individuals and businesses in Knoxville and surrounding communities. Courses are offered on the University campus and at selected off-campus locations. Courses are taught by University faculty, staff, and community experts. Courses are also delivered "on-site" for business clients, with instructional services tailored to the needs of each individual group.

Business topics include career planning and small business development. Personal interest topics range from antiques, computers and dance to gardening, music and sports.

There are also courses which meet requirements of the state or other agencies for certification in real estate, aviation, and financial planning. The department co-sponsors the Smoky Mountain Field School with Great Smoky Mountains National Park.

For further information or to register, contact UT Community Programs, 600 Henley Street, Suite 101, Knoxville, TN 37996-4110, telephone (423) 974-0150, or send e-mail to UTCcommunity@gateway.ce.utk.edu.

DEPARTMENT OF DISTANCE EDUCATION AND INDEPENDENT STUDY

Director:
David F. Holten, Ph.D. Kansas

Assistant Director:
Samuel A. Cain, M.S. State University of New York (Stony Brook); Laurel L. Thomas, M.S. New York University

Distance Education. The Department of Distance Education and Independent Study, in conjunction with academic departments of UT, offers interactive teleclasses for students at specially equipped classrooms throughout Tennessee. Teleclass students participate actively with the instructor, in independent study through directed readings, by correspondence for all campuses of the University. The program includes college credit courses, high school courses (for credit or for college entrance requirements), and non-credit courses. College credit correspondence courses are based on regular UT campus courses, and the credit is recorded on the student's UT transcript. High school courses are based on the curriculum frameworks of the Tennessee Department of Education. Non-credit courses can be taken to meet personal or professional education goals. The courses offer videotapes and audiotapes as well as traditional print materials. Through this program, The University of Tennessee is able to overcome geographic limitations in performing its services as Tennessee's land-grant institution of higher education. The program is open to UT students and to anyone who has the educational preparation required for a particular course. UT students must have the approval of their college advisor before they enroll in college credit courses. With the cooperation of a UT instructor, independent study through directed readings may also be arranged through this department for courses not listed in the Independent Study catalog.

For information and enrollment forms for correspondence courses, contact the Department of Independent Study, 420 Communications Bldg., The University of Tennessee, Knoxville, TN 37996-0300. Telephone: (423) 974-9134 or (865)-677-8657. E-mail: indstudy@gateway.ce.utk.edu


The following correspondence courses are offered through the Department of Distance Education and Independent Study. For full course descriptions refer to the listings in this Undergraduate Catalog.

Accounting 201 Principles of Financial Accounting; 282 Principles of Goods Agricultural Economics 210 Introduction to Agricultural Economics; 470 Natural Resource Economics

Anthropology 110 Human Origins; 130 Cultural Anthropology

Child and Family Studies 110 Introduction to Early Childhood Education; 240 Human Sexuality; 312 Adolescence and Aging; 290 Developmental and Cultural Foundations; 301K Circuits I; 101 English Composition I; 102 English Composition II; 201 British Literature I; Beowulf through Johnson; 202 British Literature II; Wordsworth to the Present; 230 American Literature II: Civil War to Present; 260 Introduction to Creative Writing; 306 Introduction to Shakespeare

Forestry, Wildlife and Fisheries 211K Introduction to Forestry, Wildlife and Fisheries; French 111 Elementary French, First Semester; 112 Elementary French, Second Semester; 211 Intermediate French, First Semester; 212 Intermediate French, Second Semester; 301 Elements of French for Upper Division and Graduate Students, First Semester; 302 Elements of French for Upper Division and Graduate Students, Second Semester; Geography 101 World Geography, First Semester; 101 Elementary German, First Semester; 102 Elementary German, Second Semester; German 406 Death, Dying and Bereavement; History 201 History of the United States; 252 History of the Western World; 242 Development of Western Civilization; 448 History of Tennessee; Mathematics 115 Statistical Reasoning; 118 College Algebra; 121 Calculus I; 122 Calculus II; 141K Calculus III; 142K Calculus IV; 201 Structure of the Number System; 202 Probability, Statistics and Euclidean Geometry; 210 Combinatorics; 241 Calculus III; Philosophy 345 Medical Ethics; Political Science 101 United States Government and Politics; 374 American Political Thought

Psychology 110 General Psychology; 210 Biological Basis of Behavior; 220 Behavior and Experience; Humane Science Psychology; 300 Child Psychology; 310 Learning and Thieving; 330 Abnormal Psychology; 360 Social Psychology; 315K with Clinic; 320 Research Methods in Psychology; Religious Studies 326 Images of Jesus; 345 Medical Ethics; Safety 401 General Safety; Sociology 110 Social Problems and Social Change; 150 General Sociology; 381 Juvenile Delinquency; 360 The City; 415 Sociology of Aging; 451 Criminal Justice; Sociology 395 Criminology; Spanish 111 Intermediate Spanish, First Semester; 112 Elementary Spanish, Second Semester; 211 Intermediate Spanish, First Semester; 212 Intermediate Spanish, Second Semester
ACCOUNTING (009)

415 Governmental and Nonprofit Accounting (3) Introduction to governmental and non-profit accounting concepts; fund accounting; governmental non-profit entities; governmental accounting principles; foundation of governmental accounting; governmental accounting; local government; governmental accounting principles; fund accounting; accounting for non-governmental non-profit entities. Prereq: 414.

414 Financial Reporting By Business and Nonprofit Organizations (3) Continuation of 311 ... error corrections, aggregation issues, international accounting, and governmental statements. Prereq: 311 with C or better, or consent of instructor. F, Sp.


301 Accounting Information Systems (3) Development and use of accounting information systems for collection, organization, and distribution of economic information about organizations for internal and external decision making. Prereq: 201, Management 203, or Junior standing. Majorexam may be given during the final class meeting. F, Sp.

202 Principles of Managerial Accounting (3) Introduction to managerial and cost accounting concepts with emphasis on uses of accounting data by managers in planning operations, controlling activities, and decision making. Prereq: 201. F, Sp.


200 Principles of Governmental and Nonprofit Accounting (3) Introduction to governmental and non-profit accounting concepts with emphasis on uses of accounting data by managers in planning operations, controlling activities, and decision making. Prereq: 201. F, Sp.

African and African-American Studies (022)


414 Afro-American Culture and Society (3) Same as Anthropology 414. Prereq: Anthropology 314.

413 African-American History (3) Same as History 413. Coreq: History 362.


408 African-American Studies (3) Same as History 408. Coreq: History 362.


400 African-American Studies (3) Same as History 400. Coreq: History 362.


393 African-American Studies (3) Same as History 393. Coreq: History 362.


AGRICULTURAL AND EXTENSION EDUCATION (042)

201 Field Experience in Agricultural Education (1) Field work experience to be completed during program in agri-cultural education. Satisfactory/No Credit grading only. Prereq: Consent of instructor. May be repeated. F, Sp.

245 Agricultural Experience, Leadership and Adult Programs (5) Developing student-centered agriculture experi- ences, programs, conducting leadership development activities through the Future Farmers of America. Role and methods for adult education in agriculture.

411 Independent Study in Agricultural Education (1-3) Methods and techniques for teaching agriculture, compiling teaching plans and courses of study, and developing programs of activities for agriculture.

410 Seminar in Agricultural Education and Business (1) Primarily for Agricultural Economics and Business students. May be repeated. F

431 International Agricultural Trade and Marketing (3) Introduction to the role and monetary aspects of interna- tional trade. The effect on agricultural commodity flows. Primary and marketing institutions, production, institutional marketing and marketing policies for agricultural commodities. F


420 International Agricultural Trade and Marketing (3) Introduction to the role and monetary aspects of interna- tional trade. The effect on agricultural commodity flows. Primary and marketing institutions, production, institutional marketing and marketing policies for agricultural commodities. F


420 International Agricultural Trade and Marketing (3) Introduction to the role and monetary aspects of interna- tional trade. The effect on agricultural commodity flows. Primary and marketing institutions, production, institutional marketing and marketing policies for agricultural commodities. F


420 International Agricultural Trade and Marketing (3) Introduction to the role and monetary aspects of interna- tional trade. The effect on agricultural commodity flows. Primary and marketing institutions, production, institutional marketing and marketing policies for agricultural commodities. F

written presentation on special topics and current research. May be repeated for a maximum of 6 credits. Prerequisite: Completion of Animal Science sophomore and junior core courses. 2 hours and 1 lab. F

494 Poultry Production and Management (3) Integration of principles of nutrition, breeding, physiology, and management into complete production and management programs. Structure of industry, enterprise establishment, systems of production, and management practices. Management evaluation in terms of production responses and economic returns. Prerequisite: Completion of Animal Science sophomore and junior core courses. 2 hours and 1 lab. F

496 Horse Production and Management (3) Integration of principles of nutrition, breeding, physiology, and marketing into complete production and management programs. Structure of industry, enterprise establishment, systems of production, and management practices. Management evaluation in terms of production responses and economic returns. Prerequisite: Completion of Animal Science sophomore and junior core courses. 2 hours and 1 lab. F

498 Conservation, Zoo and Lab Animal Management (3) Principles of nutrition, breeding, physiology, and management into complete production and management programs. Types of enterprises, management of feed and animal health, housing and nutrition, breeding and housing, and farm structure and equipment. Prerequisite: Completion of Animal Science sophomore and junior core courses. 2 hours and 1 lab. F

499 Human and Primate Behavior (3) Analytical, critical, interpretive, and synthesis skills and must submit a written summary after reading.Students must submit official approval form prior to registration. The student will be evaluated on knowledge of principles of nutrition, breeding, physiology, and management into complete production and management programs. Structure of industry, enterprise establishment, systems of production, and management practices. Management evaluation in terms of production responses and economic returns. Prerequisite: Completion of Animal Science sophomore and junior core courses. 2 hours and 1 lab. F

431 Linguistic Anthropology (3) Basic linguistic concepts applied to research in cultural anthropology; probability, investigation of relationships between language and culture. Prerequisite: 130 or Linguistics 202. (Same as Linguistics 411.)
410 History and Theory of Urban Forms (3) Patterns of urban development. Selected historical and contemporary examples basic urban design issues and methodological approaches examined through lectures, readings, etc. and studio studies including historical change in urban form and design.

412 Non-Western and Indigenous Architecture (3) Building typologies and design philosophy from diverse cultural and economic levels, as designed by anonymous builders. Examples from different times and places inc. the temples of Titicaca; the India; Hindu; Buddhist, and Zuni Ancestral Pueblo; China, Japan, and the like.

416 architectural (3) Studies in the history of one of the great architectural achievements of the modern world, focusing on issues of urbanism and social and historic factors.

419 Medieval Architecture (3) History of architecture from the decline of Rome to the beginning of the Renaissance. (Same as Medieval Studies 415.)

420 American Architecture, 1940-1960 (3) Stylistic evolution of American architecture through the latter half of the 20th century.

421 History of Landscape Architecture (3) Professional, social, and environmental influences which have led to the formation of landscape architecture.

422 Modern East European Architecture (3) Twentieth century architecture in Russia, Czechoslovakia, Poland, Hungary, East Germany, and Bulgaria.

423 Special Topics in Architecture (4) Faculty initiated topics in various phases of architectural education.

424 Structural and Mechanical Applications (3) Case studies illustrating and explaining the techniques and applications of structural and mechanical systems. I/S.

425 Structural Innovations (6) Building design with innovative structural configuration and technology. Exposure to specific community conditions. Exploration of design hypothesis which informs the character of a project.

426 Marketing Services (3) Theories of marketing for architecture and related professions. Emphasis on the historic integrity of buildings and places.

427 Architectural Development (3) Principles and methods of architectural design and planning. Emphasis on the historic integrity of buildings and places.


429 Building/Project Management (3) Principles, methods, and practice of building management. Emphasis on the historic integrity of buildings and places.

430 Exhibit Management (3) Principles and methods of exhibit management. Emphasis on the historic integrity of buildings and places.

432 Project and Construction Management (3) Principles, methods, and practice of project and construction management. Emphasis on the historic integrity of buildings and places.

433 Design Management (3) Principles and methods of design management. Emphasis on the historic integrity of buildings and places.

436 Advanced Lighting (3) Innovative concepts in design of technical lighting. Emphasis on the historic integrity of buildings and places.

437 Advanced Architectural Design Topics (6) Faculty initiated advanced design projects. Emphasis on the historic integrity of buildings and places.

439 Advanced Architectural Design Topics (6) Faculty initiated advanced design projects. Emphasis on the historic integrity of buildings and places.

440 Comprehensive Design Project I (3) Project selection and preparation for Architecture 482. Emphasis on the historic integrity of buildings and places.

441 The International Style (3) A survey of architecture of the early modern movement, primarily in Europe and America, covering the years 1920 to 1940.

442 Architectural Design VI (6) Order and form in complex buildings developed to address programmatic, social, and environmental issues. Emphasis on the historic integrity of buildings and places.

443 Building Energy Analysis (3) Balancing heat flow within the building to create comfortable conditions for all occupants. Emphasis on the historic integrity of buildings and places.

444 Advanced Architectural Design Topics (6) Faculty initiated advanced design projects. Emphasis on the historic integrity of buildings and places.

445 Advanced Architectural Design Topics (6) Faculty initiated advanced design projects. Emphasis on the historic integrity of buildings and places.

446 Architectural Preservation (3) Preservation of historical buildings. Emphasis on the historic integrity of buildings and places.

449 Comprehensive Design Project II (3) Projects dealing with real space and specific community conditions. Exploration of design hypothesis which informs the character of a project.

450 New Business Strategies (3) Theories of new business strategies for architecture and related professions. Emphasis on the historic integrity of buildings and places.

451 Advanced Architectural Design Topics (6) Faculty initiated advanced design projects. Emphasis on the historic integrity of buildings and places.

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462 Advanced Architectural Design Topics (6) Faculty initiated advanced design projects. Emphasis on the historic integrity of buildings and places.

463 Architectural Development (3) Principles and methods of architectural design. Emphasis on the historic integrity of buildings and places.

464 Project and Construction Management (3) Principles, methods, and practice of project and construction management. Emphasis on the historic integrity of buildings and places.

465 Marketing Services (3) Theories of marketing for architecture and related professions. Emphasis on the historic integrity of buildings and places.

466 Architectural Design V (6) Project selection and preparation for Architecture 482. Emphasis on the historic integrity of buildings and places.


476 Architectural Design VI (6) Order and form in complex buildings developed to address programmatic, social, and environmental issues. Emphasis on the historic integrity of buildings and places.

477 Architectural Design VII (6) Order and form in complex buildings developed to address programmatic, social, and environmental issues. Emphasis on the historic integrity of buildings and places.

478 Architectural Design VIII (6) Order and form in complex buildings developed to address programmatic, social, and environmental issues. Emphasis on the historic integrity of buildings and places.

479 Architectural Design IX (6) Order and form in complex buildings developed to address programmatic, social, and environmental issues. Emphasis on the historic integrity of buildings and places.

480 Comprehensive Design Project I (3) Project selection and preparation for Architecture 482. Emphasis on the historic integrity of buildings and places.

481 Advanced Architectural Design Topics (6) Faculty initiated advanced design projects. Emphasis on the historic integrity of buildings and places.

482 Advanced Architectural Design Topics (6) Faculty initiated advanced design projects. Emphasis on the historic integrity of buildings and places.


484 Project and Construction Management (3) Principles, methods, and practice of project and construction management. Emphasis on the historic integrity of buildings and places.

485 Marketing Services (3) Theories of marketing for architecture and related professions. Emphasis on the historic integrity of buildings and places.


491 Foreign Study (3-5) Faculty initiated design projects conducted in various locations outside the United States. May be repeated. Maximum 12 hours.

492 Foreign Study (3-5) Faculty initiated design projects conducted in various locations outside the United States. May be repeated. Maximum 12 hours.

493 Independent Study in Architecture (1-6) Individual projects and faculty directed programs. Credit adjusted to complexity and level of effort required. May be repeated. Prereq: consent of instructor.

494 Foreign Studies Sketchbook (1-3) Investigations of historic urban fabric and architecture in various locations outside the United States. May be repeated. Prereq: consent of instructor.

495 Design Studies in Krakow (6) Studio meets in Krakow, Poland. Faculty design studies responding to specific community conditions in an European city.

496 Sketchbook Study in Architecture in Central Europe and Krakow (6) Studio and sketchbooks in Krakow, Poland. Faculty design studies responding to specific community conditions in an European city.

497 Sketchbook Study in Architecture in Central Europe and Krakow (6) Studio and sketchbooks in Krakow, Poland. Faculty design studies responding to specific community conditions in an European city.

498 Fine Art Study in Krakow (6) Studio meets in Krakow, Poland. Fine arts investigations related to architectural design.

ART (140) 101 Studio Fundamentals: Drawing and Design (2) Introduction to basic drawing media, concepts and techniques and to the elements and principles of pictorial organization.

103 Studio Fundamentals: Three Dimensional Design (2) Projects dealing with real space and specific community conditions. Emphasis on material and techniques. Courses of Instruction
ART CERAMICS (135)

191 Introduction to Studio Art: Various Media (3) Individual sections for various artistic disciplines. For Non-majors only. Courses may be repeated, medium may not be repeated. Maximum 12 hours.

221 Ceramics: Handbuilding I (3) Introduction to the concepts of clay, preparation and firing. Prereq: 101 and 103.

222 Ceramics: Throwing (3) Introduction to throwing, glazing, clay preparation and firing. Prereq: 101 and 103.

225 Portfolio Practicum - Handbuilding (3) Intense post- studio introductory studio experience to develop work for exhibition at Ceramics Portfolio Review (320). Art majors only. Not repeatable for credit. Prereq: 221, 222, and consent of Department.

226 Portfolio Practicum - Throwing (3) Intense post- studio introductory studio experience to develop work for exhibition at Ceramics Portfolio Review (320). Art majors only. Not repeatable for credit. Prereq: 221, 222, and consent of Department.

228 Ceramics: Special Topics (3) Student or instructor initiated courses to be offered at convenience of department. Prereq: Determined by department for individual topic. May be repeated. Maximum 12 hours.

320 Ceramics Portfolio Review (3) Review of prior work in ceramics. Successful completion required prior to enrollment. Prereq: 221 and 222, and consent of Department. Satisfactory/No credit only.

321 Ceramics: Handbuilding II (3) Continued investigation of handbuilding with emphasis on the development of individual projects and expression. Prereq: 320.

322 Ceramics: Throwing II (3) Continued investigation of throwing with emphasis on the development of individual projects and expression. Prereq: 320, 321, and 322. May be repeated. Maximum 12 hours.


326 Ceramics: Clay and Glazes (3) Clay chemistry, glazing, mixing and testing of body and glaze formulas. Prereq: 323.

327 Ceramics: History Seminar (3) Survey of the history of ceramics as it relates to technological and aesthetic developments. (Does not apply toward any major requirement.) Prereq: 327.

331 Ceramics: Kiln Design (3) Designing kilns, traditional and modern techniques, construction methods, and kiln operation. Prereq: 330.

332 Ceramics: Studio Seminar (3) Studio seminar initiated to provide course work opportunity for individual students. (Does not apply toward any major requirement.) Prereq: 332. May be repeated. Maximum 12 hours.

411 Drawing IV (6) Individualized pursuit of personal investigation of drawing techniques and concepts, supplemented by individual and group critiques and weekly life-drawing sessions. Graduates of the art program only. Prereq: 410, and consent of instructor. Satisfactory/No credit only.

419 Special Topics in Drawing and Painting (3) Student or instructor initiated courses to be offered at convenience of department to enhance and expand the painting, drawing, and mixed media curricula. Prereq: Determined by department for individual topic. May be repeated. Maximum 12 hours.

491 Individual Problems (3) Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

493 Independent Study (1-15) Prereq: Consent of instructor. May be repeated. Medium may not be repeated. Maximum 15 hours.

494 Individual Problems (3) Prereq: Consent of instructor. May be repeated. Maximum 12 hours.

5950 Field Experience (1-99) Prereq: Consent of instructor. May be repeated. Medium may not be repeated. Maximum 99 hours.

ART DESIGN/GRAPHIC (136)

191 Graphic Design History (3) Major movements and pivotal artistic directors and designers. (Does not apply toward any major requirement.) Prereq: 191.

191 Graphic Design History (3) Major movements and pivotal artistic directors and designers. (Does not apply toward any major requirement.) Prereq: 191.

192 Color and Form in Graphic Design (3) Emphasis on color theory, color psychology, and design application. Prereq: 191, 192, and consent of instructor.

231 Graphic Design Production (3) Introduction to design concepts and their application to graphic projects. Prereq: 191, 192, and consent of instructor.

295 Graphic Design Practicum (3) Practical work experience in a student-managed, on-site studio. Prereq: 295 and consent of instructor. May be repeated. Maximum 6 hours.

312 Drawing Portfolio Review (0) Review of prior work in drawing. Successful completion required prior to enrollment. Prereq: 312 and consent of instructor. Satisfactory/No credit only.

315 Graphic Design Practicum (3-12) Practical work experience in the graphic design field. Only by permission of the department. Prereq: Senior rank and consent of instructor. May be repeated. Maximum 12 hours.

