### DANCE COURSES

*Department of Music, Theatre, and Dance*

**College of Liberal Arts**

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<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>D 110 03(3-0-0)</td>
<td>Understanding Dance</td>
<td>F, S, SS</td>
<td>None</td>
<td>For non-dance majors. Previous dance experience not necessary. Broad examination of dance.</td>
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<tr>
<td>D 120A-C 02(0-4-0)</td>
<td>Dance Techniques I</td>
<td>F, S</td>
<td>None</td>
<td>A) Modern. ($) B) Ballet. ($) C) Jazz.</td>
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<tr>
<td>D 121A-C</td>
<td>Dance Techniques II</td>
<td>F, S</td>
<td>Modern 02(0-4-0).</td>
<td>A) Prerequisite: Written consent of instructor. ($) B) Ballet 03(0-6-0).</td>
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<tr>
<td>D 126 02(1-2-0)</td>
<td>Dance Improvisation</td>
<td>F, S</td>
<td>None</td>
<td>Written consent of instructor. Organic movement and inventive dance movement through improvisational skills, body, physicality, space/medium/level imagery and partnering.</td>
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<tr>
<td>*D 160 02(0-4-0)</td>
<td>Musical Tap Forms</td>
<td>S</td>
<td>None</td>
<td>Basic tap dance forms with emphasis on terminology, study of rhythm, and tap styles; historical development of tap in American culture.</td>
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<tr>
<td>D 220A-C</td>
<td>Dance Techniques III</td>
<td>F</td>
<td>Modern 02(0-4-0).</td>
<td>A) Prerequisite: Written consent of instructor. ($) B) Ballet 03(0-6-0).</td>
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<tr>
<td>D 221A-C</td>
<td>Dance Techniques IV</td>
<td>S</td>
<td>Modern 02(0-4-0).</td>
<td>A) Prerequisite: Written consent of instructor. ($) B) Ballet 03(0-6-0).</td>
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<tr>
<td>D 226 02(1-2-0)</td>
<td>Dance Choreography I</td>
<td>F</td>
<td>Prerequisite: D 121A; D 121B; D 126.</td>
<td>Elements of dance composition including space, levels, rhythm, dynamics, qualities of movement, form, style.</td>
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<tr>
<td>D 320A-C</td>
<td>Dance Techniques V</td>
<td>F</td>
<td>Modern 03(0-6-0).</td>
<td>A) Prerequisite: Written consent of instructor. ($) B) Ballet 05(0-10-0).</td>
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<tr>
<td>D 321A-C</td>
<td>Dance Techniques VI</td>
<td>S</td>
<td>Modern 03(0-6-0).</td>
<td>A) Prerequisite: Written consent of instructor. ($) B) Ballet 05(0-10-0).</td>
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<td>D 324 02(1-2-0)</td>
<td>Teaching Creative Movement for Children</td>
<td>S</td>
<td>None</td>
<td>Theoretical and practical experience in teaching creative movement.</td>
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<tr>
<td>D 326 03(1-4-0)</td>
<td>Dance Choreography II</td>
<td>F</td>
<td>Prerequisite: D 226.</td>
<td>Advanced choreographic elements: group work, music influence, and nontraditional performance venues.</td>
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<tr>
<td>D 330 02(0-4-0)</td>
<td>Ballet Repertory Ensemble</td>
<td>F, S</td>
<td>Prerequisite: Written consent of dance faculty.</td>
<td>Classical ballet repertory performance for the stage.</td>
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<td>+D 340 02 (0-4-0)</td>
<td>Tour Dance Company</td>
<td>F, S</td>
<td>Prerequisite: Written consent of instructor. Required field trips.</td>
<td>Development of touring dance lecture-demonstrations and selected choreographic performances throughout Colorado.</td>
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- Alternate year offering (odd); * Alternate year offering (even); + Field trips; S Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCC-subcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)
DESIGN AND MERCHANDISING COURSES

Department of Design and Merchandising
College of Health and Human Sciences

DM 120 03(2-2-0). Textiles. F, S, SS. Prerequisite: None.
Fibers, fabrics, and finishes basic to selection, use, and care. (NT-O)

DM 272 03(3-0-0). Consumers in the Marketplace. F, S. Prerequisite: None.
Analysis and evaluation of consumers in the marketplace as applied to merchandising. (NT-O)

DM 300 03(3-0-0). Retail Sales and Customer Strategies. F, S, SS.
Prerequisite: None.
Examine selling practices and their impact on business and consumers in the global marketplace. (NT-O)

DM 360/MKT 360 03(3-0-0). Retailing. F, S, SS. Prerequisite: MKT 300 or MKT 365. Credit not allowed for both DM 360 and MKT 360.
Retail markets, institutions, operations, and problems. (NT-O)

*DM 400 03(1-2-1). U.S. Travel-New York City. S. Prerequisite: Six credits in AM, DM and/or INTD courses.
Interview/analyze designers, manufacturers, buying offices, retail stores, magazine firms, interior design and architecture firms, etc. ($)

*DM 470A-B 02(1-0-1). International Design and Merchandising. F, S, SS.
Historical, cultural, and business aspects of international design and merchandising in selected countries. A) Apparel Merchandising.
Prerequisite: AM101; AM130; DM 120; concurrent registration in DM482A. B) Interior Design. Prerequisite: ART 100; INTD 129; INTD 166; concurrent registration in DM 482B.

DM 474 03(1-0-2). Fashion Show Production and Event Planning. S.
Prerequisite: AM 101 or INTD 129; written consent of instructor.
Planning and implementing full production fashion show of student-designed collections, including promotions and fund-raising activities.

DM 482 01(0-0-1). Travel Abroad. F, S. SS. Prerequisite: AM 101; AM130; DM 120; concurrent registration in DM 470A.
Historical, cultural, aesthetic, and business aspects of design and merchandising in the selected country(ies).

DM 487A-F Internship.

DM 490 A-C Var [1-6]. Workshop.

DM 492 02(1-0-1). Preinternship Seminar. F, S.
Prerequisite: Minimum GPA of 2.50; minimum of 60 credits completed.
Professional standards/corporate structure of apparel and merchandising companies in apparel design, product development, and/or merchandising.

DM 495 Var. Independent Study.
Maximum of ten credits allowed in course.

DM 496 Var. Group Study.
Maximum of ten credits allowed in course.

DM 501 03(0-0-3). Research and Theory—Design and Merchandising. F, S, SS. Prerequisite: None.
Theory and various approaches and philosophies of research in design and merchandising. Critical evaluation and synthesis of scholarly literature. (NT-O)

*DM 510 03(3-0-0). Consumer Behavior. F. Prerequisite: None.
Evaluation of psychological, sociological, and cultural theories of consumer behavior through examination of factors that influence decision making. (NT-O)

DM 518 03(3-0-0). Consumer Issues-Global Perspectives. F.
Prerequisite: None.
Understanding and analysis of consumer well-being and issues from global perspective.

DM 520 03(3-0-0). Professional Advancement in Merchandising. SS.
Prerequisite: None. Offered as an online course only.
Analysis of leadership and how it affects organizational culture and change through a prism of past and current experiences. (NT-O)

DM 530 03(3-0-0). Product Design Development and Evaluation. SS.
Prerequisite: None. Offered as an online course only.
Issues and strategies necessary to design and produce a competitive product, including the role of globalization and technology. (NT-O)

DM 540 03(3-0-0). Promotional Strategies in Merchandising. F.
Prerequisite: None.
Integrated marketing communications while fostering cultural and global awareness, social responsibility and ethical decision-making. (NT-O)

*DM 542 03(1-4-0). Advanced Computer-Aided Textile Design. S.
Prerequisite: None.
Use of computer-aided design system to produce fabric designs for apparel or interior professional end use. ($) 

DM 550 03(3-0-0). Retail Theory and Practice. S. Prerequisite: None.
Offered as an online course only.
Theoretical and applied analysis of merchandising strategies; assessment of internal and external environmental forces; trend analysis of forecasting. (NT-O)

DM 551 03(3-0-0). Research Methods. S. Prerequisite: None.
Design and methods of research applicable to design and merchandising. (NT-O)

*DM 563 03(1-2-1). Care and Exhibit of Museum Collections. S.
Prerequisite: Three credits of ART or HIST or AM or DM. Required field trips.
Hands-on experience in management, care, exhibition, and interpretation of museum collections.

*DM 570 03(0-0-3). Creativity in Design. S. Prerequisite: DM 501.
Multiple perspectives in creativity integrating theory and research impacting design.

*DM 575 03(3-0-0). Human Factors in Design — Softlines. F.
Prerequisite: DM 501 or concurrent registration.
Theories and contemporary issues related to human factors in design with a specific focus on interior, apparel, and footwear products.

DM 578 03(2-0-1). Trends-Consumer Issues. F, S, SS. Prerequisite: None.
Developments and projections of consumer issues.

DM 590A-C Var [1-6]. Workshop. Prerequisite: None.

DM 592 Var [1-3]. Seminar.

DM 596 Var. Group Study.

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DM 610 03(3-0-0). Historical and Contemporary Issues in Trade. F.
Prerequisite: None. Offered as an online course only.
Examination of fiber, textile, and apparel industries in a global context; how economic, political, and social systems affect production and trade. (NT-O)

DM 620 03(3-0-0). International Merchandise Management. F.
Prerequisite: None. Offered as an online course only.
Comprehensive understanding of theory, practices, and trends in international merchandise management. Analysis of global retail system. (NT-O)

DM 630 03(3-0-0). Merchandising Research Methods. S. Prerequisite:
Graduate level course in statistics; completion of DM 500-level courses.
Offered as an online course only.
Research process used in social science, including survey and analysis of research methodologies; review of merchandising literature. (NT-O)

DM 640 03(3-0-0). Merchandising Finance. F. Prerequisite: None.
Offered as an online course only.
Advanced study of financial trends in merchandising; implications for sole proprietors, partnerships, franchises, S corporations, and C corporations. (NT-O)

DM 650 03(3-0-0). Strategic Decisions in Merchandising. S.
Prerequisite: None. Offered as an online course only.
Examination of executive planning processes utilized to develop successful corporate strategies; emphasis on the importance of a market orientation. (NT-O)

DM 684 Var [1-6]. Supervised College Teaching, F, S.

DM 687 Var. Internship.

DM 695 Var. Independent Study. (NT-B)

DM 698 03(0-0-3). Research. F, S, SS. Prerequisite: Written consent of instructor. (NT-O)

DM 699 Var. Thesis. (NT-O)

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ENGLISH COURSES
Department of English
College of Liberal Arts

E 140 03(3-0-0). The Study of Literature. (GT-AH2, AUCC 3B). F, S, SS. Prerequisite: None.
   Basic principles of reading literary texts.

E 142 03(3-0-0). Reading Without Borders. (GT-AH2, AUCC 3E). F, S, SS. Prerequisite: none.
   Authors from a range of international, cross-national, cultural, and ethnic backgrounds focusing on themes of immigration, exile, or education.

E 179 03(3-0-0). Western American Literature. F, S, SS. Prerequisite: None.
   Trans-Mississippi West in fiction and other literary forms.

E 210 03(3-0-0). Beginning Creative Writing. F, S. Prerequisite: Any lower-level E prefix course.
   Basic techniques of writing fiction and poetry; may include some elements of drama.

E 232 03(3-0-0). Introduction to Humanities. (GT-AH2, AUCC 3B). F, S. Prerequisite: None.
   Great literature of Western cultural tradition from ancient times to present.

E 234/ETST 234 03(3-0-0). Introduction to Native American Literature. S. Prerequisite: None. Credit not allowed for both E 234 and ETST 234.
   Native American writings and their significance in American culture.

E 237 03(3-0-0). Introduction to Science Fiction. F, S. Prerequisite: None.
   Historical development and major themes of science fiction, featuring writers such as Wells, Huxley, Bradbury, and LeGuin.

E 238 03(3-0-0). 20th-Century Fiction. (GT-AH2, AUCC 3E). F, S. Prerequisite: None.
   20th-century fiction chosen for its relevance to global and cultural awareness. (NT-O)

E 239/ETST 239 03(3-0-0). Introduction to Chicano Literature. F, S. Prerequisite: None. Credit not allowed for both E 239 and ETST 239.
   Chicano fiction and poetry with consideration of historical roots and influences.

E 240 03(3-0-0). Introduction to Poetry. F, S, SS. Prerequisite: None.
   Development of critical skills necessary to understand and enjoy poetry.

E 242 03(3-0-0). Reading Shakespeare. (GT-AH2, AUCC 3B). F, S. Prerequisite: None.
   Reading of Shakespeare texts, using various approaches of interpretation for understanding and relation to our contemporary cultural situation.

E 245 03(3-0-0). World Drama. (GT-AH2, AUCC 3E). F, S. Prerequisite: None.
   World drama in cultural contexts.

E 270 03(3-0-0). Introduction to American Literature. (GT-AH2, AUCC 3B). F, S, SS. Prerequisite: None.
   History and development of American writings from 16th-century travel narratives through early 20th-century modernism.

E 276 03(3-0-0). Survey of British Literature I. (GT-AH2, AUCC 3B). F. Prerequisite: None.
   British literature from Beowulf through the 18th century in relation to its historical contexts.

E 277 03(3-0-0). Survey of British Literature II. (GT-AH2, AUCC 3B). S. Prerequisite: None.
   British literature from the Romantics to the present in relation to its historical contexts.

E 300/AMST 300 03(3-0-0). American Lives-Methods in American Studies. F, S. Prerequisite: AMST 100; AMST 101. Credit not allowed for both E 300 and AMST 300.
   Methods and changing approaches of American studies since 1950s using autobiography as organizing theme.

E 302 03(3-0-0). Reading and the Web. F, S. Prerequisite: CO 150 or HONR 193.
   Critical examination of reading processes, as well as the rhetorical and cultural contexts of readers on the web.

E 305 03(3-0-0). Principles of Writing and Rhetoric. F. S. Prerequisite: CO 300 or CO 301A or CO 301B or CO 301C or CO 301D.
   Humanities-based exploration of central principles of rhetoric in written communication.

E 311-C 03(3-0-0). Intermediate Creative Writing. F.
   Group discussion of student writing, literary models, and theory; emphasis on developing individual style. A) Fiction. Prerequisite: E 210 with a B or better. B) Poetry. Prerequisite: E 210 with a B or better. C) Nonfiction. Prerequisite: CO 150; E 210 with a B or better or JTC 210.

E 320 03(3-0-0). Introduction to the Study of Language. F, S, SS. Prerequisite: None.
   Varied topics covering general linguistics or the relationships between language and literature or society and science.

E 322 03(3-0-0). English Language for Teachers I. F. Prerequisite: None.
   Foundations of language structure, emphasizing grammar, sounds, spelling, word structure, linguistic variation, usage, acquisition, and pedagogy.

E 323 03(3-0-0). English Language for Teachers II. S. Prerequisite: E 322.
   Advanced grammar, language history; meaning; applications to teaching composition, reading, and literature.

E 324 03(3-0-0). Teaching English as a Second Language. F, S. Prerequisite: E 320 or E 322.
   Introduction to teaching English to speakers of other languages for teacher certification candidates and for those wanting to teach abroad.

E 326 03(3-0-0). Development of the English Language. S. Prerequisite: None.
   Chronological study of four historical stages of English (Old, Middle, Early Modern, Modern) with emphasis on grammar, vocabulary, and phonology.

E 327 03(3-0-0). Syntax and Semantics. S. Prerequisite: None.
   Linguistic study of sentence structure and grammatical relations, semantic roles and representation.

E 328 03(3-0-0). Phonology, Morphology, and Lexis. S. Prerequisite: None.
   Linguistic study of pronunciation, word-formation, and vocabulary.

E 329 03(3-0-0). Pragmatics and Discourse Analysis. S. Prerequisite: None.
   Linguistic study of general principles of interpretation and textual patterns.

E 330 03(3-0-0). Gender in World Literature. F. S. Prerequisite: None.
   Selected world literature ranging from ancient world to present, considered in light of various complexities of gender relations.

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E 331 03(3-0-0). Early Women Writers. F, S. Prerequisite: E 276 or E 277.
Selected women writers from any period before the 20th century.

E 332 03(3-0-0). Modern Women Writers. S. Prerequisite: None.
Selected 20th-century women writers in variety of genres emphasizing relationships between gender, writing, and reading.

E 333 03(3-0-0). Critical Studies of Popular Texts. F, S. Prerequisite: CO 150.
Texts representing one or more popular modes focusing on issues of gender, sexuality, racial or ethnic identity, technology, and colonialism.

E 334 03(3-0-0). Gay and Lesbian Literature. S. Prerequisite: None.
Literature by gay and lesbian authors on gay and lesbian themes.

E 337 03(3-0-0). Western Mythology. S. Prerequisite: One course in literature.
Major themes in western myth: classical, Biblical, and Germanic.

E 338 03(3-0-0). Ethnic Literature in the United States. F, S, SS.
Prerequisite: One literature course or one ETST course.
Comparative study of literatures from a range of U.S. ethnic experiences and perspectives.

E 339 03(3-0-0). Literature of the Earth. F, S. Prerequisite: CO 150.
Non-fiction, fiction, and poetry on landscape, climate, animality, ecology, place.

E 341 03(3-0-0). Literary Criticism and Theory. F, S. Prerequisite: One course in literature.
Theory and practice of modern literary analysis and evaluation; writing about literature.

E 342 03(3-0-0). Shakespeare I. F, S, SS. Prerequisite: E 240 or E 276.
Shakespeare’s development as a poet and dramatist from the early plays through Hamlet.

E 343 03(3-0-0). Shakespeare II. F, S, SS. Prerequisite: E 240 or E 276.
Shakespeare’s development as a poet and dramatist after Hamlet.

E 345 03(3-0-0). American Drama. F. Prerequisite: One course in literature.
Representative examples from mainstream and alternative drama.

E 350 03(3-0-0). The Gothic in Literature and Film. S. Prerequisite: One course in literature.
Interdisciplinary, cross-cultural approach to gothic works from the 18th to the 20th centuries.

E 356 03(3-0-0). Asian Literature. F. Prerequisite: None.
Masterpieces of classical and contemporary literature of China, India, and Japan.

E 370 03(3-0-0). American Literature in Cultural Contexts. F, S, SS.
Prerequisite: E 270.
American literature in social, political, economic, aesthetic, intellectual, and multimedia contexts.

E 384A-B Var[1-3]. Supervised College Teaching. F, S. Prerequisite: Written consent of department chair. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

E 401 03(3-0-0). Teaching Reading. F, S. Prerequisite: CO 301D.
Theory and pedagogy for understanding, interpreting, and evaluating print and visual texts.

E 402 03(3-0-0). Teaching Composition. F, S. Prerequisite: CO 301A or CO 301B or CO 301C or CO 301D.
Theory and practice of the analysis and the teaching of writing.

E 403 03(3-0-0). Writing the Environment. S. Prerequisite: One course in literature or CO 301A-D or E 311A-C.
Creative writing in conjunction with study of recent American literature on nature and landscape.

E 405 03(3-0-0). Adolescents’ Literature. F, S. Prerequisite: None.
Survey of literature for adolescents emphasizing development of critical ability, appreciation, and taste.

E 406 03(3-0-0). Topics in Literacy. F, S. Prerequisite: None.
Maximum of 6 credits allowed in course.
Exploring literacy through written history: specific issues of cultural difference, gender, technology, acquisition, and workplace.

E 412A-C 03(3-0-0). Creative Writing Workshop. S. Maximum of 6 credits allowed per subtopic.
Individual projects with group discussion and analysis. A) Fiction. Prerequisite: E 311A with a B or better. B) Poetry. Prerequisite: E 311B with a B or better. C) Nonfiction. Prerequisite: E 311C with a B or better.

E 420 03(3-0-0). Beat Generation Writing. S. Prerequisite: One course in literature.
Shared experiences and historical pressures that made Beat Generation writers, including Kerouac, Ginsberg, Burroughs, and Waldman, a countercultural movement.

E 421 03(3-0-0). Asian American Literature. F, S. Prerequisite: CO 150; E 270.
Asian American writing on immigration, exile, exclusion, detainment, neo-colonialism, resistance, hybridity, and transnationalism.

E 422/ETST 422 03(3-0-0). African-American Literature. F. Prerequisite: CO 150; E 270. Credit not allowed for both E 422 and ETST 422.
African-American literature as a distinct tradition of writing and protest.

E 423 03(3-0-0). Latino/a Literature. F. S. Prerequisite: CO 150; E 270.
Latino/a writing on themes of settlement, expropriation, resistance, conquest, immigration, exile, hybridity and transnationalism.

