by arrangement. Three credits. Two class periods and, every other week, a 3-hour laboratory period. Laboratory sections in addition to those initially listed will be arranged. Prerequisite: MMAT 201 or 243.

Principles and experimental methods of optical, electron, and x-ray examination of engineering materials. Emphasis on use of x-ray analysis, with introduction to electron microscopy, Auger spectroscopy, scanning electron microscopy, and microanalysis.

236W. Materials Characterization

Prerequisite: MMAT 201 or 243; ENGL 105 or 110 or 111 or 250.

238. Alloy Casting Processes

Second semester by arrangement. Three credits. Prerequisite: MMAT 255 and 265.

Principles of alloy solidification are discussed and applied in the context of sand, investment, and die casting; continuous and direct chill casting; electroslag and vacuum arc remelting, crystal growth, rapid solidification, and laser coating.

243. Introduction to Structure, Properties, and Processing of Materials I

First semester. Three credits. Prerequisite: CHEM 127Q or 129Q. Not open to students who have passed MMAT 201. Open to sophomores or higher.

Bonding in materials, the crystal structure of metals and ceramics, and defects in materials will be introduced. Basic principles of phase diagrams and phase transformations will be given with particular emphasis on microstructural evolution and the effect of microstructure on the mechanical properties of metals and alloys. Introductory level knowledge of mechanical properties, testing methods, strengthening mechanisms, and fracture mechanics will be provided.

244. Introduction to Structure, Properties, and Processing of Materials II

Second semester. Three credits. Prerequisite: MMAT 243 or MMAT 201. Open to sophomores or higher.

Structures, properties, and processing of ceramics; structure, properties and processing of polymers and composites; electrical, thermal, magnetic and optical properties of solids; and corrosion.

255. Transport Phenomena in Materials Processing

First semester. Four credits. Prerequisite: MMAT 265 and MATH 210Q, both of which may be taken concurrently.

Mechanisms and quantitative treatment of mass, energy, and momentum transfer will be applied to design and analysis of materials processing. Increasingly complex and open-ended engineering design projects will be used to illustrate principles of diffusion; heat conduction, convection, and radiation, and fluid flow.

256. Applied Thermodynamics of Materials

Second semester. Four credits. Prerequisite: MMAT 201 or 243.

Thermodynamic principles will be applied to the behavior and processing of materials. Topics covered will include thermodynamic properties, solution thermodynamics, phase equilibria, phase diagram prediction, gas-solid reactions and electrochemistry.

265. Phase Transformation Kinetics and Applications

First semester. Three credits. Prerequisite: MMAT 243 or 201.

Principles and applications of phase transformations to control microstructure and materials properties. In depth, quantitative coverage will include vacancies, solid solutions, phase diagrams, diffusion, solidification of metals, nucleation and growth kinetics, and thermal treatments to control microstructure.

266. Mechanical Behavior of Materials

Second semester. Three credits. Prerequisite: MMAT 243 or 201.

Elements of elastic plastic deformation of materials and the role of crystal structure. Strengthening and toughening mechanisms. Fracture; including fatigue, stress corrosion and creep rupture. Test methods.

267. Electromagnetic and Environmental Properties

First semester. Three credits. Prerequisite: PHYS 152Q and MMAT 243; or MMAT 201.

Principles underlying electrical, magnetic, and chemical behavior will be applied to the selection and design of materials. Topics covered will include: thermoelectricity, photoelectricity, conductors, semiconductors, dielectrics, superconductors, magnetism, corrosion, and oxidation.

276. Thermal/Mechanical Processing of Materials

Second semester. Three credits. Prerequisite: MMAT 255, 265, and 266. Corequisite: MMAT 256.

Fundamental principles of materials processing and their quantitative application to process design will be illustrated for deformation processes: forging, rolling, drawing, extrusion, injection molding, powder compaction and sintering.

277. Processing of Materials in the Liquid and Vapor State

First semester. Three credits. Prerequisite: MMAT 255 and 256.

Fundamental principles of materials processing and their quantitative application to process design will be illustrated for materials processes involving liquids

and gasses: crystal growth, zone refining, shape casting, continuous casting, refining, welding, and vapor deposition.

284. Materials Characterization and Processing Laboratory

Second semester. One credit. Prerequisite: MMAT 244, which may be taken concurrently. One 3-hour laboratory period. Open to sophomores or higher. Not open to students who have passed MMAT 283.

Principles of materials properties, processing and microstructure will be illustrated by experiments with qualitative and quantitative microscopy, mechanical testing, thermal processing, plastic deformation and corrosion. Materials design and selection criteria will be introduced by studying case histories from industry and reverse engineering analyses.

285. Mechanical Behavior Laboratory

First semester. One credit. Prerequisite: MMAT 266, which may be taken concurrently. Three hour laboratory.

Characterization of mechanical properties of materials and fundamentals of materials deformation and fracture processes will be experienced through hands-on projects with tensile, rheological, cyclic, and high temperature testing; drawing; forging; extrusion; rolling; and hot pressing.

286. Materials Processing and Microstructures Laboratory

Second semester. One credit. Prerequisite: MMAT 284. Corequisite: MMAT 265. One 3-hour laboratory period.

Illustrative processing, microstructural characterization and control. As-cast, wrought, and solutionized non-ferrous alloys, dendritic, non-dendritic, and eutectic microstructures. Heat-treated ferrous alloys. Composites. Powder metallurgy-processed, and weld microstructures.

287. Capstone Design Project I

First semester. Two credits. Prerequisite: MMAT 266 and MMAT 276.

Seniors working in teams with faculty and industry mentors solve open ended projects in design of materials, products, and processes. Oral and written reports are required in each semester. For students with high academic standing the BSE and MS projects may overlap.

288W. Capstone Design Project II

Second semester. Two credits. Four hours practicum. Prerequisite: MMAT 266 and MMAT 276; ENGL 105 or 110 or 111 or 250.

Seniors working in teams with faculty and industry mentors solve open ended projects in design of materials, products, and processes. Oral and written reports are required in each semester. For students with high academic standing the BSE and MS projects may overlap.

298. Special Topics in Materials Engineering

Both semesters. Three credits. Prerequisite: Consent of instructor. With a change in topic this course may be repeated for credit.

299. Introduction to Research

Both semesters. Credits and hours by arrangement. Prerequisite: Consent of instructor. With a change in topic this course may be repeated for credit. Some sections of this course are graded Satisfactory/Unsatisfactory.

Methods of research and development. Laboratory investigation. Correlation and interpretation of experimental results. Writing of technical reports.

Military Science (MISI)

Head of Department: Lieutenant Colonel Paul C. Veilleux

ROTC Office, Army:

Hall Dormitory, 362 Fairfield Road

131. General Military Science I

Either semester. One credit. One class period.

Organization of the Army, basic soldier skills; ropes, knots, and rappelling; individual physical fitness; land navigation; time management; role of regular Army, Reserve and National Guard; M16 rifle.

132. General Military Science I

Either semester. One credit. One class period.

Organization and equipment of small military units, fundamentals of marksmanship and military instruction techniques. Leadership lab as announced. Army customs and traditions; land navigation; heat and cold survival; tactical communications; military correspondence; leadership/professional ethics; branches of Army; encoding and decoding messages.

133. General Military Science: Air Rifle Marksmanship

Both semesters. One credit. One class period, two hours lecture and laboratory. May be taken only once for credit.

Air Rifle Marksmanship will provide an introduction to the fundamentals of rifle marksmanship, the safe and proper use, and care of the rifle, the elements of competitive shooting, and the psychology of shooting.

145. General Military Science II

Either semester. One credit. One class period and leadership laboratory.

Map reading, mountaineering, principles of war.

146. General Military Science II

Either semester. One credit. One class period and leadership laboratory.

Emergency First Aid, leadership, military instruction techniques.

252. General Military Science III

First semester. Three credits. One 3-hour class period and leadership laboratory. One weekend field training exercise. Prerequisite: Completion of the basic course in military science, basic training, or a six-week basic summer camp. In all cases, approval of the Professor of Military Science is required.

Leadership principles, techniques, and the responsibilities of command. Military instruction techniques, to include student class presentations.

253. General Military Science III

Second semester. Three credits. One 3-hour class period and leadership laboratory. One weekend field training exercise. Prerequisite: MISI 252.

Dynamics of small unit tactics, and branches of the Army.

297. General Military Science IV

First semester. Three credits. One 3-hour class period and leadership laboratory. One weekend field training exercise. Prerequisite: MISI 253.

Army staff organization, unit administration and management, logistics, military intelligence, leadership seminar, the international system, and strategic doctrine.

298. General Military Science IV

Second semester. Three credits. One 3-hour class period and leadership laboratory. One weekend field training exercise.

Military law, obligations and responsibilities of an officer, contemporary human problems, and a leadership seminar.

Modern and Classical Languages

Head of Department: Professor David K. Herzberger

Department Office: Room 228, J.H. Arjona Building

For descriptions of all majors offered by Modern and Classical Languages, see the College of Liberal Arts and Sciences section of this *Catalog*. For course descriptions, see these topics listed alphabetically throughout this course directory: American Sign Language, Arabic, Chinese, Classics and Ancient Mediterranean Languages, Critical Languages, French, German, Hebrew, Hindi, Italian Literary and Cultural Studies, Japanese, Korean, Modern Greek, Polish, Portuguese, Russian, Spanish, and Vietnamese.

Modern Greek (MGRK)

Head of Department: Professor David K. Herzberger

Department Office: Room 228, J.H. Arjona Building

101-102. Elementary Levels I and II

103-104. Intermediate Levels I and II

101 and 103 are offered in the first semester, and 102 and 104 in the second. Please refer to the Critical Languages course descriptions in this publication. Consult the Program Director in Arjona 128 or at Ed.Benson@UConn.edu for more information.

Molecular and Cell Biology (MCB)

Head of Department: Professor Philip L. Yeagle

Department Office: Room 104, Biology/Physics Building

For major requirements, see the College of Liberal Arts and Sciences section of this *Catalog*.

200. Human Genetics

Either semester. Three credits. Two lectures and one problem session. Prerequisite: BIOL 107. Open to sophomores or higher. *Strausbaugh*

Principles of genetics as applied to humans. Focus on modern methods of molecular genetics.

201. Gene Expression

Second semester. Three credits. Recommended preparation: MCB 200 or 210 or 229. Open to sophomores or higher. *Hightower*

Basic mechanisms of genetic information transfer in eukaryotic cells from DNA to folded and assembled proteins. Regulation of transcription, translation, DNA replication, and the cell cycle.

203. Introduction to Biochemistry

Either semester. Four credits. Three class periods and one 3-hour laboratory period. Prerequisite: CHEM 141 or 244. (CHEM 244 may also be corequisite.) Open to sophomores or higher. Not open for credit to students who have passed MCB 204.

The structure, chemistry, and metabolism of carbohydrates, lipids and proteins. Enzyme function and kinetics, energy metabolism, and structure and function of nucleic acids. A survey course for students of agriculture, general biology, medical technology, nursing, and pharmacy. Molecular and Cell Biology majors, biophysics majors, and other students desiring a more intensive introduction or considering advanced course work in biochemistry or molecular biology should take MCB 204. A fee of \$20 is charged for this course.

204. Biochemistry

First semester. Five credits. Four class periods and one 3-hour laboratory. Prerequisite or corequisite: CHEM 244. Recommended preparation: MCB 210 or MCB 229. Not open for credit to students who have passed MCB 203. *Cole, Reiter*,

The structure and function of biological macromolecules. The metabolism of carbohydrates, lipids, amino acids, proteins and nucleic acids. The regulation of metabolism and biosynthesis of biological macromolecules. An in-depth introduction intended for students planning to take advanced course work in biochemistry, biophysics, or other areas of molecular biology. A fee of \$20 is charged for this course.