401 Advanced Graphic Design (3) Study and theory of individual and group critiques and weekly life-drawing sessions. Graduates of the art program only. Prereq: 410, and consent of instructor. Satisfactory/No credit only.

419 Special Topics in Drawing and Painting (3) Student or instructor initiated courses to be offered at convenience of department to enhance and expand the painting, drawing, and mixed media curricula. Prereq: Determined by department for individual topic. May be repeated. Maximum 12 hours.

491 Individual Problems (3) Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

493 Independent Study (1-15) Prereq: Consent of instructor. May be repeated. Medium may not be repeated. Maximum 15 hours.

494 Individual Problems (3) Prereq: Consent of instructor. May be repeated. Maximum 12 hours.

5950 Field Experience (1-99) Prereq: Consent of instructor. May be repeated. Medium may not be repeated. Maximum 99 hours.

ART EDUCATION (141)

301 Foundations of Art Education (3) Basic philosophy and structure of elementary and secondary school art programs. Prereq: Consent of instructor. Only by permission of the Department of Art Education.

305 Multiculturalism in Visual Art (3) Selected cogni- tive and productive experiences involving multicultural visual art experiences. Prereq: 305.


350 Principles of Printmaking (3) Critical evaluation of traditional and contemporary printmaking techniques and concepts. Prereq: 301.

351 Intermediate Graphic Design I (3) Concept development, Cormey of graphic design elements including typography and imagery and their interrelationships within the graphic design layout. Prereq: 250, 252.

352 Advanced Graphics Design II (3) Investigation of signs, symbols, marks and identity systems. Prereq: 351.

353 Color Illustration (3) Flat and process color media and techniques applied to editorial illustration. Prereq: 254 and successful completion of any portfolio review.

354 Graphic Design Production (3) Introduction to design concepts and their application to graphic projects. Prereq: 191, 192, and consent of instructor. Satisfactory/No credit only.

355 Graphic Design Seminar (3) Discussion of design and production problems including issues in economics, and ethics for the graphic designer. Graduates of the art program only. Prereq: 350.

356 Advanced Graphic Design (3) Study and theory of individual and group critiques and weekly life-drawing sessions. Graduates of the art program only. Prereq: 410, and consent of instructor. Satisfactory/No credit only.

451 Graphic Design Practicum (3-12) Practical work experience in the graphic design field. Only by permission of the department. Prereq: Senior rank and consent of instructor. May be repeated. Maximum 12 hours.

459 Special Topics in Graphic Design (3) Study and theory of individual and group critiques and weekly life-drawing sessions. Graduates of the art program only. Prereq: Determined by department for individual topic. May be repeated. Maximum 15 hours.

493 Independent Study (1-15) Prereq: Consent of instructor. May be repeated. Medium may not be repeated. Maximum 15 hours.

494 Individual Problems (3) Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

495 Visiting Artist Seminar (2) Study and discussion of contemporary art issues conducted by different visiting artists. Prereq: Consent of instructor. Only by permission of the Department of Art Education.

495 Visiting Artist Seminar (2) Study and discussion of contemporary art issues conducted by different visiting artists. Prereq: Consent of instructor. Only by permission of the Department of Art Education. Satisfactory/No credit only.

ART DRAWING (137)

191 Introduction to Studio Art: Various Media (3) Individual sections for various artistic disciplines. For Non-majors only. Courses may be repeated, medium may not be repeated. Maximum 12 hours.

211 Drawing I: Survey of Drawing (3) Fundamental studies of art concepts and basic principles of composition, techniques, and concepts. Prereq: 101.

212 Drawing II: Life Drawing (3) Development of observational skills and special emphasis on structure and dynamics of the human figure and all the figure in movement. Prereq: 211. May be repeated. Maximum 8 hours.

219 Special Topics in Drawing/219 Student or instructor-initiated courses offered at convenience of department to enhance and expand the painting, drawing, and mixed media curricula. Prereq: Determined by department for individual topic. May be repeated. Maximum 12 hours.

311 Drawing I (6) Development of personal drawing techniques and concepts through studio problems. Prereq: 212, 211, and 252. May be repeated. Maximum 12 hours.

312 Drawing Portfolio Review (6) Review of prior work in drawing. Successful completion required prior to enrollment. Prereq: 295, 254 and consent of instructor. Satisfactory/No credit only.

401 Individual Problems (3) Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

493 Independent Study (1-15) Prereq: Consent of instructor. May be repeated. Medium may not be repeated. Maximum 15 hours.

494 Individual Problems (3) Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

5950 Field Experience (1-99) Prereq: Consent of instructor. May be repeated. Medium may not be repeated. Maximum 99 hours.
ART HISTORY (139)

172 Western Art (3) Major movements in Western Art with emphasis on Europe from prehistory through the Middle Ages. Two-hour lecture and one-hour discussion each week.

173 Western Art (3) Major movements in the history of European and American Art. Emphasis on the present. Two-hour lecture and one-hour discussion each week.

177 Honors: Western Art (3) Consent of Department Required. Major movements in Western Art with emphasis on Europe from prehistory through the Middle Ages. Writing-emphasis course.

178 Honors: Western Art (3) Consent of Department Required. Major movements in the history of European and American Art from the Renaissance to the present. Study grounded in reading, writing, and discussion. Writing-emphasis course.

183 Asian Art (3) Art of Central and Southeast Asia, India, China, Korea, and Japan from prehistoric times through the modern media. Two-hour lecture, one-hour discussion, each week.

275 Special Topics in Art History (1-15) Summer or instructor-initiated course offered at convenience of department. Prereq: Determined by department for individual topic. May be repeated. Maximum 12 hours.

311 Early Christian and Byzantine Art, to 1000 (3) Art from the Eastern Empire from the beginning of the 4th century to the 11th. Lectures, studio classes, and architectural studies. Writing-emphasis. (Same as Medieval Studies 317.)

373 Northern European Painting, 1350-1600 (3) From Giotto and the Italian Middle Ages to Northern Renaissance. Emphasis on Bruegel, Rembrandt, Frans Hals, and Caravaggio. Writing-emphasis course. (Same as Medieval Studies 373.)

400 Curriculum Planning and Teaching Strategies (3) Theories and methods of planning, organizing, and evaluating instruction and micro teaching situations. Prereq: 301 and admission to teaching program, or with consent of instructor. May not be repeated. Maximum 12 hours.

430 Photography (4) A brief history of photography from the invention of the daguerreotype to some more recent trends. Emphasis will be on the technical aspects of photography as a means for artistic expression.

431 Photography 1 (3-6) Individual development of technical and conceptual skills in photography. Prereq: 231. May be repeated. Maximum 9 hours. (Same as Cinema Studies 341.)

434 Digital Photography (4) Study of theory and techniques of use of cameras in photography. Prereq: 231 or permission of instructor.

436 Video Art (3) Continued development of concepts and techniques for the creation of video works on screen. Prereq: 231 or permission of instructor. May be repeated. Maximum 9 hours. (Same as Cinema Studies 436.)

437 Special Topics in Photography (3) Student or instructor-initiated course offered at convenience of department. Prereq: Determined by department for individual topic. May be repeated. Maximum 12 hours.

471 History of North American Art (3) Survey of landscape in painting, architecture, sculpture, and design from prehistory to the present. Writing-emphasis course.

472 History of 20th Century American Art (3) Development in architecture, painting, and design in the 19th and 20th centuries. Emphasis on the works of Wright, Le Corbusier, and thirty others, or consent of instructor. Writing-emphasis course.

473 19th Century American Painting (3) From West to East and to "Emergence of the Eight." Writing-emphasis course.

474 Theory of 19th Century Art in Europe and America (3) Addresses the intellectual basis for the modern movement. Emphasis on analyzing and deconstructing individual works of art of a critical and historical perspective by modern artists. Selection of 173 or those who have completed 175 for honors equivalents, or consent of instructor. Writing-emphasis course.


486 Art of Indian Asia (3) History of Indian art with special emphasis on the culture and art of South Asia. Writing-emphasis course.

489 Studies in Art History (3) Concentration in individual topics. Prereq: Determined by department for individual topic. May be repeated. Maximum 12 hours.

490 Special Topics (3) May be repeated. Maximum 6 hours. (Same as Cinema Studies 490.)

493 Independent Study (1-15) May be repeated. Maximum 12 hours.

494 Individual Problems (3) Prereq: Consent of instructor. May be repeated. Maximum 12 hours.

ART PAINTING (138)

191 Introduction to Studio Art: Various Media (3) Elementary techniques of painting and other media. Prereq: none for non-art majors. Maximum 12 hours.

213 Painting 1: Introduction (3) Continuation of exploration of the use of color and spatial organization on canvas. Prereq: 101, 103 for art majors; none for non-art majors. May be repeated. Maximum 6 hours.

214 Painting 2: Techniques of expression in color and/or spatial organization. Prereq: 103 for art majors; none for non-art majors. May be repeated. Maximum 6 hours.

215 Watercolor 1: Introduction (3) Capabilities of transparent watercolor and its applications to the exploration of composition, space, and color. Prereq: 101, 103 for art majors; none for non-art majors. May be repeated. Maximum 6 hours.

216 Watercolor II (3) Capabilities of transparent watercolor with an emphasis on individual exploration of surfaces and techniques for non-art majors. May be repeated. Maximum 6 hours.

341 Digital Painting (3) Study of theory and techniques of use of computers in painting. Prereq: 231 or permission of instructor.

342 Large Format Photography I (4) Studio course exploring theory and techniques of photography using large format cameras. Emphasis on technical concept. Prereq: 231, 331, and permission of instructor.

470 Philosophy of Art (3) Individual development of philosophical problems and techniques. Prereq: 232 and 336. May be repeated. Maximum 12 hours.

572 Modern Western Art and Fine (3) History of the development and interaction between the visual arts and the literatures of the modern Western art tradition. (Same as Cinema Studies 477.)

592 Seminar in Art History (3) Variable theme; emphasis on the development of theories of art history. Prereq: Determined by department for individual topic. May be repeated. Maximum 12 hours.

617 Special Topics in Drawing/Painting (3) Student or instructor-initiated course offered at convenience of department. Prereq: Determined by department for individual topic. May be repeated. Maximum 12 hours.

877 Honors :Western Art 1 (3) Consent of Department. May be repeated. Maximum 9 hours. (Same as Cinema Studies 877.)


123 Special Topics in Art History (3) Student or instructor-initiated course offered at convenience of department. Prereq: Determined by department for individual topic. May be repeated. Maximum 12 hours.

125 History of American Sculpture (3) American sculptors from the beginning to the 1960s. Writing-emphasis course.


128 Art of India (3) History of Indian art and society with a consideration of the art of the Central Asia and South Asia. Writing-emphasis course.

131 Seminar in Art History (3) Reading of a number of selected works of art in light of contemporary writings by art historians and critics.


134 Individual Problems (3) Prereq: Consent of instructor. May be repeated. Maximum 12 hours.
313 Painting III (4) Individual extension with varied media on canvas. Prereq: 214 and 314 or consent of instructor. May be repeated. Maximum 8 hours.

314 Printing Portfolio Review (6) Review of prior work in printing. Successful completion required prior to registration for junior and senior courses. Prereq: Consent of department. Satisfactory/No credit only.

325 Watercolor III (6) Individual extension with varied watermedia on paper. Prereq: 216 and 316 or consent of instructor. May be repeated. Maximum 12 hours.

316 Watercolor Portfolio Review (6) Review of prior work in watercolor techniques. Successful completion required prior to registration for junior and senior courses. Prereq: Consent of department. Satisfaction/No credit only.

319 Printing IV (6) Advanced painting stressing individual projects, including serigraphs, letterpress, screen-printing, relief methods, and monoprints. Prereq. 313. May be repeated. Maximum 12 hours.

315 Watercolor IV (6) Advanced painting with water-based media on paper, exploring individual concepts and personal approaches. Prereq: 315 or consent of instructor. May be repeated. Maximum 12 hours.

318 Special Topics in Painting (3) Student or instructor-initiated course offered at convenience of department to enhance and expand the painting techniques, understanding, and concepts. Prereq: Determined by department for individual topics. May be repeated. Maximum 12 hours.

405 Independent Study (1-15) Individual investigation for independent topic. May be repeated. Maximum 15 hours.

410 Visiting Artist Seminar (2) Study and discussion of contemporary art issues conducted by different visiting artists each semester. Does not apply toward art history requirement. May be repeated. Maximum 8 hours.

### ART PRINTMAKING (132)

131 Introduction to Studio Art: Various Media (3) Individual sections for various artistic disciplines. For Non-majors only. Courses may be repeated. Maximum may not be repeated. Maximum 20 hours.

283 Intaglio I (3) Introduction to intaglio printmaking including traditional techniques, equipment, and materials. Prereq: 131 or consent of instructor. May be repeated. Maximum 6 hours.

284 Photocopy (3) Exploration of the photocopy as a medium for student-generated works. Prereq: 131 or consent of instructor. May be repeated. Maximum 6 hours.

289 Special Topics in Printmaking (3) Student or instructor-initiated course in traditional and contemporary techniques of printmaking. Prereq: 131 or consent of instructor. May be repeated. Maximum 12 hours.

290 Printmaking Portfolio Review (6) Review of prior work in printmaking. Successful completion required prior to registration for junior and senior courses. Prereq: Consent of department. Satisfactory/No credit only.

282 Intaglio II (6) Exploration of concepts and techniques in intaglio printing from metal, stone, woodcut, and lithographic plates. Prereq: 282 or consent of instructor. May be repeated. Maximum 8 hours.

283 Lithography I (6) Exploration of concepts and techniques in lithography from zinc etching, linoleum blocks, woodcut, rubber stamps, and photo-litho. Prereq: 131 or consent of instructor. May be repeated. Maximum 8 hours.

284 Intaglio III (6) Exploration of individual projects through advanced color printing methods and combinations with other printmedia. Prereq: 282 or consent of instructor. May be repeated. Maximum 12 hours.

336 Lithography II (6) Exploration of individual projects through advanced lithographic methods and combinations with other printmedia. Prereq: 283 or consent of instructor. May be repeated. Maximum 12 hours.

338 Screen-Printing III (6) Individual development of screen printing techniques and techniques. Emphasizes upon greater development of image and personal concept. Prereq: 336 or consent of instructor. May be repeated. Maximum 12 hours.

332 Individual Problems (2) Prereq: Consent of instructor. May be repeated. Maximum 12 hours.

339 Screen-Printing Portfolio Review (6) Review of prior work in screen-printing techniques including equipment, methods, and personal extension. Prereq: 336 or consent of instructor. May be repeated. Maximum 12 hours.

### ART SCULPTURE (143)

131 Introduction to Studio Art: Various Media (3) Individual sections for various artistic disciplines. For Non-majors only. Courses may be repeated. Maximum may not be repeated. Maximum 12 hours.

241 Sculpture I (6) Problems which explore basic sculpural concepts and techniques including clay modeling, plaster construction, and mixed media. Prereq: 131 or consent of instructor. May be repeated. Maximum 6 hours.

242 Life Sculpture I (6) Introduction to sculpture stressing human figure. Prereq: 241 or consent of instructor. May be repeated. Maximum 6 hours.

243 Metal Cast Sculpture I (3) Metal casting methods for bronze and aluminum. Prereq: 241 or consent of instructor. May be repeated. Maximum 6 hours.

245 Mixed Media Sculpture I (6) Use of two or more materials, and a variety of sculptural techniques, joined to create dimensional forms. Includes carving, molding, welding, kiln firing, construction, and related techniques. Emphasizes on development of a personal form. Prereq: 131. May be repeated. Maximum 6 hours.

341 Sculpture Portfolio Review (6) Review of prior work in sculpture. Successful completion required prior to registration for junior and senior courses. Prereq: Consent of department. Satisfactory/No credit only.

342 Special Topics in Sculpture (3) Problem in student initiated course stressing or dealing with a specific topic. Prereq: 241 or consent of instructor. May be repeated. Maximum 6 hours.

343 Sculpture Portfolio Review (6) Review of prior work in sculpture. Successful completion required prior to registration for junior and senior courses. Prereq: Consent of department. Satisfactory/No credit only.

351 Special Topics in Sculpture (3) Problem in student initiated course stressing or dealing with a specific topic. Prereq: 241 or consent of instructor. May be repeated. Maximum 6 hours.

360 Printmaking Portfolio Review (6) Review of prior work in printmaking. Successful completion required prior to registration for junior and senior courses. Prereq: Consent of department. Satisfactory/No credit only.

410 Visiting Artist Seminar (2) Study and discussion of contemporary art issues conducted by different visiting artists each semester. Does not apply toward art history requirement. May be repeated. Maximum 8 hours.

### CRAFTS

200 Special Topics in Crafts (2-4) Student or instructor-initiated course offered at convenience of department. May be repeated. Maximum 8 hours.

210 Drawing (2) Beginning to intermediate. May be repeated.

220 Ceramics I (3) Beginning to intermediate. May be repeated.

248 Fabric (2) Beginning to intermediate. May be repeated.

249 Fiber and Textiles (2) Beginning to intermediate. May be repeated.

260 Special Topics in Ceramics (2-4) Student or instructor initiated course offered at convenience of department. May be repeated. Maximum 8 hours.

291 Drawing (2) Intermediate to advanced. May be repeated.

292 Fiber and Textiles (2) Intermediate to advanced. May be repeated.

293 Special Topics in Ceramics (2-4) Student or instructor initiated course offered at convenience of department. May be repeated. Maximum 8 hours.

300 Special Topics in Ceramics (2-4) Student or instructor initiated course offered at convenience of department. May be repeated. Maximum 8 hours.

318 Special Topics in Painting (3) Student or instructor-initiated course offered at convenience of department. May be repeated. Maximum 12 hours.

410 Visiting Artist Seminar (2) Study and discussion of contemporary art issues conducted by different visiting artists each semester. Does not apply toward art history requirement. May be repeated. Maximum 8 hours.

### ART ARROWMONT Pi BETA PHI SCHOOL OF ARTS AND CRAFTS

289 Special Topics in Printmaking (2-4) Student or instructor-initiated course offered at convenience of department. May be repeated. Maximum 8 hours.

210 Drawing (2) Beginning to intermediate. May be repeated.

220 Ceramics I (3) Beginning to intermediate. May be repeated.

248 Fabric (2) Beginning to intermediate. May be repeated.

260 Special Topics in Ceramics (2-4) Student or instructor initiated course offered at convenience of department. May be repeated. Maximum 8 hours.

291 Drawing (2) Intermediate to advanced. May be repeated.

292 Fiber and Textiles (2) Intermediate to advanced. May be repeated.

293 Special Topics in Ceramics (2-4) Student or instructor initiated course offered at convenience of department. May be repeated. Maximum 8 hours.

300 Special Topics in Ceramics (2-4) Student or instructor initiated course offered at convenience of department. May be repeated. Maximum 8 hours.

318 Special Topics in Painting (3) Student or instructor-initiated course offered at convenience of department. May be repeated. Maximum 12 hours.

410 Visiting Artist Seminar (2) Study and discussion of contemporary art issues conducted by different visiting artists each semester. Does not apply toward art history requirement. May be repeated. Maximum 8 hours.

### ASIAN LANGUAGES (144)

131-132 Elementary Chinese I, II (5,5) Must be taken in sequence. F, Sp

131-132 Elementary Japanese I, II (5,5) Must be taken in sequence. F, Sp

160 Courses of Instruction
491 Foreign Study (1-15)

492 Off-Campus Study (1-15)

493 Independent Study (1-15)

ASTROLOGY (150)

155-162 Introductory Astrology (4) Survey of the
computation, structure, and dynamics of the universe
which introduces the vocabulary of astrology and scientific
method. Components of the solar system including results from
interplanetary exploration; hypotheses and theories of the
origin and evolution of the solar system in light of current
knowledge and scientific reasoning; stellar birth, evolu-
tion, and death as a chain of events; characteristics of
galaxies and at the beginning of the universe in light of
modern astrophysics and particle physics. Principles for
interpreting and understanding the astrological effects of
the planets and their formation; acoustics characteristicsof
speech and the production of spoken English sounds with analysis of
friiction since 1800. Writing-emphasis course.

161-162 Introductory Astrology with Laboratory (4)
Survey course, with accompanying laboratory, treating
the composition, structure and dynamics of the universe and
introducing the basic vocabulary of astrology and
scientific method. Components of the solar system including results from
interplanetary space exploration, hypotheses and theories of the origin
and evolution of the solar system in light of current
knowledge and scientific reasoning; stellar birth, evolu-
tion, and death as a chain of events; characteristics of
galaxies and at the beginning of the universe in light of
modern astrophysics and particle physics. Principles for
interpreting and understanding the astrological effects of
the planets and their formation.

161-162 Introductory Astrology (4) Survey course, with
accompanying laboratory, treating the composition, structure and
dynamics of the universe and introducing the basic vocabulary of
 astrology and scientific method. Components of the solar system including results from
interplanetary space exploration, hypotheses and theories of the origin
and evolution of the solar system in light of current
knowledge and scientific reasoning; stellar birth, evolu-
tion, and death as a chain of events; characteristics of
galaxies and at the beginning of the universe in light of
modern astrophysics and particle physics. Principles for
interpreting and understanding the astrological effects of
the planets and their formation.