E 424 03(3-0-0). English Renaissance. F. Prerequisite: E 276 or E 342 or E 343.
English Renaissance literature (1500-1670), covering a range of poetry, drama, and prose.

E 425 03(3-0-0). Restoration and 18th Century Literature. S. Prerequisite: One course in literature.
Poetry, drama, and prose, 1600-1789.

E 426 03(3-0-0). British Romanticism. F. Prerequisite: E 276 or E 277 or E 341.
British Romantic era literature (1780-1830) with emphasis on the social and cultural context.

E 427 03(3-0-0). Victorian Age. F. Prerequisite: E 276 or E 277 or E 341.
Victorian era literature (1830-1900) in social and cultural context, with attention to multiple genres (poetry, fiction, drama, and essay).

E 428 03(3-0-0). Postcolonial Literature. F. S. Prerequisite: One course in literature.
Selected readings in postcolonial literatures and theory.

E 430 03(3-0-0). 18th-Century English Fiction. F. Prerequisite: One course in literature.
English fiction from Defoe to Austen stressing Richardson, Fielding, Smollett, and Sterne.

*Alternate year offering (odd); * Alternate year offering (even); + Field trips; S Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCC-subcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)
E 431 03(3-0-0). 19th-Century English Fiction. S. Prerequisite: E 276 or E 277 or E 341.
   English fiction in Victorian and Edwardian eras emphasizing Dickens, the Brontes, Thackeray, George Eliot, and Hardy.

E 432 03(3-0-0). 20th-Century British Fiction. F. Prerequisite: One course in literature.
   British fiction from Conrad to the present emphasizing Joyce, Lawrence, Forster, Woolf, and Beckett.

E 433 03(3-0-0). Literatures of the American West. F, S, SS. Prerequisite: One course in literature or HIST 351 or HIST 352 or HIST 353.
   Relationships between places, environments, cultures, and literature in the American West.

E 436 03(3-0-0). American Fiction, 1945-Present. S. Prerequisite: One course in literature.
   Offered only as an online course through the Division of Continuing Education.
   Form, content, and context of American fiction from 1945 to present: Kesey, Updike, Heller, Pynchon, Barthelme, Vonnegut, and others. (NT-O)

E 438/ETST 438 03(3-0-0). Native American Literature. F. Credit not allowed for both E 438 and ETST 438.
   Literature of Native Americans emphasized as distinctive tradition in American literature and cultural expression of indigenous peoples.

E 440 03(3-0-0). American Prose Before 1900. F, S, SS. Prerequisite: One course in literature.
   Novels, stories, and/or literary non-fiction prose written in the U.S. before 1900.

E 441 03(3-0-0). American Prose Since 1900. F, S, SS. Prerequisite: One course in literature.
   Novels, stories, and/or literary non-fiction prose written in the U.S. from 1900 to the present.

E 443 03(3-0-0). English Renaissance Drama. F. Prerequisite: E 276 or E 342 or E 343.
   Interplay between dramatic form and cultural context in the plays of Marlowe, Jonson, Cary, Middleton, Heywood, Dekker, Webster.

E 444 03(3-0-0). Restoration and 18th-Century Drama. S. Prerequisite: One course in literature.
   Major plays and dramatic issues from 1660 to 1780 including Dryden, Etherege, Congreve, Sheridan, and others.

E 445 03(3-0-0). Modern British and European Drama. S. Prerequisite: One course in literature.
   Realism and anti-realism in modern British and European drama.

E 451 03(3-0-0). Medieval Literature. F, S. Prerequisite: One course in literature.
   Genres, themes, and authors of the Middle Ages.

E 452 03(3-0-0). Masterpieces of European Literature. S. Prerequisite: One course in literature.
   Selected works of European literature through the 19th century.

E 455 03(3-0-0). European Literature after 1900. S. Prerequisite: Two courses in literature.
   Continental European texts in translation since 1900.

E 456 03(3-0-0). Topics in Critical Theory. F, S. Prerequisite: E 341; may be repeated for one credit.
   Advanced study of literary can cultural theory.

E 460 03(3-0-0). Chaucer. S. Prerequisite: E 341; one other upper-division E prefix course.
   Chaucer’s works in medieval context.

E 463 03(3-0-0). Milton. F. Prerequisite: E 276 and E 341.
   Milton's poetry and prose emphasizing Paradise Lost.

E 465 03(3-0-0). Topics in Literature and Language. F, S. Prerequisite: E 341; one other upper-division E prefix course. Maximum of 6 credits allowed in course.
   Selected issues in literature and language.

E 470 03(3-0-0). Individual Author. F, S, SS. Prerequisite: E 341; one other upper-division E prefix course. Maximum of 6 credits allowed in course.
   Intensive study of works of a single major author.

E 475 03(3-0-0). American Poetry Before 1900. F. Prerequisite: E 240.
   Major American poets through the 19th century including Whitman, Dickinson, and Frost.

E 478 03(3-0-0). Modern Poetry. F. Prerequisite: E 240.
   Major British and American poets from late 19th century to World War II.

E 479 03(3-0-0). Recent Poetry of the United States. F, S, SS. Prerequisite: E 240.
   U.S. poetry since World War II, emphasis on the 1980s through the present.

E 487 A-D. Internship. Maximum of 4 credits allowed in E 487A and E 487B.
   A) Supervised work experience. Var[1-3]. Maximum of 3 credits allowed in course. Prerequisite: 2.500 GPA; CO 150; written consent of department head or director.
   B) Literary editing. 01(0-0-1). Prerequisite: 2.500 GPA; CO 150; written consent of department head or director.
   C) Community literacy center. Var[1-3]. Prerequisite: 2.500 GPA; CO 150; written consent of CLC director.
   D) CSU writing center. Var[1-3]. Prerequisite: 2.500 GPA; CO 300 or CO 301 A-D; written consent of Writing Center director.

E 495 Var[1-3]. Independent Study. Maximum of 6 credits allowed in course.
   Individually guided studies in literature, writing, English language, and linguistics.

E 501 03(3-0-0). Theories of Writing. F. Prerequisite: E 402.
   Theoretical approaches to the nature of the composing process.

E 502 03(3-0-0). Language, Literacy, and Learning. F. Prerequisite: Teaching experience or 3 credits in upper-division English or education courses.
   Theoretical and practical perspectives on language and learning skills necessary for basic academic reading and writing.

E 503 03(3-0-0). Investigating Classroom Literacies. F, S, SS.
   Prerequisite: None.
   Research methods and ethical issues in classroom-based inquiry into oral and written literacy practices.

E 504 03(3-0-0). Situating Composition Studies. F, S. Prerequisite: E 501.
   Contexts for composition programs, roles for program administrators, and professional opportunities for teachers and scholars.

E 505A-C 03(3-0-0). Major Authors. F, S. Prerequisite: Six credits of literature.
   Intensive study of the works of one or two major authors.


E 506A-C 03(3-0-0). Literature Survey. F, S. Prerequisite: Six credits of literature.
   Synthesis of literary attitudes, modes, genres of an age.


E 507 03(3-0-0). Special Topics in Linguistics. F, S. Prerequisite: Written consent of instructor.

Alternate year offering (odd); * Alternate year offering (even); + Field trips; S Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCC-subcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)
E 513A-C 03(3-0-0). Form and Technique in Modern Literature. F.
Prerequisite: None.
Selected readings in and discussions of modern literature and criticism from the writer’s point of view with emphasis on form and technique. A) Fiction. B) Poetry. C) Essay.

E 514 03(3-0-0). Phonology/Morphology-ESL/EFL. F. Prerequisite: None.
English sound system and word formation in relation to second language acquisition and teaching.

E 515 03(3-0-0). Syntax for ESL/EFL. F. Prerequisite: None.
Major grammatical structures of English in relation to second language acquisition and teaching.

E 520 03(3-0-0). English Phonetics and Phonology. S. Prerequisite: None.
Articulatory phonetics, phonological theory and analysis with principal applications to American English and to pedagogy.

E 522 03(3-0-0). Semantics, Pragmatics, and Discourse. F. Prerequisite: None.
Linguistic study of literal and nonliteral meaning, including role of textual and situational context.

E 526 03(3-0-0). Teaching English as Foreign/Second Language. F. Prerequisite: None.
Principles of teaching English as a foreign/second language. Development of a coherent method, including activities, materials, and course design.

E 527 03(3-0-0). Theories of Foreign/Second Language Learning. S.
Prerequisite: E 526.
Theories of second language learning/acquisition; emphasis on psycholinguistic processes of language learning.

E 590 Var[1-3]. Workshop in TESOL. F, S. Prerequisite: E 526.
Methodology/linguistic theory designed to solve practical problems in teaching, testing, and materials development.

E 600A-B 03(3-0-0). Research Methods and Theory. Prerequisite: None.
Research methods in English studies.
A) Literary scholarship. B) Research design with quantitative and qualitative methods.

E 601 Var[2-3]. Research in Teaching English as Second Language. F.
Prerequisite: E 526.
Evaluation and design of research in language acquisition.

E 603 03(3-0-0). Computers and Composition. S. Prerequisite: None.
Relationship of computer-assisted instruction to rhetoric and composition.

E 605 03(3-0-0). Reading/Writing Connection. S. Prerequisite: None.
Theoretical understanding of reading and writing processes; practical implications for professional writers and teachers of writing.

E 607A-B 03(3-0-0). Teaching Writing. F, S. Prerequisite: None.
A) Composition and rhetoric. B) Creative writing.

E 608 01(0-0-1). Integrating Writing in the Academic Core. F.
Prerequisite: None.
Theories and best practices associated with writing integration in the academic core.

E 615 03(3-0-0). Reading Literature-Recent Theories. F, S. SS.
Prerequisite: None.
Recent developments in critical and cultural theories of discourse.

E 630A-D 03(3-0-0). Special Topics in Literature. F. Prerequisite: None.

E 631 03(3-0-0). Crossing Boundaries. F. S. Prerequisite: None.
Cross-topical studies of literature.

E 632 Var[1-3]. Professional Concerns in English. F, S. Prerequisite: None.
Professional concerns of secondary school teachers of English.

E 633 03(3-0-0). Special Topics in Discourse Studies. F, S, SS.
Prerequisite: None.
Varied topics covering cultural or historical areas, or literacy and discourse theory and practice, or professional pedagogical issues.

E 634 03(3-0-0). Special Topics in TEFL/TESL. F, S. Prerequisite: None.
Theory, practice, and professional conduct of teaching English as a foreign or second language.

E 635 03(3-0-0). Critical Studies in Literature and Culture. F, S.
Prerequisite: E 615.
Advanced interpretation in contemporary literary and critical studies.

E 636 03(3-0-0). Environmental Literature and Criticism. F, S.
Prerequisite: None.
Literary, critical, and theoretical representations of nature, animals, human-environment relations.

E 637 03(3-0-0). History of Writing. F, S. Prerequisite: None.
Writing systems and practices across time, cultures, and varied constructions of author, text, audience, social context, technology.

E 638 03(3-0-0). Assessment of English Language Learners. F, S.
Prerequisite: E514; E527.
Theory, practice, and professional conduct in the assessment of English language learners.

E 640A-C Var[1-5]. Graduate Writing Workshop. F, S. Prerequisite: None. Maximum of 11 credits allowed per subtopic.

E 641 Var[1-5]. Nonfiction Workshop. F, S. Prerequisite: E 640C.
Writing workshop exploring various areas within literary nonfiction.

E 642 Var[1-5]. Writing Hypertexts. F, S. Prerequisite: None.
Writing workshop exploring development of texts in electronic formats.

E 679 01(1-0-0). Community Service Learning. F, S. Prerequisite: None.
Opportunities to learn, practice, and develop skills by serving the community.

E 684A-E Var[1-5]. Supervised College Teaching. F, S.

E 687A-M Var[1-5]. Internship. Prerequisite: B) E 501; E 684A.

E 692 01(0-0-1). Rhetoric and Composition Seminar. S.
Forum for faculty and student work in progress.

E 694 Var[1-3]. Independent Study: Portfolio. F, S, SS.

E 695 Var. Independent Study.

E 698 Var[1-2]. Research: Project. F, S, SS.

E 700 03(0-0-3). Introduction to Doctoral Studies in English. F.
Prerequisite: Admission to the doctoral program.
Disciplinary approaches to the study of written discourse.

E 710 03(3-0-0). Writing for Publication. F, S.
Shaping research questions, determining publication venues, writing
and revising for publication.

E 792A-C 03(0-0-3). Seminar. F, S.
A) New Literacies. B) Writing about Science and the
Environment. C) Writing and Cultural Contexts.

E 795 Var. Independent Study. F, S, SS.
Individually guided study in doctoral topic.

E 799 Var[1-12]. Dissertation. F, S, SS.

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ENGLISH FOR ACADEMIC PURPOSES
COURSES
Department of English
College of Liberal Arts
CSU-INTO

EAP 150 06(6-0-0). English for International Students I. F, S, SS.
Prerequisite: Admission to Pathways program.
Academic English for international students, emphasizing analysis
and integration of text and lecture-based information and its application.

EAP 151 03(3-0-0). English for International Students II. F, S, SS.
Prerequisite: EAP 150.
Academic English for international students, emphasizing research
and writing papers in various academic genres using appropriate
academic language.

EAP 152 06(6-0-0). English for International Graduate Students. F,
S, SS. Prerequisite: EAP 150; Admission to graduate INTO CSU
Pathway Program.
Academic English for international graduate students with emphasis
on both academic reading and research.

EAP 153 03(3-0-0). Writing for International Graduate Students. F,
S. Prerequisite: Admission to an accelerated graduate INTO CSU
Pathway Program.
Development of academic English for international graduate students
with an emphasis on academic research writing.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; $ Special course fee; NT Approved for nontraditional course offering (B =
blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCC-subcode = All
University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)
ECE 102 04(3-2-0). Digital Circuit Logic. F. Prerequisite: None. Boolean algebra; Karnaugh maps; multiplexers, decoders, ROMs, PLAs, flip-flops, counters; sequential networks; state tables. ($)

ECE 103 03(2-2-0). DC Circuit Analysis. S. Prerequisite: MATH 160. Basic DC circuit analysis. Use of scientific-oriented software to solve problems and analyze small projects. ($)

ECE 202 04(3-3-0). Circuit Theory Applications. S, SS. Prerequisite: ECE 103.
Basic circuit analysis techniques and applications to engineering design problems. ($)

ECE 204 03(3-0-0). Introduction to Electrical Engineering. S. Prerequisite: MATH 161; PH 142.
Basic analog and digital circuits and systems; introduction to electromechanical devices.

ECE 251 04(3-3-0). Introduction to Microprocessors. F. Prerequisite: ECE 102 with a C- or better. Microprocessor organization, assembly language, I/O techniques, real-time interfaces, applications, hardware/software. ($)

ECE 303/STAT 303 03(3-0-0). Introduction to Communications Principles. F. Prerequisite: ECE 311 or concurrent registration; MATH 261. Credit not allowed for both ECE 303 and STAT 303. Basic concepts in design and analysis of communication systems.

ECE 311 03(3-0-0). Linear System Analysis I. F. Prerequisite: ECE 202 with a C- or better; MATH 340 or MATH 345. Continuous and discrete time signals and systems representations in time and frequency domain; time convolution.

ECE 312 03(3-0-0). Linear System Analysis II. S. Prerequisite: ECE 311 with a C- or better. Laplace and Z transforms, applications to modulation, filtering and sampling, state space representation.

ECE 325 03(3-0-0). Telecommunication Networks. S. Prerequisite: MATH 141 or MATH 155 or MATH 160. Principle technologies that support data and voice communications. (NT-O)

ECE 331 04(3-3-0). Electronics Principles I. F. Prerequisite: ECE 202 with a C- or better; MATH 340 or MATH 345; PH 142. Discrete component semiconductor devices, characteristics and applications. Rectifier circuits, single-stage and multi-stage amplifiers. ($)

ECE 332 04(3-3-0). Electronics Principles II. S. Prerequisite: ECE 331 with a C- or better. Discrete and integrated-circuit amplifiers-frequency response, negative feedback; digital logic circuits. ($)

ECE 341 03(3-0-0). Electromagnetic Fields and Devices I. F. Prerequisite: ECE 202; MATH 340 with a C- or better; MATH 345 with a C- or better; PH 142 with a C- or better. Basic concepts of electrostatic and magnetostatic fields.

ECE 342 03(3-0-0). Electromagnetic Fields and Devices II. S. Prerequisite: ECE 341 with a C- or better. Basic concepts of time varying electromagnetic fields and transmission lines.

ECE 395 Var. Independent Study.

ECE 401 03(1-4-0). Senior Design Project I. F, S, SS. Prerequisite: CS 320 or (ECE 332 with a C- or better); ECE 312 with a C- or better; ECE 342 with a C- or better or ECE 452 with a C- or better. Advanced project, seminar series, formal written report, and oral presentation. ($)

ECE 402 03(1-4-0). Senior Design Project II. F, S, SS. Prerequisite: ECE 401.
Advanced project, formal report, and oral presentation. ($)

ECE 404 02(1-3-0). Experiments in Optical Electronics. F. Prerequisite: Concurrent registration in ECE 441.
Experiments in optical electronics and lasers.

ECE 411 04(3-3-0). Control Systems. F. Prerequisite: ECE 312 with a C- or better. Control system analysis and design for linear systems: stability and performance; time and frequency domain techniques.

ECE 412 03(3-0-0). Digital Control and Digital Filters. S. Prerequisite: ECE 411. FIR and IIR digital filter design, analog and digital invariance and direct digital control algorithms, hybrid systems analysis. (NT-O)

ECE 421 03(3-0-0). Telecommunications I. F. Prerequisite: ECE 303/STAT 303 with a C- or better; ECE 312 with a C- or better. Digital communication (source coding; modulation and detection; channel coding), analog communication (modulation). (NT-O/V)

ECE 422 03(3-0-0). Telecommunications II. S. Prerequisite: ECE 421. Issues of source coding, detection and estimation, and equalization; introduction of information theory.

ECE 423 03(1-4-0) DSP for Communications. S. Prerequisite: ECE 312. Design and programming of communication and signal processing algorithms into DSP hardware using C and assembly language. (NT-V)

ECE 430/MATH 430 03(3-0-0). Fourier and Wavelet Analysis with Apps. S. Prerequisite: MATH 345. Credit not allowed for both ECE 430 and MATH 430.
Fourier analysis and transforms, FFTs; sampling theorems, computational algorithms; wavelets; applications to communication, imaging, and compression.

ECE 441 03(3-0-0). Optical Electronics. F. Prerequisite: ECE 342 with a C- or better. Concepts of modern physics, optical properties of atoms, light sources, lasers, optical detectors, optical cavities, and optical fiber transmission.

ECE 442 04(3-3-0). Numerical Algorithms for VLSI Modeling. S. Prerequisite: ECE 312 with a C- or better; ECE 332 with a C- or better; ECE 342 with a C- or better. Provide the foundational knowledge of numerical algorithms for modeling and simulations of high speed VLSI circuits.

ECE 444 03(3-0-0). Antennas and Radiation. F. Prerequisite: ECE 342 with a C- or better. Retarded potential theory, antenna arrays, long wire antennas, dipoles, aperture antennas, receiving antennas.

ECE 450 01(0-3-0). Digital System Design Laboratory. F. Prerequisite: Concurrent registration in ECE 451. Small digital circuits are designed and simulated using very high speed hardware description language and synthesis tools.

ECE 451 03(3-0-0). Digital System Design. F. Prerequisite: ECE 102 with a grade of C- or better; ECE 202 with a grade of C- or better; Concurrent registration in ECE 450.
State machines with PLAs as controllers and small computers; timing and race elimination considerations; state and microprogramming implementation.

ECE 452 03(3-0-0). Computer Organization and Architecture. S. Prerequisite: ECE 251 with a C- or better.

- CPU design; microarchitecture; data path and control path; pipelining; memory system; I/O system; program optimization by system software/hardware. (NT-O)

ECE 454 03(3-0-0). Database Computers. F. Prerequisite: ECE 251 with a C- or better or CS 370.

- Computer architectures for database processing. Data filters, associative processors, parallel and distributed computers, text search processors.

ECE 456 04(3-3-0). Computer Networks. S. Prerequisite: ECE 251; ECE 303/STAT 303; CS 160 or (CS 155; CS 156; CS 157). Credit not allowed for both ECE 456 and CS 457.

- Circuit/packet switching, protocols, LAN/MAN, TCP/IP, error correction, ATM, wireless LANS, mobile networks. (NT-O)

ECE 457 03(3-0-0). Fourier Optics. S. Prerequisite: ECE 311 with a C- or better; ECE 342 with a C- or better.

- Introduction to optical systems for signal and information processing with emphasis on Fourier optics.