205. Human Metabolism and Disease

Second semester, alternate years. Two credits. Prerequisite: MCB 203 or 204 or instructor consent. *Albert*

A thorough analysis of the inter-relationships of metabolic pathways in connection with human health and disease, including inherited metabolic diseases and the role of hormones in metabolic pathways.

206. Fundamentals of Structural Biology

First semester. Three credits. Prerequisite: BIOL 107 or CHEM 128 or instructor consent. *Yeagle*

An introduction to principles underlying the structure and function of the molecules guiding life processes. These principles will be applied to proteins, DNA/RNA and membranes as well as to the energetics of life processes.

207. Introduction to Biophysical Chemistry

Second semester. Three credits. Prerequisite: CHEM 243; MATH 114 or 116; PHYS 122, 132 or 142 or instructor consent.

Energetics and kinetics of metabolic reactions. Interactions of electromagnetic radiation and biological macromolecules. Formation and energetics of supramolecular structures. The basis of selected techniques of molecular biology, such as DNA hybridization, radioimmuno assays. DNA melting and thermal transitions in polymers, thermodynamics, analysis of reactions, binding theory, cooperative interactions.

208. Techniques of Biophysical Chemistry

Second semester. Three credits. Prerequisite: MCB 207, or CHEM 263 or instructor consent.

The characterization of biological macromolecules (i.e. proteins and nucleic acids) in solution is important to the biotechnology and pharmaceutical industries. This course deals with hydrodynamic techniques (i.e. diffusion, electrophoresis, sedimentation, light scattering, and viscosity) for molecular size and shape, and spectroscopic methods (such as circular dichroism) for more detailed structure.

209. Structure and Function of Biological Macromolecules

Second semester. Three credits. Prerequisite or corequisite: MCB 204 or 203 or instructor consent. *Alexandrescu, Cole*

Correlation of three-dimensional molecular architecture with biochemical function in proteins, nucleic acids, and large assemblies such as viruses and ribosomes. Folding motifs and domains; molecular ancestry/homology; molecular recognition at the atomic level, as in DNA/protein complexes; structural basis of enzyme specificity and catalysis. Structure prediction from sequence; principles of structure determination by x-ray diffraction, NMR and CD spectroscopies, and electron microscopy.

210. Cell Biology

First semester. Three credits. Prerequisite: BIOL 107. This course is intended to be taken before MCB 203 or 204 (Biochemistry). Open to sophomores or higher. *Knecht/Lee*

Structural organization of cells and the molecular basis of dynamic cellular processes, with emphasis on eukaryotic cells. Topics include protein targeting, vesicle trafficking, cytoskeleton, cell-cell interactions in tissues, and the molecular basis of related human diseases.

211. Basic Immunology

First semester. Three credits. Prerequisite: BIOL 107. Recommended preparation: MCB 210. *Lynes*

An introduction to the genetic, biochemical, and cellular mechanisms of the immune system. This course will address basic aspects of immune function, and will examine abnormal immune function associated with cancer, autoimmune disease, AIDS, and other immunological abnormalities.

212. Genetic Engineering and Functional Genomics

Second semester. Three credits. Prerequisite: MCB 200 or 213. Recommended preparation: MCB 204 or 203. *R. O'Neill*

Methods and applications of genetic engineering, including gene manipulation and transfer techniques in prokaryotes and eukaryotes. Emphasis on applications of recombinant DNA technology in the elucidation of gene function. Consideration of recent technological developments in molecular genetics, such as cloning, gene therapy, the patenting and release of genetically engineered organisms, and societal issues related to these developments.

213. Concepts of Genetic Analysis

Second semester. Four credits. Three class periods and 2-hour laboratory. Prerequisite: BIOL 108 or 110, or MCB 200 or equivalent, and CHEM 128. Open to sophomores or higher. *Zhang*

Survey of genetic theory and applications of genetic analysis. Model genetic systems in animals, plants, and microbes. A fee of \$20 is charged for this course.

214. Experiments in DNA Identification

Second semester. Two credits. One fifty minute lecture period and one three hour laboratory session. Prerequisite: MCB 200. *O'Neill*

An introductory laboratory course in principles and techniques of DNA manipulation and identification. Course simulates independent research, using modern molecular genetics techniques. A fee of \$20 is charged for this course.

215. Experiments in Molecular Genetics

First semester. Three credits. One 1-hour lecture and two 3-hour laboratory periods. Open only with consent of instructor. Recommended preparation: MCB 204; 212 or 217. Not open for credit to students who have passed MCB 230. *Reiter*

Modern methods in molecular genetics arranged to meet a research goal. Use of polymerase chain reaction, bacteriophage library screening, molecular cloning, nucleic acid hybridizations, and DNA sequence determinations to isolate and characterize a eukaryotic gene. A fee of \$20 is charged for this course.

217. Molecular Biology and Genetics of Prokaryotes

First semester. Four credits. Three lecture periods and one 2-hour discussion. Prerequisite: MCB 229. *Noll*
Molecular genetics of bacteria, archaeobacteria, and their viruses. Transcription and replication of DNA, transformation, transduction, conjugation, genetic mapping, mutagenesis, regulation of gene expression, genome organization.

218. Heredity and Society

First semester. Three credits. Open to sophomores or higher. May not be counted toward the biology major.

The principles of heredity and their implications for society.

219. Developmental Biology

Second semester. Three credits. Prerequisite: BIOL 107. Recommended preparation: MCB 210 and 213 or 200, which may be taken concurrently. *Krider*

Principles of embryogenesis, pattern formation, and cell differentiation. The focus will be on molecular and cellular aspects of development in several experimental systems, including the mouse, nematode, fruit fly, and frog.

220. Laboratory in Developmental Biology

Second semester. Three credits. Two 3-hour laboratory periods and a discussion/recitation period. Prerequisite or corequisite: MCB 219, or six credits of college biology and consent of instructor. Not open for credit to students who have passed MCB 223.

Analysis of principles of morphogenesis and differentiation.

221. Introduction to Molecular Evolution and Bioinformatics

First semester. Three credits. Recommended preparation: At least one 200 level course in MCB. Open to sophomores or higher. *Gogarten*

Evolution of biomolecules, and application to molecular data analysis and the design of new molecules. Topics include prebiotic chemistry, origin of cells, selfish genes, molecular innovations, data bank searches, alignment of sequence and 3-D protein structures. Course includes lectures, discussions and computer lab exercises.

222. Human Disease and the Development of Therapeutic Agents

First semester. Three credits. Recommended preparation: one 200 level course in MCB. *Kendall*

Molecular basis of human disease and strategies for developing therapeutic treatments. Applications of genetic, cellular, and biochemical information in treating disease states. Especially appropriate for students interested in biomedical research and the health profession.

224. Experiments in Bacterial Genetics

Second semester. Three credits. Two 3 1/2 hour laboratory/lecture periods. Prerequisite: MCB 213. Prerequisite or corequisite: MCB 217 or 229. Open only with consent of instructor.

Experiments in bacterial genetics, emphasizing genetic manipulations using modern techniques for mutant isolation, DNA characterization and cloning. These include the use of transposons, DNA isolation, restriction analysis, gel electrophoresis, PCR and DNA sequencing.

225. Advanced Cell Biology Laboratory

First semester. Four credits. One 1-hour lecture and two 4-hour laboratories. Prerequisite or corequisite: MCB 210 and instructor consent. Open to sophomores or higher. *Knecht*

Theory and experimental techniques of modern cell biology, emphasizing the visualization of living eukaryotic cells using the light microscope and digital imaging techniques. Students will learn cell culture, immunostaining, fluorescence localization, confocal microscopy, time-lapse video microscopy, DNA mediated transformation and other techniques, and then pursue independent projects.

226W. Advanced Biochemistry Laboratory

Second semester. Four credits. One 1-hour lecture and two 4-hour laboratories. Prerequisite: Either MCB 204, or MCB 203 with consent of instructor; ENGL 105 or 110 or 111 or 250. *Teschke*

Theory and application of modern techniques for separation and characterization of biological macromolecules, including several types of liquid chromatography, liquid scintillation spectrophotometry, and SDS polyacrylamide gel electrophoresis. Instruction in writing a scientific paper. A fee of \$20 is charged for this course.

229. Fundamentals of Microbiology

Either semester. Four credits. Three lecture periods and one 2-1/2-hour laboratory period. Prerequisite or corequisite: CHEM 141 or 243. Recommended preparation: BIOL 107 or equivalent. Open to sophomores or higher. *Gage, Terry, Vinopal*

Biology of microorganisms, especially bacteria. Cellular structure, physiology, genetics, and interactions with higher forms of life. Laboratory familiarizes students with methodology of microbiology and aseptic techniques. A fee of \$20 is charged for this course.

232C. Microcomputer Applications in Molecular and Cell Biology

First semester. Three credits. One 1-hour lecture and two 3-hour laboratories. Recommended preparation: MCB 200 or 204 or 210 or 213 or 229.

Introduction to the use of microcomputers in molecular biology, emphasizing commercially available applications software, both general (spreadsheet, word processing, database, graphics) and specialized (DNA and protein sequence database manipulation, molecular modeling, data acquisition, others).

233. Pathogenic Microbiology

Second semester. Four credits. Two class periods and two 2-hour laboratory periods. Prerequisite: MCB 229. Recommended preparation: MCB 204 (or 203).

A detailed study of microbial genera, emphasizing species which are important in diseases of man and animals and which have special public health significance. Diagnostic methods include some standard serological procedures.

235. Applied Microbiology

Second semester. Four credits. Two class periods and two 2-hour laboratory periods. Prerequisite: MCB 229. Recommended preparation: MCB 204 (or 203). *Benson*

A study of the biology, physiology, and genetics of microorganisms useful in industry, agriculture, and selected environmental processes. A fee of \$20 is charged for this course.

236. Marine Microbiology

(Also offered as MARN 236.) First semester (Avery Point) second semester (Storrs). Three credits. Two lecture-discussion class periods and one 2-hour laboratory period for which field trips may be substituted. Prerequisite: MCB 229 or instructor consent.

A general survey of the taxonomy, physiology, and ecology of marine microorganisms.

240W. Bacterial Diversity and Ecology

First semester. Four credits. Two lecture periods and two 3-hour laboratory/discussion periods. Prerequisite: MCB 229 or instructor consent; ENGL 105 or 110 or 111 or 250. Recommended preparation: MCB 204 or 203. *Leadbetter*

A study of the ecophysiology of diverse bacterial types with particular emphasis on the activities of bacteria *in situ*. Investigative laboratory includes individual projects. A fee of \$20 is charged for this course.

241W. Research Literature in Molecular and Cell Biology

Second semester. Three credits. Open only with consent of instructor. Prerequisite: ENGL 105 or 110 or 111 or 250. Recommended preparation: one 200's course in MCB. With a change in content, may be repeated for credit. *Leadbetter*

Discussion of current research in molecular and cell biology. Focus on microbes as agents of environmental change.

246. Virology

Second semester. Three credits. Three lecture periods. Prerequisite: MCB 229. Recommended preparation: MCB 204 or 210. *Marcus*

Biological, biochemical, physical, and genetic characteristics of viruses, with an emphasis on molecular and quantitative aspects of virus-cell interactions.

289. Variable Topics

Either semester. Three credits. With a change of topic, may be repeated for credit. Prerequisites and recommended preparation vary.