161-162 Introductory Astrology (4) Survey course, with
accompanying laboratory, treating the composition, structure and
dynamics of the universe and introducing the basic vocabulary of
 astrology and scientific method. Components of the solar system including results from
interplanetary space exploration, hypotheses and theories of the origin
and evolution of the solar system in light of current
knowledge and scientific reasoning; stellar birth, evolu-
tion, and death as a chain of events; characteristics of
galaxies and at the beginning of the universe in light of
modern astrophysics and particle physics. Principles for
interpreting and understanding the astrological effects of
the planets and their formation.
320 Physiology of Reproduction and Lastetion (3) (Same as Animal Science 205)


331 Animal Development and Embryology Laboratory (2) Coreq: 330. 3 hrs. lab.


405-406 Microeconomics in BCB (2, 2) Select advanced topics in biochemistry: cell biology, genetics, reproduction, cell division, protein synthesis, and enzyme kinetics. Prereq: Coreq: 415. Recommended precead: 402. Coreq: 404. 4 hrs may apply toward BCB major.

409 Perspectives in Biochemistry and Cellular and Molecular Biology (2) Focuses on current developments in biochemistry, peptidogenetics, cell biology, and biochemical genetics: regulation of biochemical processes. Praying, Chemistry 30-30 and Biology 110, 120, 3 hrs. and 3 discussion hrs.

411 Advanced Protein Chemistry and Cellular Biology (5) Cell biology and function at the molecular level. Topics include nucleic acid structure and function, membrane structure and function, protein synthesis, and enzymes. Coreq: 320, Chemistry 120. Praying, 4 hrs lecture, 1 hr lab each week.

419 Advanced Cellular and Comparative Biochemistry Laboratory (2) Explores advanced topics in biochemistry, molecular biology, and molecular genetics. Praying, 4 hrs lecture, 1 hr lab each week. Coreq: 415.

449 Laboratory in Physiology (2) Prereq or coreq: 440. Study of animal cells and tissues at light and electron microscopy. Praying, 4 hrs lecture, 1 hr lab each week. Coreq: 402. Required of Biology majors. May be repeated. (Sp.


451-461 Biophysical Chemistry (3, 3, 3) Physicists of enzymes with emphasis on the structural and functional aspects of large proteins. Emphasis on methods used in enzyme research. Praying, 3 hrs lecture, 1 hr lab each week. Coreq: 440. Recommended precead: 402. Coreq: 404. 4 hrs may apply toward BCB major.

480 Physiology of Exercise (3) (Same as Physical Education 480.) Introduction to the physiological principles of exercise and the metabolic economy of exercise. Praying, 3 hrs lecture, 1 hr lab each week.

BIOL OGY (190)


BIOLOGICAL SYSTEMS (044 )

202-203 Honors in Biological Research (1) Seminar in biological research. Required of Threshold Biology Scholars. Students design research projects, complete research data acquisition, organize research documentation, and prepare presentations. May be repeated. Maximum of 12 hours. Praying, 394-395.

208-209 Honors Colloquy in Biological Research (1) Seminar in biological research. Required of Threshold Biology Scholars. Students design research projects, complete research data acquisition, organize research documentation, and prepare presentations. May be repeated. Maximum of 12 hours. Praying, 394-395.

210 Career Opportunities (1) Activities and opportunities related to bio-research; problem solving and reporting techniques; engineering tools; meeting techniques. Not available for credit if credit has been given in any previous course. Coreq: 211. 2 hrs lecture, 1 hr lab. Coreq: 211.


212-213 Honors Colloquy in Biological Research (1) Seminar in biological research. Required of Threshold Biology Scholars. Students design research projects, complete research data acquisition, organize research documentation, and prepare presentations. May be repeated. Maximum of 12 hours. Praying, 394-395.


222-223 Honors Colloquy in Biological Research (1) Seminar in biological research. Required of Threshold Biology Scholars. Students design research projects, complete research data acquisition, organize research documentation, and prepare presentations. May be repeated. Maximum of 12 hours. Praying, 394-395.

224-225 Honors Colloquy in Biological Research (1) Seminar in biological research. Required of Threshold Biology Scholars. Students design research projects, complete research data acquisition, organize research documentation, and prepare presentations. May be repeated. Maximum of 12 hours. Praying, 394-395.
403 Engineering Design Fundamentals (3) Nature of design. Technological, aesthetic, social, ecological, and safety implications of engineering design. Software used for engineering design. May be repeated up to 9 hours applied to design project. Prereg: Senior standing. Dis- count 3 hours. 3 and 1 lab. Sp.

413 Component Design and Machine Synthesis (2) Synthesis of design: structural, kinematic, power, control systems development; preparation of design draw- ings and specifications. Course work includes a re- port on project. Design content 3 hours. Prereq: 403. 1 hour and 2 labs. Sp.

415 Irrigation and Waste Management Systems (Design (2) Design of irrigation and waste management systems with consideration given to lim- itations of available power, water, labor, and water quality. Design content 3 hours. 442, 443, 411 and 1 lab. Sp.

420 Mobile Hydraulic Power Systems (Design (2) Functional and operational characteristics of mobile hydraulic power system components including pumps, valves and hydraulic actuators and control circuits. Prereg: Engineering Science and Mu- sic 311. 2 hours and 1 lab. F.

430 Bioprocess System Design and Analysis (2) Design of processing, storage and handling systems for biotechnological materials. Mass and energy transfer, product and waste characterization, equipment specifications, economic analysis, safety, and human factors. Design content 3 hours. 311. 1 hour and 2 labs. Sp.

450 Electronic Systems (4) Basic electronics with biological applications. Analog and digital electronics, sensing and controlling physical and environmental parameters; sensor selection and interfacing; signal conditioning; process control. Includes laboratory work. Prereg: 410. Prereg: Electrical and Computer Engineering 301. 3 hours and 1 lab. Sp.

470 Special Problems in Bioengineering (1-3) Independent study, research and/or other activities in bioengineering. May be repeated. E.

480 Selected Topics in Bioengineering (1-3) Independent study, research and/or other activities in bioengineering. May be repeated. E.

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BIOSYSTEMS ENGINEERING TECHNOLOGY (194)

202 Materials and Fabrication (5) Properties of mate- rials including wood, metals, ceramics, plastics and composite materials. Stress-strain curves, material properties and processes involving heat, cold, power equip- ment and equipment. Prereg: 160. 3 hours and 2 labs. F.

212 Surveying (3) Measurement of distances, angles, and areas; office and field level with topographic surveying and using a computer terminal. Prereg: Math 110 in combination of hours: 1 hour and 1 lab. F.

213 Technical Writing (3) Application of basic engineering principles to agricul- tural technology. Emphasis on research writing, drafting, dry- ing, inspection, preparation, computer development, and mis- cellaneous writing. Prereg: Math 110. 3 hours and 1 lab. 3-2-1.

214 Agricultural Machinery and Farming Systems (3) Industrial machinery and power units; adaptation to agricultural production systems; shop equipment; maintenance and repairs; safety and management practices; capabilities; adjustment and calibration. Prereg: Mathemat- ics 121 or equivalent. 2 hours and 1 lab. 2-1-1.

412 AGRICULTURAL WASTE MANAGEMENT AND POLLUTION CONTROL (3) Waste elimination fundamentals; characteristics of animal manures, livestock, manures for collecting, transport- ing, storing, and utilizing on farm. Prereg: Mathemat- ics 121, Mathematics 125. 2 hours and 1 lab. F.

422 AGRICULTURAL MATERIALS AND MACHINE TECHNOLOGY (3) Forest products: raw materials, reforestation, processing, drying, expan- sion, thermal processing, freezing, packaging, refrigeration, systems and materials handling. Prereg: Physi- cs 121, Mathematics 125. 2 hours and 1 lab. F.

431 Plant Physiology (3) Plant growth and development; transport of plant nutrients; life processes; energy production; photosynthesis; information transport; plant nutrition; plant development; reproduction; root and shoot systems. Prereg: Physics 121 or consent of instructor. 2 hours and 1 lab. Sp.

101 Algorithm and Computer Applications (3) Equipment for application of solid, solid, and ge- nera technologic principles to computer compo- nent characteristics; selection and interfacing

101 Plant Anatomy (3) Cells, tissues and organs; their development in vegetative and reproductive structures of vascular plants—emphasis on seed plants. Prereg: 110-120 or Botany 140-140 equivalent.

102 Plant Dissection (3) Dissection of flowering plants, Rosa, species, community and their environments. Circula- ting of energy and matter in ecosystems. Weekly field trips or botanica trips, and at least two weekend field trips. Prereg: 350 or equivalent. 3 hours and 1 lab. Sp.

412 Undergraduate Research Participation (1-3) Experience in research, one or more journals, supervision of under supervision of staff members. Prereg: Junior or Senior standing, minimum grade average 3.0, consent of re- structurer. May be repeated. Maximum 8 hours. E.

413 Plant Tissue Culture (2) Methods for the culture of cells, tissues, and organs including media preparation and techniques for transfer and maintenance. Prereg: 110-120 or Botany 140-140 equivalent and 121; or equivalent. 2 hours and 1 lab.

430 Integrated Plant Pathology (3) Emphasis on the function and operation of the primary video and audio equipment. Prereg: 320 or equivalent. Prereg: 105. The laboratory experience provide in study production pro- cessing. Prereg: Communications 250. May be repeated for credit. Maximum 4 hours.

431 Plant Ecology (3) Interactions between individuals, species, communities, and their environments. Circula- tion of energy and matter in ecosystems. Weekly field trips to two or more botanica trips, and at least two weekend field trips. Prereg: 350 or equivalent. 3 hours and 1 lab. Sp.

101 Plant Anatomy (3) Cells, tissues and organs; their development in vegetative and reproductive structures of vascular plants—emphasis on seed plants. Prereg: 110-120 or Botany 140-140 equivalent.

102 Plant Dissection (3) Dissection of flowering plants, Rosa, species, community and their environments. Circula- ting of energy and matter in ecosystems. Weekly field trips or botanica trips, and at least two weekend field trips. Prereg: 350 or equivalent. 3 hours and 1 lab. Sp.
BUSINESS ADMINISTRATION (205)

220 Business Career Planning and Placement (1) Introduction to business, career opportunities, career opportunities. Meets the concentration/career decision, preparing for and conducting a job search. See page 57.

230 Business Administration (3) Survey of managerial implications of business operations in an international context. Analysis of internal and external environmental factors, including legal, political, and economic influences. Key topics include :

301 Business Law (3) The Legal Environment of Business (3) Introduction to fundamental principles of business law. The text provides a broad overview of the legal principles and legal concepts that are relevant to business and management. Students will be able to understand the legal implications of business decisions and strategies. They will also be able to identify and analyze legal risks and opportunities. The course covers the following topics:

- Introduction to scientific controversy. Written reports will be required. Coreq: Senior standing in chemistry. F Writing emphasis course.

302 Business Law (3) Introduction to business, career opportunities, career opportunities. Meets the concentration/career decision, preparing for and conducting a job search. See page 57.

231 Professional Ethics (3) Professional Ethics (3) The legal environment of business includes ethical considerations, such as: the ethical implications of business decisions, the ethical implications of business operations, the ethical implications of business conflicts, and the ethical implications of business strategies. The course covers the following topics:

- Introduction to corporate responsibility and social responsibility. The course provides an overview of the legal principles and ethical concepts that are relevant to corporate responsibility and social responsibility. Students will be able to understand the legal implications of corporate responsibility and social responsibility decisions and strategies. They will also be able to identify and analyze legal risks and opportunities. The course covers the following topics:

- Introduction to business, career opportunities, career opportunities. Meets the concentration/career decision, preparing for and conducting a job search. See page 57.

232 Business Administration (3) Survey of managerial implications of business operations in an international context. Analysis of internal and external environmental factors, including legal, political, and economic influences. Key topics include :

303 Business Law (3) The Legal Environment of Business (3) Introduction to fundamental principles of business law. The text provides a broad overview of the legal principles and legal concepts that are relevant to business and management. Students will be able to understand the legal implications of business decisions and strategies. They will also be able to identify and analyze legal risks and opportunities. The course covers the following topics:

- Introduction to scientific controversy. Written reports will be required. Coreq: Senior standing in chemistry. F Writing emphasis course.

302 Business Law (3) Introduction to business, career opportunities, career opportunities. Meets the concentration/career decision, preparing for and conducting a job search. See page 57.
450 Assessment in Early Childhood Programs (3) And techniques and process of assessment in the early childhood program through 8 years of age. Includes participation. Prerequisite: 350 and admission to the major, or ECE licensure program. Prerequisite: Coreq. 351.

451 Early Childhood Education II: Mainstreaming Exceptional Children (3) Individualized curricular planning based on knowledge of normative, nonnormative development, assessment, effective teaching strategies, and behavior management. Preprerequisite: 350. Prerequisite or Coreq: 351 and admission to the Early Childhood Education licensure program.

452 Directed Study in Child and Family Studies (1-3) Independent study and/or supervised research experiences. Prerequisite: 9 hours in Child and Family Studies, overall GPA of 3.25 or greater, junior standing, or consent of instructor. May be repeated. Maximum of 3 hours.

CINEMA STUDIES (251)

421 Introduction to Video Art (3) (Same as Art 236) Introduces to Video Studies (3) (Same as English 281).

430 Family Communication (3) Dynamic of interaction and communication within families, marriages, and parent-child relationships. Focuses on family communication patterns, processes, structures, and outcomes. Preprerequisite: 220 or consent of instructor. May be repeated. Maximum of 9 hours.

435 Cinematography as Art (3) (Same as Art 435) Techniques of motion picture production. Preprerequisite: 232 or consent of instructor. Writing emphasis course.

436 Video as Art (3) (Same as Art 436) Techniques of video production. Preprerequisite: 232 or consent of instructor. Writing emphasis course.

541 Independent Study (1-15) Independent study and/or supervised research experiences. Prerequisite: 9 hours in Child and Family Studies, overall GPA of 3.25 or greater, junior standing, or consent of instructor. May be repeated. Maximum of 6 hours.
383 Women in the Greek and Roman World (3) The condition of women in the apparently male-dominated societies of Greece and Rome. May be repeated for credit. Maximum 9 hours.

402 Greek Prose (3) History, philosophy, and oratory. May be repeated for credit. Maximum 9 hours.

401-402 Special Topics in Comparative Literature (1-3) Topics vary. May be repeated for credit. Maximum 9 hours. Prereq: 261.

493 Independent Study (1-15) Special project in area of student's primary interest. Directed by Computer Science faculty. May be repeated for credit. Maximum 9 hours. Prereq: completion of core curriculum or consent of instructor.

492 College Honors: Off-Campus Study (1-15) See Programs of Instruction.

494 Special Topics in Computer Science (1-3) May be repeated for credit. Maximum 9 hours. Prereq: consent of instructor.

420 Advanced Topics in Machine Intelligence (3) Topics such as reasoning, expert systems, machine learning, and knowledge representation. Emphasis on faculty research. May be repeated for credit. Maximum 9 hours. Prereq: completion of core curriculum or consent of instructor.

470 Advanced Topics in Scientific Computation (3) Topics such as computational fluid dynamics, wave propagation, error analysis, parallel computing, software packages. Emphasis on faculty research. May be repeated. Maximum 9 hours. Prereq: completion of core curriculum or consent of instructor.

471 Numerical Analysis (3) Same as Mathematics 471.

472 Numerical Analysis (3) Same as Mathematics 472.

473 Advanced Topics in Theoretical Computer Science (1-3) Topics such as data structures, algorithms, complexity theory, formal languages, and graph theory. Emphasis on faculty research. May be repeated. Maximum 9 hours. Prereq: completion of core curriculum or consent of instructor.

493 Independent Study (1-15) Special project in an area of student's primary interest. Directed by Computer Science faculty. May be repeated for credit. Maximum 6 hours. Prereq: satisfactory grade in Computer Science 492.

494 Special Topics in Computer Science (1-3) May be repeated. Maximum 9 hours.
tion and processes of sport. Difference between sport and physical activity. Prerequisites: Progression to major or consent of instructor.

350 Philosophy of Sport (3) Theories of reality and values as they apply to sport with emphasis on ethical issues. Prerequisites: Progression to major or consent of instructor. May be repeated. Maximum credit 15 hours.

431 Personality and Mental Health (3) Perspectives of mental health with applications to education and other social institutions. Prerequisites: Progression to major or 15 hours. Independent investigation of problems in psychological and sociological approaches. May be repeated. Maximum credit 15 hours.

CULTURAL STUDIES IN EDUCATION (271)
408 TESOL: Elementary Theory and Practice (3) An introduction to theory and practice of teaching English as a second language. May be repeated. Maximum credit 8 hours. A mini-teaching experience is involved in this class.

EVOLUTIONARY BIOLOGY (270)
320 Jazz: Level II (2) Instruction and practice in elementary tap dance techniques. May be repeated. Maximum 4 hours.

346 Introduction to Oceanography (4) Basic oceanography, including physical, chemical, geological and biological processes. Emphasis on oceanic ecosystems such as seaweed populations, coral reefs, hydrothermal vents, graptolites, coral reefs, and oceanic ecosystems. May be repeated. Maximum 8 hours.

DEPARTMENT OF ANTHROPOLOGY (267)
325 Introduction to Comparative Vertebrate Biology (3) Origins, phylogeny, diversity and functional anatomy of vertebrates. Field trip to coast required. May be repeated. Maximum 8 hours.

460 Sociology of Sport (3) Social meaning, organization and processes of sport. Difference between sport and play and games, social stratification and sport, sports as an outlet for social control and protest, and the mass culture, sport subcultures, and hegemony in terms of sport and cultural interaction. Prerequisites: Progression to major or consent of instructor. (Same as Sociology 405.)

450 Movement Education (3) Clinical studies in developmentally appropriate, theme-based approach to physical education for children, with attention to differences of culture, ethnic, gender, and physical ability as modifiers of motor development and determinant of appropriate practice. Prerequisite: Admission to Teacher Education Program.

451 Education in Cultural Perspective (3) Contribution of anthropological concepts to understanding of educational processes in non-Western cultures, selected ethnographic research on processes of learning. Prerequisites: Progression to major or consent of instructor. May be repeated. Maximum credit 16 hours.

445 Composition II (3) Application of choreographic and production skills concerning in the preparation of two works. Prerequisites: 440 or equivalent or permission of instructor.

452 Philosophy of Sport (3) Theories of reality and values as they apply to sport with emphasis on ethical issues. Prerequisites: Progression to major or consent of instructor. May be repeated. Maximum credit 15 hours.

Courses of Instruction

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Courses of Instruction

324 Applications of Instructional Technology in Biology and Middle School Teaching (3) Applications of instructional technology in the secondary and middle schools with an emphasis on computers. Exposure to and experience with educational software may be required. Maximum 6 cr. Prior permission Admission to Teacher Education Program.

350 Field Experience in Teaching: Secondary I (1) Field experiences involve students teaching in regular classrooms. Prior permission Admission to Teacher Education Program. Satisfactory/No Credit only. Sp.

351 Field Experience in Teaching: Secondary II (1) Field experiences involve in-class related to teaching and to teaching roles. Prior permission Admission to Teacher Education Program. Satisfactory/No Credit grading only. Sp.

352 Field Experience in Teaching: High School (3) Field experiences in classes related to teaching and to teaching roles. Prior permission Admission to Teacher Education Program. Satisfactory/No Credit grading only. Sp.

353 Introduction to Secondary Schools (8) Aspects of teaching in grades 9-12, including curricular program and policies and responsibilities of school staff and administrators. Prior permission Admission to Teacher Education Program. E.

404 Problems in Improvement of Instruction (1-3) Special conferences, workshops, or in-service programs. May be repeated. Prior permission Admission to Teacher Education Program. Satisfactory/No Credit grading only. E.

430 Utilization of Information Media (3) Basic communication process, need for instructional media, instructional development, selection and utilization of basic media, and basic software production techniques. (Same as Library and Information Science 471's). E.

475 Instructional Media in Elementary Education (1) Basic operation of back-projected, color-coded, utilization of materials, multimedia production skills needed for effective communication in the elementary classroom. Media Lab experience in production of AV software.

480 Teaching of Mathematics, Grades 7-12 (3) Preparation of teaching plans, evaluation, readiness for teaching mathematics, teaching simulation and evaluation of teaching experiences in schools. Prior permission Admission to Teacher Education Program. S.

486 Introduction to Instructional Computing (3) Classroom use of computers, applications for teachers, overview of computer operation and software for teachers. May be repeated. Prior permission Admission to Teacher Education Program. Satisfactory/No Credit grading only. E.

495 Special Topics in Instructional Computing (3) Topics to be assigned. May be repeated. Prior permission Admission to Teacher Education Program. S.

497 Teaching Science: Grades 7-12 (3) Methods, materials, and techniques for the development and presentation of instruction programs for secondary schools. Prior permission Admission to Teacher Education Program. F.

ENGINEERING AEROSPACE (Q18)

340 Aerospace Engineering Instructional System and Measurement (3) Fundamentals of measurement systems and techniques characteristic of aerospace instrumentation; installation, alignment, accuracy, precision, pressure, temperature and flow measurements. Coreq: ME 2340. Prior permission Admission to Teacher Education Program. E.