ECE 461 03(3-0-0). Power Systems. F. Prerequisite: ECE 332 with a C- or better; ECE 462 or concurrent registration.

- Multi-phase power systems; power generation, transformer design, power distribution, power costs.

ECE 462 01(0-3-0). Power Systems Laboratory. F. Prerequisite: ECE 332 with a C- or better; ECE 461 or concurrent registration.

- Set of labs designed to enhance students' understanding of power systems.

ECE 465 03(3-0-0). Electrical Energy Generation Technologies. S. Prerequisite: ECE 202 with a C- or better.

- Various electrical energy generation alternatives. Comparisons based on cost, reliability, availability and environmental impact. (NT-O)

ECE 466 03(3-0-0). Integrated Lighting Systems. F. Prerequisite: ECE 331 or INTD 330.

- Technical underpinnings of light sources, their associated heat sink fixtures and power electronics drivers.

ECE 471A 01(1-0-0). Semiconductor Physics. S. Prerequisite: PH 142; MATH 340 or MATH 345. Credit not allowed for both ECE 471A and ECE 471B.

- Fundamentals of semiconductor electron, hole states and motion; bandgap, effective mass, carrier density, Fermi level, doping, drift and diffusion.

ECE 471B 01(1-0-0). Semiconductor Junctions. S. Prerequisite: ECE 331; ECE 471A. This is a partial-semester course. Credit not allowed for both ECE 471B and ECE 471.

- Quantitative analysis of field, carrier and current distributions in pn and metal-semiconductor junctions.

ECE 472 03(3-0-0). MOS Integrated Circuits. S. Prerequisite: ECE 332 with a C- or better.

- MOS transistor theory, design rules, layout design, gate, cell and circuit design, memories, clocking strategies, MOS technologies.

ECE 495 Var. Independent Study.

ECE 501/ENGR 501 03(0-0-3). Foundations of Systems Engineering. F, S. Prerequisite: None. Credit not allowed for both ECE 501 and ENGR 501.

- Functional components of systems engineering, application of systems engineering to practical problems, system life-cycle process (NT-O)

*ECE 503 03(3-0-0). Ultrafast Optics. S. Prerequisite: ECE 341; ECE 342.

- Principles and theory behind ultrashort pulse generation, amplification, and manipulation.

ECE 504 03(3-0-0). Physical Optics. F. Prerequisite: ECE 341; ECE 342.

- Classical optics from first principles; basic electromagnetic theory to wave and geometric guides.

*ECE 505 03(3-0-0). Nanostructures: Fundamentals and Applications. F. Prerequisite: ECE 342; PH 353.

- Fundamentals of quantum confinement; nanostructures optical properties; fabrication and characterization. (NT-O)

ECE 506 03(3-0-0). Optical Interferometry and Laser Metrology. F. Prerequisite: ECE 341; ECE 342; ECE 441.

- High resolution metrology techniques utilizing and interferometric sensors using lasers and other light sources. (NT-O)

ECE 507 03(3-0-0). Plasma Physics and Applications. S. Prerequisite: ECE 342.

- Fundamental principles and industrial applications of plasmas.

ECE 508/ENGR 508 03(3-0-0). Introduction to Power System Markets. F. Prerequisite: ECE 461. Credit not allowed for both ECE 508 and ENGR 508.

- Deregulated electrical power systems, system security, investments in generation and transmission, ancillary services, and nodal pricing. (NT-O)

ECE 509/ENGR 509 03(3-0-0). Signal Processing for Power Systems. F. Prerequisite: ECE 312; ECE 461. Credit not allowed for both ECE 509 and ENGR 509.

- Signal processing tools for analyzing power systems, voltage frequency, magnitude variations, unbalance, waveform distortion. (NT-O)

ECE 512 03(3-0-0). Digital Signal Processing. F. Prerequisite: ECE 312 with a C- or better.

- Discrete time signals and systems, digital filter design and implementation, fast algorithms, quantization effects. (NT-O)

ECE 513 03(3-0-0). Digital Image Processing. S, SS. Prerequisite: ECE 303/STAT 303 with a C- or better; ECE 312.

- Image acquisition and display systems, image enhancement, restoration and encoding, image analysis; real-life applications. (NT-O)

ECE 514 03(3-0-0). Applications of Random Processes. F. Prerequisite: ECE 303/STAT 303 with a C- or better; ECE 312 with a C- or better.

- Bit-error rates, signal-to-noise power ration, signal detection, signal estimation, Wiener filter, application.

*ECE 516 03(3-0-0). Information Theory. S. Prerequisite: ECE 303/STAT 303; ECE 421.

- Information measures and their properties; lossless data compression; channel capacity; channel coding theorem; rate distortion theorem.

*ECE 520 03(3-0-0). Optimization Methods-Control and Communication. S. Prerequisite: MATH 229; MATH 317.

- Linear and nonlinear optimization theory and methods; applications in systems, control, and communication.

ECE 521 03(3-0-0). Satellite Communication. S. Prerequisite: ECE 421.

- Principles of satellite communication systems engineering.

ECE 524 03(3-0-0). Wireless Telecommunications. S. Prerequisite: ECE 421.

- Physical layer design, including channel modeling, receiver design and performance, and multiple access techniques.

a Alternate year offering (odd); b Alternate year offering (even); + Field trips; $ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCC subcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)
<table>
<thead>
<tr>
<th>Course Code</th>
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<th>Prerequisites</th>
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<tr>
<td>ECE 525</td>
<td>Fiber Optic Communications</td>
<td>S, SS. Prerequisite: ECE 471B. Optoelectronic and optical components for fiber optics; communications system physical layer issues and examples.</td>
<td>(NT-O)</td>
</tr>
<tr>
<td>ECE 526/Biom 526</td>
<td>Biological Physics</td>
<td>S. Prerequisite: MATH 340 or MATH 345, PH122 or PH142. Credit not allowed for both ECE 526 and BIOM 526. Mathematical and physical modeling of biological systems. Mass transport in cellular environments. Electrical/mechanical properties of biomolecules.</td>
<td>(NT-O)</td>
</tr>
<tr>
<td>ECE 530/ENGR 530</td>
<td>Overview of Systems Engineering Processes</td>
<td>F. S. Prerequisites: ECE 303/STAT 303 or STAT 315. Credit not allowed for both ECE 530 and ENGR 530. Systems engineering life-cycle process and analysis techniques. Reliability and robustness.</td>
<td>(NT-O)</td>
</tr>
<tr>
<td>ECE 531/ENGR 531</td>
<td>Engineering Risk Analysis</td>
<td>F. S. Prerequisite: ECE 303/STAT 303 or STAT 315. Credit not allowed for both ECE 531 and ENGR 531. Estimation and risk identification, development of mitigation techniques.</td>
<td>(NT-O)</td>
</tr>
<tr>
<td>ECE 532/ENGR 532</td>
<td>Dynamics of Complex Engineering Systems</td>
<td>F. S. Prerequisites: ENGR 501/ECE 501 or concurrent registration. Credit not allowed for both ECE 532 and ENGR 532. Higher-level behavior and issues that emerge from interaction between components in complex socio-technical systems.</td>
<td>(NT-O)</td>
</tr>
<tr>
<td>ECE 534</td>
<td>Analog Integrated Circuit Design</td>
<td>F. Prerequisite: ECE 332 with a C- or better; concurrent registration in ECE 535. Design methods for state-of-the-art analog integrated circuits, including CMOS op-amps, comparators, and phase-locked loops.</td>
<td>(NT-O)</td>
</tr>
<tr>
<td>ECE 535</td>
<td>Analog Integrated Circuit Laboratory</td>
<td>F. Prerequisite: Concurrent registration in ECE 534. Analog integrated circuits are designed and simulated using modern software tools.</td>
<td>(NT-O)</td>
</tr>
<tr>
<td>ECE 536</td>
<td>RF Integrated Circuit Design</td>
<td>F. Prerequisite: ECE 332. Design of state-of-the-art ICs for RF applications including CMOS low-noise amplifiers, voltage-controlled oscillators, mixers and power amplifiers.</td>
<td>(NT-O)</td>
</tr>
<tr>
<td>*ECE 537/Biom 537</td>
<td>Biomedical Signal Processing</td>
<td>S. Prerequisite: MATH 340 or ECE 311 or STAT 303. Credit not allowed for both ECE 537 and BIOM 537. Measuring, manipulating, and interpreting biomedical signals.</td>
<td>(NT-O)</td>
</tr>
<tr>
<td>*ECE 538</td>
<td>Design/Analysis of Analog Digital Interface</td>
<td>F. S. Prerequisite: ECE 312 with a C- or better; ECE 332 with a C- or better; ECE 451. Topics of interface circuit designs analog and digital interfaces. Basic concept of designing and analyzing analog and digital interface circuits.</td>
<td>(NT-O)</td>
</tr>
<tr>
<td>*ECE 540</td>
<td>Computational Electromagnetics</td>
<td>S. Prerequisite: ECE 342. Computational techniques for practical applications in electromagnetic fields, devices, scattering, propagation, and radiation.</td>
<td>(NT-O)</td>
</tr>
<tr>
<td>ECE 546</td>
<td>Laser Fundamentals and Devices</td>
<td>S. Prerequisite: ECE 441. Amplification of light, laser excitation mechanisms, laser devices, characteristics and design.</td>
<td>(NT-O)</td>
</tr>
<tr>
<td>ECE 548</td>
<td>Microwave Theory and Component Design</td>
<td>F. Prerequisite: ECE 342 with a C- or better. Fundamentals of microwave engineering, components, devices, and measurements.</td>
<td>(NT-O)</td>
</tr>
</tbody>
</table>

*Alternate year offering (odd); * Alternate year offering (even); + Field trips; $ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videocassette/DVD); GT-subcode = State Guarantee Transfer course and AUCC-subcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)
Observation/classification of systems architecture. Systems architecture principles and critical evaluation through design studies. (NT-O)

ECE 568/ENGR 568 03(3-0-0). Electrical Energy Generation Systems. F, S. Prerequisite: Written consent of instructor.

Energy systems: renewable and traditional. Physics and operation of energy devices; solar-photovoltaic, wind energy, gas, coal, and nuclear plants. (NT-O)

*ECE 569/MECH 569 03(3-0-0). Micro-Electro-Mechanical Devices. S. Prerequisite: ECE 531 with a C- or better or MECH 344. Credit not allowed for both ECE 569 and MECH 569.

Micro-electro-mechanical processes and applications in sensors, optics, and structures. (NT-O)

ECE 571 03(3-0-0). VLSI System Design. S. Prerequisite: ECE 451; concurrent registration in ECE 575.

Design of integrated circuits at the system level including design, digital systems, parallel architecture, systolic arrays. (NT-V)

ECE 572 01(1-0-0). Semiconductor Transistors. S. Prerequisite: ECE 331; ECE 471B. This is a partial-semester course. Credit not allowed for both ECE 572 and ECE 471.

Quantitative analysis of electric field, carrier and current distributions in MOSFETs and bipolar junction transistors; scaling, non-idealities. (NT-O)

ECE 573 03(1-4-0). Semiconductor Optoelectronics Laboratory. S. Prerequisite: ECE 471B.

Experimental characterization techniques for semiconductor optoelectronic devices and design and testing of related electronic circuits.

*ECE 574 03(3-0-0). Optical Properties in Solids. S. Prerequisite: ECE 441 with a C- or better.

Light propagation and interaction with materials; linear and nonlinear optical properties. (NT-O)

ECE 575 01(0-3-0). Experiments in VLSI System Design I. S. Prerequisite: ECE 451; concurrent registration in ECE 571.

Set of labs designed to enhance students’ understanding of the materials in ECE 571.

ECE 576 03(3-0-0). VLSI Processing-Science and Technology I. S. Prerequisite: ECE 472.

Physics, chemistry of VLSI processing including plasma, thermal techniques of oxidation, deposition; photolithography; etching; cleaning, process modeling. (NT-O)

*ECE 604 03(3-0-0). Nonlinear Optics. F. Prerequisite: ECE 504; PH 451.

Principles of nonlinear optics, symmetry properties, multiple order nonlinear phenomenon, and nonlinear spectroscopy. (NT-O)

ECE 611 03(3-0-0). Nonlinear Control Systems. F. Prerequisite: ECE 412.

Controller analysis and design for nonlinear systems. (NT-O)

*ECE 612 03(3-0-0). Robust Control Systems. S. Prerequisite: ECE 411.

Introduction to modern robust control theory techniques for analysis and design of large-scale uncertain multivariable systems. (NT-O)

*ECE 614 03(0-0-0). Principles of Digital Communications. S. Prerequisite: ECE 514.

Information theory, optimal receiver design, waveform coding, error correcting coding. (NT-O)

ECE 621/ENGR 621 03(3-0-0). Energy Storage for Electrical Power Systems. F, S. Prerequisite: Written consent of instructor. Credit not allowed for both ECE 621 and ENGR 621.

Physics and operation of electrical, mechanical, thermal and novel energy storage systems/devices. (NT-O)

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B) Performance evaluation and modeling. C) Distributed systems.

D) Architecture of advanced systems.

ECE 672/PH 672 03(3-0-0). Principles of Semiconductors. S. Prerequisite: ECE 471B or PH 531. Credit not allowed for both ECE 672 and PH 672.
Electronic properties of semiconductors: band structure, statistics, transport properties, photoelectronic properties, potential barriers, interfaces.

*ECE 673 03(3-0-0). Thin Film Growth. F. Prerequisite: One course in thermodynamics.
Microstructures of physically vapor-deposited films; thin-film morphological development; atomistic processes of condensation, nucleation, and growth.

*ECE 674/*CS 674 03(3-0-0). Heterogeneous Computing. S. Prerequisite: CS 551 or CS 570 or CS 575 or ECE 550 or ECE 554. Credit not allowed for both ECE 674 and CS 674.
Allocation of resources to tasks in parallel and distributed heterogeneous computing systems. A variety of computational environments are considered.

ECE 695 Var. Independent Study.

ECE 697/ENGR 697 Var[1-6]. Group Study. F, S, SS.


*ECE 721 03(3-0-0). Topics in Communication Theory. F. Prerequisite: ECE 521.
Detection and estimation theory; radar-sonar problems; nonlinear modulation; information theory; communication systems.

*ECE 742 03(3-0-0). Topics in Electromagnetics. S. Prerequisite: ECE 641.
Applications of wave propagation and scattering to microwave radar, Doppler radar, meteorological radar applications.

*ECE 744 03(3-0-0). Topics in Plasma Dynamics. S. Prerequisite: None.
Kinetic equations, nonlinear theory of waves and instabilities; plasma fluctuation and radiations; plasma diagnostics and plasma heating.

*ECE 752 03(3-0-0). Topics in Signal Processing. F. Prerequisite: ECE 512; ECE 514 or STAT 525.
Adaptive filtering, spectral estimation, sonar/radar signal processing, and detection/classification schemes.

*ECE 777 03(3-0-0). X-ray Lasers. S. Prerequisite: ECE 546.
Fundamentals, design, and implementation of soft X-ray lasers and X-ray optics.

ECE 795 Var. Independent Study.

ECE 799 Var. Dissertation.

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ECOL 505 02(2-0-0). Foundations of Ecology. F. Prerequisite: One course in ecology.
   Overview of the science of ecology; what questions are asked, how they are answered.

ECOL 571 Var[1-3]. Advanced Topics in Ecology. S. Prerequisite: One course in ecological principles.
   Current research topics presented and analyzed by visiting scientists.

ECOL 592 Var[1-3]. Interdisciplinary Seminar in Ecology. F, S. Prerequisite: One 300- or 400-level course in ecology.
   Concepts and principles of basic and applied ecology in an interdisciplinary context.

ECOL 600 03(2-0-1). Community Ecology. S. Prerequisite: One course in general ecology, calculus, and statistics.
   Current theories and tests of the dynamics and regulation of plant and animal communities.

*ECOL 610 03(3-0-0). Ecosystem Ecology. F. Prerequisite: LIFE 320 or any ECOL course.
   Concepts, methods, issues in ecosystem science: energy and matter cycling, systems perspectives, simulation modeling, sustainability, global change.

*ECOL 620 04(2-2-1). Applications in Landscape Ecology. F. Prerequisite: Previous coursework in geographic information systems, ecology, statistics, and mathematics.
   Spatial patterning of landscape elements and dynamics of ecological systems; spatial heterogeneity. Influence on biotic and abiotic processes.

ECOL 693 01(0-0-1). Research Seminar. Prerequisite: Written consent of instructor.
   Critique of research programs, plans, and ecological theory.

ECOL 695 Var. Independent Study.

ECOL 698 Var. Research.
   Non-thesis research in ecology.


ECONOMICS COURSES
Department of Economics
College of Liberal Arts

ECON 101 03(3-0-0). Economics of Social Issues. (GT-SS1, AUCC 3C). F, S, SS. Prerequisite: None.
Economic analysis of poverty, crime, education, and other social issues. Basics of macro, micro, and political economy.

ECON 202 03(2-0-1). Principles of Microeconomics. (GT-SS1, AUCC 3C). F, S, SS. Prerequisite: MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160. Credit not allowed for both ECON 202 and AREC 202.
Introduction to decision-making by households, firms, and government, and resulting allocation of resources through markets. (NT-O)

ECON 204 03(2-0-1). Principles of Macroeconomics. (GT-SS1, AUCC 3C). F, S, SS. Prerequisite: AREC 202 or ECON 202; MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160.
Determinants of national output, employment, and price level; inflation and unemployment; fiscal and monetary policy. (NT-O)

ECON 211 03(3-0-0). Gender in the Economy. (GT-SS1, AUCC 3E). F, S, SS. Prerequisite: None.
Role gender plays in economies; the way gender affects economic outcomes for individuals and societies. (NT-O)

ECON 212 03(3-0-0). Racial Inequality and Discrimination. (GT-SS1, AUCC 3C). F. Prerequisite: None.
Economic inequality between Afro-Americans and Euro-Americans. Debates about causes, consequences, and remedies.

ECON 240/AREC 240 03(3-0-0). Issues in Environmental Economics. (GT-SS1, AUCC 3C). F, S, SS. Prerequisite: None. Credit not allowed for both ECON 240 and AREC 240.
Discussion and economic analysis of current environmental issues with special emphasis on the impact of economic growth. (NT-C/O)

ECON 304 03(3-0-0). Intermediate Macroeconomics. F, S, SS. Prerequisite: ECON 204; MATH 141 or MATH 155 or MATH 160.
Theory of national income, its measurement and determinants; analysis of inflation, growth, debt, and public policy. (NT-C/O)

ECON 306 03(3-0-0). Intermediate Microeconomics. F, S, SS. Prerequisite: AREC 202 or ECON 202; MATH 141 or MATH 155 or MATH 160.
Analysis of competitive and noncompetitive markets in terms of efficiency of resource utilization. (NT-O)

ECON 310 03(3-0-0). Poverty and the Welfare State. S, SS. Prerequisite: AREC 202 or ECON 101 or ECON 202.
Description and analysis of U.S. poverty; the “underclass”; feminization of poverty; working poor; the welfare state.

ECON 315 03(3-0-0). Money and Banking. F, S, SS. Prerequisite: ECON 204.
Monetary theory and policy; description of financial institutions and markets. (NT-O)

ECON 320 03(3-0-0). Economics of Public Finance. F, S, SS. Prerequisite: ECON 204.
Impact of taxes, government expenditures on allocation of resources, distribution of income; evaluation of government expenditure program; tax policies. (NT-O)

ECON 325 03(3-0-0). Health Economics. S. Prerequisite: AREC 202 or ECON 202.
Economic analysis of health care markets, health insurance markets, and public policy regarding health care.

ECON 327 03(3-0-0). Law and Economics. F. Prerequisite: ECON 202 or AREC 202.
Economic analysis of the common law.

ECON 332/POLS 332 03(3-0-0). International Political Economy. F, S. Prerequisite: AREC 202 or ECON 202; POLS 232. Credit not allowed for both ECON 332 and AREC 332.
Theories on relations between international politics and economics. Policy implications of different theories and case studies.

ECON 335/AREC 335 03(3-0-0). Introduction to Econometrics. F, S. Prerequisite: ECON 204; MATH 141 or MATH 155 or MATH 160; STAT 201 or STAT 204 or STAT 301 or STAT 307. Credit not allowed for both ECON 335 and AREC 335.
Estimating statistical regression models of economic relationships; treatment of special problems that may arise in analysis of economic data. (NT-O)

ECON 340/AREC 340 03(3-0-0). Introduction: Economics of Natural Resources. S. Prerequisite: AREC 202 or ECON 202. Credit not allowed for both ECON 340 and AREC 340.
Concepts, theories, institutions; analytical methods for economic evaluation of alternative resource use patterns and land use plans.