290. Forensic Application of DNA Science

First semester. Three credits. Prerequisite: MCB 200 or 213. *Strausbaugh*

DNA analysis in forensic science, with emphasis on molecular genetic technology in criminal investigations and issues surrounding the use of DNA evidence. Team-taught with forensic practitioners.

292W. Senior Research Thesis in Molecular and Cell Biology

Either semester. Three credits. Hours by arrangement. Prerequisite: Three credits of MCB 299, which may be taken concurrently; ENGL 105 or 110 or 111 or 250. Open only with consent of instructor and department honors committee. Not limited to honors students.

Designed for the advanced undergraduate who is pursuing a special problem as an introduction to independent investigation. Research and writing of a thesis.

297. Undergraduate Seminar

Either or both semesters. Credits and hours by arrangement. Open only with consent of instructor. May be repeated for credit with a change of topic.

298. Special Topics

Either semester. Credits and hours by arrangement. With a change in content, may be repeated for credit. Prerequisites and recommended preparation vary.

299. Independent Study

Either or both semesters. Credits and hours by arrangement. Open only with consent of instructor. May be repeated for credit with change in topic.

Designed for the advanced undergraduate student who is pursuing a special problem as an introduction to independent investigation.

Music (MUSI)

Interim Department Head: Professor Robert Thayer
Department Office: Room 230, Music Building

For major requirements, see the School of Fine Arts section of this *Catalog*.

101. Convocation, Concert and Recital Repertoire

Required of all music majors every semester of residence. No credit. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory). *Larrabee, Maker*

108. Varsity Band

Either semester. One credit. Two laboratory periods. Open only with consent of instructor. May be repeated for credit. *Mills*

Repertory, rehearsal techniques, preparation and presentation of performances in support of the University community.

109. Marching Band

First semester. One credit. Three laboratory periods. Open only with consent of instructor. May be repeated for credit. *Mills*

Repertoire, rehearsal techniques, preparation and presentation of marching band shows.

110. Band

Either semester. One credit each semester. Three laboratory periods. Open only with consent of instructor. May be repeated for credit. Wind Ensemble, Symphony Band, Concert Band. *Mills, Renshaw*

Repertoire, rehearsal technique, preparation and presentation of concerts.

111. Chorus

Either semester. One credit each semester. Three laboratory periods. Open only with consent of instructor. May be repeated for credit. Concert Choir, Chamber Singers, University Chorale. *Bagley*

Choral repertoire from all periods, concentration on vocal and choral techniques as related to musical styles, preparation and presentation of concerts.

112. Orchestra

Either semester. One credit each semester. Three laboratory periods. Open only with consent of instructor. May be repeated for credit. *Sacco*

Standard symphonic repertoire, technique of orchestral routine, preparation and presentation of concerts.

113. Chamber Ensemble

Semester by arrangement. One credit each semester. Three laboratory periods. Open only with consent of instructor. May be repeated for credit. As a requirement for credit, the student must participate in MUSI 110, 111, or 112.

Chamber music for various combinations of voices, string, woodwind, brass, percussion and keyboard instruments. Preparation and presentation of concerts.

114. Voices of Freedom Gospel Choir

Either semester. One credit. One 2-hour laboratory period. Open only with consent of instructor. May be repeated for credit.

Preparation and presentation of concerts. Gospel and spiritual music of the Black experience.

115. Jazz Ensemble

Either semester. One credit. Two laboratory periods. Open only with consent of instructor. May be repeated for credit.

Jazz repertoire, rehearsal techniques, preparation and presentation of concerts.

116. Small Ensemble

Either semester. One credit. Two laboratory periods. Open only with consent of instructor. May be repeated for credit. As a requirement for credit, the student must participate in MUSI 110, 111, or 112.

Small ensemble music under the direction of a conductor. Preparation and presentation of concerts.

117. Women's Choir

Either semester. One credit. Two 1 1/2 hour laboratory periods. Open only with consent of instructor. May be repeated for credit.

Choral repertoire from all styles, concentration on vocal and choral techniques as related to musical styles, preparation and presentation of concerts.

118. Collegium Musicum

(Formerly offered as MUSI 220.) Either semester. One credit per semester. One lecture period, two laboratory periods. Open only with consent of instructor. May be repeated for credit. *Bellingham*

Performance practices, iconography, notation, instrumentation in vocal and instrumental music before 1700. Preparation and participation in historically authentic performance.

119. Opera Workshop

(Formerly offered as MUSI 221.) Either semester. One credit each semester. Three laboratory periods. Open only with consent of instructor. May be repeated for credit. *McClain*

Performance practices. Preparation and participation in scenes from operatic repertoire.

121. Secondary Applied Music

Either semester. One credit each semester. May be repeated for credit. Ensemble required with conditions stated under MUSI 122. Open only with consent of instructor and department head.

Basic performance techniques. Elementary and intermediate repertoire. Primarily for students majoring in another applied area.

A fee of \$115 for one half-hour lesson per week or \$230 for a one-hour lesson per week per semester is charged all students receiving private instrumental or vocal instruction.

122. Applied Music

Bn (Bassoon), Co (Cello), Ct (Clarinet), Em (Euphonium), Fe (Flute), Fn (French Horn), Gr (Guitar), Hp (Harp), Oe (Oboe), On (Organ), Pn (Percussion), Po (Piano), Se (Saxophone), Ss (String Bass), Te (Trombone), Tt (Trumpet), Ta (Tuba), Va (Viola), Vn (Violin), Ve (Voice).

Either or both semesters. One to 3 credits each semester. May be repeated for credit. Participation in an appropriate ensemble, MUSI 110, 111, or 112, is required each semester for students registered in MUSI 122 unless exception is made by the department head.

Open to qualified students. Before registering for the course, students must obtain an audition with the department and obtain the consent of the department head. Open only with consent of instructor.

A fee of \$115 for one half-hour lesson per week or \$230 for a one-hour lesson per week per semester is charged all students receiving private instrumental or vocal instruction.

123. Class Instruction in Piano

Either or both semesters. One credit each semester. Two class periods and required practice. May be repeated for credit. Open only with consent of instructor. *Clark*

124. Applied Accompanying

One credit per semester. One class period per week by arrangement. Open only with consent of instructor. This course is intended for students whose area of emphasis is keyboard. An audition is required for all other students.

Performance class in accompanying skills.

125. Applied Music Techniques

Bs (Brass), Pn (Percussion), Sg (String), Ve (Voice), Wd (Woodwind).

Either semester. One credit. Two laboratory periods. May be repeated for credit. Open only with consent of instructor.

Performance and teaching techniques.

126. Introduction to Diction for Singers

First semester. One credit. Two one-hour laboratory periods. Prerequisite: concurrent registration in applied voice study under MUSI 122, 222, or 323. *McClain*

An introduction to the International Phonetic

Association (IPA) symbols with special application to the study of English diction for singers.

127. Italian Diction for Singers

Second semester. One credit. Two one-hour laboratory periods. Prerequisite: MUSI 126 and concurrent registration in applied voice study under MUSI 122, 222, or 323.

A continuing study of the IPA symbols with their special application to the study of Italian diction for singers.

128. German Diction for Singers

First semester. One credit. Two one-hour laboratory periods. Prerequisite: MUSI 126 and concurrent registration in applied voice study under MUSI 122, 222, or 323. *McClain*

A continuing study of the IPA symbols with their special application to the study of German diction for singers.

129. French Diction for Singers

Second semester. One credit. Two one-hour laboratory periods. Prerequisite: MUSI 126 and concurrent registration in applied voice study under MUSI 122, 222, or 323.

A continuing study of the IPA symbols with their special application to the study of French diction for singers.

135. Honors Harmony I

First semester. Four credits. Three class periods and two 1-hour laboratory periods. Prerequisite: Open only with consent of instructor. *Kaminsky*

Writing and analysis of tonal harmony; study of harmony in relation to melody and counterpoint. Elementary score reading; sight-singing; melodic and harmonic dictation; introduction to counterpoint; model composition and elements of form.

136. Honors Harmony II

Second semester. Four credits. Three class periods and two 1-hour laboratory periods. Prerequisite: MUSI 135. *Kaminsky*

Continuation of Honors Harmony I.

138. Introduction to Improvisation

Either semester. One credit. One laboratory period. Open only with consent of instructor. May be repeated once for credit.

Basic jazz theory and the elements of improvisation.

145. Harmony I

First semester. Four credits. Three class periods and two 1-hour laboratory periods. Open only with consent of instructor. Not open for credit to students who have passed MUSI 135. *Kaminsky*

Writing and analysis of tonal harmony; relation to melody and counterpoint. Elementary score reading; sight-singing; melodic harmonic dictation, and keyboard application.

146. Harmony II

Second semester. Four credits. Three class periods and two 1-hour laboratory periods. Prerequisite: MUSI 145. Not open for credit to students who have passed MUSI 136. *Kaminsky*

Continuation of MUSI 145.

153. Fundamentals of Music I

Either semester. Three credits. *Maker*

Basic skills in note reading, rhythm, meter, pitch symbols, scales, key-signatures, intervals, and triads. No previous training is required.

155. Introduction to Ear Training

Second semester. Three credits.

Music reading, sight-singing, and dictation.

190. Non-Western Music

Either semester. Three credits. Intended primarily for students who are not music majors. Not open for credit to students who have passed MUSI 292W.

Folk, popular, and classical musics of selected non-Western cultures, with an emphasis on the distinctive characteristics of each culture. CA 1. CA 4-INT.

191. Music Appreciation

Either semester. Three credits. No previous training is required. Not appropriate for students who have previously passed MUSI 193 or 194. Not intended for students with previous musical experience.

An approach toward intelligent listening, illustrated by recordings. CA 1.

193. Introduction to Music History I

First semester. Three credits. Not intended for music majors.

Music history in relation to other arts from the early Christian era to J.S. Bach (1750). Some background in music fundamentals or performance is highly recommended.

194. Introduction to Music History II

Second semester. Three credits. Not intended for music majors.

Music history in relation to other arts from the mid 18th Century to the present. Some background in music fundamentals or performance is highly recommended.

195. Special Topics Lecture

Either semester. Credits, prerequisites, and hours as determined by the Senate Curricula and Courses Committee. May be repeated for credit with a change in topic.

201. Practicum in Music

Either or both semesters. Credits and hours by arrangement. Open only with consent of instructor. May be repeated for credit. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

210W. Music, History, and Ideas

Either semester. Three credits. Prerequisite: ENGL 105 or 110 or 111 or 250. Open only with consent of instructor.

Relationships of musical styles to cultural and intellectual backgrounds.

211. The Composer and the Composer's World

Either semester. Three credits. Prerequisite: MUSI 286. May be repeated for credit with a change in content.

Selected works in relation to the musical institutions, musical style, social, intellectual and political milieu, and biography of composer(s).

212. Music of the Church

First semester. Three credits. Prerequisite: MUSI 286.

Plainsong, mass, motet, cantata, oratorio, and other forms of church music.

213. Music of the Theater

Second semester. Three credits. Prerequisite: MUSI 286.

Opera, ballet, and other types of music for the theater.

214. Orchestral Music

First semester. Three credits. Prerequisite: MUSI 286.

Concerto, symphony, symphonic poem, and other forms of music for orchestral ensembles.

215. Chamber Music

Second semester. Three credits. Prerequisite: MUSI 286.

String quartet, trio sonata, and other forms of music for various small ensembles.

216. Solo Literature

Second semester. Three credits. Prerequisite: MUSI 286.

Keyboard music, the art song, and other types of music for instrumental or vocal soloists.