351 Compressible Flow (3) One-dimensional internal flow with shocks; friction and non-adiabatic conditions. Two-dimensional external flows. Prior permission Admission to Teacher Education Program. E.

352 Dynamics/Vibrations (3) Center force motion, transfer order, tone and frequency vibrations of single and multiple degree systems. Prior permission Admission to Teacher Education Program. E.

363 Structural Analysis of Aerospace Vehicles (2) Fundamentals of the mathematical basis for structural analysis common to aerospace vehicles. Prior permission Admission to Teacher Education Program. E.

370 Airplane Performance (3) Characterization of propulsion devices, predictions of airplane performance, static and dynamic stability, and control system. Prior permission Admission to Teacher Education Program. E.

401 Thesis (3) Problem investigation and report. Prior permission Admission to Teacher Education Program. S.

420 Aerodynamics (3) Theory and design of aerodynamic bodies for low speed vehicles. Prediction of flow theory, viscous effects, compressibility effects, Subsonic, hypersonic, and supersonic aircraft. Prior permission Admission to Teacher Education Program. E.

423 Viscous Flow (3) Boundary layer theory, laminar and turbulent flow, compressibility, numerical solution methods. Prior permission Admission to Teacher Education Program. E.

424 Aerodynamics (3) Prediction of propulsion devices; behavior, raw, jet and rocket motors. Prior permission Admission to Teacher Education Program. E.

425 Introduction to Aerospace Design (3) Design process, synthesis, safety, reliability, products, product liability, economic analysis, optimization, design iteration and failure analysis. (Same as Library and Information Science 471). Prior permission Admission to Teacher Education Program. S.

426 Aerospace System Design (3) Synthesis and design of a complete aerospace system including economic and technical aspects. Participation in team design effort including normal presentations and design reports. Prior permission Admission to Teacher Education Program. S.

431 Mechanical Engineering/Aerospace Engineering Seminar (1) Topics related to engineering including vehicles. Formats and presentations by students on engineering topics. Prior permission Admission to Teacher Education Program. S.

440 Aerospace Engineering Laboratory (3) Design, conducting, and reporting of experimental experiments. Test standards and specifications, analysis of data and formation of conclusions. 3 hours lab per week. Prior permission Admission to Teacher Education Program. E.

445 Selected Topics in Aerospace Science (1-4) Current problems and topics in aerospace science, topics in science and engineering for the several areas of aerospace science. Prior permission Admission to Teacher Education Program. S.

449 Seminar (1) Discussion and presentation of topics in the practice of engineering science and engineering. Prior permission Admission to Teacher Education Program. S.

450 Research (1-3) Independent research for the purpose of completing a thesis and a final written report. Prior permission Admission to Teacher Education Program. E.

451 Chemical Engineering Data Analysis (3) Analysis of experimental data; identification of system extremals; and estimating of product manufacturing costs. Prior permission Admission to Teacher Education Program. S.

452 Chemical Engineering Seminar (1) Presentation and discussion of topics in chemical engineering. Prior permission Admission to Teacher Education Program. S.

453 Chemical Engineering Techniques (1) Use of FORTRAN and BASIC programming in the development of algorithms for tasks in chemical engineering. Prior permission Admission to Teacher Education Program. S.

454 Material and Energy Balances (3) Introduction to chemical engineering. Prior permission Admission to Teacher Education Program. S.

455 Chemical Engineering Data Analysis (3) Analysis of experimental data; identification of system extremals; and estimating of product manufacturing costs. Prior permission Admission to Teacher Education Program. S.

456 Chemical Engineering Seminar (1) Discussion and presentation of topics in the practice of engineering science and engineering. Prior permission Admission to Teacher Education Program. S.

457 Honors Seminar (1) Presentations and discussion of topics in the practice of engineering science and engineering. Prior permission Admission to Teacher Education Program. S.

458 Introduction to Optimization (3) Principles and applications of optimization techniques in chemical processes. Prior permission Admission to Teacher Education Program. S.

460 Chemical Engineering Laboratory (3) Laboratory investigations of mass transfer and chemical reactions in chemical engineering. Prior permission Admission to Teacher Education Program. E.

461 Computer Aided Design (1) Techniques of mechanical design. Computer-aided design. Prior permission Admission to Teacher Education Program. S.

462 Chemical Engineering Process Economics (3) Concepts and methods of cost estimation and economic analysis. Prior permission Admission to Teacher Education Program. S.

463 Chemical Engineering Process Economics (3) Concepts and methods of cost estimation and economic analysis. Prior permission Admission to Teacher Education Program. S.

464 Separation Processes Technology (3) Multicomponent distillation, theory and computer simulations: Non-idealized, specialized technologies, including mem-
201 Engineering Surveys (3) Mensuration through practical applications.
Prereq: Sophomore standing.

210 Engineering Surveys (3) Mensuration through practical applications.
Prereq: Sophomore standing.


460 Civil Engineering Systems Design and Management (6) Methods of data analysis and modeling of civil engineering systems to enhance resource allocation for transportation, water resources, environmental, and structural analysis.
Prereq: 480 Senior standing or consent of instructor.

464 Environmental Engineering (6) Methods of data analysis and modeling of civil engineering systems to enhance resource allocation for transportation, water resources, environmental, and structural analysis.
Prereq: 480 Senior standing or consent of instructor.

470 Construction Methods and Equipment (3) Fundamentals of construction and equipment selection and productivity; concrete and steel construction; and construction contracts and economic.
Prereq: 251.

471 Introduction to Structural Design (3) Methods of data analysis and modeling of civil engineering systems to enhance resource allocation for transportation, water resources, environmental, and structural analysis.
Prereq: 480 Senior standing or consent of instructor.


475 Construction Methods and Equipment (3) Fundamentals of construction and equipment selection and productivity; concrete and steel construction; and construction contracts and economic.
Prereq: 251.

478 Honors: Applied Process Automation Laboratory (3) Application of computer software to process automation and control.
Prereq: 390, 395.


480 Water and Waste Transport (3) Theory and design of water and wastewater systems. Prereq: 390, 395.

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490 Senior Design Project (3) Open-ended design project following problem formulation, problem solving, feasibility and viability design concepts. Topical topics vary; each topic is presented by a professional engineer and student team. Prereq: 477 Honors: Applied Process Automation Design Laboratory or equivalent.


495 Water Resources Project Design (3) Development of multi-purpose reservoir and dam project, including data acquisition, spillway and outlet works design, and storage and energy dam analysis.
Prereq: 390, 395.

496 Water Resources Project Design (3) Development of multi-purpose reservoir and dam project, including data acquisition, spillway and outlet works design, and storage and energy dam analysis.
Prereq: 390, 395.

496 Water Resources Project Design (3) Development of multi-purpose reservoir and dam project, including data acquisition, spillway and outlet works design, and storage and energy dam analysis.
Prereq: 390, 395.
320 Electronic Circuits (3) Multisize resonator amplifier design; gain stages; and output stages; frequency and transient responses of open loop linear amplifier fundamentals of integrated circuits, operational amplifier applications in basic feedback configurations; basic transistor switching circuits. Includes laboratory experiments and design projects. Design content: 1 hour. Prerequisites: 251, Coreq: 331.

321 Frequency-Domain Analysis of Signals and Noise (3) Fourier analysis of waveforms, including time and frequency domain transforms, power spectral density and autocorrelation, deterministic and random processes. Design content: 1 hour. Prerequisite: 301, Coreq: 331.

323 Analog and Digital Computers (3) Design and analysis of analog and digital computer systems; computer architecture, digital system design. Design content: 1 hour. Prerequisites: 171, Coreq: 331.


343 Analog Communication Amplitude and Frequency Modulation (3) Filter design, noise, signal-to-noise ratio, modulation frequency modulation. Design content: 1 hour. Prerequisite: 331, Mathematical. Design content: 1 hour. Prerequisites: 312, Coreq: 331.

365 Senior Seminar (1) Presentations and discussions related to professional development, including registration, ethics and current topics in electrical engineering. Prerequisite: 250, Satisfactory/No Credit.

401 Senior Design (4) Major design project that fosters the student's ability on professional project conceptualization, implementation, and coordinated effort with other team members and design projects. Design content: 1 hour. Prerequisites: 310, 331.

411 Digital Signal Processing and Filter Design (3) Design of digital and software systems, sampling, aliasing, Fourier transforms, analog filter characteristics, noise reduction and recursive filter design, CAD tools for filter design. Includes expert herbal and project design. Design content: 1 hour. Prerequisite: 301, Mathematical. Design content: 2 hours.

422 Power System Operations and Planning (4) Dynamic phenomena in power systems. Transient stability analysis and probabilistic studies. Electrical power system operations, fault studies, system protection, power system stability. Design content: 1 hour. Prerequisite: 312, 331, and senior standing. Design content: 2 hours.

423 Electric Machines (3) Principles of electromechanical conversion. Machine windings, design of machine components, design of electric drives and power systems. Design content: 1 hour. Prerequisite: 312, Coreq: 331.

431 Communication System Design (4) Application of communication theory to system design. Development of communication system specifications, system simulation utilizing a programming and language. Simulation and software design and construction. Communication and performance evaluation of a complete analog or digital communication system from subsystem to system level. Design content: 2 hours. Prerequisite: 341.


442 Communication System Design (4) Application of communication theory to system design. Development of communication system specifications, system simulation utilizing a programming and language. Simulation and software design and construction. Communication and performance evaluation of a complete analog or digital communication system from subsystem to system level. Design content: 2 hours. Prerequisite: 341.


451 Microprocessors and Microcontrollers in Electroni- cal Engineering (3) Project oriented work using a microcomputer to perform a mini project and develop and application with cross- assembler, link manager and debug. Overview of computer fundamentals and software tools. Radio frequency transmission and some basic pitfalls. Design content: 2 hours. Prerequisite: 312, Coreq: 331.

463 PhysicsofFusionEnergy (3) Hightemperature plasmas relevant to fusion principles, plasma physics and other topics related to plasma physics and technology relevant to the industrial application of fusion engines. Design content: 1 hour. Prerequisite: 312, Senior standing. Design content: 1 hour.

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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Description</th>
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<tr>
<td>300</td>
<td>Quality Control (3)</td>
<td>Application of mathematical programming includes classical optimization techniques and new methodologies. May be repeated once.</td>
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474 Biomaterials (3) Metallurgy, polymers and ceramics. Prereq: 302 or equivalent. (Same as Engineering 456).

444 Plastics Fabrication and Design (3) Lectures, including structure development, properties. Current and potential applications. Prereq: 201 and 344.

365 Mechanical Vibration (3) Forced and free vibrations of damped and undamped lumped parametric systems; energy methods; free vibration of continuous bodies. Prereq: 201 and ES 301 (same as Science 420).

366 Elements of Machine Design I (3) Motion and power transmission; friction; bearings; belts and pulleys; gears and gear trains. Kinematics and geometry of motion. Stresses and strains. Design procedures. Prerequisites: Materials Science 201, ES 207, 301, F. Sp., Su.


391 Engineering Analysis (4) Analysis techniques for problems in heat transfer, chemical and aerospace engineering. Emphasis on numerical methods including use of symbolic math and spreadsheet software packages and numerical solutions of systems of ordinary and partial differential equations. Prerequisite: Engineering 201. Prerequisites: Mathematics 200 or 301.

357 Senior Engineering Seminar (1) Topics related to engineering including formal presentation and design effort including formal presentations and design reports. Prerequisites: Senior standing or consent of instructor. F, Sp., Su. (1-3, 1-4) Problems and topics related to developments and practices in mechanical engineering. Prerequisite: Senior standing or consent of instructor.

391 Engineering Analysis Laboratory (Design) (3) Design and conducting research experiments. Experimental tests and standardization. Analysis of data and formation of conclusions. 3 hours per week. Prerequisites: 334, 345, Coreq: 470. F. Sp., Su.

346 Heat Transfer (3) Heat transfer by conduction, convection, and radiation. Prerequisites: Senior standing or consent of instructor. Prerequisite: Senior standing or consent of instructor. F. Sp.

345 Mechanical Engineering Instrumentation and Measurement (3) Physical basis of measurement systems, standards, dynamic characteristics of instruments, control and data treatment procedures, signal conditioning, strain, pressure, temperature and flow measurements. Coreq: 330, Prerequisites: EE 241, EE 301, F., Sp., Su.

350 Environmental Control Thermodynamics (3) Prerequisites: Senior standing, mathematics, and engineering background. Prerequisite: Mathematics 301.

353 Nuclear Engineering Laboratory (3) Cross-sectional, discrete ordinates, and Monte Carlo. Prerequisites: ME 201, Coreq: 350.


364 Nuclear Engineering Laboratory (3) Radiation detection and counting instrumentation, counting statistics, half-life and decay schemes, gamma spectroscopy, heat transfer experiments. Prerequisites: 305, Coreq: 470.

365 Energy Transport (3) Development of heat and integral airflows, convection and conduction heat transfer including numerical methods, application to nuclear reactor fuel elements, reactor cores, and heat exchangers. Prerequisite: 401.

349 Designing for Energy Transport (3) Heat transfer in hydrodynamics and heat transfer in boiling and condensng systems, boiling flows, critical heat fluxes, Marangoni effect, thermal engine design, etc. Design problems. Prerequisite: 401.

364 System Modeling and Simulation (3) Development of mathematical models of dynamic systems and operations simulation, including mathematical formulation, system analysis, and computer simulation. Stability, state space methods, and control. Prerequisite: 301.

365 Nuclear Engineering Laboratory (3) Cross-section measurement, a diffusion theorem of neutrons, criticality control, and reactor instrumentation. Measurement, radiation shielding, and reactor control systems. Economics. Prerequisite: 301.

201-202 Seminar (1,1) Topics related to nuclear engineering. Satisfaction for credit. F, Sp.


350 Radiation Shielding (3) Types of radiation sources, types of shielding materials, detection and counting instrumentation, counting statistics, half-life and decay schemes, gamma spectroscopy, radioactivity, heat transfer experiments. Prerequisites: 305, Coreq: 470.


349 Designing for Energy Transport (3) Heat transfer in hydrodynamics and heat transfer in boiling and condensation systems, boiling flows, critical heat fluxes, Marangoni effect, thermal engine design, etc. Design problems. Prerequisite: 401.

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479 Nuclear Reactor Theory II (3) Theoretical and computational mechanical-hydraulic effects in fluid and thermal systems; considerations in reactor design; equations that relate thermal and neutron variables; power distribution calculations and reactivity control methods. Prepsy 470.

472 Nuclear System Design (3) Fluid flow design and analysis of nuclear systems; interaction of nucler fission aspects of system design; including system reliability and economics. Prepsy 470.

484 Special Topics in Nuclear Engineering (2) Problems related to reactor development and practice. Prepsy, Senior standing, consent of instructor. May be repeated.

ENGINEERING SCIENCE (335)

233 Dynamics (3) Kinematics of rigid bodies, kinetic energy, kinematic and kinetominetic equations of systems; methods of solution; application to engineering design problems. Prepsy 241, Mathemarics 241F, Mathemarics 417.

211 Introduction to Biomedical Engineering (2) Overview of basic principles of medical instrumentation, anayis, physiology, biochemistry, biologic, sanitation, and life cycle. Mathemarics 241, Consent of instructor if.

301 Seminar (1) Engineering professionality and career planning; seminars on current topics. Consent of student. Prepsy 301.


421 Materials of Engineering (3) Mechanical properties of engineering materials, data collection and processing; stress and strain analysis, design of mechanical systems for aerospace and mechanical applications. Mathemarics 231, Mathemarics 241F, Prepsy 311.

433 Statics-Safe Design (3) Critical view of variables controlling fracture toughness; joint geometries and temperature sensitivity; fracture toughness testing. Mathemarics 231.

453 Engineering Acoustics (3) Concepts of acoustics, microphone design and solid responds; transmission; noise control principles and applications; multiple sources and procedure for noise abatement. Prepsy, Switzer Standing in Engineering or consent of instructor.

442 Fluid Mechanics (3) Intraporal interations of fluid and aerodynamic motion and some historical motion; pressure measurements; energy, momentum, and thermodynamic principles. Prepsy 241, Mathemarics 241.

453 Dynamic Systems (3) Intermediate methods of control theory, with emphasis on transfers, feedback, and stability. Prepsy 311, Mathemarics 241F.


461 Experimental Stress Analysis (2) Theory, techniques, and instrumentation for stress measurement. Prepsy 311, Mathemarics 241F, Prepsy 311.

430 Computational Mechanics (3) Introduction to fluid flow concepts; hydrodynamic development of moment, momentum, and energy of systems; application of the Navier-Stokes integral equations; computational methods. Prepsy 241, Mathemarics 241.

426 Fundamental Principles of Composite Materials (3) Same as Materials Science 475.

425 Fracture-Mechanics (3) Introduction to fluid flow concepts; hydrodynamic development of moment, momentum, and energy of systems; application of the Navier-Stokes integral equations; computational methods. Prepsy 241, Mathemarics 241.

424 Stress-Free Design (3) Critical view of variables controlling fracture toughness; joint geometries and temperature sensitivity; fracture toughness testing. Mathemarics 231.

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424 Stress-Free Design (3) Critical view of variables controlling fracture toughness; joint geometries and temperature sensitivity; fracture toughness testing. Mathemarics 231.
for a total of 6 hours credit.

Implications for the teaching of composition. Prereq: 355.

Modes of inquiry in rhetoric and composition and their implications for the teaching of composition. (Same as Linguistics 472.)

Seeing, studying, and leading fitness activities, including jogging, exercise to improve cardiovascular health, and strength training. 1 hour lecture and 3 hours in the lab. 1 credit.

Big deals. Relevance of exercise to education and the workplace. Experiences in exercise and fitness areas. May be repeated for a maximum of 10 hours. Satisfaction/No Credit grading. (Offered as Faculty Reading 352, 353, 354, 414, 415.)

Practicum in Applied Physical Activity (1-15). Working with individuals with developmental and disabilities, with emphasis on nature of disability and implications for program planning. Satisfactory/No Credit grading. May be repeated with consent of instructor. Requires a cumulative GPA of 3.0 to register for this course.

Practicum in Adapted Physical Activity (1) Working with individuals in education or clinical settings, where an emphasis is placed on teaching groups and fine motor skills. Prereq: Coring 411.

Fitness Testing and Exercise Prescription (3). Relationship of exercise to cardiorespiratory function, body composition, strength and flexibility. Measurement and evaluation of fitness in normal populations. Prerequisite 230. Exercise Science majors must have a cumulative GPA of 3.0.

Biomechanics of Human Movement (2). Study of biomechanics and its approach to the analysis of human movement. Emphasis on quantitative and qualitative analysis of human movement. Prerequisite 230, MATH 120 or Phys 323. Exercise Science majors must have a cumulative GPA of 3.0.

Exercise Science Practicum (2). Supervised experiences in exercise and fitness areas. May be repeated for a maximum of 10 hours. Satisfaction/No Credit grading. (Offered as Faculty Reading 352, 353, 354, 414, 415.)

Exercise Physiology (3). Lecture and class dealing with the function of the body in muscular work. Topics include physical exercise, nutrition, training, and adaptation to exercise. 2 credits and 1 lab. Prereq. Exercise and Biochemistry and Cellular and Molecular Biology 350 or equivalent. (Same as Biochemistry and Cellular and Molecular Biology 450.)

Exercise Physiology/Fitness Internship (1-15). Practical experience in exercise/fitness areas. May be repeated for a maximum of 90 hours. Prereq. Consent of instructor and progression to the major. Satisfaction/No Credit or letter grades.

EXERCISE SCIENCE (347)

100 Orientation to Exercise Science (1). Overview of discipline and professional areas for incoming Exercise Science majors. Must be taken prior to admission to the Exercise Science major.

106 Exercise Science Practicum (1). Practicum experience to support and clarify career goals. Satisfaction/No Credit grading only. 1 credit.

276 Fitness for Life (2). Evaluation and discussion of topics related to optimal cardiovascular health. Emphasis on lifestyle and leisure activities. 1 lecture, 2 lab. 2 credits.

325 Veterinary Entomology (3). Identification, biology, and control of arthropods that affect livestock or wildlife. Emphasis on insect ecology, and control and surveillance of important arthropods and their impact on economically important livestock and wildlife environments. 3 lecture and 2 lab. 3 credits (or consent of instructor). 4 hours, S.A.

321 Economic Entomology (3). Structure, life history, habits and principles of control of important insect pests. 3 lecture, general, ornamental, and household pests. Emphasis on pest ecology and optimal control methods. Prereq. Biology 301 or equivalent. 2 lecture and 1 lab. 3 credits.

312 Animal Nutrition (4). Content varies, but all sections address issues of value from an interdisciplinary perspective. Topics may include nutrition issues dealing with function of the body in muscular work. Topics include physical exercise, nutrition, training, and adaptation to exercise. 2 lecture and 1 lab. Prereq. Exercise Science and Biochemistry and Cellular and Molecular Biology 350 or equivalent. (Same as Biochemistry and Cellular and Molecular Biology 450.)