ECON 344 03(3-0-0). Economics of Energy Resources. S. Prerequisite: AREC 202 or ECON 202.
Supply, consumption trends and projected demand for alternative energy resources in domestic and world perspective; economics of public energy policies.

ECON 346/A REC 346 03(3-0-0). Economics of Outdoor Recreation. F. Prerequisite: AREC 202 or ECON 202. Credit not allowed for both ECON 346 and AREC 346.
Benefit cost framework in public planning for outdoor recreation, pricing problems, projecting demand, and regional economic development.

ECON 370 03(3-0-0). Comparative Economic Systems. F. Prerequisite: AREC 202 or ECON 101 or ECON 202.
Place of the economy in different societies; nature and evolution of capitalism; crisis of command economies and capitalist restoration.

ECON 372 03(3-0-0). History of Economic Institutions and Thought. F, S. Prerequisite: AREC 202 or ECON 101 or ECON 202.
Origins and development of capitalist institutions including contemporary issues of alienation, loss of community, and changing values. (NT-O)

ECON 376 03(3-0-0). Marxist Economic Thought. S. Prerequisite: AREC 202 or ECON 101 or ECON 202.
Marxist critique of capitalism and orthodox economics in both its original 19th-century and contemporary settings.

ECON 379/HIST 379 03(3-0-0). Economic History of the United States. S. Prerequisite: AREC 202 or ECON 101 or ECON 202 or any two courses in American history; completion of 45 credits. Credit not allowed for both ECON 379 and HIST 379.
Economic analysis of growth and welfare from beginning of industrialization to present.

ECON 404 03(3-0-0). Macroeconomic Policy. S. Prerequisite: ECON 304.
Alternative macroeconomic policies, policy coordination; application to current macroeconomic problems, policies, proposals.

ECON 410 03(3-0-0). Labor Economics. S. Prerequisite: ECON 306.
Capital/labor relationship; supply, demand of labor; wage determination; role of unions; unemployment and instability; structure of modern working class.

ECON 435 03(3-0-0). Economic Forecasting. S. Prerequisite: AREC 335/ECON 335 or STAT 340; ECON 204.

Alternate year offering (odd); * Alternate year offering (even); f Field trips; S Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)
Theory and techniques used in economic forecasting as practiced by economists in industry, government, and academic life.

ECON 440 03(3-0-0). International Economics I. F. Prerequisite: ECON 306.
Theory of international trade; payments, commercial policies, and economic integration. (NT-O)

ECON 442 03(3-0-0). International Economics II. F, S, SS. Prerequisite: ECON 304.
Balance of payments, adjustment mechanisms, and international monetary systems. (NT-O)

ECON 460 03(3-0-0). Economic Development. F. Prerequisite: ECON 304.
Economic problems of underdeveloped nations. (NT-O)

ECON 463 03(3-0-0). Regional Economics-Tools/Analysis/Policy. F, S, SS. Prerequisite: ECON 306.
Introduction to economic importance of location for firms, consumers, and policy makers. Basic tools, applications, and student research. (NT-O)

ECON 474 03(3-0-0). Recent Economic Thought. S. Prerequisite: ECON 304; ECON 306.
Nontraditional schools of economic thought, such as institutionalism and neo-Marxism, that critique neoclassical economic theory.

ECON 484 var[1-3]. Supervised College Teaching. F, S, SS. Prerequisite: Written consent of instructor. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.
Assistance in teaching introductory economics courses.

ECON 487 var[1-3]. Internship.

ECON 492 03(0-0-3). Seminar. F, S, SS. Prerequisite: Senior status.
Summarizes, debates, and applies issues and policies chosen by the instructor. Emphasis on student participation, debate, and research.

ECON 495 var. Independent Study.

ECON 501 03(3-0-0). Quantitative Methods for Economists. F. Prerequisite: MATH 141 or MATH 155 or MATH 160.
Quantitative methods essential for graduate study in economics; functional forms, optimization, matrix methods, topological modeling.

ECON 504 03(3-0-0). Applied Macroeconomics. S. Prerequisite: ECON 304; ECON 306.
Application of macroeconomic models to economic growth, economic fluctuations, and policy analysis.

ECON 505 03(3-0-0). History of Economic Thought. F. Prerequisite: Graduate status.
History of economic thought as a foundation for studying economic theory.

ECON 506/AREC 506 03(3-0-0). Applied Microeconomic Theory. F. Prerequisite: ECON 306. Credit not allowed for both ECON 506 and AREC 506.
Introduction to mathematical models in modern microeconomics, including choices and demand, production and supply, and market structures and failures.

*ECON 510 03(3-0-0). Labor Market Analysis. F. Prerequisite: ECON 304; ECON 306.
Determination of wages and employment. Focus on theoretical and applied controversies.

*ECON 515 03(3-0-0). Financial Institutions-Structure/Regulation. F. Prerequisite: None.
Regulation of financial institutions in the U.S.; international banking and international financial institutions, and financial modernization.

ECON 520 03(3-0-0). Public Economics I. S. Prerequisite: ECON 506.
Analysis and evaluation of tax policy in terms of efficiency and equity.

*ECON 530/AREC 570 03(3-0-0). Methodology of Economic Research. F. Prerequisite: ECON 304; ECON 306. Credit not allowed for both ECON 530 and AREC 570.
Philosophical foundations of science and research. Concepts and skills for planning, performing, reporting, and evaluating economic research.

ECON 535/AREC 535 03(3-0-0). Applied Econometrics. F. Prerequisite: AREC 335/ECON 335; ECON 304 or ECON 306; Credit not allowed for both ECON 535 and AREC 535.
Econometric techniques applied to testing and quantification of theoretical economic relationships drawn from both microeconomics, macroeconomics.

ECON 540/AREC 540 03(3-0-0). Economics of Natural Resources. F. Prerequisite: ECON 340/AREC 340; MATH 141. Credit not allowed for both ECON 540 and AREC 540.
Public natural resources policy, effect on resource use in private sector, optimal pricing of minerals, timber and fisheries, public project analysis.

ECON 541/AREC 541 03(3-0-0). Environmental Economics. S. Prerequisite: ECON 306. Credit not allowed for both ECON 541 and AREC 541.
Economics of environmental policy; partial equilibrium and general equilibrium model; pollution; natural environments; population and economic growth.

ECON 563/AREC 563 03(3-0-0). Regional Economics-Theory, Methods, and Issues. F. Prerequisite: ECON 306; ECON 501 or concurrent registration. Credit not allowed for both ECON 563 and AREC 563.
Tools and methods of regional economics, including supply, demand, and externality analyses. Applications to current urban and regional policy issues.

*ECON 570 03(3-0-0). Evolution of Economic Thought. F. Prerequisite: ECON 304; ECON 306.
From Plato and Aristotle to the modern period.

ECON 604 03(3-0-0). Macroeconomic Analysis I. S. Prerequisite: ECON 304; ECON 501.
Theoretical and empirical analysis of short-run and long-run macroeconomic performance across countries using dynamic models.

ECON 606/AREC 606 03(3-0-0). Microeconomic Analysis I. S. Prerequisite: ECON 306; ECON 501. Credit not allowed for both ECON 606 and AREC 606.
Advanced price/allocation theory; consumer/producer decisions; uncertainty; market structure; partial/general equilibrium; efficiency/welfare.

ECON 635/AREC 635 03(3-0-0). Econometric Theory I. F. Prerequisite: AREC 535/ECON 535; ECON 501 or concurrent registration. Credit not allowed for both ECON 635 and AREC 635.
Theory of mathematical statistics and classical linear regression model in context of economic application.

ECON 640 03(3-0-0). International Trade Theory. F. Prerequisite: ECON 306 or ECON 506.
Theory of international trade including comparative advantage, factor growth, market distortions, and commercial policy.

ECON 663 03(3-0-0). Urban and Regional Modeling. S. Prerequisite: ECON 506.
Methodological approaches in regional economics: general equilibrium, input-output, compatible general equilibrium models; social accounting matrices.

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ECON 695 Var. Independent Study.

ECON 698 03(0-0-3). Research—Technical Paper. F, S, SS. Prerequisite: ECON 504; ECON 506; ECON 705; ECON 735/AREC 735.


ECON 704 03(3-0-0). Macroeconomic Analysis II. F. Prerequisite: ECON 604.
  Theoretical and empirical frameworks for analyzing macroeconomic policies and their impact on economic growth, employment, and income distribution.

ECON 705 03(3-0-0). Heterodox Approaches to Economics. S. Prerequisite: ECON 505.
  Contemporary heterodox approaches to economic research.

ECON 706/AREC 706 03(3-0-0). Microeconomic Analysis II. F. Prerequisite: ECON 606. Credit not allowed for both ECON 706 and AREC 706.
  Advanced topics in microtheory: game theory; market imperfections; adverse selection; principal-agent problems; social choice theory; incentives, etc.

ECON 715 03(3-0-0). Monetary Economics. F. Prerequisite: ECON 504.
  Principle issues of monetary theory: money supply and demand, interest rates, and current problems of monetary policy.

ECON 720 03(3-0-0). Public Economics II. F. Prerequisite: ECON 506.
  Analysis of welfare foundations of public expenditure, including cost-benefit analysis.

ECON 735/AREC 735 02(2-0-0). Econometric Theory II. S. Prerequisite: AREC 635/ECON 635. Credit not allowed for both ECON 735 and AREC 735. This is a partial-semester course.
  Econometrics models and estimators in econometrics, from fully parametric to semiparametric and nonparametric approaches.

ECON 736/AREC 736 A-C 01(1-0-0). Advanced Econometric Methods. S. Prerequisite: AREC 735/ECON 735 or concurrent registration. Credit not allowed for both ECON 736A-C and AREC 736A-C. This is a partial-semester course.

ECON 742 03(3-0-0). International Production and Monetary Theory. S. Prerequisite: ECON 304 or ECON 504.
  Factor movements, theory of international production (multinationalism), balance of payments, and international monetary system.

*ECON 760 03(3-0-0). Theories of Economic Development. S. Prerequisite: ECON 460.
  Analysis of fundamentals of economic development (processes, problems, and strategies) with special reference to developing nations.

*ECON 770 03(3-0-0). Economic Thought and Systems. S. Prerequisite: ECON 570.
  Aspects of modern economic thought and comparative economics selected according to backgrounds and interests of the class.

ECON 771 03(3-0-0). Political Economy of Race and Gender. F, S. Prerequisite: Graduate status.
  Economic approaches to inequality based on race/ethnicity, gender, and class.

ECON 772 03(3-0-0). Marxian Political Economy. F. Prerequisite: ECON 505.
  Marxian method, relevance of Marxian approach, and relation to other economic approaches.

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### ADULT EDUCATION COURSES

**School of Education**  
**College of Health and Human Sciences**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Prerequisite</th>
<th>Syllabus</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDAE 495</td>
<td>Var. Independent Study-Adult Education.</td>
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<tr>
<td>EDAE 520</td>
<td>03(0-0-3). Adult Education.</td>
<td>None</td>
<td>Philosophical foundations, a description of program service areas, adult participation trends, and current issues. (NT-O, V)</td>
</tr>
<tr>
<td>EDAE 586</td>
<td>Var. Practicum.</td>
<td>None</td>
<td>Participation in field experiences relevant to study program and objectives. (NT-O, V)</td>
</tr>
<tr>
<td>EDAE 590</td>
<td>Var. Workshop.</td>
<td>None</td>
<td>Specially designed learning situations to provide opportunities for concentrated problem-solving experiences. (NT-O)</td>
</tr>
<tr>
<td>EDAE 601</td>
<td>03(3-0-0). Philosophy/Organization of Workforce Education</td>
<td>None</td>
<td>Principles, philosophy, practices, and innovations of workforce education and human resources. (NT-O/V)</td>
</tr>
<tr>
<td>EDAE 620</td>
<td>03(0-0-3). Processes and Methods.</td>
<td>None</td>
<td>Processes and methods including helping theories used by adult learning facilitators. (NT-O)</td>
</tr>
<tr>
<td>EDAE 624</td>
<td>03(0-0-3). Adult Teaching and Learning I.</td>
<td>EDAE 520</td>
<td>Using theory and best practices to design and deliver instruction for adults. (NT-O)</td>
</tr>
<tr>
<td>EDAE 629</td>
<td>03(0-0-3). Program Development.</td>
<td>None</td>
<td>Models for planning, implementing, and evaluating programs for adult learners. (NT-O)</td>
</tr>
<tr>
<td>EDAE 639</td>
<td>03(1-0-2). Instructional Design.</td>
<td>None</td>
<td>Apply instructional design principles in the development of a course or workshop and explore application of various learning methods. (NT-O)</td>
</tr>
<tr>
<td>EDAE 668</td>
<td>03(1-0-2). Cognitive Theory and Learning Transfer.</td>
<td>EDAE 620; EDAE 624</td>
<td>Investigation of learning processes and training strategies that lead to application of learning outside of the classroom. (NT-B/O)</td>
</tr>
<tr>
<td>EDAE 687</td>
<td>Var. Internship.</td>
<td></td>
<td>Career or job fieldwork experience with an adult education institution, agency, or program.</td>
</tr>
<tr>
<td>EDAE 692</td>
<td>Var. Seminar-Adult Education.</td>
<td></td>
<td>(NT-O)</td>
</tr>
<tr>
<td>EDAE 695</td>
<td>Var. Independent Study.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EDAE 698</td>
<td>Var. Research.</td>
<td>EDAE 520; EDAE 624; EDRM 600</td>
<td></td>
</tr>
<tr>
<td>EDAE 699</td>
<td>Var. Thesis.</td>
<td>EDAE 520; EDAE 624; EDRM 600</td>
<td></td>
</tr>
<tr>
<td>EDAE 724</td>
<td>03(0-0-3). Adult Teaching and Learning II.</td>
<td>None</td>
<td>Adult teaching and learning, alternative delivery systems, performance technology, and faculty evaluation.</td>
</tr>
</tbody>
</table>

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COMMUNITY COLLEGE EDUCATION COURSES

School of Education
College of Health and Human Sciences

EDCL 675 03(3-0-0). The Community College. SS. Prerequisite: None.
Role and scope of community college: history, philosophy, organization, administration.

EDCL 687 Var. Internship.

EDCL 701 03(0-0-3). Higher Education Law. S. Prerequisite: None.
Legal theory, analysis, and review of cases relevant to higher education. (NT)

EDCL 702 03(2-0-1). Community College Curriculum. F. Prerequisite: None.
Investigation and research of critical curricular issues affecting the community college now and in the future.

EDCL 703 03(2-0-1). Community College Leadership. S. Prerequisite: EDCL 675.
Investigation and research of critical leadership issues affecting the community college now and in the future.

EDCL 750 03(0-0-3). Simulated Presidential Cabinet I. SS. Prerequisite: EDCL 701; EDUC 710.
Issues and challenges relating to students, faculty, instructional programs, noninstructional programs, and instructional delivery.

EDCL 751 03(0-0-3). Simulated Presidential Cabinet II. SS. Prerequisite: EDCL 701; EDUC 710.
Issues and challenges relating to internal/external governances, legal authority, institutional revenues, expenditures and insurances, human resources.

EDCL 792 Var [1-6]. Seminar. F.


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# COUNSELING AND CAREER DEVELOPMENT COURSES

## School of Education

## College of Health and Human Sciences

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Term(s)</th>
<th>Prerequisites</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDCO 500</td>
<td>Career and Employment Concepts</td>
<td>F.</td>
<td>Bachelor’s degree.</td>
<td>Career and lifestyle studies that provide an understanding of career development, employment concepts, and career counseling resources. (NT-O)</td>
</tr>
<tr>
<td>EDCO 550</td>
<td>Professional School Counseling</td>
<td>S.</td>
<td>Admission to Counseling and Career Development Program or approval of instructor.</td>
<td>History, professionalism, ethics, program planning and program development of school counseling programs.</td>
</tr>
<tr>
<td>EDCO 552</td>
<td>School Counseling Program Delivery/ Evaluation</td>
<td>F.</td>
<td>EDCO 550.</td>
<td>Effective school counseling program development, delivery, and evaluation.</td>
</tr>
<tr>
<td>EDCO 590</td>
<td>Var. Workshop.</td>
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<tr>
<td>EDCO 625</td>
<td>Foundations of Counseling</td>
<td>F.</td>
<td>Bachelor’s degree.</td>
<td>Foundations and techniques of individual guidance and counseling.</td>
</tr>
<tr>
<td>EDCO 650</td>
<td>Individual Guidance and Counseling</td>
<td>F.</td>
<td>EDCO 625.</td>
<td>Theories of individual counseling and development.</td>
</tr>
<tr>
<td>EDCO 651</td>
<td>Group Guidance and Counseling</td>
<td>S.</td>
<td>EDCO 650.</td>
<td>Theory and techniques of group guidance and counseling.</td>
</tr>
<tr>
<td>EDCO 652</td>
<td>Ethics in Counseling/Career Development</td>
<td>S.</td>
<td>Admission to Counseling and Career Development Program.</td>
<td>Awareness and critical analysis of ethical and legal issues in counseling and career development.</td>
</tr>
<tr>
<td>EDCO 656</td>
<td>Tests and Assessment</td>
<td>SS.</td>
<td>None.</td>
<td>Use of tests in educational, vocational, and counseling assessment. (S)</td>
</tr>
<tr>
<td>EDCO 660</td>
<td>Career Development Counseling</td>
<td>S, SS.</td>
<td>EDCO 500.</td>
<td>Career development programs and processes over the life span with particular attention to career choice.</td>
</tr>
<tr>
<td>EDCO 662</td>
<td>Counseling Children and Adolescents</td>
<td>SS.</td>
<td>Admission to M.Ed. Counseling and Career Development program.</td>
<td>Counseling theories and interventions applied to the child and adolescent client population.</td>
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<tr>
<td>EDCO 686</td>
<td>Var. Practicum.</td>
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<tr>
<td>EDCO 687</td>
<td>Var. Internship.</td>
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<tr>
<td>EDCO 692</td>
<td>Seminar-Brief Counseling</td>
<td>S, SS.</td>
<td>EDCO 650; EDCO 652; proof of professional counseling liability insurance.</td>
<td>Blends theory of brief counseling with practice. Individualized for application in the student’s counseling setting.</td>
</tr>
<tr>
<td>EDCO 693</td>
<td>Var. Seminar.</td>
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<tr>
<td>EDCO 696</td>
<td>Var. Group Study.</td>
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CAREER AND TECHNICAL EDUCATION COURSES
School of Education
College of Health and Human Sciences

EDCT 300 02(0-0-0-2). Principles of Career and Technical Education. F, S, SS. Prerequisite: None. Offered only through Continuing Education, School of Education. History, purpose, administration, funding, programs, services, and delivery of career and technical education within educational systems. (NT-O)

EDCT 370 03(3-0-0). Laboratory Management, Safety, and Liability. S, SS. Prerequisite: None. Organization and management of learning laboratories. Approved principles and practices of classroom and laboratory safety including impact of accidents.

EDCT 387 Var. Internship. Coordinated and supervised experiences in business, industry, or agriculture selected to strengthen the intern's specialty through experience.

EDCT 400 02(2-0-0). Building Student Organizations/Partnerships. F, S, SS. Prerequisite: None. Credit not allowed for both EDCT 400 and EDCT 402. Techniques and methods to implement and advise student leaders; establish and nurture business/industry partners and work-based experiences. (NT-O)

EDCT 403 02(0-0-2). Coordination Techniques of Cooperative Programs. F, S, SS. Prerequisite: None. Offered only through Continuing Education, School of Education. Techniques and methods employed in organization, development, and maintenance of a cooperative program. (NT)

EDCT 420 03(3-0-0). Agricultural Experience and Adult Education. S. Prerequisite: None. Developing secondary agriculture experience programs. Organizing and teaching adult education classes in agriculture.

EDCT 425 04(4-0-0). Methods/Materials in Agricultural Education. F. Prerequisite: Concurrent registration in EDCT 492; EDUC 350 or concurrent registration or EDUC 450 or concurrent registration. Methods and procedures in teaching and evaluating agricultural education in the classroom and laboratory; vocational foundations; microteaching.

EDCT 431 04(4-0-0). Methods/Materials in Business Education. F. Prerequisite: Concurrent registration in EDCT 492; EDUC 350 or concurrent registration or EDUC 450 or concurrent registration. Methods for teaching business education. (NT-O)

EDCT 441 01(1-0-0). Methods/Materials-Vocational Marketing Education. F. Prerequisite: EDCT 431; EDUC 350 or concurrent registration or EDUC 450 or concurrent registration. Instructional methods and resource materials development for vocational marketing education. (NT-O)

EDCT 451 04(3-2-0). Methods-Family/Consumer Sciences Education. F. Prerequisite: EDUC 350 or concurrent registration or EDUC 450 or concurrent registration. Teaching methods, processes, and materials for family and consumer sciences education.