217. A History of Jazz

Either semester. Three credits. Prerequisite: MUSI 146.

222. Applied Music, Advanced Course

Either or both semesters. Credits and hours by arrangement. Ensemble required with conditions stated under MUSI 122. Prerequisite: Advanced standing in performance as recommended by a faculty jury, recommendation by an instructor in this department, and consent of the Department Head. May be repeated for credit.

A continuation of MUSI 122 for students with proven ability. A fee of \$115 for one half-hour lesson per week or \$230 for a one-hour lesson per week per semester is charged all students receiving private instrumental or vocal instruction.

225. Vocal Literature I

First semester. Two credits. Two class periods. Corequisite: MUSI 222 and consent of instructor.

Songs and arias of the Renaissance and Baroque Periods: Oratorio Literature.

226. Vocal Literature II

Second semester. Two credits. Two class periods. Corequisite: MUSI 222 and consent of instructor.

Classical Period Songs; German Lied.

227. Vocal Literature III

First semester. Two credits. Two class periods. Corequisite: MUSI 222 and consent of instructor.

French melody; Songs of Nationalistic origin.

228. Vocal Literature IV

Second semester. Two credits. Two class periods. Corequisite: MUSI 222 and consent of instructor.

British and American Songs; The Modern Period.

229. Instrumental Pedagogy and Literature

Either semester. One or two credits. One or two instrumental hours per week. Corequisite: MUSI 222 (Junior-Senior level). May be repeated for credit to a maximum of four semesters. Open only with consent of instructor.

232. Conducting I

Either semester. Two credits. Prerequisite: MUSI 146. *Renshaw*

Physical aspects of conducting, reading of full and condensed scores.

233. Conducting II: Choral

Either semester. Two credits. Prerequisite: MUSI 232. *Bagley*

234. Conducting II: Instrumental

Either semester. Two credits. Prerequisite: MUSI 232. *Renshaw*

235. Honors Harmony III

First semester. Four credits. Three class periods and two 1-hour laboratory periods. Prerequisite: MUSI 136. Open to sophomores or higher.

Continuation of Honors Harmony II, including writing and analysis of chromatic harmony; formal analysis.

236. Honors Harmony IV

Second semester. Four credits. Three class periods and two 1-hour laboratory periods. Prerequisite: MUSI 235. Open to sophomores or higher. *Bass*

Continuation of Honors Harmony II, including writing and analysis of chromatic harmony; formal analysis.

238. Jazz Improvisation and Performance

Either semester. One credit. One laboratory period. Prerequisite: MUSI 138. May be repeated for credit.

Advanced jazz theory, styles, and ensemble techniques.

239. Jazz Arranging I

First semester. Two credits. Two class periods. Prerequisite: MUSI 146 or equivalent and consent of instructor.

Arranging and composition of chamber jazz ensembles and big band.

240. Jazz Arranging II

Second semester. Two credits. Two class periods. Prerequisite: MUSI 239 and consent of instructor.

Continuation of MUSI 239.

241. Jazz: Theory and Performance

Either semester. Two credits. Two class periods. Prerequisite: MUSI 146 and consent of instructor. Open to sophomores or higher.

Performance, improvisation, arranging, and ensemble techniques.

245. Harmony III

First semester. Four credits. Three class periods and two 1-hour laboratory periods. Prerequisite: MUSI 146. Open to sophomores or higher. Not open for students who have passed MUSI 235. *Bass*

246. Harmony IV

Second semester. Four credits. Three class periods and two 1-hour laboratory periods. Prerequisite: MUSI 245. Open to sophomores or higher. Not open for credit to students who have passed MUSI 236. *Bass*

250. Introduction to Electronic Composition

Either semester. Three credits. Prerequisite: MUSI 264. Composition by synthesizer and computer.

251. Composition I

First semester. Three credits. Prerequisite: MUSI 246. Creative writing in the smaller forms. Extensive analysis and discussion.

252. Composition II

Second semester. Two credits. Prerequisite: MUSI 251 and consent of instructor.

253. Composition III

Either or both semesters. Two credits. Hours by arrangement. May be repeated for credit. Prerequisite: MUSI 252 and consent of instructor.

Individual instruction in musical composition.

257. Form and Analysis I

Either semester. Three credits. Prerequisite: MUSI 246. Not open for credit to students who have passed MUSI 236 with a grade of "B" or better.

Musical structure and expression; melodic, harmonic, rhythmic and contrapuntal relationships; style analysis.

258. Form and Analysis II

Either semester. Three credits. Prerequisite: MUSI 257. Continuation of MUSI 257. Emphasis on the larger works of the 19th-century and 20th-century styles.

258W. Form and Analysis II

Prerequisite: MUSI 257; ENGL 105 or 110 or 111 or 250.

259. Music for the Classroom Teacher

Either semester. Three credits. *Junda*
Primarily for the non-music major preparing to teach in the elementary school. Elementary music materials, organization of learning experiences, and teaching methods.

261. Acoustics and the Perception of Music

Either semester. Three credits.

Science of Music, using basic quantitative techniques.

264. Electronic Music Techniques

Either semester. Three credits. Open only with consent of instructor.

Theory and application of standard electronic music systems and techniques of sound synthesis.

267C. Microcomputers in Music Education

Either semester. Two credits. Two laboratory/discussion periods. Open only with consent of instructor.

Uses of micro-computers in the school music program.

271. Seminar: The Life and Works of Individual Composers

Either semester. Three credits. Prerequisite: MUSI 286 and one MUSI 200-level W course. Open only with consent of instructor. With a change in content, may be repeated once for credit.

272. Seminar: Style Periods in Music History

Either semester. Three credits. Prerequisite: MUSI 286 and one MUSI 200-level W course. Open only with consent of instructor. With a change in content, may be repeated once for credit.

273. Seminar in Music Education

Either semester. One or two credits. One or two class periods. Open only with consent of instructor. With a change of content, may be repeated for credit. *Junda*
Theories and procedures for the organization of musical instruction.

274. Seminar: History of Musical Forms

Either semester. Three credits. Prerequisites: MUSI 286 and one MUSI 200-level W course. Open only with consent of instructor. With a change of content, may be repeated once for credit.

Sonata, concerto, madrigal, motet, or other musical forms.

275. Orchestration I

Second semester. Three credits. Prerequisite: MUSI 245 and consent of instructor. *Maker*

Range, tone quality, and characteristics of the various orchestral and band instruments. Elementary scoring problems.

276. Orchestration II

First semester. Three credits. Prerequisite: MUSI 275. *Maker*

Scoring problems, score reading, and study of scores in the standard literature.

277. Counterpoint I

Either semester. Three credits. Prerequisite: MUSI 246. Two- and three-voiced textures in the principal 16th-century styles: Josquin, Lassus, Palestrina.

278. Counterpoint II

Either semester. Three credits. Prerequisite: MUSI 277.

279Q. Twentieth Century Theory and Analysis

Either semester. Three credits. Prerequisite: MUSI 246 and MUSI 257. With consent of instructor, MUSI 257 may be taken concurrently. Recommended preparation: MATH 101 or the equivalent. *Bass*

Analytical techniques appropriate to selected styles of twentieth century music. Problems in twentieth century counterpoint and composition.

281. Vocal Pedagogy

Either semester. Two credits. Two class periods. Prerequisite: MUSI 222 and consent of instructor. *Vasil*
Vocabulary, methodology and practical application of pedagogical techniques.

282. Orchestral Techniques

Semester by arrangement. One credit. Open only with consent of instructor. May be repeated for credit.

The art of practice, preparation, and performance of orchestral literature.

283. Marching Band Techniques

First semester. Two credits. Two class periods. Open only with consent of instructor. *Mills*

Scoring for the outdoor band, administration, marching and maneuvering.

284. Music History and Literature Before 1700

(Formerly offered as MUSI 287.) First semester. Three credits. Prerequisite: MUSI 146. Open to sophomores or higher. *Bellingham*

Medieval, Renaissance, to High Baroque periods. Score study, development of notation, and relation to other artistic traditions.

285. Music History and Literature 1700-1830

First semester. Three credits. Prerequisite: MUSI 284. Open to sophomores or higher.

Leading composers, genres, elements of style, form and harmony, musical institutions and aesthetics in the High Baroque, Pre-classic, and Classic periods.

286. Music History and Literature 1830 to Present

Second semester. Three credits. Prerequisite: MUSI 285. Open to sophomores or higher.

The romantic period and the Twentieth Century.

290. Theory Review

First semester. Three credits.

An overview of traditional undergraduate theory. Intended for graduate students in Music.

291. Procedures in Historical Research

Either semester. Three credits. Prerequisite: MUSI 286 and one MUSI 200-level W course. Open only with consent of instructor.

A project-oriented approach to bibliographic tools and research methods applicable to the historical study of music.

292W. Music in World Cultures

Either semester. Three credits. Not open for credit to students who have passed MUSI 190. Prerequisite: MUSI 286 and consent of instructor; ENGL 105 or 110 or 111 or 250.

Comparison of musical concepts, styles, and performance practice in the social context of various cultures. CA 4-INT.

295. Music of the Twentieth Century

Either semester. Three credits. Prerequisite: MUSI 286.

297. Senior Recital

Required of all Bachelor of Music performance majors. No credit. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

298. Special Topics

Either semester. Credits and hours by arrangement. Open only with consent of instructor. May be repeated for credit.

Classroom course in a special topic as announced in advance for each semester.

299. Independent Study

Either semester. Credits and hours by arrangement. Open only with consent of head of department. May be repeated for credit.

Natural Resources Management and Engineering (NRME)

Department Head: Professor David B. Schroeder
Department Office: Room 308, W.B. Young Building

For major requirements, see the College of Agriculture and Natural Resources section of this *Catalog*.

100. Environmental Science

First semester. Three credits. *Rudnicki*

An introduction to basic concepts and areas of environmental concern and how these problems can be effectively addressed. Topics include human population; ecological principles; conservation of biological resources; biodiversity; croplands, rangelands, forestlands; soil and water conservation; pollution and water management; and wildlife and fisheries conservation. CA 3.

110. Introduction to Natural Resources

First semester. One credit. Open only to Freshman - Sophomore students.

An introduction to the field of renewable resources. Field trips required.

130. Environmental Conservation

Second semester. Three credits. *Barclay*

Overview of conservation policy development from colonial period to present and development of the environmental movement in the U.S. Discussion of the context and complexity of some contemporary environmental policy issues.

201. Conservation Law Enforcement

Second semester. Three credits.

Basic pre-professional course for majors in natural resource conservation and related disciplines. Recommended for persons considering a career in wildlife, fisheries, law enforcement, or other natural resource conservation and management disciplines.

204. Wetlands Biology and Conservation

Second semester, alternate years (even). Three credits. Three class periods and one weekend field trip. Recommended preparation: BIOL 107 and 108. *Clausen*

Principal wetland habitats of North America are surveyed, and the relationship of wildlife associations to biological and physical features of wetlands is reviewed. Emphasis is placed on issues relating to wetlands conservation and management.

205. Stream Ecology

Second semester. Three credits. Recommended preparation: BIOL 108 or equivalent. *Vokoun*

A broad overview of stream ecology will be presented. Emphasis will be placed on types of lotic habitats and the diversity and community patterns of organisms which inhabit them. Adaptations to life in running water and energy flow in stream ecosystems will also be discussed. Efforts targeted at the conservation of streams will be integrated throughout the semester. One or more field trips required.