364 Special Topics in Writing (3). Original writing integrated with reading, usually taught by a professional writer. Topics vary. May be repeated. Maximum 6 hours.

395 Special Topics in Language (2). Special topics. Prereq. Second year of a foreign language or consent of instructor. Maximum 6 hours. (Same as Linguistics 490.)

325 Economic Entomology (3). Structure, life history, habits and principles of control of important insect pests. 3 lecture, general, ornamental, and household pests. Emphasis on pest ecology and optimal control methods. Prereq. Biology 301 or equivalent. 2 lecture and 1 lab. 3 credits (or consent of instructor). 4 hours, S.A.

388 Applied Anatomy (3). Structure and roles of bones, joints, muscles and tendons in human movement. 3 lecture, 1 lab. 4 lecture hours and 1 lab. (Same as Physiology 347.)

325 Veterinary Entomology (3). Identification, biology, and control of arthropods that affect livestock or wildlife. Emphasis on insect ecology, and control and surveillance of important arthropods and their impact on economically important livestock and wildlife environments. 3 lecture and 2 lab. 3 credits (or consent of instructor). 4 hours, S.A.

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430 Financial Markets (3) Role of short and long term financial markets in the process of capital formation and allocation. Theories and mathematical models of interest rates and capital markets. Prereq: 212.}


440 Advanced Topics in Financial Management (3) Contemporary issues in corporate finance and debt financing. Role of financial intermediaries, internal and external capital markets, international finance. Prereq: 301.

470 Risk Management and Insurance (3) Identification, measurement and decision making with regard to insurance-risk facing firms. Establishing and maintaining insurance programs in the goals of the firm. Prereq: 301.

471 Estate and Financial Planning (3) Process of valuation, measurement and decision making with regard to financial institutions including asset, liability and capital supply for national and international markets. Prereq: 470 or consent of instructor. 2 3-hour lectures.

140 The Food Industry (3) Introduction to the food industry from a technology perspective. Coreq: CHEM 110 or equivalent. Letter grade or Satisfactory/No Credit grading only. Meet twice weekly. No credit can be repeated; maximum 9 hours. Prereq: Consent of instructor.

306 Forest Protection (3) Prereq: FWF 311, or consent of instructor. 2 75-minute lecture/lab sessions.

305 Prescribed Fire Management (1) Prescribed fire management, identification and control, forest protection, wildland law and regulations; theory of conflict resolution; formulation; criteria for policy determination; forest and related laws and regulations. Prereq: FWF 313. Coreq. Letter grade or Satisfactory/No Credit grading only. Credit can be repeated; maximum 12 hours. Prereq: Consent of instructor.

491 Course Title (3) Integration of the three areas of interest under faculty direction. Field experience required. Prereq: FWF 313.


492 Off-Campus Study (3) Satisfactory/No Credit grading only. Prerequisite: Consent of instructor. May be repeated; maximum 24 hours. Prereq: Consent of instructor. Letter grade or Satisfactory/No Credit grading only. Credit can be repeated; maximum 24 hours. Prereq: Consent of instructor.

177 Courses of Instruction
Characteristics and processes of the Earth's surface and
Geography 101. Students may not receive credit for
their major field of study.

490 Internship (1-15) Career-related experiences in
Language & World Business. Director for Language &
the United States or abroad with permission of the

491 Foreign Study (1-15) Study of contemporary French language and culture as

492 Off-Campus Study (1-15) Study of contemporary French language and culture as

493 Independent Study (1-15) Study of advanced topics in French Studies.

494 Process Geomorphology (3) (Same as Geology 425) Study of the geomorphology of

495 Process Geography (3) Geographical appraisal of physical, cultural, and
economic characteristics of the countries of

496 Process Geography (3) Geographical appraisal of physical, cultural, and
economic characteristics of the countries of

497 Thesis (1-15) Candidates must submit a research paper,

498 Undergraduate Research Experience (1-3) Supervised participation in active research projects.

101 The Dynamic Earth (4) Physical processes within and upon the Earth's surface, including the formation

435 The Land-Surface System (3) Characteristics of surface form, water, vegetation, and surface materials,
and their regional and international implications. Precept: 131-132 or consent of instructor.

436 Climatology (3) General circulation system leading to world climate patterns. Climatic change and modi-
and interrelationships of climate and human activity. Precept: 131-132 or consent of instructor.

437 Biogeography (3) Study of the origin, distribution, and adaptations of plants and animals.

438 Plant Geography of North America (3) Characteristics
of major plant communities of

439 Plant Geography of Russia and the Commonwealth of

440 Capstone Experience in French (3) Writing emphasis.

441 Urban Geography (3) Concepts and theories
toward major.

442 Rural Geography (3) Geographical appraisal of rural areas of the United States, including small towns and
urban fringes. Problems and processes of rural America.

443 Rural Geography (3) Geographical appraisal of rural areas of the United States, including small towns and
urban fringes. Problems and processes of rural America.

444 Advanced French for Business (3) Study of advanced contemporary French language and culture as
they relate to business transactions. A comparative approach is used to explore differences and similarities between French (business culture) and those of North America and Japan. Students build upon their knowledge of business terminology while being exposed to cultural references and the demands in spins, strengthening. Precept (44 or consent of instructor.

445 Geometric Analysis of Cartographic Data (3) Computer language or consent of instructor.

446 Historical Geography of the United States (3) Study of the development of agricultural regions, and patterns of urbanization. Precept: 310 or consent of instructor.

447 Historical Geography of the United States (3) Study of the development of agricultural regions, and patterns of urbanization. Precept: 310 or consent of instructor.

448 Historical Geography of the United States (3) Study of the development of agricultural regions, and patterns of urbanization. Precept: 310 or consent of instructor.

449 Biogeography (3) Study of the changing distribution of plant and animal communities of the earth. Precept: 131-132 or consent of instructor.

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497 Thesis (1-15) Candidates must submit a research paper,

498 Undergraduate Research Experience (1-3) Supervised participation in active research projects.

499 Honors: Senior Thesis (3) Students developing un-
published work, who will receive credit for thesis

500 Senior Honors Thesis (3) Completion of senior thesis, with grades of A or better

501 Senior Honors Thesis in Geography (3) Major themes in geography, especially those over the past 40 years. Open only to graduating seniors. Precept: Senior standing and completion of at least 12 hours of department requirements in geography. Writing emphasis course.

502 Senior Honors Thesis in Geography (3) Major themes in geography, especially those over the past 40 years. Open only to graduating seniors. Precept: Senior standing and completion of at least 12 hours of department requirements in geography. Writing emphasis course.

503 History of Geography (3) (Same as Geography 425) Study of the development of academic geography, with particular emphasis on the role of women in the discipline and the impact of geography on the humanities and social sciences. Precept: 131-132 or consent of instructor.

504 Writing-Emphasis (3) Emphasis on the raisond'etre of the discipline from a multi-
dimensional point of view. Writing emphasis course.

505 Capstone Experience in French (3) Writing emphasis.

506 Courses of Instruction 179

507 Characterization and process of the Earth's surface
and...
105 Earth, Life and Time (4) Evolution, and ancient environments. 3 lecture hours and one 2-hour lab per field period.

106 Geology of National Parks (4) Spectacular landscapes and geologic history of national parks of the West. 3 lecture hours and one 2-hour lab per field period.

110 Principles of Geology (4) Introduction to physical processes of the earth. 3 lecture hours and one 2-hour lab per field period.

113 Field Geology (4) Principles and techniques of field geology. 3 lecture hours and one 2-hour lab per field period.

121-122 Intermediate German (3,3) Language laboratory required. Must be taken in sequence. Not available to students majoring in German 105.

201-202 Elementary German (3,3) Language laboratory required. Must be taken in sequence. Not available to students majoring in German 105.

210-212 Intermediate German (3,3,3) Selected themes, issues, figures, movements, and problems in the German-speaking world. Undergraduate credit only. No credit for students who have completed 211-213. 3 lecture hours and one 2-hour lab per field period.

213-214 Advanced German (3,3) Advanced readings and a final 10,000-word translation project. Open only to graduate students preparing for advanced undergraduate or graduate study. 3 lecture hours and one 2-hour lab per field period.

301 World History to 1815 (4) World history to 1815. 3 lecture hours and one 2-hour lab per field period.

302-303 German Film (3,3) A study of the German cinema and its relationship to the development of modern times. 3 lecture hours and one 2-hour lab per field period.

310-312 Reading in German (3,3) Topics in both literary and non-literary fields. Students or student groups are encouraged to work individually. 3 lecture hours and one 2-hour lab per field period.

311-312 Conversation and Composition (3,3) Prerequisite: 202 or equivalent. Need not be taken in sequence. 3 lecture hours and one 2-hour lab per field period.

313-314 German Film (3,3) A study of the German cinema and its relationship to the development of modern times. 3 lecture hours and one 2-hour lab per field period.

315-316 Elements of German Culture (3,3) Elements of language, literature, and culture. Undergraduate credit only. No credit for graduate students prepared for advanced undergraduate or graduate study. 3 lecture hours and one 2-hour lab per field period.

317-318 German Film (3,3) A study of the German cinema and its relationship to the development of modern times. 3 lecture hours and one 2-hour lab per field period.

319-320 Intermediate German Through Literature and Culture (3,3) Selected themes, issues, figures, movements, and problems in the German-speaking world as reflected in literature and culture from the 17th century to the present. Undergraduate credit only. No credit for graduate students prepared for advanced undergraduate or graduate study. 3 lecture hours and one 2-hour lab per field period.

321-322 Modern German Culture (3,3) An overview of the history and development of modern Germany. 3 lecture hours and one 2-hour lab per field period.

330 Igneous and Metamorphic Petrology (3) Classification and properties of igneous and metamorphic rocks. The processes that produce them, and the tectonic environments in which they form. Prerequisite: 310, 2 lecture hours and one 2-hour lab per field period.

331 Petrology (3) Principles and their use in understanding petrogenetic, chemical, and physical processes. 2 lecture hours and one 2-hour lab per field period.

332 Structural Geology (4) Physical, mathematical, and chemical principles underlying the study of the Earth's crust, and principles of geologic mapping. 3 lecture hours and one 2-hour lab per field period.

333 Global Environment (3) Ecological, biological, and social aspects of global change. 3 lecture hours and one 2-hour lab per field period.

420 Paleontology (4) Principles of ecological analysis as applied to fossils and fossil assemblages with emphasis on the diagenetic processes that produce fossils. Prerequisite: 310, 2 lecture hours and one 2-hour lab per field period.

431 Geological Engineering (3) Geotechnical engineering and geology. 2 lecture hours and two 2-hour laboratory periods.

440 Geology of Wyoming (4) Geology of Wyoming, with special emphasis on the effect of geologic processes on human activities. 3 lecture hours and one 2-hour lab per field period.

485 Principles of Geohydrology (3) Groundwater flow and recharge. 3 lecture hours.

490 Special Problems in Geology (1-3) Directed study. Prerequisite: Consent of instructor. May be repeated with the approval of the department. Maximum 9 hours.

491 Field Geology (4) Summer field course for credit without undergraduate geology majors and first-year graduate students in geology. Taught off-campus and requires the full time of the student. The course provides a synthesis of the major aspects of the geologic sciences in a societal context. Field techniques demonstrated and practiced, and applied to the solution of geologic problems. Prerequisite: Completion of other major core courses (310, 311, 330, 340, 370) and consent of instructor. 3 lecture hours and one 2-hour lab.

493 Independent Study (1-15) Directed study. Prerequisite: Consent of instructor. Maximum 15 hours.

494 Special Topics in Geology (1-3) Special topics. 1-3 lecture hours. Prerequisite: Consent of instructor. May be repeated with the approval of the department. Maximum 9 hours.

496 Special Problems in Geology (1-3) Directed study. Prerequisite: Consent of instructor. May be repeated with the approval of the department. Maximum 9 hours.

501 Advanced Structural Geology (3) Principles of structural geology, including mathematical description of geologic structures. 3 lecture hours.

502 Honors: The Dynamic Earth (4) Laboratory and field emphasis to understanding physical processes, formation, composition and evolution of the Earth. 3 lecture hours and one 2-hour lab. Prerequisite: 101-102.

587 Advanced Physical Geology (3) Applications of the geologic sciences toward a comprehension of the effect of geologic processes on humans and the effects of human activities on the Earth's environments. 3 lecture hours of geologic courses; 2 lecture hours and one 2-hour lab per field period.

601-602 Special Problems in Geology (1-3) Directed study. Prerequisite: Consent of instructor. 3 lecture hours and one 2-hour lab per field period.

651 Oceanic and Marine Geology (4) Introduction to the geologic processes that operate on the ocean floor and the physical environment of the ocean. Prerequisite: 310-312 or equivalent. 3 lecture hours and one 2-hour lab per field period.

656-657 Independent Study (1-15) Directed study. Prerequisite: Consent of instructor. Maximum 15 hours.
483 History of U.S. Foreign Relations Since W W II (3)

History of both primary and secondary sources. Recommended problem; emphasis on questions and skills, with special
482 Colloquium in History (3) Historical theme or
481 Studies in History (3) Variable content. Subject
475 American Studies (475)

May be repeated. Maximum 9 hours.

474 Studies in Medieval and Early Modern European History (3) Selected aspects of Eastern European history, political, cultural, economic and political impact of both spectator and participatory arts in 20th century. (Same as Latin American Studies 460).

473 Studies in British History (3) Variable content. Selected themes and issues in British History. May be repeated. Maximum 9 hours.

471 Studies in Western European History (3) Variable content. Particular aspects of Western European history such as war, revolution, or national renaissance. May be repeated. Maximum 9 hours.

472 Studies in Central European History (3) Variable content. May be repeated. Maximum 9 hours.

470 Studies in Early Modern European History (3) Variable content. Special topics in European history. May be repeated. Maximum 9 hours.

469 Studies in Latin American History (3) Variable content. May be repeated. Maximum 9 hours. (Same as Latin American Studies 475).

468 Studies in Asian History (3) Variable content. Prerequisites: English 472 and Latin American Studies 410. May be repeated. Maximum 9 hours. (Same as Latin American Studies 475).

467 Studies in United States History (3) Variable content. Particular aspects of United States History. May be repeated. Maximum 9 hours.

466 Studies in African History (3) Variable content. Course content will vary with emphasis on aspects of the African experience such as African resistance movements, African problems in the nationalization of education, and economic development under colonialism to social problems in modern African nations, and the relationship of Africa to the West. May be repeated. Maximum 9 hours.

465 Studies in Latin American History (3) Variable content. Subject matter to be determined. Prerequisites in other courses. May be repeated. Maximum 9 hours.

464 Colloquium in History (3) Historical themes or problems. Emphasis on questions and skills, with special areas chosen by the instructor. May be taken by students who have had previous history course work in any field. May be repeated. Maximum 9 hours.

463 History of U.S. Foreign Relations Since W W II (3) Examines the ideas and practices of U.S. international relations since World War II.

484 Studies in Cross Cultural History (3) Variable content. Comprehensive analysis of applications of cross-cultural studies of specific topics in the relationship between two cultural systems. May be repeated. Maximum 9 hours.

491 Foreign Study (1-15)

492 Off-Campus Study (1-15)

493 Independent Study (1-15)

IOLISTIC TEACHING/ LEARNING (467)

393 Field Study in Education (1-9) Problems of pare

392 Studies in Education (1-9) Methods and materials for teaching science and social studies in elementary and secondary schools.

391 Selecting Science and Social Studies in Elementary and Middle Schools (3) Methods and materials for teaching science and social studies in elementary and middle schools.

390 Teaching Science and Social Studies in Elementary and Middle Schools (3) Methods and materials for teaching science and social studies in elementary and middle schools.

389 Teaching Arts in Elementary and Middle Schools (3) Mediums and materials for teaching art in elementary and middle schools.

388 Teaching Language Arts in Elementary and Middle Schools (3) Language and language development as an aid to teaching reading, writing and spelling. Not open to students who have had recent course in language arts methods.

387 Teaching Foreign Languages (3) Foreign language intensive courses. Prerequisites: 481 and permission of department.

386 Speech and Language Basis of Learning Disabilities (3) Nature and characteristics of learning disabilities and the educational strategies appropriate for these persons. Prerequisites: 310, 320, 342 and Admission to Teacher Education Program.

385 Reading Strategies and Techniques in Special Education (3) Instructional strategies for teaching reading, writing, and language to students with special needs. Prerequisites: 310 and permission of department.

384 Speech and Language Development (3) The traditionally recognized stages of the life-cycle. Prerequisites: 310 and permission of department.

383 The Life Cycle in America: Colonial Period to the Present (3) The socially recognized stages of the life cycle are explored in social studies. Required for teaching science and social studies. Prerequisites: Admission to Teacher Education Program.

382 Foreign Study (1-15)

381 History of Latin America (3) Latin America's largest nation. History of boom and bust economic cycles, slavery and the abolition of slavery, populism, economic development, and modernization. (Same as Latin American Studies 460).

380 Cuban Revolution in Historical Perspective (3) Social, economic, political, religious, and modern American history, emphasizing the 20th century. (Same as Latin American Studies 461).

379 Mexico (3) Pro-Colonial, colonial, republic, and modern Mexican history, emphasizing the 20th century. First few social revolutions, the Mexican Revolution, and contemporary social and economic problems. (Same as Latin American Studies 462.)

378 Modern Latin American History in Film (3) Major events and trends in Latin America since 1945, as represented in Latin American films. Topics include economics development, the Cuban Revolution, and Authoritarianism. (Same as Latin American Studies 463).

377 Media in British History (3) Variable content. Selected themes and issues in British History. May be repeated. Maximum 9 hours.

376 Studies in World History in Film (3) Variable content. Special topics in World History and the Film. May be repeated. Maximum 9 hours.

375 Studies in Medieval and Early Modern European History (3) Variable content. May be repeated. Maximum 9 hours.

374 Studies in Latin American History (3) Variable content. May be repeated. Maximum 9 hours. (Same as Latin American Studies 475).

373 Studies in Asian History (3) Variable content. Prerequisites: English 472 and Latin American Studies 410. May be repeated. Maximum 9 hours. (Same as Latin American Studies 475).


371 Studies in African History (3) Variable content. Course content will vary with emphasis on aspects of the African experience such as African resistance movements, African problems in the nationalization of education, and economic development under colonialism to social problems in modern African nations, and the relationship of Africa to the West. May be repeated. Maximum 9 hours.

370 Studies in Latin American History (3) Variable content. Subject matter to be determined. Prerequisites in other courses. May be repeated. Maximum 9 hours.

369 Colloquium in History (3) Historical themes or problems. Emphasis on questions and skills, with special areas chosen by the instructor. May be taken by students who have had previous history course work in any field. May be repeated. Maximum 9 hours.

368 History of U.S. Foreign Relations Since W W II (3) Examines the ideas and practices of U.S. international relations since World War II.
Courses of Instruction

366 Manufacturing Technology (5) Manufacturing systems, including manufacturing and developing products, processes, materials, manufacturing, marketing, and services. Prerequisites: Consent of instructor. E, Sp.

389 Plastic Technology (3) Characteristics and applications of thermoplastic and thermosetting plastics. Plastic production equipment related to design and processing of plastics. Prerequisite: E and admission to Teacher Education Program.

372 Job Analysis (3) Applied techniques of job analysis to determine job descriptions, training requirements, performance standards and sequence of training technical personnel.

373 Instructional Techniques in Industrial Education (3) Acceptance of the industrial education, instructional techniques, and instructional activities in technical and related fields.

374 Planning Instruction for Human Resource Development (3) School and industry and development of performance-based training programs. Prerequisite: 372.

432 Methods and Materials in Business and Marketing Education (3) The application of modern educational theories and techniques to the instruction of business and marketing. Prerequisites: Completion of all business education courses.

433 Special Topics in Human Resource Development (1-3) Topics to be assigned. May be repeated. Maximum 9 hours.

434 Individual Study in Human Resource Development (1) Prerequisite: Consent of supervising instructor and approval form filed in the office of the department head. May be repeated. Maximum 6 hours.

435 Coordination Techniques (3) Necessary procedures, duties and responsibilities to implement, maintain, and evaluate a cooperative education program.

440 Introduction to Adult Education (3) Basic principles and the dynamics of adult education and the private sector through advisory committees and various reports and working relationships. Development and management of block-related programs. Prerequisites: Three hours of education courses.

443 Adult Development and Training (3) Application of adult learning theory to the development and management of training programs for adults. Prerequisite: Consent of instructor.

450 Principles and Organization of Business Marketing Education (3) Historical and development of vocations of educational value in business and marketing. Marketing and selling principles. Enrollment, policies. Prerequisite: Consent of instructor.

451 Supervised Commercial Field Experience (3) Provides direct services in a supervised learning situation. Prerequisites: Progression to the major, 330; senior standing or consent of instructor. SP.

452 Supervised Vocational Field Experience (3) Supervised vocational experience for special needs learners. Emphasis on the various professions, including skills, the role of the special needs learner in the workplace, and the processes and principles that guide decisions for success. Prerequisites: Consent of instructor.

453 Independent Study (1-3) Topics to be assigned. May be repeated. Maximum 9 hours. E.

458 Human Services Methodologies 1 (3) Basic helping processes. Prerequisites: Admission to Teacher Education Program. F.