EDCT 465 03(3-0-0). Methods and Materials in Technology Education. F. Prerequisite: EDUC 350 or concurrent registration or EDUC 450 or concurrent registration. Strategies and practices of teaching in a technical laboratory setting.

EDCT 471 02(2-0-0-0). Orientation and Assessment of New Teachers. F, S, SS. Prerequisite: None. Offered only through Continuing Education, School of Education. Orientation to teaching and individual assessment of teaching skills: development and implementation of professional growth plan. (NT)

EDCT 472 01(0-0-1-1). Classroom Management. F, S, SS. Prerequisite: Admission to TAP; EDCT 471. Offered only through Continuing Education, School of Education. Introduction to student management techniques and program management. Teachers will create a preliminary plan for instruction. (NT)

EDCT 473 01(0-0-1). Communication Strategies. F, S, SS. Prerequisite: Admission to TAP; EDCT 471. Offered only through Continuing Education, School of Education. Introduction to improved communication techniques, conflict resolution, performing occupational advisement, and facilitating leadership activities. (NT)

EDCT 485 Var. Student Teaching. F, S. Prerequisite: EDUC 450; appropriate special (content) methods courses. Teacher education candidates participate in an intensive and extensive on-site capstone experience within a public school setting. (S)

EDCT 486 Var[1-6]. Practicum. Prerequisite: Admission to teacher licensure.

EDCT 492 Var. Seminar-Professional Relations. F, S, SS. Prerequisite: EDUC 450; appropriate special (content) methods course; concurrent registration in EDCT 485. Collegial and professional discussions, support, and assistance.

EDCT 494 Var. Independent Study.

EDCT 496 Var. Group Study.

EDCT 520 Var. Teaching Agricultural Education. SS. Prerequisite: Admission to teacher licensure. Methods of teaching recent developments in the field of agriculture and allied industries.

EDCT 571 03(0-0-3). Vocational Assessment for Special Needs. F, S, SS. Prerequisite: None. Information on techniques regarding vocational assessment of special needs students including traditional and curriculum-based strategies. (NT-O)

EDCT 590 Var. Workshop.

EDCT 612 03(0-0-3). Career and Technical Administrative Strategies. F, S, SS. Offered only through Continuing Education, School of Education. Basic educational systems; the scientific method as a basis for analysis; systems as a tool for planning and decision making. (NT)

*EDCT 630 02(2-0-0). Organization of Business Education. SS. Prerequisite: EDCT 300. Procedures for organizing new programs and for managing or modifying existing programs. (NT-O)

*EDCT 631 02(2-0-0). Management of Business Departments. SS. Prerequisite: EDCT 300. Preparation of teachers and administrators for implementation of vocational business and office education programs. (NT-O)

*EDCT 640 02(2-0-0). Methods in Marketing Education. SS. Prerequisite: EDCT 441. Instruction and curricula for secondary and postsecondary vocational marketing education. (NT-O)

*EDCT 641 02(2-0-0). Programs in Marketing Education. SS. Prerequisite: EDCT 441.

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Techniques used in determining need for and implementations of new or additional programs of vocational marketing education. (NT-O)

EDCT 693 Var. Seminar.

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EDHE 590A-M 01(0-0-1). Workshop-Student Personnel. 
Prerequisite: Enrollment in SAHE program. 

EDHE 660 02(1-0-1). Financial Management in Student Affairs. F, S. Prerequisite: Written consent of instructor. 
Budgeting, fiscal planning, and financial administration in student affairs. (NT-O)

EDHE 661 03(3-0-0). Inclusive University. F, S. Prerequisite: 
Enrollment in SAHE program. 
Exploration of broad range of human differences and their impact in higher education. (NT-O)

EDHE 662 02(2-0-0). Trends/Issues/Assessment in Higher Education. F, S. Prerequisite: Enrollment in SAHE program. 
Assessment and research involving students in collegiate settings. (NT-O)

EDHE 670 03(0-0-3). College Student Personnel Administration. F, S. Prerequisite: Written consent of instructor. 
Historical, philosophical, and professional development in student affairs functions; analysis of role of student affairs in higher education. (NT-O)

EDHE 671 03(3-0-0). Higher Education Administration. F, S, SS. Prerequisite: None. 
History, purpose, structure, and role of leadership within the administration of higher education with relevance to present day higher education. (NT-O)

EDHE 672 02(2-0-0). Ethical and Practical Issues-Student Affairs. F, S. Prerequisite: Enrollment in SAHE program. 
Ethical principles and standards used in student affairs. (NT-O)

EDHE 673 03(0-0-3). Student Development Theory. F, S. Prerequisite: None. 
Strategies for application of student development theories in practice. (NT-B)

EDHE 674 03(3-0-0). Campus Ecology. SS. Prerequisite: None. 
Patterns of relationships among students and the college campus social and physical environments. (NT-O)

EDHE 675 03(3-0-0). Campus Crisis Management. F. Prerequisite: 
Bachelor’s degree. Offered only online. 
Crisis management on college campuses. (NT-O)

EDHE 676 03(3-0-0). Organizational Behavior in Student Affairs. S, SS. Prerequisite: Enrollment in SAHE program. 
Understanding and application of basic organizational behavior principles within administration of student affairs in higher education. (NT-O)

EDHE 677 03(3-0-0). Law in Student Affairs. F, S. Prerequisite: 
Enrollment in SAHE program. 
Legal issues focusing on sources and application of educational law and responsibilities of higher education administrators. (NT-O)

EDHE 678 02(2-0-0). Current Issues in Student Affairs. S, SS. Prerequisite: Enrollment in SAHE program. 
Capstone analyzing current issues and leadership in transition to professional roles. (NT-O)

EDHE 692A-D Var. Seminar. Prerequisite: Enrollment in SAHE program. 

EDHE 694 Var. Independent Field Studies.

EDHE 695 Var. Independent Study.
**Establish Relations, Diagnose Organizations.**

Prerequisite: Admission to the Organizational Learning, Performance and Change specialization or written consent of instructor.

Build relationships with clients and examine current practices to diagnose organizational learning and performance issues. (NT-O)

**Contextualize Workplace Learning.**

Prerequisite: Admission to OPC specialization.

Analyze workplace learning and performance issues drawing on foundational principles. (NT-O)

**Plan and Implement Change Interventions.**

Prerequisite: Admission to the Organizational Learning, Performance and Change specialization or written consent of instructor.

Plan strategies and facilitate change interventions to improve organizational learning and performance. (NT-O)

**Analyze Workplace Learning.**

Prerequisite: Admission to the Organizational Learning, Performance and Change specialization or written consent of instructor.

Analyze workplace learning and performance issues drawing on foundational principles. (NT-O)

**Design, Develop, Implement Workplace Learning.**

Prerequisite: Admission to the Organizational Learning, Performance and Change specialization or written consent of instructor.

Design, develop, and implement workplace learning and performance interventions drawing on foundational principles. (NT-O)

**Evaluate Workplace Learning.**

Prerequisite: Admission to the Organizational Learning, Performance and Change specialization or written consent of instructor.

Evaluate workplace learning and performance interventions drawing on foundational principles. Examine satisfaction, learning, and performance results. (NT-O)

**Action Learning and Inquiry.**

Prerequisite: Admission to the Organizational Learning, Performance and Change specialization or written consent of instructor.

Literature reviews and data collection methods as the basis for diagnosing organizational learning and performance issues. (NT-O)

**Assess Change Interventions.**

Prerequisite: Completion of a minimum of 15 500-level or above EDOD credits or written consent of instructor.

Assess and institutionalize change interventions to improve organizational learning and performance. (NT-O)

**Var. Internship**

EDOD 692A-B 03(0-0-3). Seminar: HRD Concepts. F, S, SS. Prerequisite: Admission to the Organizational Learning, Performance and Change specialization.

A) Workplace Learning. (NT-O) B) Organizational Learning. (NT-O)

EDOD 706 03(2-0-1). Organizational Learning, Performance, Change. F. Prerequisite: Admission to the Organizational Learning, Performance, and Change specialization (OLPC), Education and Human Resource Studies Ph.D.

History, development and current status of organizational learning, performance and change theory, research and practice (praxis). (NT-B)

EDOD 761 03(2-0-1). Evaluation and Assessment of Interventions. S. Prerequisite: EDOD 706; EDOD 768.

Evaluation and assessment of organizational learning, performance and change (OLPC) interventions. (NT-B)

EDOD 765 03(3-0-0). Strategic Planning of Education for Work. F. Prerequisite: Admission to OPC specialization.

Human capital as component of strategic planning of education; training and development at national, regional, and organizational levels. (NT-B)

EDOD 766 03(2-0-1). Scenario Planning in Organizations. SS. Prerequisite: EDOD 761; EDOD 769.

Theory and practice of scenario planning. Application of scenario planning in organizations. (NT-B)

EDOD 767 03(3-0-0). Cross-Culture and International Training. S. Prerequisite: Admission to OPC specialization.

Issues, models, techniques of development and delivery of human resource development and training programs across cultural, interregional, national barriers. (NT-B)

EDOD 768 03(3-0-0). Workforce Development. F. Prerequisite: Admission to the Organizational Learning, Performance and Change (OLPC) specialization under the Ph.D. in Education and Human Resource Studies.

Characteristics and elements of workforce development with special attention to the roles and responsibilities of employers and managers. (NT-B)

EDOD 769 03(3-0-0). Theory and Practice of Change. F, S. Prerequisite: None.

Theory, history, characteristics, nature, levels, and types of change and modern conceptual and integrated models of change. (NT-B)

EDOD 770 03(3-0-0). Organizational Culture. F. Prerequisite: Admission to the Organizational Performance and Change specialization.

Examine the theories, methods, and practices of organizational culture for evaluating, analyzing, and changing organizational culture. (NT-B)

EDOD 777 03(2-0-1). Social Foundations of the Workplace. SS. Prerequisite: EDOD 761; EDOD 769.

Social, cultural and political systems in organizations and their implications for employees. (NT-B)

EDOD 786 Var. Practicum. Prerequisite: Admission to OPC specialization.

EDOD 792 Var. Seminar-Human Resource Development. Prerequisite: Admission to OPC specialization.


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EDUCATION RESEARCH METHODS

COURSES

School of Education
College of Health and Human Sciences

EDRM 600 03(3-0-0). Introduction to Research Methods. F, S, SS. Prerequisite: None.
Methods of research, scientific methods, problem identification, research design, preparation and evaluation of research reports. (NT-O/V)

EDRM 602 03(3-0-0). Action Research. S, SS. Prerequisite: EDRM 600.
Provide educators with knowledge and skills to plan and implement school-based research to improve teaching and learning. (NT-B)

EDRM 606 03(3-0-0). Principles: Quantitative Data Analysis. F, S, SS. Prerequisite: EDRM 600; STAT 201.
Quantitative data analysis in social science research; descriptive statistics; fundamentals of inference. (NT-B)

EDRM 612 03(2-0-1). Assessing Students in Educational Settings. F, S, SS. Prerequisite: Admissions into a Master’s program within the School of Education.
Various ways of assessing students including traditional, authentic, and portfolio techniques for P-20 education. (NT-O)

EDRM 666 03(3-0-0). Program Evaluation. F, S. Prerequisite: EDRM 600.
Models and practices of program evaluation in both public and private sector organizations. (NT-B)


EDRM 698 Var. Research. (NT-O)

EDRM 699 Var. Thesis. (NT-O)

EDRM 700 03(3-0-0). Quantitative Research Methods. F, S. Prerequisite: EDRM 606 or concurrent registration.
Design, data analysis, interpretation of results, and evaluation of educational research studies. (NT-B)

EDRM 701 03(3-0-0). Applied Linear Models-Educational Research. S. Prerequisite: EDRM 606.
General linear model applications in educational research emphasizing conceptual understanding and characteristics of non-experimental designs.

EDRM 702 03(3-0-0). Foundations of Educational Research. F, S. Prerequisite: None.
Philosophical, theoretical, and ethical foundations of educational research. (NT-B)

EDRM 703 03(3-0-0). Applied Longitudinal Data Analysis. F. Prerequisite: EDRM 701.
Methods and empirical applications of individual growth modeling and discrete-time event history analysis in educational research.

EDRM 704 03(3-0-0). Qualitative Research. F. Prerequisite: EDRM 600.
Examination of qualitative research theory, methods, and applications to education and the social sciences. (NT-O)

EDRM 705 03(3-0-0). Qualitative Data Analysis. S. Prerequisite: EDRM 704.
Examination of qualitative methods of data analysis, data presentation, and use of computer. (NT-O)

EDRM 706 03(3-0-0). Analysis of Variance-Education Research. S, SS. Prerequisite: EDRM 700 or concurrent registration.
Analysis of variance applications in educational research; experimental design and analysis of data from experiments.

EDRM 707 03(0-0-3). Quantitative Data Collection Methods/Analysis. F, S. Prerequisite: EDRM 700.
Selection or development of questionnaires, tests, structured interviews, and observations. Reliability and validity. Reporting educational studies. (NT-B)

EDRM 708 03(3-0-0). Narrative Inquiry. F. Prerequisite: EDRM 704.
Theory, methods and design of narrative approaches to research including data collection and analysis applications. (NT-B)

EDRM 711 03(3-0-0) Ethnographic Research. S. Prerequisite: EDRM 704.
Theoretical underpinnings, research design, ethics and practical application of ethnographic research in a naturalistic setting.

EDRM 786 Var[1-6]. Practicum. F, S, SS.


EDRM 798 Var. Research. F, S, SS.


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EDUC 255 02(2-0-0). Introduction to Education. F, S, SS. Prerequisite: None.
Overview of teaching profession emphasizing teaching opportunities, licensure, and University professional program.

EDUC 275 03(3-0-0). Schooling in the United States. (GT-SS1, AUC C 3C). F, S, SS. Prerequisite: Completion of 30 credits course work.
Social, political, historical, and economic forces that shape U.S. system of public schooling (P-12). (NT-O)

EDUC 296 Var. Group Study.

EDUC 320 03(0-0-3). Educational Psychology. F, S, SS. Prerequisite: None. Offered as an online or correspondence course only.
Psychological conditions of classroom learning and teaching including understanding needs of exceptional children in the classroom. (NT-O/C)

EDUC 331 02(1-2-0). Educational Technology and Assessment. F, S, SS. Prerequisite: EDUC 275; EDUC 340; admission to teacher licensure.
Skills and strategies for the use of appropriate technology and assessment in teacher education.

EDUC 340 03(1-2-1). Literacy and the Learner. F, S, SS. Prerequisite: Completion of 30 credits of course work. Required background check through CDE, CBI, FBI.
Understanding and supporting literacy and numeracy development. Field experiences, service learning experiences.

EDUC 350 03(2-2-0). Instruction I-Individualization/Management. F, S, SS. Prerequisite: EDUC 275; EDUC 340; concurrent reg. in EDUC 386; admission to teacher licensure.
Theory, research, and practice of teaching at the junior high/middle school level; adapting instruction for individuals including learners with special needs.

EDUC 386 Var[1-3]. Practicum-Instruction I. Prerequisite: EDUC 275; EDUC 340; concurrent registration in EDUC 350; admission to teacher licensure.

EDUC 400 03(1-4-0). Diagnostic Teaching of Reading. F, S. Prerequisite: EDUC 275; EDUC 340; HDFS 217; HDFS 310; HDFS 320.
Development of the knowledge base, skills, and strategies for teaching reading from birth to age 8. Service learning experiences.

EDUC 425 04(2-6-0). Early Childhood Education I. F, S. Prerequisite: EDUC 275; EDUC 340; admission to teacher licensure.
Integrated methods; theoretical bases; teacher’s role; appropriate curriculum; measurement; environments; pedagogy; instructional design and decisions.

EDUC 426 04(2-4-0). Early Childhood Education II. F, S. Prerequisite: EDUC 425.
Integrated methods; organizing/presenting materials/activities; applying decisions; managing groups; individual instruction; assessment/evaluation.

EDUC 450 04(2-4-0) Instruction II-Standards and Assessment. F, S. Prerequisite: EDUC 331; EDUC 350; EDUC 386; concurrent registration in EDUC 486J. Course must be taken semester immediately prior to student teaching semester.

EDUC 460 04(3-2-0). Methods and Materials in Teaching Science. F. Prerequisite: Admission to teacher licensure.

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EDUC 462 04(4-0-0). Methods and Assessment in Teaching Languages. F. Prerequisite: Admission to teacher licensure; oral and written competency in the language endorsement area.
Objectives, methods, and resource materials for teaching languages in secondary schools.

EDUC 463 04(4-0-0). Methods in Teaching Language Arts. F, S. Prerequisite: Admission to teacher licensure.
Objectives, content, and methods of teaching English, speech, and journalism in secondary schools.

EDUC 464 04(4-0-0). Methods and Materials in Teaching Mathematics. S. Prerequisite: 18 credits in mathematics; admission to teacher licensure.
Problems and techniques of teaching secondary mathematics; evaluation of student achievement and teacher effectiveness.

EDUC 465 04(4-0-0). Methods and Materials in Social Studies. F. Prerequisite: Admission to teacher licensure.
Methods of teaching social studies; sources of information and teaching materials and literature for social studies teachers.

EDUC 466 04(4-0-0). Methods and Assessment in K-12 Art Education. F. Prerequisite: EDUC 275; admission to teacher licensure.
Objectives, methods, and resource materials for teaching art in elementary and secondary schools.

EDUC 474 02(1-3-0). Elementary Music Methods I. F. Prerequisite: Admission to teacher licensure.
Developmentally appropriate strategies and materials for K-6 music instruction; emphasis on common methodologies, resources, standards-based teaching.

EDUC 475 02(1-3-0). Elementary Music Methods II. S. Prerequisite: EDUC 474.
Classroom management, motivational strategies, technology tools, assessment/evaluation of music learning and field experiences in K-6 music education. ($)

EDUC 476 02(1-3-0). Choral Methods for Secondary Schools. F. Prerequisite: MU 217; admission to teacher licensure.
General music classes, choral techniques and literature; current practices and trends. ($)

EDUC 477 02(1-3-0). Instrumental Methods for Secondary Schools. F. Prerequisite: MU 217; admission to teacher licensure.
Organization and administration of instrumental music, grades 5-12. ($)

EDUC 485A-C, Var[6-14]. Student Teaching. F, S.
Teacher education candidates participate in an intensive and extensive on-site capstone experience within a public school setting. A) Elementary. Prerequisite: EDUC 450; appropriate special methods courses. B) Secondary. Prerequisite: EDUC 450; appropriate special methods courses. (5) C) Early childhood: Prerequisite: EDUC 426. ($)

EDUC 486A-E Var. Practicum. Prerequisite: Admission to teacher licensure.

EDUC 493A-B Var[1-3]. Seminar. Prerequisite: EDUC 426 or EDUC 450; appropriate special methods courses(s); EDUC 485A or concurrent registration, or EDUC 485B or concurrent registration, or EDUC 485C or concurrent registration, or EDCT 485 or concurrent registration.
A) Professional relations. Collegial and professional discussions, support, and assistance. B) Assessment of learning. Information and techniques that enable educators to use assessment results to inform planning and instructional practices.

Current trends in science education, K-12; techniques of experimentation demonstrations; study of equipment, facilities, and resource materials.

EDUC 493A-B Var[1-3]. Seminar. Prerequisite: EDUC 426 or EDUC 450; appropriate special methods courses(s); EDUC 485A or concurrent registration, or EDUC 485B or concurrent registration, or EDUC 485C or concurrent registration, or EDCT 485 or concurrent registration.
A) Professional relations. Collegial and professional discussions, support, and assistance. B) Assessment of learning. Information and techniques that enable educators to use assessment results to inform planning and instructional practices.
EDUC 494 Var. Independent Field Studies.  
Specialized field study in the public schools under direction and supervision of faculty.

EDUC 495 Var. Independent Study.

EDUC 496 Var. Group Study.

EDUC 501 03(3-0-0). Reading in the Content Areas. SS. Prerequisite: EDUC 320.  
Specific methods, materials, and techniques for helping students become more efficient in reading content area material.

EDUC 502 03(3-0-0). Human Relations in Education. F, S. Prerequisite: Bachelor’s degree or EDCT 300.  
Human relations in an individual’s educational, organizational, and social activities as applied to various educational settings. (NT-O)

EDUC 525A-D Expert Teaching. Prerequisite: Bachelor’s degree; admission to teacher licensure.  
Theories related to effective classroom instruction. A) Inclusion, special needs, 02(0-0-2)  
B) Thinking and learning, 02(0-0-2)  
C) Literacy and numeracy, 03(0-0-3)  
D) Standards, assessment, 02(0-0-2), F.