207. African Field Ecology and Renewable Resources Management

(Also offered as EEB 207 and EEB 307.) Second semester, alternate years. Four credits. One class period during the semester, followed by three weeks in the field in South Africa. Recommended preparation: EEB 244. Instructor consent required. *Ortega*

An intensive, field oriented methods course conducted primarily in South Africa at the Basil Kent Field Station, Great Fish River Reserve in collaboration with the University of Fort Hare. An introduction to South Africa culture and history, ecology, and natural resources is provided in weekly meetings during the semester. This is followed by three weeks in the field in South Africa. Topics covered include vegetation and faunal surveys, data collection and analysis, biodiversity monitoring, and conservation management. A research paper relating to an independent project conducted by the student in the field is required. CA 4-INT.

208. Introduction to Aquaculture

Either semester. Three credits. Two class periods, one 2-hour laboratory. Prerequisite: BIOL 107 or 108.

Basic principles and practice of environmentally compatible aquaculture. Emphasis on commercial aquaculture production including concepts and principles of various re-circulation systems, species, and culture techniques. Application of biotechnology will also be covered.

210. Air Pollution

First semester. Three credits. Prerequisite: NRME 241. *Miller*

The meteorology, effects and controls of air pollution.

211. Watershed Hydrology

Second semester, alternate years (even). Three credits. Recommended preparation: NRME 242 or ENGR 150. Open to sophomores or higher. *Warner*

Fundamental hydrologic processes, water balances, precipitation analyses, infiltration, soil water, evapotranspiration, open channel flow, discharge measurements, and analysis, flow frequencies, ground water-surface water interactions, runoff processes and prediction. Problem oriented course requiring use of computer spreadsheets.

214. Dendrology

First semester. Three credits. Two class periods and one 3-hour laboratory period. Recommended preparation: BIOL 108 or 110. Open to sophomores or higher. *Schroeder*

The taxonomy, silvics, and distribution of trees and shrubs of the United States with emphasis upon Northeastern species. Field trips will be required.

217. North American Wildlife

First semester. Three credits. Recommended preparation: BIOL 107. Open to sophomores or higher. *Ortega*

An introduction to wildlife conservation programs and resource values. The distribution, life history and status of those birds and mammals whose populations humans are attempting to preserve, reestablish, or to control are examined.

218. Water Resources Assessment, Development and Management

Second semester. Three credits. Three class periods and two field trips. Recommended preparation: NRME 100 and GEOL 105. *Robbins*

Introduction to surface and ground water resource assessment, development and management. Integration of scientific, legal, environmental and human factors that enter into developing and maintaining sustainable water resources. Examines current and future plight of water shortages and water quality issues here and abroad.

219. Introduction to Geomatics

Second semester. Four credits. Three lecture periods and one laboratory period. Open to sophomores or higher. Not open to students who have passed NRME 237 or 252. *Civco, Meyer*

Principles and applications of geographic information systems (GIS), global positioning system (GPS), and remote sensing will be covered. Students will be provided with the scientific knowledge and technical skills needed to collect and use spatial data effectively in a Geographic Information System (GIS).

232. Wildlife Management

Second semester. Three credits. Prerequisite: NRME 217. Recommended preparation: Prior course work in ecology. *Ortega*

Brief review of wildlife conservation and ecological principles; management of wetlands, farmlands, rangelands, and forest lands for wildlife; programs dealing with exotic, urban, nongame, and endangered wildlife; contemporary economic, administrative, and policy aspects of management.

233. Wildlife Management Techniques

First semester, alternate years. Two credits. One 4-hour laboratory period. Prerequisite: NRME 232. Open only with consent of instructor. One or more field trips will be required. *Barclay*

Collection and reporting of biological data upon which wildlife conservation decisions are based.

235. Fisheries Management

First semester. Three credits. Two class periods and one 3-hour laboratory period. Prerequisite: STAT 100QC. *Vokoun*

Introduction to fisheries management principles with application to the biotic, habitat, and human components of fisheries. Selected topics include sampling and gears, harvest regulations, stocking, population dynamics, and habitat management practices in pond, lake, reservoir, river, and stream fisheries.

237. Introductory Remote Sensing

First semester. Three credits. Two class periods and one 2-hour laboratory period. Open to only CANR students and GEOG major. *Civco*

The principles of the interpretation of remote sensing imagery acquired from aircraft and satellite platforms will be studied. Various applications of remote sensing will be discussed.

238C. Advanced Remote Sensing

Second semester. Three credits. Two class periods and one 2-hour laboratory period. Prerequisite: NRME 237. Open only with consent of instructor. *Civco*

The principles of quantitative remote sensing, image processing and pattern recognition will be studied. Computer-assisted data analysis techniques will be used.

239W. Natural Resources Planning and Management

Second semester. Three credits. Prerequisite: Senior standing; ENGL 105 or 110 or 111 or 250. *Clausen*

Concepts and methods of planning for the allocation, management and utilization of terrestrial and aquatic ecosystems. Techniques and methods of managerial decision making. Written technical reports required.

240. Environmental Law

First semester. Three credits.

An overview of environmental law including the common law principles of nuisance, negligence, and trespass. Students will become acquainted with legal research techniques; emphasis will be on federal, state, and municipal programs addressing clear air, clean

water, hazardous waste, inland wetlands, coastal zone management, and prime agricultural farm land and aquifer protection.

241. Meteorology

First semester. Three credits. *Yang*

A survey course in meteorology at the introductory level covering weather and climate processes.

242. Natural Resources Measurements

First semester. Four credits. Two class periods and two 2-hour laboratories. Field trips required. Open to sophomores or higher. *Miller*

Principles and instrumentation used in the measurement of environmental conditions and processes.

246. Water Quality Management

First semester, alternate years (odd). Three credits. Recommended preparation: NRME 211 or NRME 260. *Clausen*

An introduction to all aspects of water quality problems relating to the many beneficial uses of water, including the physical, chemical, and biological properties.

247. Public Lands Wildlife Management

Second semester. Three credits. Recommended preparation: NRME 217, 232, EEB 244. Open only with consent of instructor. *Ortega*

Applied natural resources management in different ecosystems (forestlands, grasslands, and drylands). Meet one hour per week for background readings from current literature. Two short research papers and presentation to the class. Required field trip last two weeks of May. Students are responsible for cost of field trip.

248. Private Lands Wildlife Management

First semester. Alternate (odd) years. Three credits. Two class periods and one 3-hour laboratory period. Prerequisite: One 200-level course in ecology or wildlife management. *Barclay*

Companion course for Public Lands Wildlife Management (NRME 247). Provides practical experience and acquaintance with persons or groups managing wildlife resources on private properties such as nature preserves, land trusts, non-governmental organizations, farms, recreational clubs, commercial shooting preserves and propagation facilities. Appreciation for private land management options, economic realities and other challenges, plus ability to assess resource potentials on private land, are stressed. Field trips required.

251C. Computer Utilization in Agriculture and Natural Resources

Second semester. Three credits. Two class periods and one two-hour laboratory.

Instruction in the utilization of microcomputer technology in a variety of natural resources management and engineering applications, such as forest mensuration, water runoff and soil erosion estimation, land use planning, ecological modeling, and general problems from commercial agriculture. Skills will be developed in the use of popular programming languages, such as BASIC and FORTRAN, and commercial packages, including spreadsheets, data base managers, computer graphics and application-specific software.

252. Geographic Information Science for Natural Resources Management

Second semester. Four credits. Three class periods and one two-hour laboratory period. Prerequisite: NRME 242, MATH 112Q or higher calculus course. Recommended preparation: PHYS 121Q. Open only to natural resource majors or with consent of instructor. *Meyer*

Introduction to geodetic and cartographic principles underlying the creation of accurate maps. Particular emphasis is given to mapping topography and natural areas. Topics include: horizontal and vertical geodetic datums, the geoid, map projections, coordinate systems, global positioning systems (GPS), GIS data modeling with regional database management systems, and digital terrain models.

253. Introduction to Geodesy

First semester. Three credits. Prerequisite: NRME 219, STAT 110, PHYS 121 or higher. Three class periods, some fieldwork required. *Meyer*

Horizontal and vertical geodetic datums, proper integration of spatial information collected in disparate datums, distortions created by cartographic projections, and proper use of standard cartographic coordinate systems. Integrate measurements from optomechanical instruments such as total stations with Global Positioning System measurements.

256. Natural Resources Modeling

First semester. Three credits. Prerequisite: MATH 112Q or higher. Open only to natural resource majors except by consent. *Warner, Clausen*

Applications of conservation of mass, energy and momentum in modeling natural resources systems. Defining systems; determining flows and storages; interactions and feedback mechanisms within systems. Problem oriented course including computer solutions using spreadsheets or modeling programs.

260. Soil and Water Management and Engineering

Second semester, alternate years (odd). Three credits. Recommended preparation: NRME 211 or CE 265. *Warner*

Floodplain management, erosion and erosion control, reservoir management, storm water control, watershed management, and on-site sewage treatment systems. Written technical reports, use of spreadsheets and field work required. Some field trips required.

271. Environmental Meteorology

Second semester, even numbered years. Three credits. Recommended preparation: NRME 241. *Yang*

Applied meteorology in environmental science and engineering. Solar energy, winds and air pollution, atmospheric-hydrologic interactions, agricultural and forest meteorology, and biometeorology.

277. Natural Resource Applications of Geographic Information Systems

First semester. Three credits. *Civco*

Principles and applications of computer-assisted spatial data analysis in natural resources management. Hypothetical and actual case studies of the use of geographic information systems (GIS) to solve natural resource problems will be discussed. Raster-and vector-oriented, microcomputer-based GIS software will be applied.

280. Forest Management

Second semester, alternate years (odd). Four credits. Two class periods and one 4-hour laboratory period. Prerequisite: NRME 214.

An introduction to forest mensuration, ecology, silviculture, and multiple-use management. Field trips required.

285. Forest Ecology

First semester. Three credits. Two class periods and one 3-hour laboratory. Prerequisite: NRME 214, may be taken concurrently. *Rudnicki*

Ecological basis of forest management. Ecological diversity and relationships to the physical environment (light, temperature, soil, etc.); the influence of time (succession, disturbance, stand dynamics) and space (landscape ecology, ecosystem management) on forest ecosystem dynamics; forest production ecology and

nutrient cycling. Laboratory will be in the field or in computer lab.

287. Field Study Internship

Either semester or summer. One to six credits. Hours by arrangement. Open only to Junior - Senior students with consent of advisor and department head. This course may be repeated provided that the sum total of credits earned does not exceed six. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

This course is designed to acquaint students through actual work experience with research and management activities not available on campus. Students will work with professionals in an area of concentration. Student evaluation will be based upon the recommendation of the field supervisor and a detailed written report submitted by the student.

295. Seminar

Second semester. One credit. May be repeated for credit. Open only with consent of instructor.

296. Undergraduate Research in Natural Resources

Either semester. Credits and hours by arrangement. May be repeated for credit for maximum of six credits. Open only with consent of instructor.

Field or laboratory research performed by the advanced undergraduate student in an area of natural resources under the supervision of a NRME faculty member. A report and/or an oral presentation will be required at the end of the semester.

297. Undergraduate Research Thesis in Natural Resources

Either semester. Three credits. Hours by arrangement. Prerequisite: Three credits of either NRME 296 or 299, which may be taken concurrently. Open only with consent of instructor.

Writing of a formal thesis based on independent research conducted by the student. Thesis proposal and final thesis must follow guidelines developed by the Department; and be submitted to, and approved by, a department review committee.

298. Special Topics

Either semester. Credits and hours by arrangement. May be repeated for credit with a change of topic. Open only with consent of instructor.

Topics and credits to be published prior to the registration period preceding the semester offerings.