459 Human Services Methodologies 2 (3) Advanced helping processes. Prerequisites: Consent of instructor.

460 Principles of Human Resource Development (3) Basic helping processes. Prerequisites: Admission to Teacher Education Program. F.

461 Coordination Techniques (3) Necessary procedures, duties and responsibilities to implement, maintain, and evaluate a cooperative education program.

464 Methods and Mediation in Technology Education (3) Selection and arrangement of course content. Planning, instructional objectives, project/product selection, and evaluation. Prerequisite: Consent of instructor.

465 Materials and Processes (3) Materials relative to specifications, testing, and methods to classify and categorize materials. Determining correct processes to match the industrial needs. Prerequisites: Completion of all technology courses.

466 Organization and Operation of VICA/HOSA (3) Planning, organizing and implementing youth-club activities in vocational-technical programs. Prerequisites: Consent of instructor.

470 Training for Human Resource Development (3) Organization and management of training, including design and function performed and the theories, costs, advantages and disadvantages of training systems. Prerequisites: Consent of instructor.

479 Internship in Human Resource Development (3) Assessment, planning, implementing and evaluating the effectiveness of training programs in an industrial setting. May be repeated to a maximum of 10 semester hours. Satisfactory/No Credit only. E.

500 Information Seeking: Resources and Strategies (3) Principles, selection, and use of computer-based information systems for finding, evaluating, and using information. A focus on topic of social, educational and legal considerations for using and evaluating information. Prerequisite: Consent of instructor. F, Sp.

510 Technologies for Information Retrieval (3) Principles, selection, and use of computer-based information systems for finding, evaluating, and using information. A focus on topic of social, educational and legal considerations for using and evaluating information. Prerequisite: Consent of instructor. F.

550 Independent Study (1-15) Topics to be assigned. May be repeated. Maximum 9 hours.

590 Information Seeking: Resources and Strategies (3) Principles, selection, and use of computer-based information systems for finding, evaluating, and using information. A focus on topic of social, educational and legal considerations for using and evaluating information. Prerequisite: Consent of instructor. F, Sp.

610 Early Childhood Special Education Foundations (3) Introduction to the field of early childhood special education including the nature of disabling conditions; theoretical perspectives in the field; legislation; policy development; and future professional roles. Prerequisite: Admission to Teacher Education Program. F.

611 Early Childhood Special Education Program Development and Teaching in Kindergarten (3) Curriculum planning, evaluation and management, and practices and techniques for teaching children with disabilities in kindergarten. Prerequisite: Admission to Teacher Education Program. F.

612 Community-Based Field Experience (1-560) Prerequisite: Admission to Teacher Education Program. F.

613 Early Childhood Special Education (3) Assisting in the management and administration of special education programs. A focus on group work and team decision making. Prerequisites: Consent of instructor and admission to the Teacher Education Program. F, Sp.

614 Early Childhood Special Education Field Experience (1-5) Field experience in early childhood special education. Prerequisites: Consent of instructor and admission to the Teacher Education Program. F.

615 Field Experience in early Childhood Special Education (3) Field experience in early childhood special education. Prerequisites: Consent of instructor and admission to the Teacher Education Program. F.

616 Field Experience in early Childhood Special Education (3) Field experience in early childhood special education. Prerequisites: Consent of instructor and admission to the Teacher Education Program. F.

617 Field Experience in early Childhood Special Education (3) Field experience in early childhood special education. Prerequisites: Consent of instructor and admission to the Teacher Education Program. F.

618 Independent Study (1-560) Topics to be assigned. May be repeated. Maximum 12 hours.

619 Independent Study (1-560) Topics to be assigned. May be repeated. Maximum 12 hours.

620 Special Topics in Early Childhood Special Education (1-5) Topics to be assigned. May be repeated. Maximum 12 hours.

622 Field Experience in Early Childhood Special Education (3) Field experience in early childhood special education. Prerequisites: Consent of instructor and admission to the Teacher Education Program. F.

623 Early Childhood Special Education Foundations (3) Introduction to the field of early childhood special education including the nature of disabling conditions; theoretical perspectives in the field; legislation; policy development; and future professional roles. Prerequisite: Admission to Teacher Education Program. F.

624 Early Childhood Special Education Program Development and Teaching in Kindergarten (3) Curriculum planning, evaluation and management, and practices and techniques for teaching children with disabilities in kindergarten. Prerequisite: Admission to Teacher Education Program. F.

625 Independent Study (1-15) Topics to be assigned. May be repeated. Maximum 9 hours.

626 Special Topics in Early Childhood Special Education (1-5) Topics to be assigned. May be repeated. Maximum 12 hours.

627 Certificate in Early Childhood Education (6) Certificate in teaching, field experience in early childhood special education. Prerequisites: Consent of instructor and admission to the Teacher Education Program. F.

630 INFORMATION SCIENCES (542) INCLUSIVE EARLY CHILDHOOD EDUCATION (542)

640 Methods and Mediation in Technology Education (3) Selection and arrangement of course content. Planning, instructional objectives, project/product selection, and evaluation. Prerequisite: Consent of instructor.

641 Human Services Field Work (6) Practical field experience in appropriately organized and directed human services settings. Development of specific professional skills and abilities in the field of human services, including work with individuals with special needs. Prerequisite: Consent of instructor.

644 Information Seeking: Resources and Strategies (3) Principles, selection, and use of computer-based information systems for finding, evaluating, and using information. A focus on topic of social, educational and legal considerations for using and evaluating information. Prerequisite: Consent of instructor. F, Sp.

645 Human Services Methodologies 1 (3) Basic helping processes. Prerequisites: Admission to Teacher Education Program. F.

646 Human Services Methodologies 2 (3) Advanced helping processes. Prerequisites: Consent of instructor.

647 Special Topics in Human Services (3) Topics to be assigned. May be repeated. Maximum 12 hours.

648 Independent Study (1-15) Topics to be assigned. May be repeated. Maximum 12 hours.

649 Independent Study (1-15) Topics to be assigned. May be repeated. Maximum 12 hours.

650 INFORMATION SCIENCES (560) INFORMATION SCIENCES (560)


652 Technologies for Information Retrieval (3) Principles, selection, and use of computer-based information systems for finding, evaluating, and using information. A focus on topic of social, educational and legal considerations for using and evaluating information. Prerequisite: Consent of instructor.

653 Information Seeking: Resources and Strategies (3) Principles, selection, and use of computer-based information systems for finding, evaluating, and using information. A focus on topic of social, educational and legal considerations for using and evaluating information. Prerequisite: Consent of instructor.

654 Information Seeking: Resources and Strategies (3) Principles, selection, and use of computer-based information systems for finding, evaluating, and using information. A focus on topic of social, educational and legal considerations for using and evaluating information. Prerequisite: Consent of instructor.

655 Information Seeking: Resources and Strategies (3) Principles, selection, and use of computer-based information systems for finding, evaluating, and using information. A focus on topic of social, educational and legal considerations for using and evaluating information. Prerequisite: Consent of instructor.
Courses of Instruction

Courses of Instruction

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Courses of Instruction

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Courses of Instruction

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for 125. Prereq: Two years of algebra and one year of student who has received credit for Math 141 or 152 with major in the physical sciences, engineering, mathematics, or computer science. Students are permitted to count toward the total number of hours required for graduation, not to fulfill any mathematics requirement. A, B, C, NC, CG.

119 Algebraic Reasoning (3) A course in the applications of elementary mathematics to life in the modern world, including elementary mathematics of finance, consumer mathematics, and personal financial management. Prereq: Placement test score or Math 100. This course should not be taken to satisfy the course prerequisite for 141 or 142.

120 College Algebra (3) A review of algebraic functions, equations, and inequalities for students who satisfy the course prerequisites for 141 or 151, but do not have enough background in these areas. Prereq: Placement test score or Math 100.

121 Calculus I (4) The calculus of one variable, including limits, continuity, differentiation, and fundamental theorems of calculus. Prereq: Placement test score or Math 100.

122 Calculus II (4) A continuation of 121, including techniques of integration and applications. Prereq: Math 121.

123 Multivariable Calculus (4) Calculus of functions of several variables, vector analysis, line and surface integrals, and the theorems of Gauss and Stokes. Prereq: Math 122.

130 Precalculus I (4) Review of algebraic, logarithmic, exponential, and trigonometric functions for students who satisfy the course prerequisites for 141 or 151, but do not have enough background in these areas. Prereq: Placement test score or Math 100.

130-152 Mathematics for the Life Sciences I, II (3, 3) For students majoring in the life sciences. Does not satisfy major requirements for a B.S. or M.S. in mathematics.

131 Calculus A (3) For students not planning to major in the physical sciences, engineering, mathematics, or computer science. Calculus of algebraic, exponential, and logarithmic functions, with applications. Prereq: Placement test score or Math 100.

132 Calculus B (3) For students not planning to major in the physical sciences, engineering, mathematics, or computer science. Calculus of algebraic, exponential, and logarithmic functions, with applications. Prereq: Placement test score or Math 100.

133 Finite Mathematics (3) For students not planning to major in the physical sciences, engineering, mathematics, or computer science. Elementary and matrix algebra, permutations and combinations, probability, and linear programming. Prereq: Placement test score or Math 100.

134-144 Microcomputer Laboratory (1, 1, 1, 1) This laboratory provides an introduction to computers, emphasizing computer demonstrations and projects. Prereq: Math 121, 122, or 130.

135 Linear Algebra (3) A first course in linear algebra, emphasizing matrices, determinants, vector spaces, linear transformations, and related theoretical issues. Prereq: Math 122 or 130.

141-142 Calculus I, II (4, 4) Standard first year course in single variable calculus, including elementary functions, limits, continuity, differentiation, and fundamental theorems of calculus. Prereq: Math 121 with a grade of C or better recommended. Prereq: Placement test score or Math 100.

143-144 Calculus I, II, III (4, 4, 4) A continuation of 141, 142. Prereq: 141.

145-146 Calculus I, II (4, 4) A general first year calculus sequence for students of science, engineering, mathematics, and computer science. Includes multivariable calculus. Prereq: 141.

147-148 Honors Calculus I, II (4, 4) Honors version of 141, 142. Students are usually invited to enroll, but not all students have had enough preparation to succeed. Prereq: 141.

151-152 Mathematics for the Life Sciences I, II (3, 3) For students majoring in the life sciences. Does not satisfy major requirements for a B.S. or M.S. in mathematics.

153-154 Calculus for Business I, II (4, 4) A one year course in single variable calculus, emphasizing applications to business and economics. Prereq: Math 130.

161 Elementary Statistics (3) Basic concepts and procedures of statistical inference, estimation, and hypothesis testing. Prereq: Placement test score or Math 100.


167 Elementary Linear Algebra (3) Elementary linear algebra, including systems of linear equations, matrices, and vector spaces. Prereq: Math 121.

168 Probability (3) An introduction to probability and its applications. Prereq: Math 121.

171-172 Probability and Statistics for Engineers and Scientists (4, 4) A calculus-based introduction to probability and statistics for engineers and scientists. Prereq: Math 122.


178-179 Dynamic Programming (3, 3) Dynamic programming for use in computer programming and optimization. Prereq: 121 or 130.

189 Statistics for Business Decision Making (3) An introductory course in statistics for business students. Prereq: Math 121 or 130.

189-289 Special Topics (1, 1, 1, 1) Special topics in mathematics. Prereq: Instructor consent.
461 Topology (3) Introduction to the theory of functions of a complex variable, including numerous topics in complex analysis and Riemann integration of functions of one or more variables. Prereq: 241 or 247.

460 Geometry (3) Axiomatic and historical development of spaces and linear transformations. Prereq: 251 (or 257) or consent of instructor.

455-456 Abstract Algebra I, 11 (3,3) Introduction to the theory of groups, rings, and fields. Prereq: 251 (or 257) and consent of instructor.

453 Matrix Algebra II (3) Advanced topics in matrix theory and applications, including numerical methods for matrix computations. Prereq: 371 or consent of instructor.

445-446 Advanced Calculus I, 11 Introduction to the theory of sequences, series, differentiation, and integration of functions of one or more variables. Prereq: 241 or 247 and consent of instructor.

440 Virology (3) Pathogenesis and molecular biology of viruses, including virological techniques, mechanisms of viral spread, and the significance and correlation of laboratory data. Prereq: 441 Immunohematology (3) Theory and practice of blood bank operations, clinical and laboratory practice used in evaluating blood typing, crossmatching, and blood inventory, and personnel utilization for transfusion. Basic control methods used to control blood bank activities.

431 Hematology and Clinical Microscopy (4,4) Theoretical and practical procedures in hematological and immunological diagnosis of human diseases. Emphasis on microscopic identification of cells and the interpretation of broad range of clinical serological and immunological procedures with emphasis on crossmatching and allogeneic bone marrow transplantation. Corequisite: senior honors course.


MEDIEVAL STUDIES (674)

210 Medieval Civilization I (3) Introduction to the medieval experience, approached as a historical period characterized by religious and political themes, and art and architecture, language and literature, and social and political history. Introduction to the works of Chaucer and modern scholarship.

216 Medieval Culture: Readings from the Early Middle Ages (3) Introduction to medieval civilization and culture in the early medieval period. Focuses on formative types of literature produced during the period 600-1000 A.D., e.g., cultural, religious, and secular epigrams. Includes Augustine’s Confessions, Boethius’ Consolation. Since: Gregory of Tours, St. Boniface, St. Bede, St. Bernadette, St. Francis, St. Thomas Aquinas, St. Thomas More, St. Thomas Becket, St. Francis of Assisi, St. Thomas Aquinas.

220 Medieval Culture: Readings from the Later Middle Ages (3) Introduction to medieval civilization and culture in the later medieval period. Focuses on formative types of literature produced during the period 1000-1500 A.D., e.g., the Song of the Nibelungen, the Romance of the Rose, St. Bernard’s Commentary on the Song of Songs, Peter Abela’s History of the Crusades. Includes Beowulf in sequence with 961. Writing-emphasis course.

312-313 Medieval History (3,3) (Same as History 312-313)

322 Medieval Philosophy (3) (Same as Philosophy 322)

371 Early Christian and Byzantine Art, 1380 (3) (Same as Art 371)

370 Northern European Painting, 1500-1600 (3) (Same as Art 370)

402 Medieval Art of the West, 600-1400 (3) (Same as Art 402)

432 The Art of Italy, 1500-1850 (3) (Same as Art 432)

421 Danes and Medieval Culture (3) (Same as Italian 421)

403 Seminar in Medieval Studies (2) Interdisciplinary treatment of selected topics. Consent varies. May be repeated. Writing-emphasis course.

405 Medieval Literature (3) (Same as English 405)

410 Chaucer (2) (Same as English 410)

419 Medieval French Literature (3) (Same as French 419)

424 Medieval Architecture (3) (Same as Architecture 424)

475 Ancient and Medieval Political Thought (3) (Same as Political Science 475)

491 Foreign Study (1-15)

492 Off-Campus Study (1-15)

493 Independent Study (1-15)

MICROBIOLOGY (684)

210 General Microbiology (3) General properties of bacteria and viruses including physiology, metabolism, genetics, applied bacteriology, pathogenesis, and immunity. May not be repeated. Consists of half the major in microbiology. 2 hours and 2 labs.

310 Introduction to Microbiology (3) Introduction to bacteria and viruses including physiology, metabolism, and genetics of bacteria and introduction and expression of viruses; bacterial and viral pathogenicity; mechanisms of resistance to viruses. Prereq: Biology 140-142, Biology 240, 242. F, S.

319 Introductory Microbiology Laboratory (2) Basic techniques for the enumeration, cultivation, and identification of microorganisms. Coreq: 310, F.


329 Advanced Microbiology Laboratory (2) Laboratory exercises designed to accompany 320. Prereq: 310, Coreq: 320, Sp.

391 Laboratory Problems in Microbiology (2-4) Research projects under the direction of a faculty member. May not be used for credit toward requirements for a major. Prereq: 310. F, S, Su.

400 Laboratory Problems in Microbiology (2-4) Research projects under the direction of a faculty member. Prereq: 310. F, S, Su.

401 Seminar in Microbiology (2) Independent study with faculty supervision. May be repeated. Coreq: Biology 240. F, S, Su.

402 Microbiology Senior Honors Thesis (4) Supervised research experience in laboratory of faculty member with faculty committee guidance. Prereq: junior or senior standing, 3.5 GPA in microbiology courses, and consent of department head. F.

403 Seminar in Microbiology (2) Independent study with faculty supervision. May be repeated. Coreq: Biology 240. F, S, Su.

429 Medical Microbiology Laboratory (2) Disease-producing microorganisms. Diagnosis, clinical and laboratory techniques. Prereq: 400, 402. F, S.


431 Immunology (2) Principles of inflammation and immunity, immunological structure and theories of defense and immunity, complement, hypersensitivities, cell cooperation and recognition in immune function, cell mediated reactions, solid state facets. Prereq: Biology 240, F, S.

440 Virology (2) Biochemical and molecular approaches to the study of viruses. Prereq: 310, F, S.

450 Clinical Serology and Immunology (2) Introduction to basic principles of management, supervision, and execution of tests and methods. Comprehensive examination covers entire course.
320 Advance Military Studies II (4) Preparation of the future officer leadership of Army to excel at MS 400 years of JROTC (or) 110, 120, 210, 220 completion (or) 200 completion (or) basic training completion. Letter grade only. 3 hours and 1 hour lab. Sp

320 Military Ethics and Law (4) Military profession, ethical reasoning, staff operations, military theater and law. Military justice system, individual leadership and responsibility, decision making based on ethical understanding and effective teaching of the Instruments. Practical use of current instructional materials. May be repeated. Maximum 4 hours. Letter grade only. F

240 Class Brass Methods (2) Structure, use, techniques of playing, care and repair of principal instruments, emphasis on techniques necessary for basic understanding and effective teaching of the Instruments. Practical use of current instructional materials. Letter grade only. Sp

240 Class String Methods (2) Structure, use, techniques of playing, care and repair of principal instruments, emphasis on techniques necessary for basic understanding and effective teaching of the Instruments. Practical use of current instructional materials. Letter grade only. Sp

240 Class Percussion Methods (2) Structure, use, techniques of playing, care and repair of principal instruments, emphasis on techniques necessary for basic understanding and effective teaching of the Instruments. Practical use of current instructional materials. Letter grade only. Sp

220 Music for Elementary Teachers (3) Vocal, rhythmic activities, instrumental activities, listening, music reading, and creative activities appropriate for the elementary grades by teachers. Emphasis on preparing students for the elementary music classroom. Letter grade only. F

191 Courses of Instruction
WORLD MUSIC (398)
100 Fundamentals of Music (3) Theory and practice of basic elements of music. Writing-externship course. F, S
110 Music Appreciation (2) Developing listening skills and understanding of Western music from the ancient world through the 20th century. Not for music majors. Writing-externship course. E
120 History of Rock (3) Study and appreciation of rock music. Its origins in blues and rock and roll, its development and changes in style and form. Offered with enrollment at an externship course. One hour of equivalent study (Music Performance 101-103) and enrollment in an externship course equalled to Music Essentials 201-203. May be repeated once only. Requires payment of Applied Music fee. F, S
130 World Music (3) Basic attitudes and techniques of ethnomusicology. Survey of music cultures throughout the world, with emphasis on the Pacific, Near East, Asia, and Europe.
140 World History Survey (3) History of music with emphasis on genres, styles, and cultural forces. Western European evolution from 400 to 1700. Recommended as a review course for graduate students. Prerequisite: Consent of instructor.
150 Music History Genre (3) Topics vary. May be repeated for credit. Minimum 6 hours.
160 History of Opera (2) Dramatic, vocal and orchestral elements in operas of Italian, French, and German composers. 1600-present.
230 Symphonic Literature (3) Survey of literature for percussion from Baroque to present, with emphasis on the evolution of the orchestra.
240 Music of North America (3) Folk and art music of the United States and Canada from colonial times to the present. Writing-externship course.
250 Harmony (3) Study of harmony and the role of voices in Western music. Prerequisite: Applied Music fee. F, S
250 Solo Class (F)
301 Junior Recital (0)
301 Senior Recital (0)
411 Lecture Recital (0)
419 Special Topic in Performance (1-4) Prerequisite: Consent of department head. May be repeated. Maximum 4 hours.
425 Special Topic in Pedagogy (1-5) Prerequisite: Consent of department head. May be repeated. Maximum 4 credits.
MUSIC HISTORY (709)
200 Introduction to Music Literature (3) Basic form of musical works from prehistoric to Baroque in chronological approach. For music majors and minors only. Sp
201-202 Music Literature I,II (3,3) Survey of music literature from 1200 to present. Prerequisite: 200. Must be taken in sequence.
301 Introduction to African-American Music (3) History of African-American music, blues, gospel music, and jazz with emphasis on Black social and political events and environment. (Same as African-American Studies 310.)
302 Women in Music (3) History of women in music from the Middle Ages to the present as performers, composers, educators, and patrons. (Same as Women's Studies 302.)
320-321 Contemporary Trends in American Music I, II (2,2) Survey of jazz and popular music with emphasis on the development of the Big Band, rock and roll, and other contemporary trends. Prerequisite: Consent of instructor.
350 History of Jazz (3) Origin, development, and styles of jazz and popular music in the United States. Offered with enrollment in written term paper. (Same as African-American Studies 350.)
420-421 Current Trends in American Music I, II (3,3) Survey of the music of West African and Western European-influenced music. Emphasis on musical structures; transcriptions will be done from live, radio, jazz and Western European repertoires. Prerequisite: 200-220.
MUSIC PERFORMANCE (713)