EDUC 526 04(0-4-2). Interdisciplinary Methods. F. Prerequisite: Bachelor’s degree; admission to teacher licensure.  
Methods and theories related to effective classroom instruction.

EDUC 530 03(2-2-0). Technology Enhanced Learning. F, SS. Prerequisite: Bachelor’s degree. 
Enhancing instruction and learning through the effective use of technology. (NT-O)

EDUC 570 03(2-2-0). Perspectives of Special Education. F, SS. Prerequisite: None.  
Historical and legal, philosophical foundations, student characteristics, and building collaborative relationships in special education.

EDUC 572 03(3-0-0). Special Needs-Foundations and Practices. SS. Prerequisite: Teacher licensure.  
Principles and procedures for school personnel in planning the public school curriculum. (NT-O)

EDUC 573 03(3-0-0). Differentiating Instruction for Diverse Needs. F, SS. Prerequisite: EDUC 570.  
Information techniques, and practice regarding methods for differentiating instruction.

EDUC 574 03(3-0-0). Transition and Secondary Services. F, SS. Prerequisite: EDUC 570.  
Methods comprising state-of-the-art transition services for individuals with disabilities for the special education generalist.

EDUC 575 04(4-0-0). Methods for Mild/Moderate Special Needs. S. Prerequisite: EDUC 572; teacher licensure.  
Methods addressing learning of students with mild/moderate special needs and instructional accommodations in regular classes.

EDUC 576A-L. Issues in Education. F, S, SS. Prerequisite: Baccalaureate degree. Offered only through Division of Continuing Education.  
Issues in educating a diverse student population. Methods used in identification and assessment; strategies for intervention and/or instruction. A) Talented and Gifted, 02(0-0-2), B) Attention Deficit Disorder, 02(0-0-2), C) Autism/Asperger’s, 02(0-0-2), D) Behavior and Language, 02(0-0-2), E) Classroom Management, 02(0-0-2), F) Teaching Diversity, 01(0-0-1), G) Harassment in Schools, 01(0-0-1), H) Assessing Special Needs, 02(0-0-2), I) Sexually Transmitted Diseases, 01(0-0-1), J) Drugs and Alcohol, 02(0-0-2), K) Child Abuse, 02(0-0-2), L) Traumatized Child, 02(0-0-2). (NT-C)

EDUC 591A-F Var. Workshop.  

EDUC 601 03(2-0-1). Principles of Supervision and Evaluation. F, S. Prerequisite: None.  
Supervision and evaluation of instruction including required Colorado evaluation training. (NT-B)

EDUC 618 03(3-0-0). School Law. F, S. Prerequisite: None.  
Legal framework for operation and management of public and private schools emphasizing legal responsibilities for administrators and teachers.

EDUC 619 03(3-0-0). Curriculum Development. S, SS. Prerequisite: None.  
Principles and procedures for school personnel in planning the public school curriculum. (NT-O)

EDUC 620 02(2-0-0). Philosophy of Education. SS. Prerequisite: None.  
Contemporary philosophies as related to principles and practices in education.

EDUC 622 03(3-0-0). Innovative Social Studies Teaching. SS. Prerequisite: EDUC 485A or EDUC 485B.  
Current trends in secondary school social studies teaching and curriculum techniques and materials for value formulation, decision-making skills, concepts, generalizations, and attitudes.

EDUC 623 03(0-2-2). Innovative Science Teaching. SS. Prerequisite: EDUC 485A or EDUC 485B.  
Innovative trends in curriculum and methodology of science teaching.

EDUC 625 03(3-0-0). Contexts of Schooling. SS. Prerequisite: Admission to graduate program.  
History, purpose, structure, and role of schooling with relevance to current issues, U.S. and international.

EDUC 628 03(3-0-0). Models of Teaching. F, S. SS. Prerequisite: Must be enrolled in one of the following levels: professional or graduate.  
Exploration of pedagogical topics and skill development related to instructional approaches. (NT-T)

EDUC 629 03(3-0-0). Communication and Classrooms. F, S, SS.  
Exploration of pedagogical topics and growth experiences related to classroom management and presentation skills. (NT-T)

*EDUC 635 03(3-0-0). Educators, Systems and Change. F, S, SS. Prerequisite: EDUC 485A or EDUC 485B. Offered only through the Division of Continuing Education.  
Process of change in education, focusing on teacher’s role as leader and facilitator. (NT)

EDUC 645 03(3-0-0). Leadership and Ethics in Public Education. SS. Prerequisite: Admission to administrator licensure.  
Focus on leadership functions for public schools and ethical dimensions of leadership.

EDUC 646 03(3-0-0). School Resource Management. SS. Prerequisite: Admission to administrator licensure.  
School resource management including fiscal, personnel, and organization. (NT-O)

EDUC 647 03(3-0-0). School Culture, Climate, and Communications. SS. Prerequisite: Admission to administrator licensure; concurrent registration in EDUC 645; EDUC 646.  
Assist public school leaders in their facilitation role in enhancing human relations and communication within schools and communities.

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EDUC 648A-B. Role of the Principal—Managing/Leading Change
Role of the principal as a result of changes in society and in the schools. A) Professional learning community 01(1-0-0). F. Prerequisite: Admission to administrator licensure; concurrent registration in EDUC 687B. B) Managing and leading change 02(1-0-1). S. Prerequisite: Admission to administrator licensure; concurrent registration in EDUC 687B. (NT-O)

EDUC 651 03(2-0-1). Multicultural and Special Populations. F, S, SS. Prerequisite: Bachelor’s degree.
Special concerns for working with people of various cultural, ethnic, exceptional, and special interest groups. (NT-B/O)

EDUC 660 03(0-0-3). Advanced Methods—Science and Math Instruction. SS. Prerequisite: None. Offered as an online course only through the Division of Continuing Education.
Knowledge and skills to improve the teaching of science, technology, engineering, and mathematics for in service K-12 teachers. (NT-O).

EDUC 670 03(1-0-2). Grant Writing. F, S, SS. Prerequisite: None. Offered as an online course only through the Division of Continuing Education.
Mechanics of proposal writing, including intangibles of the grant-seeker’s art. (NT-O)

EDUC 675 03(1-0-2). Analyzing Education Literature. F, S, SS. Prerequisite: EDRM 700 or EDRM 702 or EDRM 704.
Analyze, critique, and interpret scholarly literature in the discipline. (NT-B)

EDUC 684 Var. Supervised College Teaching.

EDUC 686A-B Var. Practicum.

EDUC 687A-E Var. Internship.
A) Administration. B) Principal. C) Guidance and counseling. D) Teacher licensure I. Prerequisite: Must be enrolled in one of the following levels: professional or graduate. E) Teacher licensure II. Prerequisite: Must be enrolled in one of the following levels: professional or graduate.

EDUC 693A-C Var. Seminar.
A) Administrator. B) Instruction. C) Teacher licensure capstone. Prerequisite: Must be enrolled in one of the following levels: professional or graduate.

EDUC 695 Var. Independent Study.

EDUC 696 Var. Group Study.

EDUC 709 03(3-0-0). Leadership Development. F, S, SS. Prerequisite: None.
Principles, theories, attributes, and skills related to individual leadership development. (NT-B)

EDUC 710 03(0-0-3). Higher Education Finance. S. Prerequisite: None.
Federal, state, and local revenue distribution, budget preparation and controls, accounting options, audit preparation. (NT)

EDUC 713 03(3-0-0). Teaching, Learning, and Professional Growth.
F. Prerequisite: Admission to Ph.D. program. Teaching, learning, and professional development perspectives related to educational change and reform.

EDUC 714 03(3-0-0). Education Policy Analysis. S, SS. Prerequisite: Admission to Ph.D. program.
Frameworks for analyzing, designing policy proposals, and implementing plans.

EDUC 715 03(3-0-0). Critical Issues for Special Populations. S. Prerequisite: EDUC 709; EDUC 713.
Social and cultural issues related to special populations are researched and analyzed to understand policy that guides educational decisions.

EDUC 716 03(3-0-0). Capstone: Educational Equity and Reform. F, SS. Prerequisite: EDUC 709; EDUC 713.
Applies tenets of educational leadership research and theory into a context of equity, global citizenship and environmental responsibility.

EDUC 720 03(3-0-0). Human Learning, Cognition, and Motivation. F, S. Prerequisite: EDUC 628 or EDUC 629.
Theories of learning, cognition, and motivation applicable to enhancing effective and efficient learning for individuals and teams.

EDUC 725 03(3-0-0). Professionalism in Education and Leadership. F, SS. Prerequisite: Admitted into doctoral program. Credit not allowed for both EDUC 725 and EDHE 725.
Professional choices and ethical decision making in education and leadership, with emphasis on higher education.

EDUC 786 Var. Practicum.

EDUC 787 Var. Internship.

EDUC 792 Var. Seminar. (NT-O)

EDUC 793 Var. Seminar.

EDUC 795 Var. Independent Study.

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EGSC 492 01(0-0-1), Seminar, F. S.

EGSC 495 Var. Independent Study.

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ENGR 101 03(3-0-0). Grand Challenges in Engineering. F. Prerequisite: None.
National Academy of Engineering’s Grand Challenges in Engineering: overview, roles of engineering disciplines, engineering and societal challenges.

ENGR 102 03(3-0-0). Problem Solving for Engineers. F, S. Prerequisite: MATH 160 or concurrent registration.
Engineering problem solving: dimensional analysis; precision, accuracy, repeatability; problems from all major engineering disciplines.

ENGR 298 Var[1-3]. Undergraduate Research. Prerequisite: Written consent of research mentor and department head.
Directed undergraduate research with a faculty mentor.

ENGR 389 01(0-0-1). Engineering Cooperative Experience. F, S, SS. Prerequisite: Written permission of instructor. May be taken up to 9 times.
Semester-long full-time industry engineering experience in a position relevant to the student’s major field.

ENGR 486 Var[1-3]. Practicum. F, S, SS.

ENGR 496 Var[1-3]. Group Study. F, S.

ENGR 498 Var[1-3]. Undergraduate Research. Prerequisite: Thirty credits in engineering and science; written consent of instructor.
Directed undergraduate research with a faculty mentor.

ENGR 501/ECE 501 03(0-0-3). Foundations of Systems Engineering. F, S. Prerequisite: None. Credit not allowed for both ENGR 501 and ECE 501.
Functional components of systems engineering, application of systems engineering to practical problems, system life-cycle process. (NT-O)

ENGR 508/ECE 508 03(3-0-0). Introduction to Power System Markets. F. Prerequisite: ECE 461. Credit not allowed for both ENGR 508 and ECE 508.
Deregulated electrical power systems, system security, investments in generation and transmission, ancillary services, and nodal pricing. (NT-O)

ENGR 509/ECE 509 03(3-0-0). Signal Processing for Power Systems. F. Prerequisite: ECE 312; ECE 461. Credit not allowed for both ENGR 509 and ECE 509.
Signal processing tools for analyzing power systems, voltage frequency, magnitude variations, unbalance, waveform distortion. (NT-O)

ENGR 510 03(3-0-0). Engineering Optimization: Method/Application. F. Prerequisite: MATH 229; MATH 261. Credit not allowed for both ENGR 510 and MATH 510.
Optimization methods; linear programming, network flows, integer programming, interior point methods, quadratic programming, engineering applications. (NT-O)

ENGR 520 03(3-0-0). Engineering Decision Support/Expert Systems. S. Prerequisite: ENGR 510 or MATH 510. Credit not allowed for both ENGR 520 and ENGR 610.
Decision support systems for complex engineering problems; multicriteria decision making and optimization; hybrid knowledge-based/algorithmic methods. (NT-O/V)

ENGR 521 03(3-0-0). Geospatial Engineering Management, Policies. F. Prerequisite: CIVE 576 or concurrent registration.

ENGR 522 03(3-0-0). Object-Oriented GIS Programming for Engineers. F. Prerequisite: CIVE 577.
Object-oriented GIS programming with C# & .NET framework; integration of GIS libraries; development of custom desktop GIS applications in engineering. (NT-O)

ENGR 523 03(3-0-0). Photogrammetric Engineering/Remote Sensing. S. Prerequisite: CIVE 576 or CIVE 577.
Photogrammetry and remote sensing; image registration and resampling; image processing and classification; multi-sensor fusion, imaging spectroscopy. (NT-O)

ENGR 524 03(3-0-0). Geospatial Web Technologies for Engineers. S. Prerequisite: CIVE 576.
Web-based, service oriented, distributed GIS System development; geospatial implementation, data preparation, map authoring, application development. (NT-O)

ENGR 530/ECE 530 03(3-0-0). Overview of Systems Engineering Processes. F, S. Prerequisite: ECE 303/STAT 303 or STAT 315. Credit not allowed for both ENGR 530 and ECE 530.
Systems engineering life-cycle process and analysis techniques. Reliability and robustness. (NT-O)

ENGR 531/ECE 531 03(3-0-0). Engineering Risk Analysis. F, S. Prerequisite: ECE 303/STAT 303 or STAT 315. Credit not allowed for both ENGR 531 and ECE 531.
Estimation and risk identification, development of mitigation techniques. (NT-O)

ENGR 532/ECE 532 03(3-0-0). Dynamics of Complex Engineering Systems. F, S. Prerequisite: ENGR 501/ECE 501 or concurrent registration. Credit not allowed for both ENGR 532 and ECE 532.
Higher-level behavior and issues that emerge from interaction between components in complex socio-technical systems. (NT-O)

ENGR 550/MATH 550 03(3-0-0). Numerical Methods in Science and Engineering F, S. Prerequisite: MATH 340 or MATH 345 or MATH 530 Credit not allowed for both ENGR 550 and MATH 550.
Finite elements, finite differences, spectral methods, method of lines, conservation laws; stability and convergence analysis for PDEs.

ENGR 565/ECE 565 03(3-0-0). Electrical Power Engineering. F, S. Prerequisite: ECE 332; ECE 342. Credit not allowed for both ENGR 565 and ECE 565.
Analysis of power systems in terms of current, voltage, and active/reactive power; introduction of computer-aided tools for power systems. (NT-O)

ENGR 567/ECE 567 03(3-0-0). Systems Engineering Architecture. F. S. Prerequisite: ENGR 501 or ENGE 501. Credit not allowed for both ENGR 567 and ECE 567.
Observation/classification of systems architecture. Systems architecture principles and critical evaluation through design studies. (NT-O)

ENGR 568/ ECE 568 03(3-0-0). Electrical Energy Generation Systems. F, S. Prerequisite: Written consent of instructor. Credit not allowed for both ENGR 568 and ECE 568.
Energy systems: renewable and traditional. Physics and operation of energy devices; solar-photovoltaic, wind energy, gas, coal, and nuclear plants. (NT-O)

ENGR 597 03(0-0-3). Group Study in Systems Engineering. F, S. Prerequisite: CIS 600; ENGR 530/ECE 530; ENGR 531/ECE 531.
Capstone study experience in systems engineering. (NT-O)

+ENGR 601/AGRI 601 03(2-2-0). Bioenergy Technology. F. Prerequisite: None. Required field trips.

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Science and engineering aspects of bioenergy production, including plant biology, fermentation, and biofuel properties.

**ENGR 621/ECE 621 03(3-0-0). Energy Storage for Electrical Power Systems.** F, S. Prerequisite: Written consent of instructor. Credit not allowed for both ENGR 621 and ECE 621.

- Physics and operation of electrical, mechanical, thermal and novel energy storage systems/devices. (NT-O)

**ENGR 622/ECE 622 03(3-0-0). Energy Networks and Power Distribution Grids.** F, S. Prerequisite: ECE 411 or MECH 417; ECE 565/ENGR 565. Credit not allowed for both ENGR 622 and ECE 622.

- Energy networks: generation, storage, consumers. Systems approach to analysis of distribution networks and transition to intelligent grid systems. (NT-O)

**ENGR 623/ECE 623 03(3-0-0). Electric Power Quality.** S. Prerequisite: ECE 461 or ECE 562. Credit not allowed for both ENGR 623 and ECE 623.

- Interconnecting power electronic devices and renewable energy sources to power systems. (NT-O)

**ENGR 695 Var. Independent Study.** F, S, SS. Prerequisite: None. (NT-O)

**ENGR 697/ECE 697 Var[1-6]. Group Study.** F, S, SS.

**ENGR 699 Var. Thesis.** F, S, SS. Prerequisite: None. (NT-O)

**ENGR 795 Var. Independent Study.** F, S, SS. Prerequisite: None. (NT-O)

**ENGR 799 Var. Dissertation.** F, S, SS. Prerequisite: None. (NT-O)

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ENVIRONMENTAL ENGINEERING COURSES
Department of Civil and Environmental Engineering
College of Engineering

As noted in the University Curriculum Committee minutes of 2/28/14, effective Fall Semester 2014, all courses with the ENVE subject code were dropped.

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**ENVIRONMENTAL AND RADIOTHERAPEUTIC HEALTH COURSES**

*Department of Environmental and Radiological Health Sciences*

*College of Veterinary Medicine and Biomedical Sciences*

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**ERHS 174 01(1-0-0).** Freshman Scholar. F. S. Prerequisite: Admission to CVMBS Freshman Scholar’s Program. May be taken up to 2 times for credit.
- Scholarship-supported exploration of biomedical research theory and practice.

**ERHS 192 01(1-0-0).** Environmental Health First Year Seminar. F. Prerequisite: Freshman standing.
- Introduction to biosciences, college life, learning skills, problem solving, and degree planning.

**ERHS 210 02(2-0-0).** Cancer Biology, Medicine, and Society. F. Prerequisite: None.
- A broad overview of cancer biology and cancer medicine.

**ERHS 220 03(3-0-0).** Environmental Health. F, S. Prerequisite: BZ 101 or concurrent registration or BZ 104 or concurrent registration or BZ 110 or concurrent registration or BZ 120 or concurrent registration or LIFE 102 or concurrent registration.
- Impact of people on the physical and biological environment as well as impact of the environment on people; emphasis placed on human health.

**ERHS 230 03(0-6-0).** Environmental Health Field Methods. F, S. Prerequisite: CHEM 113 with a C or better; or CHEM 114 with a C or better.
- Field and laboratory techniques necessary for practice of environmental health. ($)

**ERHS 300 03(3-0-0).** Introduction to Radiation Biology. S. Prerequisite: LIFE 102 or PH 121.
- Genetic and somatic effects of radiation on cells, tissues, and the whole organism; tumor therapy; carcinogenesis; risks vs. benefits of radiation.

**ERHS 320 03(3-0-0).** Environmental Health—Water and Food Safety. F. Prerequisite: MIP 300 or concurrent registration.
- Water quality and food safety for practice of environmental health.

**ERHS 332 03(3-0-0).** Principles of Epidemiology. S. Prerequisite: MIP 300 or concurrent registration; STAT 301 or concurrent registration or STAT 307 or concurrent registration.
- Use of epidemiological methods in studying distribution of diseases in human populations.

**ERHS 350 03(3-0-0).** Industrial Hygiene and Air. F. Prerequisite: BMS 300; CHEM 341 or concurrent registration; ERHS 230; PH 122.
- Industrial and airborne hazards, disease prevention, hazard control and evaluation.

**ERHS 400 03(3-0-0).** Radiation Safety. F, S, SS. Prerequisite: CHEM 112; ERHS 300; PH 122.
- Radiation physics, dosimetry, radiation measurement, emergencies and waste management. Essentials of radiation safety.

**ERHS 405 02(2-0-0).** Fundamentals of Ergonomics. S. Prerequisite: One college-level animal biology or anatomy/physiology or engineering design course or concurrent registration. Offered as an online course only.
- Basic skills, knowledge, and abilities in ergonomics; focus on musculoskeletal injury prevention. (NT-O)

**ERHS 410 03(3-0-0).** Environmental Health Waste Management. S. Prerequisite: CHEM 245 or concurrent registration or CHEM 343 or concurrent registration or CHEM 346 or concurrent registration; ERHS 230.
- Recognition of impacts, occupational and environmental, in handling wastes; administrative management for waste programs.

**ERHS 430 03(3-0-0).** Human Disease and the Environment. S. Prerequisite: None.
- Overview of the human diseases which are associated with the environment.

**ERHS 446 03(3-0-0).** Environmental Toxicology. F. Prerequisite: CHEM 245 or CHEM 341 or CHEM 345; LIFE 102.
- Essentials of environmental toxicology based on problem-oriented discussions addressing environmental impacts of organic/inorganic chemicals.