299. Independent Study

Either or both semesters. Credits and hours by arrangement. May be repeated for credit. Open only with consent of instructor.

Nursing (NURS)

Dean: Laura Cox Dzurec

Assistant Dean: Kathleen Hiatt

Office: Room 102, Storrs Hall

For major requirements, see the School of Nursing section of this *Catalog*.

110. Introduction to Health

Both semesters. Three credits.

This interdisciplinary course introduces the intrinsic and extrinsic factors that influence health. It includes discussion of approaches to health promotion and disease prevention; leading causes of illness, injury and death in a university community; cultural practices and beliefs about health, and emergency preparedness.

111. Humanizing Health Care: Nursing's Past, Present and Future

Both semesters. Three credits.

This course is designed to explore the history of health care in the United States as it relates to nursing.

Beginning with the work of Florence Nightingale, the founder of modern nursing, the impact of events and the contributions of individuals will be examined, in light of present day concerns. Historical imperatives, dealing with such issues as gender related constraints and other social, political and economic factors will be identified. Both external and internal forces that shape the substance of nursing education, practice and research and reinforce its mission to society will be analyzed.

112. Health Care Delivery System

Both semesters. Three credits. Prerequisite: open only to Nursing majors.

An historical and contemporary exploration of the American health care delivery system: its evolution and development, legal and regulatory perspectives, roles of all providers and finances. A comparison with socialized health care will be made.

200. Clinical Science I

First semester. Three credits. Prerequisite: PNB 264, may be taken concurrently; open only to Nursing majors. Open to sophomores or higher. Not open to students who have completed NURS 207.

Critical examination of concepts from pathophysiology, pharmacology and nutrition as they relate to preventative health care of adults. Emphasis will be placed on nutritional aspects of preventative health care.

201. Clinical Science II

Second semester. Three credits. Prerequisite: CHEM 122; NURS 200; PNB 264. PNB 265 concurrent or prerequisite; open only to Nursing majors. Open to sophomores or higher. Not open to students who have completed NURS 204.

Critical examination of concepts from microbiology, pathophysiology, and pharmacology as they relate to health care of individuals throughout the lifespan. Emphasis will be placed on microbiology and anti-infectives.

212. Clinical Science for Sub-Acute and Chronically Ill Adults

First semester. Three credits. Prerequisite: To enroll in this course, a student must have earned a "C" or better in NURS 110, 111, 112, 200, 201 and 221; open only to Nursing majors.

Critical examination of concepts of pharmacology, microbiology, nutrition and pathophysiology as they relate to nursing care of adults with sub-acute and chronic health problems and their families.

213. Nursing Research

First semester. Three credits. Prerequisite: To enroll in this course, a student must have earned a "C" or better in STAT 100QC or 110QC; open only to Nursing majors.

An introduction to qualitative and quantitative research. A variety of processes and resources is used to identify scholarly writing, critique research, and apply research findings to nursing.

213W. Nursing Research

Prerequisite: STAT 100QC or 110QC; ENGL 105 or 110 or 111 or 250.

218. Nursing Science for Adults with Sub-Acute or Chronic Health Issues

First semester. Three credits. Prerequisite: To enroll in this course, a student must have earned a "C" or better in NURS 110, 111, 112, 200, 201 and 221; open only to Nursing majors.

Critical examination of theory, research and expert clinical practice supportive of nursing with adults experiencing sub-acute and chronic health problems and their families.

219. Practicum with Sub-Acute and Chronically Ill Individuals

First semester. Six credits. Prerequisite: To enroll in this course, a student must have earned a "C" or better in NURS 110, 111, 112, 200, 201, 221; NURS 212, 218 concurrent; open only to Nursing majors.

Nursing and interdisciplinary care of the person and family with sub-acute and chronic health issues.

221. Health Assessment throughout the Lifespan

Second semester. Three credits. Prerequisite: NURS 200; PNB 264; PNB 265 concurrent; open only to Nursing majors. Open to sophomores or higher.

In this course, students will acquire the knowledge, skills, and values needed for assessing individuals through the lifespan. Supervised laboratory sessions will provide opportunity to practice newly acquired skills.

225. Ethical Ways of Knowing

First semester. Three credits. Prerequisite: To enroll in this course, a student must have earned a "C" or better in NURS 219 or RN license; open only to Nursing majors.

An exploration of the ethical way of knowing in nursing. Selected models and theories illustrating an ethical approach will be analyzed.

232. Clinical and Nursing Science: Nursing Care of the Childbearing Family

Both semesters. Four credits. Prerequisite: To enroll in this course, a student must have earned a "C" or better in NURS 212, 213W, 218, and 219; open only to Nursing majors.

This course builds on students' understanding of microbiology, pharmacology, nutrition and pathophysiology as these sciences relate to childbearing families. Emphasis is on development of clinical decision making skills related to nursing care of childbearing families with a particular focus on anticipatory guidance, prevention, intervention and health restoration.

235. The Aesthetic Way of Knowing in Nursing

Second semester. Three credits. Prerequisite: To enroll in this course, a student must have earned a "C" or better in NURS 219 or RN license; open only to Nursing majors.

An exploration of the aesthetic way of knowing in nursing.

239. Practicum with Childbearing Families

Both semesters. Three credits. Prerequisite: To enroll in this course, a student must have earned a "C" or better in NURS 212, 213W, 218, and 219; NURS 232 concurrent; open only to Nursing majors.

This course provides experience in the application of principles of nursing used in the care of childbearing families. Clinical placements will be settings such as day care centers, childbirth education classes, schools, clinics, group homes, women's health centers and agencies providing acute and chronic care.

250. Nursing Leadership in the 21st Century

Second semester. Three credits. Prerequisite: To enroll in this course, a student must have earned a "C" or better in NURS 219, 239, 259, and 279; NURS 289 concurrent; open only to Nursing majors.

An in-depth analysis of the components that facilitate new nursing graduates to become leaders at the patient bedside, within interdisciplinary groups, and in the community. Emphasis is on communication, leadership, social disclosure and social justice to benefit the client and the discipline.

252. Clinical and Nursing Science for Nursing Care of Childrearing Families

Both semesters. Four credits. Prerequisite: To enroll in this course, a student must have earned a "C" or better in NURS 212, 213W, 218, 219; NURS 232 concurrent; open only to Nursing majors.

This course builds on students' understanding of microbiology, pharmacology, nutrition and pathophysiology as these sciences relate to childrearing families. Emphasis is on development of clinical decision making skills related to nursing care of childrearing families with a particular focus on anticipatory guidance, prevention, intervention and health restoration.

259. Practicum with Childrearing Families

Both semesters. Three credits. Prerequisite: To enroll in this course, a student must have earned a "C" or better in NURS 212, 213W, 218, 219; NURS 252 concurrent; open only to Nursing majors.

This course provides experience in the application of principles of nursing used in the care of infants, children, adolescents and their families. Clinical placements will be settings such as day care centers, schools, clinics, group homes, women's health centers and agencies providing acute and chronic care.

262. Clinical Science for Psychiatric and Mental Health Nursing

Both semesters. Two credits. Prerequisite: To enroll in this course, a student must have earned a "C" or better in NURS 212, 218, 219; 263, 269 concurrent; open only to Nursing majors.

Biochemical, neural activity, functional and structural aspects of the brain, cognition, mental health and illness (behavioral health) are overviewed. The psychopharmacology and nutrition of behavioral health is addressed. Psychopharmacological issues will consist of how to offer a safe and effective biochemical environment for a person (group or family) with mental health (behavior health) issues. Psychological, sociological, and physiological integrity will be addressed for behavioral health.

263. Nursing Science for Psychiatric and Mental Health Nursing

Both semesters. Two credits. Prerequisite: To enroll in this course, a student must have earned a "C" or better in NURS 212, 213W, 218, 219; NURS 262 and 269 which may be taken concurrently; open only to Nursing majors.

The role of nursing, in regard to psychiatric and social parameters of any person, family or group with a medical or psychiatric illness is examined. Major elements are the use of therapeutic communication, critical thinking, and the nursing process to examine multiple therapeutic interventions. This course stresses assessment of health and mental illness in populations that will be the focus of interventions in a professional nurse's career. Students will be exposed to knowledge that explicates how to provide a safe and effective environment in diverse milieus; how to promote health and support growth and development issues through the lifespan; how to assist persons in coping and adaptation and how to reduce risks in population of interest.

269. Practicum for Psychiatric and Mental Health Nursing

Both semesters. Three credits. Prerequisite: To enroll in this course, a student must have earned a "C" or better in NURS 212, 213W, 218, 219; NURS 262 and 263, must be taken concurrently; open only to Nursing majors.

This course entails the clinical application of theory from nursing and related disciplines to mental health and illness (behavioral health). The focus is on psychiatric illness, critical thinking, communication

skills, the nursing process in persons with a primary or secondary/adjunctive illness. The target of nursing care is the individual, family, group or community.

270. Public Health Nursing

Second semester. Three credits. Open only to Nursing majors.

Theories from nursing and public health are examined within the context of aggregate/population based care. Primary, secondary and tertiary approaches are used to promote the health of selected population/community.

272. Clinical Science for Adults with Acute Illness

Both semesters. Two credits. Prerequisite: To enroll in this course, a student must have earned a "C" or better in NURS 212, 218 and 219; open only to Nursing majors.

Critical examination of pharmacology, microbiology, nutrition and pathophysiology as they relate to nursing care of adults experiencing acute, life threatening problems.

273. Nursing Science for Acutely Ill Adults

Both semesters. Two credits. Prerequisite: To enroll in this course, a student must have earned a "C" or better in NURS 212, 213W, 218 and 219; NURS 272, which may be taken concurrently; open only to Nursing majors.

Critical examination of theory, research and expert clinical practice supportive of nursing with adults experiencing acute life-threatening health problems.

279. Practicum with Acutely Ill Adults

Both semesters. Three credits. Prerequisite: To enroll in this course, a student must have earned a "C" or better in NURS 212, 213W, 218, 219; NURS 272, 273 must be taken concurrently; open only to Nursing majors.

Nursing and interdisciplinary care of acutely ill persons and their families.

289. Capstone Practicum

Second semester. Variable credits. Recommended preparation: To enroll in this course, a student must have earned a "C" or better in all nursing courses through first semester, senior year; NURS 250 concurrent; open only to Nursing majors. Undergraduate students should register for 6 credits.

Synthesis of knowledge, skills, and values from all prior learning to provide professional nursing care as a beginning practitioner.

290. Health Assessment and Fundamentals of Nursing Praxis

Second semester. Variable credits, 1 through 12. Prerequisite: PNB 264/265, CHEM 122, BIOL 107, MCB 200, NURS 200, Portfolio Review as required; equivalent coursework will be accepted for all courses. Student must be accepted into Basic Nursing (MBeIN) Certificate Program.

This course utilizes a combination of didactic and laboratory methods to explore all realms of health assessment (inspection, palpation, percussion, and auscultation) and introduces learners to the technological skills necessary for safe nursing practice: vital signs, activities of daily living, medication administration, wound healing and dressing changes, tubes and lines, safety and isolation precautions, and routine monitoring. Patient populations are adults in sub-acute and chronic settings. The course will address the nursing science, clinical science and disease science as appropriate to the assessment and skills.

291. Nursing Across the Lifespan I

Variable credits, 1 through 12. Prerequisite: To enroll in this course, a student must have earned a "C" or better in NURS 290. Student must be accepted into Basic Nursing (MBeIN) Certificate Program.