Admission by audition only. Prerequisites: Musicians 140 or equivalent.
103-203-303-403-503 Flute (1-4) may be repeated.
105-205-305-405-505 Oboe (1-4) may be repeated.
110-210-310-410-510 Bassoon (1-4) may be repeated.
120-220-320-420-520 Baritonehorn (1-4) may be repeated.
125-225-325-425-525 Horn (1-4) may be repeated.
130-230-330-430-530 Trumpet (1-4) may be repeated.
135-235-335-435-535 Trombone (1-4) may be repeated.
140-240-340-440-540 Baritone (1-4) may be repeated.
145-245-345-445-545 Tuba (1-4) may be repeated.
200-300-400-500-600 Percussion (1-4) may be repeated.
205-305-405-505-605 Timpani (1-4) may be repeated.
160-260-360-460-560 Violin (1-4) may be repeated.
165-265-365-465-565 Viola (1-4) may be repeated.
170-270-370-470-570 Cello (1-4) may be repeated.
175-275-375-475-575 Bass (1-4) may be repeated.
176-276-376-476-576 Electric Bass (1-4) may be repeated.
177-277-377-477-577 Guitar (1-4) may be repeated.
180-280-380-480-580 Piano (1-4) may be repeated.
185-285-385-485-585 Harpsichord (1-4) may be repeated.
190-290-390-490-590 Organ (1-4) may be repeated.
204-304-404-504-604 Composition I-IV (1-4) may be repeated. Prereq: Consent of instructor.
205-305-405-505-605 Composition with Electronic Media (1-3) may be repeated. Prereq: Consent of instructor.
210-310-410 Computer Applications in Music (3) may be repeated. Prereq: Consent of instructor.
215-315-415-515 Computer Applications in Music (3-3) may be repeated. Prereq: Consent of instructor.
220-320-420-520-620 Music Technology for Musicians (3) may be repeated. Prereq: Consent of instructor.
225-325-425-525-625 Computer Applications in Music (3) may be repeated. Prereq: Consent of instructor.
230-330-430 Audio Recording Techniques I-IV (1-4) may be repeated. Prereq: Consent of instructor.
235-335-435 Sound Recording Techniques I-IV (1-4) may be repeated. Prereq: Consent of instructor.
240-340-440-540-640 Recording Techniques I-IV (1-4) may be repeated. Prereq: Consent of instructor.
245-345-445-545 Sequencing and Recording Techniques (1-4) may be repeated. Prereq: Consent of instructor.
250-350-450-550 Industry Internship (1-3) may be repeated. Prereq: Consent of instructor.
255-355-455-555 Industry Internship (1-3) may be repeated. Prereq: Consent of instructor.
310 Form and Analysis (3) Study and practice in analysis of forms of music from analytical structural units to large composite forms. Prereq: 220.
320 Instrumentation (3) Basic techniques in recording for violin, viola, cello and double bass. Prereq: 120.
330 Introduction to Computer Music Technology (3) Exercises in notation, playback and publishing inter- active multimedia, computer music and interface design. Prereq: Consent of instructor.
340 Media Measurements (3) Study and real- time applications of acoustics. Historical background. familiar concepts, equipment interface and usage, analysis of sounds and compositions. Prereq: 280 or consent of instructor.
350 Sound Synthesis and Processing (3) Studio and real- time applications of acoustics. Historical background. familiar concepts, equipment interface and usage, analysis of sounds and compositions. Prereq: 280 or consent of instructor.
460 Recording Technology (3) Review and application of harmonic and metric data skills for graduate and advanced undergraduate students. Prereq: 240 or equivalent. Required of entering graduate students with a deficiency in ear training. Satisfactory/credit grading only.
465 Conversation (3) Advanced techniques in instru- mental writing with emphasis on scoring for the concert orchestra. Topics to be by theory and composition majors.
466-476-486-496 Counterpoint I-IV (3,3,3,3) Study of counterpoint. Prereq: 280. May be repeated for credit. Maximum 2 hours.
480 Survey of Music Technology I (3) May not be used to satisfy any music major requirement. Consent of instructor.
481 Survey of Music Technology II (3) May not be used to satisfy any music major requirement. Consent of instructor.
NURSING (720)

All upper division nursing courses, except 301 and 314, are restricted to students who have progressed into the major. See PROGRESSION POLICIES AND PROCEDURES in the chapter (N).

302 Health and Culture (3) An exploration of the beliefs and practices of various cultural groups within the United States. Emphasis on health, illness, and the health care delivery system. Prerequisites for the helping professions are examined. The course has no prerequisites and is open to all UW-KHSU undergraduate students.

303 Clinical Pharmacology (3) Biochemical and pharmacological effects of drugs and the impact of the body's own processes on their actions. Prerequisites: Chemistry 100 and 10-hour seminar on pharmacy.


305 Nursing Assessment and Wellness Promotion (4) Developmental, psychosocial, cultural environments, spiritual, family and physical dimensions of health status. Assessment, collection, analysis, and application of assessment data in formulation of wellness-oriented nursing plans. Emphasis on wellness as prevention of disease. Coreq: Preview or Preview 301. 305.

306 Transition to Professional Nursing (2) Current status of professional nursing. Utilization of the nursing process. Anatomy and physiology of the community, philosophy and conceptual framework of the sociocultural, psychological, medical, legal and ethical principles of care of clients with chronic and acute illness. Prerequisites: 3 credits in humanities and 2 credits in writing skills.

310 Introduction to Nursing Research (3) Language, research, and research methods in the field of nursing. Emphasis on the development and selected psychological and behavioral studies that have been done. 2 lectures. Prereq: Preview 306. 26.

313 Introduction to Nursing Research (7) Language, research, and research methods in the field of nursing. Emphasis on the development and selected psychological and behavioral studies that have been done. 2 lectures. Prereq: Preview 306. 26.

314 Nursing Concepts II (3) Exploration of political, social, economic, and cultural factors that influence the health care delivery system. Prerequisites: Health and Culture and Preview or Preview 303. 314.

315 Community Health Nursing (6) Description of the interaction of family, nurse, and community in the health care delivery system. Coreq: 315 or 315. F.

316 Health Promotion Seminar (2) Critical examination of selected health promotion topics not covered in other nursing courses. Topics determined by faculty and student interest. Prereq: All required 300 level courses. Coreq: Preview or Preview 306. 316.

317 Community Health Nursing: Concepts (3) Exploration of health promotion topics not covered in other nursing courses. Topics determined by faculty and student interest. Prereq: All required 300 level courses. Coreq: Preview or Preview 306. 317.

318 Community Health Nursing: Concepts (3) Exploration of health promotion topics not covered in other nursing courses. Topics determined by faculty and student interest. Prereq: All required 300 level courses. Coreq: Preview or Preview 306. 318.

319 Community Health Nursing: Concepts (3) Exploration of health promotion topics not covered in other nursing courses. Topics determined by faculty and student interest. Prereq: All required 300 level courses. Coreq: Preview or Preview 306. 319.

320 Community Health Nursing: Concepts (3) Exploration of health promotion topics not covered in other nursing courses. Topics determined by faculty and student interest. Prereq: All required 300 level courses. Coreq: Preview or Preview 306. 320.

321 Community Health Nursing: Concepts (3) Exploration of health promotion topics not covered in other nursing courses. Topics determined by faculty and student interest. Prereq: All required 300 level courses. Coreq: Preview or Preview 306. 321.

322 Community Health Nursing: Concepts (3) Exploration of health promotion topics not covered in other nursing courses. Topics determined by faculty and student interest. Prereq: All required 300 level courses. Coreq: Preview or Preview 306. 322.

323 Community Health Nursing: Concepts (3) Exploration of health promotion topics not covered in other nursing courses. Topics determined by faculty and student interest. Prereq: All required 300 level courses. Coreq: Preview or Preview 306. 323.

324 Community Health Nursing: Concepts (3) Exploration of health promotion topics not covered in other nursing courses. Topics determined by faculty and student interest. Prereq: All required 300 level courses. Coreq: Preview or Preview 306. 324.

325 Community Health Nursing: Concepts (3) Exploration of health promotion topics not covered in other nursing courses. Topics determined by faculty and student interest. Prereq: All required 300 level courses. Coreq: Preview or Preview 306. 325.

326 Community Health Nursing: Concepts (3) Exploration of health promotion topics not covered in other nursing courses. Topics determined by faculty and student interest. Prereq: All required 300 level courses. Coreq: Preview or Preview 306. 326.

327 Community Health Nursing: Concepts (3) Exploration of health promotion topics not covered in other nursing courses. Topics determined by faculty and student interest. Prereq: All required 300 level courses. Coreq: Preview or Preview 306. 327.

328 Community Health Nursing: Concepts (3) Exploration of health promotion topics not covered in other nursing courses. Topics determined by faculty and student interest. Prereq: All required 300 level courses. Coreq: Preview or Preview 306. 328.

329 Community Health Nursing: Concepts (3) Exploration of health promotion topics not covered in other nursing courses. Topics determined by faculty and student interest. Prereq: All required 300 level courses. Coreq: Preview or Preview 306. 329.

330 Community Health Nursing: Concepts (3) Exploration of health promotion topics not covered in other nursing courses. Topics determined by faculty and student interest. Prereq: All required 300 level courses. Coreq: Preview or Preview 306. 330.

331 Community Health Nursing: Concepts (3) Exploration of health promotion topics not covered in other nursing courses. Topics determined by faculty and student interest. Prereq: All required 300 level courses. Coreq: Preview or Preview 306. 331.

332 Community Health Nursing: Concepts (3) Exploration of health promotion topics not covered in other nursing courses. Topics determined by faculty and student interest. Prereq: All required 300 level courses. Coreq: Preview or Preview 306. 332.

333 Community Health Nursing: Concepts (3) Exploration of health promotion topics not covered in other nursing courses. Topics determined by faculty and student interest. Prereq: All required 300 level courses. Coreq: Preview or Preview 306. 333.

334 Community Health Nursing: Concepts (3) Exploration of health promotion topics not covered in other nursing courses. Topics determined by faculty and student interest. Prereq: All required 300 level courses. Coreq: Preview or Preview 306. 334.

335 Community Health Nursing: Concepts (3) Exploration of health promotion topics not covered in other nursing courses. Topics determined by faculty and student interest. Prereq: All required 300 level courses. Coreq: Preview or Preview 306. 335.

336 Community Health Nursing: Concepts (3) Exploration of health promotion topics not covered in other nursing courses. Topics determined by faculty and student interest. Prereq: All required 300 level courses. Coreq: Preview or Preview 306. 336.
290 Field Experience: Nutrition (1-3) Prereq: Junior or Senior standing, consent of instructor. Satisfactory/Unsatisfactory Credit only.

391 Spring Herbaceous Ornamental Plants (3) Prereq: 110 or consent of instructor. Spring herbaceous ornamental plants including annuals, perennials, herbs, bulbs and wildflowers. Basic gardening practices and design elements using such herbaceous ornamental plants. Prerequisite: 110 or consent of instructor. 3 credits.

410 Nursery Management and Production (3) Management methods as applied to nursery and landscape contracting firms. Methods of predicting needs, control and two-power injury ornamental plants. Prerequisite: 280, 300, and Plant and Soil Science 210. 3 credits.

420 Advanced Floriculture Science and Technology (3) Physiology and plant production of horticultural crops. Cultural practices such as propagation, planting, spacing, fertilization, and disease resistance. Prerequisite: 280 or consent of instructor. 3 credits.

390 Fundamentals of Landscape Design (3) History of landscape design as it relates to contemporary specifications. Awareness and aesthetic to the landscape; basic graphic skills and design theory with an emphasis on the use of landscape landscaping training. Introduction to landscape design. Prerequisite: 110, 220 or consent of instructor. 3 hours. 3 credits.

410 Greenhouse Operation and Management (3) Principles of greenhouse operation and management including greenhouse construction, control of environmental factors, regulation of plant growth, production training, and business management. 2 hours and 1 lab. 3 credits.

399 Plant Health (2) Identification, classification, and design-use of ornamental plants including annuals, perennials, herbs, bulbs, and wildflowers. Basic gardening practices and design elements using such herbaceous ornamental plants. Prerequisite: 110 or consent of instructor. 2 credits.

393 Marxism (3) Basic philosophical issues in Marxist critical theory. Emphasis on the role of the individual and the role of social institutions. Prerequisite: 392. 3 credits.

398 Ornamental Horticulture and Landscape Design (740) Continued exposure to the history of the industry, the use of ornamental horticulture, and environmental factors as they relate to landscape design and production. Prerequisites: 280, 300, and Plant and Soil Science 210. 4 credits.

399 Directed Study: Nutrition (1-3) Individual student-faculty arrangement. Prerequisite: Junior or Senior standing. Satisfactory/Unsatisfactory Credit only. 1-3 credits.

380 Critical Thinking (3) An introduction to practical reasoning and the processes of critical thinking. Prerequisite: 351. 3 credits.

379 Religion and Philosophy in China (3) Prerequisites: Religion Studies 376 or consent of instructor. 3 credits.

376 Buddhist Philosophy and Religion (3) (Same as Religion Studies 376.) The development and fundamental concepts of Buddhism as it developed in India and other countries. Prerequisite: Religion Studies 370. 3 credits.

374 Philosophy and Religion of India (3) (Same as Religion Studies 374.) A study of Hinduism, Jainism, and Sikhism. Prerequisite: Religion Studies 370. 3 credits.

373 Philosophy and the Human Condition (3) (Same as Religion Studies 373.) A study of the nature and impact of the philosophy of religion. Prerequisite: Religion Studies 370. 3 credits.

360 Practicum in Landscape Design (3) Practical experience in implementation of landscape development projects. Design lab and field instruction in direct or indirect applications of landscape design and implementation. Prerequisite: 110 or consent of instructor. 3 credits.

370 Grounds Maintenance (3) Identification, classification, and design-use of ornamental plants including annuals, perennials, herbs, bulbs, and wildflowers. Basic gardening practices and design elements using such herbaceous ornamental plants. Prerequisite: 110 or consent of instructor. 3 credits.

391 Spring Herbaceous Ornamental Plants (3) Identification, classification, and design-use of ornamental plants including annuals, perennials, herbs, bulbs and wildflowers. Basic gardening practices and design elements using such herbaceous ornamental plants. Prerequisite: 110 or consent of instructor. 3 credits.
400 Special Topics (3) When content varies, may be repeated. Maximum 6 hours.

411 Modern Religious Philosophy (3) Same as Religious Studies 411.


420 Topics in History of Philosophy (3) One or more staple elements of philosophy from antiquity through mid-twentieth century. Prereq.: 6 hours of philosophy or consent of instructor. When content varies, may be repeated. Maximum 6 hours.

423 Intermediate Formal Logic (3) Metatheory of formal logic and philosophy of logic. Prereq.: 120 or consent of instructor.

440 Contemporary Ethical Theory (3) Topics in metaethics, non-theism, consent of instructor. Prereq.: 3000 or consent of instructor.

446 Theoretical Issues in Medical Ethics (3) Prereq: 300 or 345 or consent of instructor. (Same as Religious Studies 446.)

470 Philosophy of Mind (3) Problem of mind/body relation to consciousness and personal identity. Prereq.: 6 hours of philosophy or consent of instructor. When content varies, may be repeated. Maximum 6 hours.

481 Foreign Study (1-15)

482 Off-Campus Study (1-15)

483 Independent Study (1-15)

PHYSICAL EDUCATION ACTIVITY PROGRAM (764)

The following courses may not be repeated:

203 Badminton (1) When content varies, may be repeated. Maximum 6 hours.

204 Basketball (1)

205 Bowling (1)

206 Box (1)

207 Cross Country (1)

208 Fall and Square Dance (2)

211 Golf (1)

212 Handball (1)

213 Naval Art (Special Topics) (1)

222 Pattideball (1)

223 Personal Safety and Self-Defense (1)

224 Physical Fitness: Conditioning (1)

225 Physical Fitness: Exercise to Music (1)

226 Exercise and Weight Control (1)

229 Physical Fitness: Jogging (1)

230 Physical Fitness: Swimming (1)

231 Physical Fitness: Walking (1)

232 Racquetball I (1)

233 Racquetball II (1)

234 Soccer (1)

235 Social Dance (2)

236 Softball (1)

237 Beginning Swimming (1)

240 Intermediate Swimming (1)

241 Emergency Water Safety (1)

244 Tennis I (1)

246 Tennis II (1)

247 Track and Field (1)

249 Tumbling I (1)

250 Tumbling II (1)

251 Volleyball (1)

252 Weight Training (1)

254 Yoga and Relaxation (1)

255 Water Safety Instructor (1)

256 Lifeguarding (1)

258 Snow Skiing (1)

260 Western Dance (1)

266 Fitness for Life (2) Same as HPSS 266

PHYSICS (773)

121-122 Introductory Physics (3,3) Fortunates who wish to understand the physical universe must develop a model of physics developed by observation of phenomena and logic, using a minimum of mathematical analysis. 121: Description of motion, forces, energy and momentum, properties of matter. 122-Electricity, magnetism, light. Topics from modern physics including properties of all objects and nuclei. Must be taken in sequence. 3 hours lecture including demonstration lab. Prereq.: Algebra.


135 Fundamentals of Physics: Mechanics and Heat (4) For engineering physics majors and Arts and Science majors interested in the physical sciences. Coreq.: Mathematics, 141: 4 hours lecture, 3 hours lab.

221 Theoretical Physics (3) Theoretical aspects of mechanics, electricity and magnetism, modern physics. Must be taken in sequence. 3 hours lecture including demonstration lab.

222 Fundamentals of Physics: Wave Motion, Optics, and Modern Physics (3) Elementary physics of waves and modern physics. 3 hours lecture, 3 hours lab. Consent of Math.

231 Fundamentals of Physics: Electricity and Magnetism (3) Concepts, methods and aspects of electricity and magnetism. 3 hours lecture and demonstration. Prereq.: 222 or 134, or consent of instructor.

232 Fundamentals of Physics: Electricity, Magnetism, Waves, Optics, and Modern Physics (3) Concepts, methods and aspects of electricity, magnetism, waves, and modern physics. 3 hours lecture, 3 hours lab. Con specialized topics.


236-237 Mechanics, Heat, and Electromagnetism (3,3) 3 hours lecture and demonstration. Prereq.: 232 or 134.

238-239 Mechanics, Heat, and Electromagnetism (3,3) 3 hours lecture and demonstration. Prereq.: 232 or 134.

241-242 Modern Physics Laboratory (3,3) 3 hours lecture and demonstration. Consent of Math.

243 Fundamentals of Organic Chemistry (3) General chemistry as it applies to biological sciences. Prereq.: Mathematics, 141 or consent of instructor.

244 Fundamentals of Inorganic Chemistry (3) Physical properties of inorganic substances. Prereq.: 232 or 134.

250 Heat, Quantum Mechanics, and Modern Physics (3) Problem of the relationship of mechanics, thermodynamics, and quantum mechanics. 3 hours lecture, 3 hours lab. Consent of Math.

251 Modern Physics Laboratory (3) Special relativity, quantum mechanics. 3 hours lecture and demonstration. Consent of Math.

252 Quantum Electrodynamics (3) Main ideas of quantum theory as applied to the study of the interactions of light and matter. 3 hours lecture, 3 hours lab. Consent of Math.

253 Quantum Mechanics (3) Concepts and methods of wave mechanics as applied to the description of the behavior of particles, fields, and their interactions. Consideration of the effects of physics on modern society and the practice of physics from a values-oriented perspective. Written reports on important original papers. Prereq.: physics major or consent of instructor.

311-312 Modern Physics (3,3) Introduction to modern physics. Concepts and methods of classical mechanics, special relativity, quantum mechanics, statistical mechanics, and modern, nuclear, and solid-state physics. Must be taken in sequence. 3 hours lecture and demonstration. 3 hours lab. Consent of Math.

341-342 Quantum Electrodynamics (3,3) Experiments, concepts, methods, and historical development of quantum electrodynamics. 3 hours lecture, 3 hours lab. Consent of Math.

343-344 Quantum Mechanics (3,3) Main ideas of quantum theory as applied to problems in atomic, nuclear, or solid-state physics. Must be taken in sequence. 3 hours lecture, 3 hours lab. Consent of Math.

345-346 Theoretical Physics (3,3) Theoretical aspects of mechanics, electricity and magnetism, modern physics. Must be taken in sequence. 3 hours lecture, 3 hours lab. Consent of Math.

350-351 Electromagnetism (3,3) Electric and magnetic fields, Maxwell's equations, electromagnetic waves, waves and matter, waves and energy, optics, acoustics, solid state physics, and applications. Consent of Math.

352-353 Physics Laboratory (3,3) Experiments in the various areas of physics. 3 hours lecture and demonstration. Consent of Math.