**ERHS 448 03(3-0-0).** Environmental Contaminants: Exposure and Fate. F. Prerequisite: CHEM 245 or CHEM 341 or CHEM 345; LIFE 102.
- Pathways of exposure and behavior of environmental contaminants. Exposure assessment in environmental health protection.

**ERHS 492 01(0-0-1).** Environmental Health Seminar. S. Prerequisite: None.
- Professional field practice in environmental health with a public or private sector agency.

**ERHS 494 Var. Independent Study in Environmental Health.** Prerequisite: ERHS 220.
- Directed independent study or project under faculty guidance.

**ERHS 498 Var[1-4].** Research. Prerequisite: Written consent of instructor.
- Research in environmental and radiological health sciences.

**ERHS 502 03(3-0-0).** Fundamentals of Toxicology. F. Prerequisite: BMS 300 or BMS 360; CHEM 245 or CHEM 341 or CHEM 345.
- Fundamental principles of toxicology; dose-response, organ targets, toxic agents.

**ERHS 503 01(1-0-0).** Toxicology Principles. S. Prerequisite: CHEM 113; LIFE 102; credit not allowed for both ERHS 502 and ERHS 503.
- This is a partial-semester course.
- Principles of toxicology for applications in industrial hygiene and environmental public health.

**ERHS 504 02(2-0-0).** Occupational and Environmental Toxicology. S. Prerequisite: ERHS 502 or (ERHS 503 or concurrent registration) or ERHS 446. This is a partial-semester course.
- Toxic effects of harmful agents found in occupational and environmental settings.

**ERHS 510 03(3-0-0).** Cancer Biology. S. Prerequisite: BC 351 or BC 403 or concurrent registration or BZ 310 or CM 501.
- Cancer biology, from epidemiology and classification, through the molecular basis of the phenotypes to detection and treatment.

**ERHS 515 02(2-0-0).** Non-Ionizing Radiation Safety. F, S, SS. Prerequisite: CHEM 107 or CHEM 113; MATH 118; PH 122 or PH 142.
- Evaluation and safe use of non-ionizing radiation sources. Calculation of safe distances for exposure and maximum permissible exposures. (NT-O)

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ERHS 520 03(3-0-0). Environmental and Occupational Health Issues. F. Prerequisite: BZ 110 or LIFE 102; CHEM 245 or CHEM 341 or CHEM 345.

Issues in environmental and occupational health sciences in the context of public health and regulatory concerns. (NT-O)

ERHS 526 03(3-0-0). Industrial Hygiene. F. Prerequisite: CHEM 245 or CHEM 341 or CHEM 345; ERHS 520 or concurrent registration; PH 110 or PH 121.

Theory and application of industrial hygiene principles to management of the occupational environment.

ERHS 527 01(0-3-0). Industrial Hygiene Laboratory. S. Prerequisite: ERHS 526 or concurrent registration.

Industrial hygiene field monitoring equipment and techniques.

ERHS 528 03(3-0-0). Occupational Safety. S. Prerequisite: ERHS 350.

Introduction to occupational safety hazard recognition and control.

ERHS 530 03(3-0-0). Radiological Physics and Dosimetry I. F. Prerequisite: MATH 155 or MATH 160; PH 122.

Theory and detection of ionizing radiation; measurement and calculation of exposure and dose. (NT-V)

ERHS 531 02(1-3-0). Nuclear Instruments and Measurements. S. Prerequisite: ERHS 530 or concurrent registration.

Instrument systems for measurement and identification of ionizing radiations.

ERHS 532 03(2-0-1). Epidemiologic Methods. F. Prerequisite: STAT 307.

Method of epidemiologic investigation and study design. Applications to disease control with literature examples.

ERHS 536 03(3-0-0). Advanced Occupational Health. S. Prerequisite: ERHS 446 or ERHS 526.

Advanced topics in occupational health emphasizing contemporary issues, topics, trends, and problems in the field of industrial hygiene.

ERHS 540 03(3-0-0). Principles of Ergonomics. F. Prerequisite: None.

Theory and practice of ergonomics.

ERHS 541 03(3-0-0). Ergonomics in Product and Process Design. S. Prerequisite: ERHS 540.

Application of ergonomics to design of products and processes with respect to health, safety, function, and quality.

ERHS 542 03(3-0-0). Biostatistical Methods for Qualitative Data. F. Prerequisite: STAT 301 or STAT 307.

Statistical analysis of categorical data as obtained in epidemiology, toxicology, occupational health, and clinical sciences.

ERHS 544/STAT 544 03(3-0-0). Biostatistical Methods for Quantitative Data. S. Prerequisite: STAT 301 or STAT 307. Credit not allowed for both ERHS 544 and STAT 544.

Regression and analysis of variance methods applied to both observational studies and designed experiments in the biological sciences.

ERHS 546 02(2-0-0). Environmental Exposure Assessment. S. Prerequisite: CHEM 110.

Approaches and techniques for quantitative characterization of environmental exposure to harmful agents via inhalation, ingestion and dermal pathways.

ERHS 547 03(0-6-0). Equipment and Instrumentation. S. Prerequisite: ERHS 446.

Sample collection, quality control, theory and application of equipment and instrumentation for analysis and confirmation of organic-inorganic chemicals. ($)

ERHS 549 03(3-0-0). Environmental Health Risk Assessment. S. Prerequisite: ERHS 446 or ERHS 502 or ERHS 532.

Environmental contamination and health effects of chemicals using risk assessment, management and communication approaches.

ERHS 550 05(5-0-0). Principles of Radiation Biology. S. Prerequisite: BZ 310; ERHS 300 or ERHS 530.

Dose-response relationships; physical, chemical, and biological modification of radiation damage; radiation oncology; radiation genetics and oncogenesis.

ERHS 555 03(3-0-0). Quantitative Methods for Radiation Safety. F. Prerequisite: ERHS 530 or concurrent registration.

Analytical methods used in health physics, radioecology and radiocchemistry. Quantification of uncertainty in radioactive samples and dosimetry. (NT-O)

ERHS 556 03(3-0-0). Monte Carlo Methods in Health Physics. F. Prerequisite: ERHS 530 or concurrent registration; eligibility for access to government software.

Monte Carlo methods for the assessment of complex systems or macroscopic quantities on basis of statistical nature of microscopic components.

ERHS 561 02(2-0-0). Radiation Public Health. F, S. Prerequisite: ERHS 530; ERHS 550 or concurrent registration; or ERHS 300 and ERHS 400 with written consent of instructor.

Aspects of radiation public health for students in health physics with emphasis on contemporary issues in radiation protection.

ERHS 563 02(2-0-0). Environmental Contaminant Modeling I. S. Prerequisite: MATH 155.

Mathematical modeling of radionuclide and chemical transport in aquatic and terrestrial ecosystems.

ERHS 565 02(2-0-0). Chemical and Biological Warfare Agents. S. Prerequisite: CHEM 245 or CHEM 346.

Current understanding of chemical and biological agents used in asymmetric warfare.

ERHS 566 03(2-2-0). Forensic Toxicology. S. Prerequisite: CHEM 245 or CHEM 343 or CHEM 346.

Toxic effects of commonly encountered abused substances and laboratory methods to identify and measure these.

ERHS 567 03(0-6-0). Cell and Molecular Toxicology Techniques. F. Prerequisite: None.

Hands-on techniques exposure to molecular toxicology. ($)

ERHS 568 03(3-0-0). Pharmaceutical and Regulatory Toxicology. S. Prerequisite: ERHS 502.

Toxicology as applied in public (regulatory) and private (pharmaceutical, industrial) sectors.

ERHS 570 02(2-0-0). Radioecology. S. Prerequisite: None.

Environmental transport and exposure assessment of radioactive and other contaminants; estimating risk for human health and ecological impacts. (NT-O)

ERHS 595B-K Var. Independent Study.


ERHS 601 03(3-0-0). Metabolism and Disposition of Toxic Agents. S. Prerequisite: ERHS 502.

Metabolism of toxic agents and effects on their fate in the body. Covalent and non-covalent interactions with cellular targets.

ERHS 602 03(3-0-0). Toxicological Mechanisms. S. Prerequisite: ERHS 502.

Role of cellular information systems in toxic mechanisms: DNA expression, signal transduction and control of cellular processes.

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ERHS 603  03(3-0-0). Toxictological Pathology. F. Prerequisite: BMS 300 or BMS 360.
   Toxicological study of pharmacologic, chemical and environmental agents and resulting morphologic and cellular changes.

ERHS 611 02(2-0-0). Cancer Genetics. F. Prerequisite: BZ 350 or MIP 450.
   Role of genetic background in determining individual susceptibility to cancer.

ERHS 630  03(3-0-0). Radiological Physics and Dosimetry II. S. Prerequisite: ERHS 530.
   Calculations and measurement techniques for dosimetry shielding and protection from ionizing radiations.

ERHS 632  01(0-3-0). Techniques in Radiation Dosimetry. F. Prerequisite: ERHS 630 or concurrent registration.
   Techniques for determining the absorbed dose in tissue from ionizing radiations.

ERHS 633  01(0-3-0). Radiation Detection Methods in Radiobiology. S. Prerequisite: ERHS 630 or concurrent registration.
   Detection and measurement of ionizing radiation appropriate for radiobiologists.

*ERHS 636  03(3-0-0). Industrial Hygiene Control Methods. S. Prerequisite: ERHS 526; ERHS 536 or concurrent registration.
   Controlling occupational exposures to chemical agents, emphasizing local exhaust ventilation; personal protective devices.

*ERHS 637  03(3-0-0). Environment, Safety, and Health Management. F. Prerequisite: ERHS 526.
   Environment, safety, and health management systems for occupational health practitioners; major environmental and DOT regulatory standards and laws.

*ERHS 640  03(3-0-0). Advanced Epidemiology. S. Prerequisite: ERHS 532.
   In-depth exploration of advanced epidemiologic methods.

*ERHS 642  03(3-0-0). Applied Logistic Regression. S. Prerequisite: ERHS 532; ERHS 542.
   Basic and advanced concepts of logistic regression with focus on practical applications in epidemiology using SAS.

*ERHS 656  03(3-0-0). Occupational Noise Control. F. Prerequisite: ERHS 527.
   Measurement and control of industrial or environmental noise emphasizing practical solutions. (NT-O)

*ERHS 658  03(2-0-1). Environmental/Occupational Epidemiology. S. Prerequisite: ERHS 532.
   Epidemiologic analyses of effects of exposure to environmental and occupational health hazards.

ERHS 665  03(2-3-0). Radiochemistry. S. Prerequisite: CHEM 114; ERHS 530 or concurrent registration; MATH 155.
   Radionuclide separation and measurement and radiotracer applications in physical and biological systems.

ERHS 670 Var[1-3]. Directed Readings. F, S, SS. Prerequisite: ERHS 520.
   Advanced study through supervised readings on specialized topics.

ERHS 671  01(0-3-0). Experimental Radiobiology. S. Prerequisite: ERHS 400 or ERHS 532; concurrent registration in ERHS 570.
   Experimental techniques used in radiobiological and environmental radioactivity studies.

ERHS 675  03(3-0-0). Environmental Health Regulatory Compliance. S. Prerequisite: 15 credits of regular-numbered ERHS courses 500-level or above or written consent of instructor.

Requirements and strategies for meeting obligations under regulations and laws involved in environmental and occupational health protection.

+ERHS 679  02(0-0-2). Occ Env Health Interdisciplinary Symposium. F. Prerequisite: Enrollment in a graduate program related to occupational, environmental, or public health. May be repeated for credit. Required field trips.
   Evaluation of occupational and environmental health issues, through multidisciplinary interactions in seminars and field visits.

ERHS 684 Var[1-3]. Supervised College Teaching.
   Participation in environmental health course teachings under guidance of faculty in classroom, laboratory, or field.

ERHS 687  01(0-3-0). Seminar. F. S.
   Advanced study or research in environmental health with a governmental agency, private sector entity, or research facility.

ERHS 692  01(1-0-0). Seminar. F. S.
   Professional seminar series with student interaction on weekly basis; topics presented by outside experts, faculty, or doctoral candidates.

ERHS 693A-D  01(0-0-1). Research Seminar.
   Presentation of student research and discussion of publications from scientific literature. A) Epidemiology. B) Industrial hygiene. C) Toxicology. D) Health physics.

ERHS 695A-P  01(1-0-1). Independent Study.

ERHS 696A-D  01(1-3-0). Group Study.
   A) Epidemiology. Prerequisite: ERHS 520. B) Industrial hygiene. Prerequisite: ERHS 520. C) Toxicology. Prerequisite: ERHS 520. D) Health physics. Prerequisite: ERHS 530.

ERHS 698  01(0-3-0). Research. Prerequisite: Written consent of research mentor.

ERHS 699  01(0-3-0). Thesis.
   Master’s-level research and preparation of thesis.

*ERHS 701 04(4-0-0)  Advanced Diagnostic Imaging Modalities. S. Prerequisite: VM 786A or VM 786B or DVM.
   Interpretation/applications of advanced imaging methods including ultrasound, nuclear medicine, magnetic resonance imaging and computed tomography.

*ERHS 711  01(3-0-0). Advanced Radiographic Interpretation. S. Prerequisite: VM 786A or VM 786B or DVM.
   Radiographic interpretation of disease processes of all major systems in large and small animals.

*ERHS 712 03(3-0-0). Physics of Diagnostic Imaging. F. Prerequisite: DVM or equivalent professional veterinary medicine degree.
   Physics of imaging for radiology, ultrasound, computerized tomography, magnetic resonance, and nuclear medicine.

*ERHS 714 03(3-0-0). Radiation Therapy Physics. F. Prerequisite: DVM or health physics, physics, or engineering graduate student.
   Radiation therapy physics, photon and electron production for therapeutic use, teletherapy, brachytherapy, radiation protection and quality assurance.

ERHS 721  01(1-3). Radiation Oncology. F, S, SS. Prerequisite: None.
   Management of spontaneous and experimental tumors with emphasis on radiation therapy.

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ERHS 726 03(3-0-0). Aerosols and Environmental Health. F.
Prerequisite: PH 141.
Properties and behavior of environmental and occupational aerosols emphasizing how airborne particles affect health of humans and the environment.

°ERHS 733 03(3-0-0). Environmental Carcinogenesis. S. Prerequisite: BC 403.
Molecular and cellular mechanisms by which environmental carcinogens exert effects.

°ERHS 751 03(3-0-0). Advanced Radiation Biology I. F. Prerequisite: ERHS 550.
Molecular and cellular mechanisms of radiation damage and repair; mammalian radiation genetics.

°ERHS 753 03(3-0-0). Advanced Radiation Biology II. S. Prerequisite: ERHS 550.
Perturbations in cell cycle and cell population growth kinetics by radiation; radiation effects on normal tissues; radiation oncogenesis.

ERHS 765 01(0-3-0). Environmental Contaminant Modeling II. SS. Prerequisite: ERHS 563; ERHS 570.
Development and analysis of advanced computer models for radionuclide and chemical transport in aquatic and terrestrial ecosystems.

ERHS 770 01(0-0-1). Radiation Biology Basic to Tumor Therapy. F, S. Prerequisite: None.
Current aspects of radiation biology pertinent to improvements in radiation therapy.

ERHS 784 Var[1-3]. Supervised College Teaching.
Participation in environmental health course teachings under guidance of faculty in classroom, laboratory, or field.

ERHS 786 Var. Practicum. Prerequisite: ERHS 530.

ERHS 787 Var[1-6]. Internship.
Advanced study or research in environmental health with a governmental agency, private sector entity, or research facility.

ERHS 792 01(0-0-1). Seminar.
Professional seminar series with student interaction on weekly basis; topics presented by outside experts, faculty or doctoral candidates.

ERHS 793 01(0-0-1). Seminar.

ERHS 795A-P Var. Independent Study.

ERHS 796 Var. Group Study.

Doctoral-level research and preparation of dissertation.

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ECOSYSTEM SCIENCE AND SUSTAINABILITY COURSES

Department of Ecosystem Science and Sustainability

Warner College of Natural Resources

ESS 130 01(0-2-0). System Theory and Information Management. S. Prerequisite: BUS 150 or CS 110.
Applying computers, networks, software applications, and the internet for managing information in ecosystem science an sustainability.

ESS 210/GR 210 03(3-0-0). Physical Geography. F, S. Prerequisite: None. Credit not allowed for both ESS 210 and GR 210.
Energy, mass budget, and human impacts on atmosphere, hydrosphere, and continental land surfaces.

ESS 211 03(3-0-0). Foundations in Ecosystem Science. S. Prerequisite: ESS 210/GR 210.
Linkage between society and ecosystems services as foundation for sustainability of the coupled human-environmental system.

ESS 220 01(0-0-1). Research Skills for Ecosystem Science I. F. Prerequisite: Written consent of instructor.
Fundamental skills for participating in ecosystem science research through hands-on learning-modules.

ESS 221 01(0-0-1) Research Skills for Ecosystem Science II. S. Prerequisite: ESS 220; concurrent registration in ESS 298; written consent of instructor.
Advanced topics in the practice of the scientific method and participation in research.

ESS 298 Var[1-2]. Research. F, S, SS. Prerequisite: Concurrent registration in ESS 221.
Directed ecosystem science research.

+ESS 311 03(3-0-0). Ecosystem Ecology. F. Prerequisite: ESS 211.
Required field trips.
Principles of ecosystems ecology, emphasis on their application to coupled natural and human systems.

ESS 330 03(3-0-0). Quantitative Reasoning for Ecosystem Science. S. Prerequisite: ESS 211 or LIFE 320; MATH 155 or MATH 160; STAT 301 or STAT 307 or STAT 315; junior or senior standing.
Understanding diverse approaches for using data and models to understand complex ecological systems.

ESS 400 03(2-0-1). Sustainability and Ecosystem Science. S. Prerequisite: ESS 311; ESS 330.
Integrates ecosystems services and sustainability strategies, application to coupled natural and human systems.

ESS 411 03(2-0-2). Earth Systems Ecology. F. Prerequisite: ESS 311.
Earth as a system, stressing ecological interactions among energy, water, and biogeochemistry.

ESS 440 04(2-0-2). Practicing Sustainability. S. Prerequisite: ESS 311; ESS 330; senior standing.
Capstone integration of ecosystem science and sustainability, focused on case studies.

+ESS 486 02(0-0-2). Ecosystem Practiceum. F. Prerequisite: ESS 311; NR 220; senior standing. Required field trips.
One-week field practicum to examine ecosystem science and sustainability issues in Colorado landscapes. ($)

ESS 487 Var[1-6]. Internship. F, S, SS. Prerequisite: Written consent of instructor.
Supervised work experience in professional settings related to Ecosystem Science and Sustainability.

ESS 495 Var. 1-6. Independent Study in Ecosystem Science. F, S, SS. Prerequisite: None.

ESS 501 03(3-0-0). Principles of Ecosystem Sustainability. F. Prerequisite: Upper division coursework in BZ, ECOL, or CHEM; admission to graduate school.
Principles of ecosystem sustainability and threats to sustainability. Students will investigate and develop case studies. (NT-O)

ESS 524 03(3-0-0). Foundations for Carbon/Greenhouse Gas Mgmt. F. Prerequisite: Upper division coursework in biology, ecology, or chemistry.
Foundations for understanding greenhouse gas emissions management and accounting. (NT-O)

ESS 542 01(0-0-1). Greenhouse Gas Policies. F. Prerequisite: Admission to graduate school.
Rules, regulations and standards for greenhouse gas management and accounting. (NT-O)

ESS 543 02(2-0-0). Current Topics in Climate Change. F. Prerequisite: Upper division coursework in biology, ecology, or chemistry.
Climate fundamentals and current topics in climate change. (NT-O)

+ESS 545 04(2-6-0). Applications in Greenhouse Gas Inventories. F. Prerequisite: ESS 524; ESS 542. Required field trips.
Overview of methods for estimating greenhouse gas emissions and mitigation potential for agriculture and forestry activities.

*ESS 565 04(3-2-0). Niche Models. F. Prerequisite: (BSPM 526/BZ 526 or BZ 535 or BZ 548 or BZ 561 or ECOL 505 or ECOL 600 or ECOL 610 or ECOL 620 or FW 555 or FW 622; STAT 511) or written consent of instructor.
Concepts and application of niche models in ecosystem science.

ESS 575 04(3-2-0). Models for Ecological Data. S. Prerequisite: MATH 255; STAT 340.
Gaining insight about the operation of ecological processes using models and data.

ESS 587 Var. 1-6. Internship. F, S. Prerequisite: none.