This course is a problem based learning course examining issues in both parent-child health and community health. The nursing care of three major populations is explored: parents of childbearing and childrearing age, children, and clients in the community (wellness care and morbidity care in the home). The course will explore the major health and illness problems associated with these populations and incorporate clinical science, nursing science, and disease science knowledge appropriate to them. Major concepts of birth, wellness, prevention, grief and grieving, and chronicity will be explored. Settings will include but are not limited to hospitals, clinics, and homes.

293. Nursing Across the Lifespan II

Variable credits, 1 through 12. Prerequisite: To enroll in this course, a student must have earned a "C" or better in NURS 291. Student must be accepted into Basic Nursing (MBeIN) Certificate Program.

This course examines the major health and illness issues with adults through a problem based learning approach. Primary areas of focus are acute care and psychiatric mental health nursing. Hospitals and community centers are the primary areas of practice although students may also follow clients to their homes, long term care facilities, or other residential facilities. Major concepts of infection, coping, grief and grieving, loss, aeration/oxygenation, communication, and circulation are addressed.

298. Special Topics in Nursing

Either semester. Credits and hours by arrangement. Open only with consent of instructor. With a change in content, this course may be repeated for credit.

299. Independent Study

Either semester. Credits and hours by arrangement. Open only with consent of instructor.

Primarily for qualified students who wish to extend their knowledge by investigating special problems in nursing. With a change in content, this course may be repeated for credit.

Nutritional Sciences (NUSC)

Head of Department: Professor Sung I. Koo
Department Office: Room 214, Roy E. Jones Building

For major requirements, see the College of Agriculture and Natural Resources section of this *Catalog*.

160. The Science of Food

(Also offered as ANSC 160.) Second semester. Three credits.

An introductory level course for students interested in the application of science to food. Nutritional and functional attributes of various food constituents are discussed. Issues concerning food processing and food safety are covered. CA 3.

165. Fundamentals of Nutrition

Either semester. Three credits.

An introduction to the principles and concepts of nutrition with emphasis on the nature and function of carbohydrates, fats, proteins, minerals and vitamins, and their application to the human organism. CA 3.

166. Food, Culture and Society

Second semester. Three credits. *Lammi-Keefe*

Social, cultural, and economic factors affecting food intake and nutritional status. Includes contemporary topics such as world food problems, hunger in the United States, dieting and eating disorders, health foods and vegetarianism. CA 4.

167. Honors Colloquium in Nutrition

Either semester. One credit. One class period and one 2-hour discussion/laboratory every other week. Concurrent enrollment in NUSC 165 required. *Clark*

Lectures, discussions, and laboratory exercises to complement topics from NUSC 165. Primarily for, but not restricted to, honors students.

195. Special Topics Lecture

Either semester. Credits, prerequisites, and hours as determined by the Senate Curricula and Courses Committee. May be repeated for credit with a change in topic.

200. Nutrition and Human Development

First semester. Three credits. Prerequisite: NUSC 165. Open to sophomores or higher. *Ferris*

Nutritional needs and consequences of nutritional deficiencies throughout the life cycle: periconception, pregnancy, lactation, childhood, adolescence and aging. Maternal and child public health issues in the developed and developing world.

212. Principles of Food Science

Second semester. Three credits. Recommended preparation: MCB 203 or 204. *Dzurec*

Chemical, physical, microbiological, and legal aspects of food production, preservation and processing. Safety, aesthetics and nutrition topics included.

213. Principles of Food Science Laboratory

Second semester. Two credits. One class period and one 2-hour laboratory period. Consent of instructor required. Recommended preparation: NUSC 212.

Flavor, color, texture, viscosity and consistency, enzyme reactions, and processing. Field trips.

233. Food Composition and Preparation

First semester. Three credits. Prerequisite: NUSC 165. Recommended preparation: CHEM 141 or 243. *Fernandez*

Study of the composition of food and the physical and chemical changes that occur during preparation and/or processing that affect taste, palatability, shelf-life, and nutrient content.

235. Food Composition and Preparation Laboratory

First semester. One credit. One 3-hour laboratory period. Prerequisite: NUSC 165 and concurrent registration in NUSC 233. Recommended preparation: CHEM 141 or 243. Enrollment restricted to Nutritional Sciences and Allied Health Dietetic majors. Open to others by consent if space is available. *Fernandez*

Laboratory techniques related to composition of foods, and the physical and chemical changes that occur during preparation. A fee of \$20 is charged for this course.

236. Principles of Nutrition

Second semester. Three credits. Prerequisite: NUSC 165 and MCB 203 or 204. *Clark*

Function and metabolism of carbohydrates, proteins, fats, minerals, and vitamins.

237W. Writing in Nutritional Sciences

Second semester. One credit. Prerequisite: ENGL 105 or 110 or 111 or 250. NUSC 236 must be taken concurrently. Open only by consent of instructor.

A writing-intensive class that emphasizes both style and content consistent with the discipline of Nutritional Science.

241. Nutritional Assessment

Second semester. One credit. One class period and one 2-hour laboratory, every other week. Prerequisite: NUSC 165. Recommended preparation: MCB 203 or 204, PNB 250 or 265. Enrollment restricted to Nutritional Sciences and Kinesiology majors. *Clark*

Anthropometry, clinical, and biochemical techniques for assessment of human nutritional status.

245. Profession of Dietetics

First semester. One credit. *Shanley*

Overview of the profession of dietetics, including clinical, community, and food service management. Portfolio development will be introduced. Not open for credit to students who have passed NUSC 298 when entitled Profession of Dietetics.

250. Nutrition for Exercise and Sport

Second semester. Three credits. Prerequisite: NUSC 165 and PNB 250 or 265. *Rodriguez*

Basic nutrition principles. Physical activity, exercise, sport performance and consequences of nutritional ergogenic aids.

260. Readings in Human Nutrition

First semester. Two credits. Two class periods. Prerequisite: NUSC 200.

Readings dealing with utilization and metabolism of nutrients in the human body, with particular emphasis on understanding research methodology.

265. Medical Nutrition Therapy

First semester. Three credits. Prerequisite: NUSC 241. Recommended preparation: MCB 203 or 204. *Rodriguez*

Metabolic basis for medical nutrition therapy. Enteral and parenteral nutrition. Pathology of disease. Role of dietary management of disease.

266. Medical Nutrition Therapy Recitation

First semester. One credit. Prerequisite: NUSC 241. NUSC 265 must be taken concurrently. *Rodriguez*

Case studies and presentations. Medical terminology. Practical aspects of medical nutrition therapy administration.

267. Principles of Community Nutrition

First semester. Three credits. Prerequisite: NUSC 200 which may be taken concurrently. *Perez-Escamilla*

Role of community structures, agencies, services and the professional nutritionist in community health.

270W. Food Services Systems Management I

Second semester. Three credits. Two class periods and one 2-hour laboratory/discussion period. Prerequisite: ENGL 105 or 110 or 111 or 250. Recommended preparation: AH 244 or MGMT 201, NUSC 233, 235. *Shanley*

Quantity food procurement, preparation and distribution; recipe standardization; sanitation and safety; portion and quality control; food cost control; computer applications; and personnel management. A fee of \$20 is charged for this course.

272C. Food Service Systems Management II

First semester. Three credits. Two class periods and one 2-hour laboratory/discussion period. Prerequisite: NUSC 270W. *Shanley*

Institutional menu development; cost and budgeting; recipe analysis and adaptation; equipment layout and design; personnel management; communications skills; computer applications; marketing and merchandising; food delivery systems. A fee of \$20 is charged for this course.

275. Experience in Food Service Systems Management

Either semester. One to six credits. Prerequisite: NUSC 270W. Consent of instructor required. May be repeated for credit. No more than six credits of experience or independent study may apply toward the major. *Shanley*

Application of principles of food service management. Supervised placement.

281. Experience in Community Nutrition

Either semester. One to six credits. Prerequisite: NUSC 165. Recommended preparation: NUSC 267. Consent of instructor required. May be repeated for credit. No more than six credits of experience or independent study may apply toward the major. *Ferris, Perez-Escamilla*

Supervised field work with community nutrition education or problem-solving. Readings and reports.

295. Seminar

Second semester. One credit. One class period. Prerequisite: NUSC 200. May be taken twice.

Review, evaluation, and oral and written presentation of contemporary nutrition issues.

296W. Senior Thesis in Nutrition

Either semester. Three credits. Hours by arrangement. Prerequisite: Open only by consent of honors advisor and department head; enrollment limited to Nutritional Sciences honors students; ENGL 105 or 110 or 111 or 250.

298. Special Topics

Either semester. Credits and hours by arrangement. May be repeated for credit with a change of topic. Consent of instructor required.

Topics and credits to be published prior to the registration period preceding the semester offerings.

299. Independent Study

Either semester. One to 3 credits. Consent of instructor and department head required. No more than six credits of experience or independent study may apply toward the major.

Individual study and research with faculty. Written report.

Occupational Safety and Health (OSH)

Dean: Krista K. Rodin

Assistant Dean: Jeet Joshee

Department Office: Room 133, Bishop Center

For General Studies major requirements, see the College of Continuing Studies section of the Catalog.

270. Industrial Fire Safety/Industrial Protection

First semester. Three credits. *Russo*

Aims at developing an understanding of the Fire Safety problems faced by the industry. An overview and introduction of the problem. Students will learn about the characteristics and properties of fire and be introduced to the various methods of fire protection and control in both the industrial and the public sectors.

271. Workplace Chemical Safety

(Formerly offered as GS 271.) Both semesters. Three credits.

A comprehensive overview of the workplace chemical hazard and their biological effects.

272. Workplace Safety Hazards

(Formerly offered as GS 272.) Both semesters. Three credits.

A comprehensive overview of the workplace safety hazards and their occurrence and controls.

273. Psychology of Workplace Safety

(Formerly offered as GS 273.) Both semesters. Three credits.

A comprehensive overview of the human factors and behavior which impact upon the safety performance of workers in the workplace.

274. Workplace Environmental Issues

(Formerly offered as GS 274.) Both semesters. Three credits.

A comprehensive overview of the environmental factors and how they impact the workplace.

275. Workplace Environmental Law and Regulations

(Formerly offered as GS 275.) Both semesters. Three credits.

A comprehensive overview of the environmental laws and regulations and how they impact the workplace environment.

276. Workplace Security and Violence

(Formerly offered as GS 276.) Both semesters. Three credits.

A comprehensive overview of the workplace security issues and the aspects of workplace violence.

277. Hazardous Chemicals

(Formerly offered as GS 277.) Either semester. Three credits. *Reese*

A writing course that has as its subject hazardous chemicals and their use in the workplaces, their effects on the environment, and the hazards caused by exposure to them.

277W. Hazardous Chemicals

Prerequisite: ENGL 105 or 110 or 111 or 250.

278. Workers' Compensation Law

(Formerly offered as GS 278.) First semester. Three credits. *Brouillet*

A comprehensive overview of state and federal workers' compensation laws, and the interrelationship of these laws with other laws. It is designed for the student without a legal background, but an interest in learning about the laws governing workplace injuries and practical considerations for handling of these claims.

Operations and Information Management (OPIM)

Head of Department: Professor James R. Marsden
Department Office: Room 372, School of Business

For major requirements, see the School of Business section of this *Catalog*.

Courses in this department are open to juniors and seniors only. The School of Business requires students at the Storrs campus to participate in the Mobile Computing Initiative before registering for the courses listed below. See the School of Business *Catalog* section for details about how the program operates.

203C. Business Information Systems

Either semester. Three credits. Prerequisite: ACCT 131. Open only to School of Business students; others with the consent of the Operations and Information Management Department Head. Not open to students who have passed or are taking BADM 260.