354-355 Planck's Constant (3,3) Elementary quantum mechanics. 3 hours lecture and demonstration. Consent of Math.

356-357 Modern Physics Laboratory (3,3) Experiments in modern physics. 3 hours lecture and demonstration. Consent of Math.

358-359 Quantum Mechanics (3,3) Main ideas of quantum theory as applied to the study of the interactions of light and matter. 3 hours lecture, 3 hours lab. Consent of Math.

360-361 Electromagnetism (3,3) Electric and magnetic fields, Maxwell's equations, electromagnetic waves, waves and matter, waves and energy, optics, acoustics, solid state physics, and applications. Consent of Math.

362-363 Modern Physics Laboratory (3,3) Experiments in modern physics. 3 hours lecture and demonstration. Consent of Math.


380-381 Modern Physics Laboratory (3,3) Experiments in modern physics. 3 hours lecture and demonstration. Consent of Math.

391-392 Quantum Mechanics (3,3) Main ideas of quantum theory as applied to the study of the interactions of light and matter. 3 hours lecture, 3 hours lab. Consent of Math.

393-394 Modern Physics Laboratory (3,3) Experiments in modern physics. 3 hours lecture and demonstration. Consent of Math.

395-396 Quantum Mechanics (3,3) Main ideas of quantum theory as applied to the study of the interactions of light and matter. 3 hours lecture, 3 hours lab. Consent of Math.

397-398 Modern Physics Laboratory (3,3) Experiments in modern physics. 3 hours lecture and demonstration. Consent of Math.
392 Practicum (2-4) Working with agricultural, environmental, and biological sciences. Specific recommendations for various crop and environmental management factors will be given. Field trips. Prerequisites: 210 or 230. 2 hours and 1 lab. Sp.

211 Introduction to Soil Science Laboratory (3) Experience in field survey in SW Iowa. Prerequisite: 210. 3 hours. F.

230 Introduction to Crop Science (3) Fundamentals of ecosystem, cultivation, and agricultural mechanization of vegetable, field, and specialty crops. Prerequisites: Mathematics 121, one year of high school biology, and consent of instructor. Maximum 4 hours. 1 hour and 1 lab. Sp.

311 Soil Fertility (3) Influences of soil properties on plant nutrition, mineral availability, and water supplies. Important agronomic, field, and vegetable crops, effects of crop rotation, and soil usage management. Prerequisites: 210 and 1 hour and 1 lab. Prerequisite: Consent of instructor. F.

371 Soil Chemistry (3) Structure and chemical properties of soil materials with emphasis on the colloidal aspects of soil constitution. Prerequisites: 210, 1 hour and 1 lab. Sp.

372 Soil and Water Conservation (3) Hydrologic, agronomic, and engineering principles applied to soil and water conservation problems including flood and non-flood damage, and water yields. Prerequisites: 210, 1 hour and 1 lab. Sp.

315 Soil and Water Conservation (3) Hydrologic, agronomic, and engineering principles applied to soil and water conservation problems including flood and non-flood damage, and water yields. Prerequisites: 210, 1 hour and 1 lab. Sp.

343 Vegetable Crops (3) Characteristics, economic importance, adaptability and production of vegetables for fresh and processed markets with emphasis on environmental and soil care aspects. Prerequisites: 210 or 1 hour and 1 lab. Sp.

322 Weed Management (3) Principles of weed interations, interpretations, herbicide guidelines and weed control. Specific recommendations for various crop and non-crop environments will be given. Prerequisites: 210 or 1 hour and 1 lab. Sp.

360 Practicum (2-4) (Using with agricultural, environmental, and biological sciences. Specific recommendations for various crop and environmental management factors will be given. Field trips. Prerequisites: Consent of advisor and faculty committee. E.

401 Seminar (1) Current topics in the plant and soil sciences. Techniques of effective oral and written presentation, professional writing, review of literature, assignments for written and oral presentations. Consent of instructor.

411 Soil Microbiology (3) Soil microbial population and the nature of the soil ecosystems, microbial biodiversity of micro- and macrofauna, and the role of fungi and bacteria in soil organic matter. Prerequisites: 210 and Chemistry 110 or consent of instructor. 2 hours and 1 lab. F.

412 Soil Genesis and Classification (3) Soil genesis and the constitution of soil profile classes and environmental inter-relationships; soil profile weathering, horizons, profile description, and classificiation. Prerequisites: 210 or consent of instructor. 3 hours and 1 lab. F.

413 Soil Chemistry (3) Structure and chemical properties of soil materials with emphasis on the colloidal fraction. Soil properties related to chemical, physical, and biological activity; acidification, oxidation-reduction, weathering, nutrient availability and soil fertility. Prerequisite: 211 or consent of instructor. F.

414 Soil Biology (5) Physical relationships among soil, biomass, and soil organisms, and the role of the biota in soil formation. Soil microorganisms, the influence of micro- and macrofauna on soil structure, processes in soil development and management. Prerequisites: 210 or consent of instructor. 2 hours and 1 lab. F.

416 Crop Physiology and Ecology (3) Plant physiology and ecology applied to crop production. Effects of environmental factors on physiological processes. Prerequisite: 230. 2 hours and 1 lab. A.

417 Fruit Propagation, Tree Training, Pest Control and Related topics (3) Fruit propagation, tree training, pest control and related topics. Prerequisites: 210. 2 hours and 1 lab. Sp.

418 Animal Propagation and Related Topics (3) Animal propagation and related topics. Prerequisites: 210. 2 hours and 1 lab. Sp.

419 Nutrient Management (3) Nutrient availability to plants. Management of inorganic and organic nutrients in soil. Prerequisites: 210. 2 hours and 1 lab. Sp.
421 Political Parties and Interest Groups (3) Analytical study of the political parties and interest groups in the United States, with emphasis on the President, Congress, and the role of interest groups. (Same as Latin American Studies 455.) Writing emphasis course. }

454 Government and Politics of China and Japan (3) Political setting, structure and political processes in China and Japan. Writing emphasis course.

455 Latin American Government and Politics (3) Selected topics on Latin American political dynamics, including consideration of leading theoretical explanations. (Same as Latin American Studies 455.) Writing emphasis course.

456 Policy Making in Democracies (3) Comparative approach to theory and process of making public policies.}

460 Self-Management in the Helping Professions (3) Application of self-management strategies to career, social, emotional, and health problems for both helping professionals and their clients. Directed and associational development of personal development. (Same as Religious Studies 493.) Writing emphasis course. }

461 Policy Making in Democracies (3) Comparative approach to theory and process of making public policies. (Same as Latin American Studies 455.) Writing emphasis course.

463 Contemporary Middle East Politics (3) An introductory course to Middle East, its history, culture and natural features. (Same as Religious Studies 493.) Writing emphasis course.

464 Administrative Law (3) Legal dimension of administrative law, their policy and administrative implications.

465 Government and Politics of the Soviet Union (3) TDs: History of the Post-Marxist State in the Western Hemisphere and Eastern Europe. (Same as Russian and Eastern European Studies 499.) Writing emphasis course.

467 Writing in Politics (3) Composition course designed for students majoring in political science. May be repeated. Maximum 12 hours. Prereq: At least one course at the 200 level or the equivalent. (Same as Latin American Studies 455.) Writing emphasis course.}

470 International Law (3) Nature and development of international law and customs, and the influence of international law in American politics. Writing emphasis course.

472 Western Political Thought (3) Major Western political themes from Socrates to Machiavelli. (Same as Modern Language Studies 474.) Writing emphasis course.

481 Foreign Study (1-15) Foreign Study in a country of the world. Required of honors majors; admission with consent of instructor. May be repeated. Maximum 15 hours. (Same as Latin American Studies 481.)

487-488 Senior Honors Thesis and Seminar (3,3) Independent Study (1-15) Independent Study (1-15)

491 Independent Study (1-15) Independent Study (1-15)

492 and 493 combined may be applied toward the major. (Same as Religious Studies 493.) Writing emphasis course.}

493 Independent Study (1-15) Independent Study (1-15)

500 Developmental Psychology (3) Understanding and application of psychological principles to education, human behavior and the social sciences. (Same as Religious Studies 493.) Writing emphasis course.}

503 Reading, Writing, Listening, and Speaking of Portuguese to promote appropriate comparison of the language Mattie taken in sequence. Language Laboratory required. (Same as Religious Studies 493.) Writing emphasis course.}

530-531 Literature, Culture & Civilization of the Portuguese-Speaking World (3,3) A course for students who have completed the intermediate sequence of Portuguese and wish to enhance their knowledge of language and culture through the medium of literature. Taught in Portuguese. Prereq: 210, 310 or equivalent.

531 Advanced Aspects of Luso-Brazilian Literature (3) Luso-Estelutcration literature through literary history and theory. Prereq: At least one course at the 300 level or the equivalent. (Same as Latin American Studies 431-432.)

531 Advanced Aspects of Luso-Brazilian Literature (3) Luso-Estelutcration literature through literary history and theory. Prereq: At least one course at the 300 level or the equivalent. (Same as Latin American Studies 431-432.)

540 Portuguese for Speakers of Another Romance Language (3) Intensive reading and expanding vocabulary in Portuguese with a strong background in another Romance language. Introduction to grammar, reading and culture. (Same as Portuguese 336.)

540 Portuguese for Speakers of Another Romance Language (3) Intensive reading and expanding vocabulary in Portuguese with a strong background in another Romance language. Introduction to grammar, reading and culture. (Same as Portuguese 336.)

541 Sensory Processes and Perception (3) Physiology of the senses, with an emphasis on understanding environmental and personal factors. Directed and associational development of personal development. (Same as Religious Studies 493.) Writing emphasis course.}

542 History and Systems of Psychology (3) History of psychology and psychological methodology. (Same as Religious Studies 493.) Writing emphasis course.}

543 Personality and Mental Health (3) (Same as Religious Studies 493.) Writing emphasis course.}

544 Biological Behavior and Experience: Humanistic Psychody (3) Formulation and phenomenological analysis of individual and social development in individual and social environments. Prereq: 110 or equivalent, in consent of instructor, E

546 Political Psychology (3) The normal social control function of government and governance through political science and social science. Prereq: 110 or equivalent in political science, and 210 or 220, or consent of instructor, E

548 Learning and Thinking (3) Study of theory and research in the field of political science and social science. Prereq: 110 or equivalent and 210 or 220, or consent of instructor, E

550 Motivation (3) Study of theories and research in the field of political science and social science. Prereq: 110 or equivalent and 210 or 220, or consent of instructor, E

552 Political Psychology (3) Individual and environmental factors in deviance and motivational behavior; neuropsychological and physiological processes. Contemporary methods of treatment. Prereq: 110 or equivalent and 210 or 220, or consent of instructor, E

553 Social Psychology (3) Theories, methods, and applications of individual and group behavior. (Same as Religious Studies 493.) Writing emphasis course.}

554 Ethology and Sociobiology (3) Development of behavioral research and social science as a field of study. (Same as Religious Studies 493.) Writing emphasis course.}

555 Psychology and the Law (3) Psychological aspects of legal and social issues. (Same as Religious Studies 493.) Writing emphasis course.}

556 Social Psychology (3) Theories, methods, and applications of individual and group behavior. (Same as Religious Studies 493.) Writing emphasis course.}

557 Psychology and Social Psychology (3) Theories, methods, and applications of individual and group behavior. (Same as Religious Studies 493.) Writing emphasis course.}

558 Social Psychology (3) Theories, methods, and applications of individual and group behavior. (Same as Religious Studies 493.) Writing emphasis course.}

559 Social Psychology (3) Theories, methods, and applications of individual and group behavior. (Same as Religious Studies 493.) Writing emphasis course.}

560 Self-Management in the Helping Professions (3) Application of self-management strategies to career, social, emotional, and health problems for both helping professionals and their clients. Directed and associational development of personal development. (Same as Religious Studies 493.) Writing emphasis course.}

561 Sensory Processes and Perception (3) Physiology of the senses, with an emphasis on understanding environmental and personal factors. Directed and associational development of personal development. (Same as Religious Studies 493.) Writing emphasis course.}

562 Developmental Psychology (3) Understanding and application of psychological principles to education, human behavior and the social sciences. (Same as Religious Studies 493.) Writing emphasis course.}

563 Reading, Writing, Listening, and Speaking of Portuguese to promote appropriate comparison of the language Mattie taken in sequence. Language Laboratory required. (Same as Religious Studies 493.) Writing emphasis course.}

344 Supervised Research (1-9) Prereq: Consent of Instructor. May be repeated. Maximum of 6 hours may be applied toward the major.

345 Directed Independent Study (1-3) Individual study of selected issues. Prereq: Consent of instructor. May be repeated. Maximum 3 hours.

346 Public Relations Cases (3) Analysis and evaluation of current and classic cases in public relations. Ethics, professional organizations, publications, research and forms of public relations. Prereq: Consent of Instructor. May be repeated. Maximum credit 6 hours. Prereq: Consent of instructor.

347 Public Relations Campaigns (3) Research, planning and communication and evaluation of major public relations. Prereq: 445. May be repeated. Maximum 9 hours.

348 Public Relations Communications (3) Meant to develop the ability to establish and maintain interpersonal relations and the ability to develop crisis management plans. Prereq: Consent of instructor. May be repeated. Maximum 3 hours.

349 Public Relations Programming (3) Knowledge and ability to create a public relations program to be used in an organization. Prereq: 445. May be repeated. Maximum 6 hours.

350 Principles of Therapeutic Recreation (3) Principles and techniques in therapeutic recreation, including specific activities, program selection, individual and program assessment, behavior change, and public relations project from inception to completion. Prereq: 470. Prereq: Consent of Instructor. May be repeated. Maximum credit 6 hours. Prereq: Consent of instructor.

351 Principles of Independent Study (1-3) Individual study of selected issues. Prereq: Consent of instructor. May be repeated. Maximum 3 hours.

352 Recreation and Tourism Management (854) 11 Recreation Foundations of Leadership (4) Introduction of factors in the field of leadership and management including understanding concepts, philosophies, and professional practices in the leisure service, tourism industry, and functions of recreation/leisure service organizations. F, Su

353 Practicum in Recreation and Tourism Management (2-3) Supervised practical experience in agency operations of tourism and management. Each hour of credit requires 40 clock hours of work. Prereq: 350. Prereq: Consent of Instructor. May be repeated. Maximum credit 6 hours.

354 Leisure Program Development and Evaluation (3) Emphasis on the administration, marketing, evaluation of various program development and evaluation of development of program objectives, practical and common management decisions such as development of facilities, personnel and budgeting and facility within student's particular area of interest. Prereq: 110 (Sport Management 250 for Sport Management majors only), junior standing, GPA required for Sport Management majors only.

355 Therapeutic Recreation and Special Populations (3) Principles, concepts, historical development of recreation, therapeutic recreation, and leisure services to special populations. Emphasis on legislation, attitudinal, barriers to participation, marketing, advocacy, as related to leisure fulfillment. Prereq: Consent of Instructor.

356 Therapeutic Recreation and Lifestyle Planning (3) Emphasis on the application of the recreation profession in the development of leisure services for special populations. Use of the application of the leisure lifestyle principles as a basis for the development of recreation services for special populations (e.g., functional groups of individuals with specific lifestyles). Prereq: 470. Supervised practicum with hearing impaired students in pre-school, public school, and/or residental school setting.

357 Monitoring and Evaluation of Leisure Services (3) Evaluation of leisure services in public and private facilities. Prereq: 110 or 310. Prereq: Consent of Instructor. May be repeated. Maximum credit 6 hours. Prereq: Consent of instructor.
415 Language Development for the Hearing Impaired (3)  Developmental and oral skills of hearing language, with emphasis on communication disorders, idiomatic and figurative language.

418 Speech Development of Hearing Impaired (6) Theory of speech, skills development, approaches in therapy and improvement of speech and oral communication. Introduction to the use of sign language.

423 American Sign Language (5) Expansive and expressive development in sign communication. Video and interactive teaching method used.

424 Nature of Hearing Impaired (4) Anatomy and physiology of hearing; nature of causes of hearing loss; rehabilitation for critical age groups.

432 Introduction to the Psychology and Education of the Hearing Impaired (4) Philosophy for those planning to teach the hearing impaired. Research related to psychological, social, communication, language development and education of the hearing impaired. Survey of literature. Video in program.

431 American Sign Language (3) Expressive and receptive development in sign communication. Video and interactive teaching method used. Class conducted totally in sign. Must be taken in sequence.

433-434 American Sign Language I and II (3,3) Sequence stresses therapeutic and expressive communication skills. Use of language in context is emphasized. Prerequisites: American Sign Language I.

300 Ways of Understanding Religion (3) Sources and methods of religious thinking. Writing emphasis course.

102 The Comparison of World Religions (3) Introduction to religion in culture and society, focusing on the development of world religions and religious traditions in the Mediterranean world. Writing-emphasis course.

200 Courses of Instruction (3) Primarily for those planning to teach the hearing impaired. Research related to psychological, social, communication, language development and education of the hearing impaired. Survey of literature. Video in program.


239 Sociology of Religion (3) (Same as Sociology 239) A sociological overview of the major world religions. Central issues raised for religious inquiry in contemporary society. Writing emphasis course.

245 Introduction to Religion in the United States (3) A sociological and historical perspective of the major religious groups in the United States. Prerequisites: Religious Studies 353.

249 Medical Ethics (3) (Same as Philosophy 249) Writing-emphasis course.

252 Anthropology of Religion (3) (Same as Anthropology 252) Survey of literature enhancing appreciation of biblical and classical religious thought. Writing emphasis course.

271 Social Anthropology (3) (Same as Anthropology 271) Social and cultural functions in religions. Writing-emphasis course. (Same as Religious Studies 271.)

281 Studies of Asian Religions (3) A survey of religious traditions in India, China, and Japan. Prerequisites: Religious Studies 332 or consent of instructor. (Same as Asian Studies 381.)

282 Introduction to Religion in India (3) Survey of the major non-Buddhist religious traditions. Prerequisites: Religious Studies 353, 373. Writing-emphasis course.

284 Introduction to the Psychology and Education of the Hearing Impaired (4) Philosophy for those planning to teach the hearing impaired. Research related to psychological, social, communication, language development and education of the hearing impaired. Survey of literature. Video in program.

300 Ways of Understanding Religion (3) Sources and methods of religious thinking. Writing emphasis course.

319 Sociology of Religion (3) (Same as Sociology 319) A sociological overview of the major world religions. Central issues raised for religious inquiry in contemporary society. Writing emphasis course.

325 Religion and Culture in the United States (3) Survey of the major non-Buddhist religious traditions. Prerequisites: Religious Studies 353. Writing emphasis course.

333 Islam in the Modern World (3) Beginning with the prophet Muhammad (571-632 CE) through the 17th century. Events of, movements in and of modern Islam, as well as scholarly reactions to the 20th century and the growth of the Islamic community in the West. Prerequisite: Religious Studies 332 or consent of instructor. (Same as Asian Studies 333.)

339 Religious and Ethics (3) Selected theoretical insights and moral teachings of religious communities and their action-guides for individuals and institutions, their application to personal and social problems.

340 Professional Responsibility (3) (Same as Philosophy 340) Writing-emphasis course.

345 Medical Ethics (3) (Same as Philosophy 345) Writing-emphasis course.

349 Introduction to Religion in the United States (3) A sociological and historical perspective of the major religious groups in the United States. Prerequisites: Religious Studies 353.

351 Introduction to Religion in the United States (3) A sociological and historical perspective of the major religious groups in the United States. Prerequisites: Religious Studies 353.

359 Religion and Culture in the United States (3) Survey of the major non-Buddhist religious traditions. Prerequisites: Religious Studies 353. Writing emphasis course.

370 Buddhism and Buddhist Philosophy (3) (Same as Philosophy 370) Survey of the major non-Buddhist religious traditions. Prerequisites: Religious Studies 353. Writing emphasis course.

374 Philosophy and Religion in India (3) Survey of the major non-Buddhist religious traditions. Prerequisites: Religious Studies 353, 373. Writing-emphasis course.

375 Historical and Critical Examination of Judaism (3) Historical and critical examination of the development of Judaism. Prerequisites: Religious Studies 332 or consent of instructor. (Same as Jewish Studies 375.)

415 Religious Education for the Hearing Impaired (3)  Developmental and oral skills of hearing language, with emphasis on communication disorders, idiomatic and figurative language.

418 Speech Development of Hearing Impaired (6) Theory of speech, skills development, approaches in therapy and improvement of speech and oral communication. Introduction to the use of sign language.

423 American Sign Language (5) Expansive and expressive development in sign communication. Video and interactive teaching method used. Class conducted totally in sign. Must be taken in sequence.

432 Introduction to the Psychology and Education of the Hearing Impaired (4) Philosophy for those planning to teach the hearing impaired. Research related to psychological, social, communication, language development and education of the hearing impaired. Survey of literature. Video in program.

431 American Sign Language (3) Expressive and receptive development in sign communication. Video and interactive teaching method used. Class conducted totally in sign. Must be taken in sequence.

433-434 American Sign Language I and II (3,3) Sequence stresses therapeutic and expressive communication skills. Use of language in context is emphasized. Prerequisites: American Sign Language I.