Information needs of managers, the structure of the information systems required to fill these needs, systems development, business computing technology, and management applications within major business functional subsystems.

204. Operations Management

Either semester. Three credits. Prerequisite: OPIM 203.

Introduction to concepts, models, and information systems applicable to the planning, design, operation and control of systems which produce goods and services. Topics include process design, facility locations, aggregate planning, inventory control, and scheduling.

205. Introduction to Database Management

Either semester. Three credits. Prerequisite: OPIM 203C or equivalent. Consent of Department Head and BGS Mentor is required. Cannot be used toward fulfilling MIS major requirements. Offered only at the Stamford Regional Campus.

Introduction to the development and implementation of database applications. Topics covered include costs and benefits of database approach, database design lifecycle, conceptual database design, the relational data model, data administration, database security, database backup and recovery, and database management system selection and implementation. Students participate in the hands-on design and implementation of a small database using the relational architecture.

206. Business Application Programming

Either semester. Three credits. Prerequisite: OPIM 203C or equivalent. Consent of Department Head and BGS Mentor is required. Cannot be used toward fulfilling MIS major requirements. Offered only at the Stamford Regional Campus.

Development of business application software using structured and object oriented programming techniques. The emphasis is on programming logic, rapid application development techniques and personal productivity tools. Topics include program design techniques, programming constructs, interface development techniques, event driven programming, file and database processing, and object linking and embedding.

207. Internet Technologies and Electronic Commerce

Either semester. Three credits. Prerequisite: OPIM 205, OPIM 206; consent of Department Head and BGS Mentor is required. Cannot be used toward fulfilling MIS major requirements. Offered only at the Stamford Regional Campus.

This course introduces Internet technology and tools from the perspective of business users. The focus is on providing knowledge base and functional tools for students as workers in the 21st Century. The specific technologies covered in the class will depend upon state-of-the-art at the time of class offering. However, some of the general concepts include: HTML, client side programming such as Javascript or VBscript, dynamic content creation and management, electronic business process management, security concerns and solutions, and regulatory/public policy issues. A significant part of the course will involve hands-on training.

208. System Development and Process Management

Either semester. Three credits. Prerequisite: OPIM 205, OPIM 206; consent of Department Head and BGS Mentor is required. Cannot be used toward fulfilling MIS major requirements. Offered only at the Stamford Regional Campus.

The course covers the system development life cycle of business information systems. Topics include business process reengineering, detailed process modeling and data modeling techniques, project management concepts, system architecture, testing and implementation considerations. The potential system issues and relevant up-to-date technologies are also explored in the class. Students participate in a project using supportive software tools.

210. Operations Research for Information Systems Analysis

Either semester. Three credits. Prerequisite: OPIM 203C, which may be taken concurrently.

The philosophy and techniques of Operations Research, including problem definition, modeling, and solution in the context of analysis, design, and implementation of computer-based information systems.

211. Systems Analysis and Design

Either semester. Three credits. Prerequisite: OPIM 203C, 220, 221, 222; open only to MIS majors.

System development methodologies for business information systems. Project management concepts, hardware and software technology, and organizational considerations are explored. Students participate in a system development project.

212. Advanced Information Technologies

Either semester. Three credits. Prerequisite: OPIM 203C, 220, 221, 222; open only to MIS majors.

Deepens knowledge of application development tools for the design of decision oriented information systems. Emphasis will be placed on emerging tools and techniques relevant for modern organizational information needs.

220. Business Software Development

Either semester. Three credits. Prerequisite: OPIM 203C, which may be taken concurrently; open only to MIS majors.

The development of computer software for business information processing. Topics include flowcharting, pseudocode, programming with a business oriented computer language, file processing concepts, and on-line and batch processing.

221. Business Data Base Systems

Either semester. Three credits. Prerequisite: OPIM 203C (may be taken concurrently). Open to MIS majors only.

Development and implementation of database applications for business. Topics include: data modeling, relational database concepts, query languages, hands-on design and implementation of a relational database system, database administration, non-relational database models, distributed architectures, and advanced object bases.

222. Network Design and Applications

Either semester. Three credits. Prerequisite: OPIM 203C (may be taken concurrently.) Open to MIS majors only. Open only to juniors and seniors.

Principles and applications of business telecommunications emphasized. Course covers important network systems as well as crucial techniques in building these systems. Students participate in network design and implementation project.

223. Advanced Business Application Development

Three credits. Prerequisite: OPIM 203C. Open to MIS majors only. Open only to juniors and seniors.

Course designed to cover structured and object-oriented programming methodologies for developing business applications. Program design techniques and logic emphasized. Students participate in a business application design and implementation project.

230. Management of Production/Operations Systems

Second semester. Three credits. Prerequisite: OPIM 204.

In-depth study of the problems and models applicable to the design, operation and control of systems which produce goods and services. Students will learn to define, relate to, and solve production and operations problems using such media and methods as cases, projects, simulations, behavioral and quantitative models.

252. Industrial Quality Control

Semester by arrangement. Three credits. Prerequisite: STAT 100 or 110, and OPIM 204 or MEM 211.

The economic control and assurance of quality and reliability with emphasis on management of the quality function. Included are: a conceptual treatment of statistical methods in quality control; control of quality during manufacture and at delivery of finished goods; planning for quality control and reliability; quality management, to include organization, economics, systems and procedures.

289. Field Study Internship

Either or both semesters. One to six credits. Hours by arrangement. Prerequisite: Completion of Freshman - Sophomore School of Business Requirements and consent of instructor and Department Head. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Designed to provide students with an opportunity for field work relevant to one or more major areas within the Department. Students will work under the supervision of one or more professionals in the specialty in question. Student performance will be evaluated on the basis of an appraisal by the field supervisor and a detailed written report submitted by the student.

293. Foreign Study

Either or both semesters. Credits and hours by arrangement, up to a maximum of six credits. Consent of Department Head required, prior to the student's departure. These credits must be awarded for regularly scheduled course work at a recognized foreign university in the field of information systems or in the student's Applications Area; if in the Applications Area the consent of both the Department Head and the Head of the Applications Area is required. Prior to taking the course the student must sign up for the course in advance as a course in that Applications Area. No credits can be counted toward required courses in the MIS major.

Special topics taken in a foreign study program.

296. Senior Thesis in Operations and Information Management

Either semester. Three credits. Hours by arrangement. Prerequisite: Open only by consent of instructor and department head; open only to OPIM Department Honors Students.

298. Special Topics

Either semester. Credits and hours by arrangement. Prerequisite: Announced separately for each offering. With a change in content, may be repeated for credit.

Classroom course in special topics in operations management, operations research and information management as announced in advance for each semester.

299. Independent Study

Either semester or both semesters. Credits by arrangement, not to exceed six in any semester. Open only with consent of instructor and Department Head.

Individual study of special topics in operations management, operations research and information management as mutually arranged between a student and an instructor.

Pathobiology and Veterinary Science (PVS)

Head of Department: Professor Herbert J. Van Kruiningen

Department Office: Room 103, Animal Pathology Building

For major requirements, see the College of Agriculture and Natural Resources section of this *Catalog*.

113. Biomedical Issues in Pathobiology (Formerly offered as PATH 113.) Second semester, alternate years (odd). Two credits. *Frasca*

This introductory course focuses on current global issues of health and disease to describe fundamental topics in pathobiology. Global biomedical concerns regarding infectious diseases, population, cancer, biotechnology and environmental health will be addressed. Course content will provide examples of the impact of veterinary and human pathology on world health issues.

195. Special Topics Lecture

Either semester. Credits, prerequisites, and hours as determined by the Senate Curricula and Courses Committee. May be repeated for credit with a change in topic.

200. Anatomy and Physiology of Animals

(Formerly offered as PATH 200.) First semester. Four credits. Prerequisite: BIOL 107 or equivalent. Three class periods and one 2-hour discussion/laboratory period. Open to sophomores or higher. *Bushmich*

A study of the anatomy and physiology of animals with reference to pathological changes of the component parts of the body.

202. Health and Disease Management of Animals

(Formerly offered as PATH 202.) Second semester. Three credits. Prerequisite: PVS 200. Open to sophomores or higher. *Bushmich*

This course is designed for students who plan to own and work with domestic animals. Its purpose is to develop student competence in disease management and to foster an intelligent working relationship with their veterinarian. The course will cover a systematic study of infectious and noninfectious diseases of domestic animals from the standpoint of economy and public health.

235. Clinical Chemistry

(Formerly offered as PATH 235.) Second semester, alternate years (odd). Four credits. Prerequisite: CHEM 141. Recommended preparation: Biochemistry course. *D. Hill*

Deviations in normal concentrations of endogenous chemicals in biological fluids and tissues and use in the diagnosis of disease. Analysis and relationship of these chemicals to diagnostic interpretations.

248. Principles of Animal Virology

(Formerly offered as PATH 248.) First semester. Three credits. *Garmendia*

Structure and classification of viruses, cultivation and multiplication, pathogenesis and epidemiology of viral infections, host response, oncogenic viruses, immunization against, and laboratory diagnosis of viral diseases.

248W. Principles of Animal Virology

(Formerly offered as PATH 248W.) Prerequisite: ENGL 105 or 110 or 111 or 250.

252. Pathobiology of the Avian Species

(Formerly offered as PATH 252.) First semester. Three credits. Offered in odd-numbered years. *Khan*

A systematic study of metabolic, nutritional, genetic, and infectious diseases of commercial poultry, avian wildlife, and caged pet birds. Emphasis is placed upon diagnosis and disease prevention. For each system of the body, pertinent anatomy, physiology, histology, pathology, and histopathology will be discussed.

256. Systemic Pathology and Microbiology of Finfish and Shellfish

(Formerly offered as PATH 256.) Second semester. Three credits. Offered in even-numbered years. Two class periods and one 2-hour laboratory. Prerequisites: BIOL 107 or 108, PNB 250 or PVS 200/202. Recommended MCB 203 or 204, MCB 229, EEB 200 and NRME 298. *Frasca, French*

A systematic study of infectious and noninfectious diseases of commercial finfish and shellfish. Emphasis is placed upon the pathology, diagnoses and preventive measures. For each system of the body, pertinent anatomy, physiology, histology, and gross and microscopic pathology will be discussed.

295W. Seminar

Either or both semesters. Two credits. One class period. Prerequisite: ENGL 105 or 110 or 111 or 250. Open only with consent of instructor. Majors may take this course in each semester of the senior year. May be repeated for credit. *French*

296. Histologic Structure and Function

(Formerly offered as PATH 296.) First semester. Four credits. Three class periods and one 2-hour laboratory. Open only with consent of instructor. *French*

The course is designed for students in biologic, paramedical and animal sciences, and its purpose is to integrate histologic and cellular structure with function, utilizing tissues from man and other vertebrates.

297. Principles of Pathobiology

(Formerly offered as PATH 297.) Second semester. Three credits. *Van Kruiningen*

The body's response to chemical, physical, and microbial injuries including the functional and morphologic alterations in disease of the major organ systems are discussed. Knowledge of anatomy and physiology is recommended.

298. Special Topics

(Formerly offered as PATH 298.) Either semester. Credits and hours by arrangement. May be repeated for credit with a change of topic. Open only with consent of instructor.

Topics and credits to be published prior to the registration period preceding the semester offerings.

299. Independent Study

(Formerly offered as PATH 299.) Either or both semesters. Credits and laboratory periods by arrangement. May be repeated for credit.

Special problems in connection with departmental research programs and diagnostic procedures for diseases of animals. Some suggested topics are histopathologic laboratory procedures, clinical hematology, diagnostic bacteriology, diagnostic parasitology.