*ESS 625/F 625 03(3-0-0). Ecology of Forest Production. S. Prerequisite: 300-level course in ecology. Credit not allowed for both ESS 625 and F 625.
Develops student expertise in understanding carbon and nutrient flows in forests. (NT-O)

ESS 660 03(3-0-0). Biogeochemical Cycling in Ecosystems. S. Prerequisite: CHEM 245; SOCR 240; one course in advanced ecology.
Biotic and abiotic processes responsible for distribution and fluxes of elements at ecosystem, landscape, and global scales.

ESS 692 01(0-0-1). Seminar. F, S. Prerequisite: none. (NT-O)

ESS 695 Var[1-6]. Independent Study in Ecosystem Science. F, S, SS. Prerequisite: None.

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ETHNIC STUDIES COURSES
Department of Ethnic Studies
College of Liberal Arts

ETST 100 03(3-0-0). Introduction to Ethnic Studies. (GT-SS3, AUCC 3E) F, S, SS. Prerequisite: None.
Key concepts, theories, and historical experiences that form the basis of scholarly work in comparative ethnic studies, domestically and internationally.

ETST 110 01(0-0-1). Blacks in Higher Education. SS. Prerequisite: Must be enrolled in the Black issues Forum.
Contemporary issues of Blacks in higher education.

ETST 120 01(0-0-1). Native Americans in Higher Education. SS. Prerequisite: Must be enrolled in the Native American Issues Forum.
Contemporary issues of Native Americans in higher education.

ETST 130 01(1-0-0). West Africa in Global and Local Perspective. F. Prerequisite: None.
Sociopolitical and historical perspective of social and cultural issues in contemporary Ghana, West Africa, and connections to the African diaspora.

ETST 205 03(3-0-0). Ethnicity and the Media. (GT-SS3, AUCC 3E). F. Prerequisite: None.
Ethnic representation across time as represented in autobiography, fiction, poetry, and popular media.

*ETST 208/ART 208 03(3-0-0). Native American Art and Material Culture. S. Prerequisite: None. Credit not allowed for both ETST 208 and ART 208. Required field trips.
Traditional arts and material culture of the indigenous peoples of North America. ($)

ETST 210 03(3-0-0). Asian American Leaders and Leadership. F. Prerequisite: None.
Cultural, historical, and social influences on Asian American leaders and leadership explored via personal histories, culture, and values.

ETST 234/E 234 03(3-0-0). Introduction to Native American Literature. F. Prerequisite: None. Credit not allowed for both ETST 234 and E 234.
Native American writings and their significance in American culture.

ETST 239/E 239 03(3-0-0). Introduction to Chicano Literature. F, S. Prerequisite: None. Credit not allowed for both ETST 239 and E 239.
Chicano fiction and poetry with consideration of historical roots and influences.

ETST 240 03(3-0-0). Native American Cultural Expressions. (GT-AH2, AUCC 3B). F. Prerequisite: None.
Exploration of Native lives and expressions through examination of Native architecture, art, music, film, activism, and literature.

ETST 250/HIST 250 03(3-0-0). African American History. (GT-HI1, AUCC 3D). F. Prerequisite: None. Credit not allowed for both ETST 250 and HIST 250.
Slavery, emancipation, labor, political, socioeconomic, and cultural history of African Americans since colonial times.

ETST 252/HIST 252 03(3-0-0). Asian American History. (GT-HI1, AUCC 3D). F. Prerequisite: None. Credit not allowed for both ETST 252 and HIST 252.
Asian American historical experience in the United States from 1850s to the present time.

*ETST 253 03(3-0-0). Chicana/o History and Culture. (GT-HI1, AUCC 3E). F. Prerequisite: None.
Historical study of Chicana/o/Mexicana/o people and culture from Spanish colonization to beginning of 20th century.

*ETST 254 03(3-0-0). La Chicana in Society. F. Prerequisite: None.
Historical contributions of Chicana women and current gender issues in Chicano communities in the U.S.

ETST 255/HIST 255 03(3-0-0). Native American History. (GT-HI1, AUCC 3D). S. Prerequisite: None. Credit not allowed for both ETST 255 and HIST 255.
History of Native American peoples in the United States to the present, including origin stories.

ETST 256 03(3-0-0). Border Crossings: People/Politics/Culture. (GT-SS3, AUCC 3E). S. Prerequisite: None.
Colonial and post-colonial discourse, politics of representation and epistemology of “location” it has produced: first and third world.

ETST 261 03(3-0-0). Latina/o Populations in the U.S. F. Prerequisite: None.
Historical processes and sociocultural phenomena that define Latina/o populations in the U.S.

ETST 300 03(3-0-0). Queer Studies and Women of Color. F, S. Prerequisite: None.
Historical/contemporary analysis of contributions of women of color to queer studies; racialized sexual/gender identities; written and cultural works. (NT-O)

ETST 310 03(3-0-0). African American Studies. F. Prerequisite: None.
Meaning of African-American studies in context of American higher education; historical development of such studies; perceptions and misperceptions.

ETST 312 03(3-0-0). African American Situation. F. Prerequisite: None.
Examination of historical, political, social, and economic experiences of the African American people.

ETST 316/JTC 316 03(3-0-0). Multiculturalism and the Media. S. Prerequisite: None. Credit not allowed for both ETST 316 and JTC 316.
Media and multiculturalism with emphasis on race, ethnicity, and other protected groups.

*ETST 318/*ANTH 318 03(3-0-0). Peoples and Cultures of the Southwest. F, S. Prerequisite: ANTH 100. Credit not allowed for both ETST 318 and ANTH 318.
Analyze development of cultures of the American Southwest; colonialism, migration, political incorporation, and socioeconomic processes. (NT-O)

ETST 319/ANTH 319 03(3-0-0). Latin American Peasantries. F, S. Prerequisite: ANTH 100 or ANTH 200 or ETST 100. Credit not allowed for both ETST 319 and ANTH 319.
Sociocultural, economic, and political responses of Latin American peasants to poverty and global processes.

ETST 320 03(3-0-0). Ethnicity and Film: Asian-American Experience. F. Prerequisite: None.
Asian American film image and film representation through both mainstream and independent movies.

ETST 324 03(3-0-0). Asian Pacific Americans and the Law. S. Prerequisite: None.
Legal history of Asian Pacific Americans examined through case studies.

ETST 332 03(3-0-0). Contemporary Chicana/o Issues. S. Prerequisite: None.
Current Chicana/o issues including conquest, immigration, urbanization, health in context of societal trends.

ETST 340 03(3-0-0). Native American Perspectives on Conquest. S. Prerequisite: None.
Native life and expression in the U.S. through response of Native Americans to conquest via revitalization movements, literature, arts.

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ETST 344 03(3-0-0). Native American Religious History and Issues. F. Prerequisite: None.
- Native ritual, ceremony, and sacred existence; clearer understanding of Native life and religious ways.

ETST 352/SOWK 352 03(3-0-0). Indigenous Women, Children, and Tribes. F. Prerequisite: None. Credit not allowed for both ETST 352 and SOWK 352.
- Historical and contemporary lives of women, children, and tribal communities.

ETST 354 03(3-0-0). A Century of Black Cinema. F. Prerequisite: None.
- History of Black cinema in 20th century.

ETST 360 03(3-0-0). Service and Leadership in Black Communities. S. Prerequisite: None.
- Sociocultural context of leadership in and beyond the African American community.

ETST 364/HIST 364 03(3-0-0). Asian American Social Movements, 1945-Present. F, S. Prerequisite: HIST 151 of HIST 252/ETST 252; completion of 45 credits. Credit not allowed for both ETST 364 and HIST 364.
- Historical relationships between Asian Americans and social movements for social, economic, and political equity in the U.S. since 1945.

ETST 365 03(3-0-0). Global Environmental Justice Movements. F, S. Prerequisite: None.
- How the world’s poor and minorities self-empower to challenge institutional racism and government apathy in order to secure basic environmental goods.

ETST 370 03(3-0-0). Caribbean Identities. F, S. Prerequisite: None.
- Development of Caribbean identities from the arrival of Amerindian groups to the abolition of slavery in the nineteenth century.

ETST 371 03(3-0-0). The Modern Caribbean. F, S. Prerequisite: None.
- Modern political and socio-economic developments in the Caribbean with emphasis on race, ethnicity, and gender.

ETST 377 03(3-0-0). African Americans in Sports. F. Prerequisite: Completion of AUCC category 2.
- Sociocultural and historical dimensions of African Americans in sports.

ETST 404 03(3-0-0). Race Formation in the United States. F. Prerequisite: None.
- Concept of race as a social construct in the shaping of U.S. character, values, and institutions.

ETST 405 03(3-0-0). Ethnicity, Class, and Gender in the U.S. S. Prerequisite: None.
- Roles of and interconnections among ethnicity, class and gender for various groups in the United States.

*ETST 410 03(3-0-0). African American Periods and Personalities. S. Prerequisite: None.
- Historical moments, movements, and men and women who have helped shape the African American heritage.

ETST 411 03(3-0-0). Black Feminism(s). F, S. Prerequisite: None.
- History and trajectory of Black feminist thought from the nineteenth century to the present.

*ETST 412 03(3-0-0). Africa and African Diaspora. F. Prerequisite: None.
- Interdisciplinary investigation of retention, transformation, and creation of culture in plantation economies of Americas.

*ETST 413 03(3-0-0). Queer Creative Expressions. F, S. Prerequisite: None.
- Analysis of queer creative expressions within socio-political discourse and cultural works, with an emphasis on critical, queer feminist theory.

*ETST 414/°ANTH 414 03(3-0-0). Development in Indian Country. F. Prerequisite: None. Credit not allowed for both ETST 414 and ANTH 414.
- Critical examination of history, public policy, and tribal strategies for economic development and natural resource management in Indian country.

ETST 422/E 422 03(3-0-0). African-American Literature. F, S. Prerequisite: CO 150; E 270. Credit not allowed for both ETST 422 and E 422.
- African-American Literature as a distinct tradition of writing and protest.

*ETST 424 03(3-0-0). Asian Pacific American Literature and Culture. S. Prerequisite: None.
- Asian Pacific American culture viewed through literature, art, and popular culture.

ETST 425 03(3-0-0). Indigenous Film and Video. F, S. Prerequisite: None.
- Historical and contemporary analysis of film featuring indigenous peoples.

ETST 430 03(3-0-0). Latina/o Creative Expression. S. Prerequisite: Junior or senior status.
- Creative expression in literature, art, theatre, music: approach to understanding experiences of various Chicana/o/Latina/o groups in the U.S.

ETST 432 03(3-0-0). Latina/o Routes to Empowerment. S. Prerequisite: Junior or senior status.
- Critical examination of political and economic strategies used to incorporate Chicana/o/Latina/o groups into U.S. society.

ETST 438/E 438 03(3-0-0). Native American Literature. F. Prerequisite: None. Credit not allowed for both ETST 438 and E 438.
- Literature of Native Americans emphasized as distinctive tradition in American literature and cultural expression of indigenous peoples.

ETST 444/SOC 444 03(3-0-0). Federal Indian Law and Policy. S. Prerequisite: None. Credit not allowed for both ETST 444 and SOC 444.
- Indian policy processes and their impact on Native lives and culture, particularly Native sovereignty.

ETST 454/SPCM 454 03(2-2-0). Chicano/a Film and Video. F. Prerequisite: None. Credit not allowed for both ETST 454 and SPCM 454.
- Emergence of Chicano/a cinema from a place of displacement, resistance, and affirmation found in contemporary Chicano/a film, video.

ETST 484 Var[1-3]. Supervised College Teaching. Prerequisite: Written consent of instructor. May be taken only once. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

ETST 487 Var[1-6]. Internship. Prerequisite: ETST 100.

ETST 492 Var(0-0-3). Seminar. F, S.

ETST 493 03(3-0-0). Ethnic Studies Research Methods and Writing. S. Prerequisite: ETST 100; 18 additional ETST credits. Senior standing required.
- Research ethics, methodology, theory, and writing in ethnic studies.

ETST 495 Var. Independent Study. F, S.

ETST 500 03(3-0-0). Race, Ethnicity, and Nationality. S. Prerequisite: None.

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Alternate year offering (odd); * Alternate year offering (even); + Field trips; $ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCC-subcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)
Intersections of race, ethnicity, and nationality within a broader framework of political economy.

**ETST 501 03(3-0-0). Ethnic Studies History and Theory.** F. Prerequisite: Graduate or senior status.
- History and theory of study of racial and ethnic formation, identity, and politics.

**ETST 502 03(3-0-0). Research Methods.** F. Prerequisite: Graduate or senior status.
- Interdisciplinary ethnic studies research methods.

**ETST 503 03(3-0-0). Contemporary Ethnic Studies Issues.** F. Prerequisite: Graduate or senior status.
- Contemporary ethnic studies issues in the United States and abroad.

**ETST 505 03(3-0-0). Academic Writing.** S. Prerequisite: Graduate status.
- Academic writing skills development including article summaries, literature reviews, annotated bibliographies, proposals, and journal articles.

**ETST 510 03(3-0-0). Ethnicity, Race, and Health Disparities in U.S.** F. Prerequisite: None.
- Health status of ethnic/racial populations; cultural dimensions that underlie health and health disparities.

**ETST 513/ANTH 513 03(3-0-0). Capitalism and Global Ethnic Conflicts.** S. Prerequisite: ANTH 200 or ETST 100. Credit not allowed for both ETST 513 and ANTH 513.
- Causes of global ethnic conflicts with emphasis on resource competition, capitalist development schemes, and role of the state.

**ETST 520 03(3-0-0). Race and U.S. Social Movements.** S. Prerequisite: Graduate or senior status.
- Intersections of race, class, gender, and sexuality which structure life chances and mobilize movements for rights, recognition, and resources.

**ETST 530 03(3-0-0). Race, Labor, and the Economy.** S. Prerequisite: Graduate or senior status.
- Social stratification, class, race, and gender formation, neoliberalism, and the impact of globalization.

**ETST 531 03(3-0-0). Latina/o Politics in the U.S.** F, S. Prerequisite: None.
- Impact of Latina/o politics on the U.S. political system by examining Latina/o political mobilization patterns and behaviors.

**ETST 535 03(3-0-0). Chicana Feminism: Theory and Form.** F, S. Prerequisite: None.
- Different forms of Chicana feminism as produced by Chicana scholars, writers, poets, artists and activists from historical and contemporary accounts.

**ETST 540 03(0-0-3). Race in Latin America.** F. S. Prerequisite: Admission to Ethnic Studies graduate program.
- Examination of race in Latin America and its intersection with ethnicity, class, gender, and sexuality.

**ETST 541 03(3-0-0). Gender, Violence, and Indigenous Peoples.** S. Prerequisite: None.
- Multiple forms of violence against indigenous women and children in the Americas, Australia, and New Zealand.

**ETST 544/POLS 544 03(3-0-0). National Identities and Nation Building.** F. Prerequisite: None. Credit not allowed for both ETST 544 and POLS 544.
- How statist conceptions of race and ethnicity have been mobilized in nation-building projects.

**ETST 545 03(3-0-0). Immigration and Citizenship in U.S. History.** F. S. Prerequisite: Graduate student standing.
- Comparative survey of immigration and citizenship debates in the U.S. since the 19th century, with a focus on the politics of racial formations.

**ETST 550 03(3-0-0). Law, Policy, and Indigenous Peoples.** S. Prerequisite: Graduate or senior status.
- Laws and policies impacting indigenous women, children, families, and communities in North America, New Zealand, and Australia.

**ETST 555 03(3-0-0). African American Intellectual Thought.** S. Prerequisite: Graduate student standing.
- Historical efforts of Black/African American intellectuals to describe the conditions and circumstances of African descendants in the U.S.

**ETST 560 03(3-0-0). Race, Ethnicity, and Higher Education.** F. Prerequisite: None.
- Historical and contemporary experiences of people of color as students, faculty, and staff in higher education in the United States.

**ETST 684 Var. Supervised College Teaching.**

**ETST 687 Var. Internship.**

**ETST 695 Var. Independent Study.**

**ETST 698 Var. Research in Ethnicity.**

**ETST 699 Var. Thesis.**

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; $ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCC-subcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)
FOREST SCIENCES COURSES  
Department of Forest and Rangeland Stewardship  
Warner College of Natural Resources  

F 210 03(2-2-0). Forest Ecogeography. F, S. Prerequisite: BZ 101 or BZ 104 or BZ 110 or BZ 120 or LIFE 102. 
Ecogeography of forested ecosystems on a global scale and identification of important North American trees.

+F 224 01(0-2-0). Wildland Fire Measurements. F. Prerequisite: None. Required field trips
Wildland fire control and use measurements: fuels, weather, topography, fire behavior, and fire ecology.

F 230 02(0-4-0). Forestry Field Measurements. SS. Prerequisite: None.
Develop field skills using maps, compasses and aerial photos; photo interpretation; tree and stand measurements; stand volume and value estimates.

F 310/RS 310 03(2-2-0). Forest and Rangeland Ecogeography. F, S. Prerequisite: BZ 101 or BZ 104 or BZ 110 or BZ 120 or LIFE 102. 
Distribution of wildland plant communities and identification of important grasses, forbs, shrubs and trees common in North America.

F 311 03(3-0-0). Forest Ecology. F. S. Prerequisite: LAND 220/LIFE 220 or LIFE 320.
Relationships of ecological concepts to the dynamics of forest ecosystems.

F 312 01(0-2-0). Dendrology Lab. F, S. Prerequisite: Concurrent registration in F 310.
Identification of characteristic trees common to North American forests.

+F 321 03(2-2-0). Forest Biometry. F. Prerequisite: NR 220; F 230; MATH 141; STAT 201 or STAT 301. Required field trips.
Measurement and estimation of timber in logs, trees, and stands. Sampling with varying probabilities. ($)

F 322 03(3-0-0). Economics of the Forest Environment. F.S. Prerequisite: AREC 202 or AREC 240/ECON 240 or ECON 202.
Economic principles and techniques applied to forested environments.

F 324 03(3-0-0). Fire Effects and Adaptations. F. Prerequisite: LAND 220/LIFE 220 or LIFE 320.
Introduction to fire ecology including fire history, ecosystem effects, and organism responses.

F 325 03(3-0-0). Silviculture. S. Prerequisite: F 230; F 311; NR 220.
Credit not allowed for both F 325 and NR 326.
Principles of silviculture and their application to major forest types of United States.

Principles of timber harvesting and effects of logging on the environment.

+F 331 03(2-2-0). Wood Products in Society. F. Prerequisite: None.
Role of wood products in society; spectrum of wood products, some field trips.

F 421 04(3-3-0). Forest Stand Management. F. Prerequisite: F 230; F 321; F 322; F 325.
Forest management plan preparation: forest condition and health assessment; evaluation of silvicultural treatments; implementation and monitoring. ($)

F 422 03(2-2-0). Quantitative Methods in Forest Management. F. Prerequisite: F 321; F 322.
Design and analysis of optimization and nonoptimization models in forest managerial operations.

F 424 03(2-2-0). Wildland Fire Behavior and Management. F. Prerequisite: LAND 220/LIFE 220 or LIFE 320.
Policies and strategies for the management of fire and fuels. Fire behavior, fuels treatments, prescribed fire, suppression operations, and prevention. ($)

F 425 03(3-0-0). Advanced Wildland Fire Behavior and Management. S. Prerequisite: F 424; NR 319.
Advanced strategies, tools, and techniques for wildland fire management: prediction, prevention, suppression, and use for resource benefit.

F 430 03(1-4-0). Forestry Field Practices. S. Prerequisite: F 330; F 421.
Forestry field course, S212 saw certification, collect stand inventory data, develop and implant stand prescriptions, and harvest and process trees. ($

F 487 Var[3-12]. Professional Forestry Internship. Prerequisite: Written consent of department head.
Professional-level field experience with forestry organization.

F 495 Var. Independent Study.

F 510 03(2-3-0). Ecophysiology of Trees. S. Prerequisite: BZ 440.
Environmental factors affecting physiology of woody plants; emphasis on water relations in trees and importance of water in physiological processes.

F 520 03(3-0-0). Advanced Quantitative Methods in Forestry I. F. Prerequisite: F 322; MATH 160.
Design and analysis of optimization models in forest management operations: linear, goal, and dynamic programming.

F 521 03(2-2-0). Advanced Quantitative Methods in Forestry II. S. Prerequisite: F 520.
Analysis of forest inventory information; dynamic and stochastic models oriented to decision making and research in forestry.

F 522 03(3-0-0). Advanced Forest Economics. S. Prerequisite: ECON 306.
Analysis of forestry issues: financial maturity, management intensity, federal policy, taxation, natural environments, and silviculture.

+F 524 03(2-2-0). Forest Fire Meteorology and Behavior. F. Prerequisite: None.
Effects of atmospheric processes on wild and prescribed fires; interrelationships of weather, fuels, and topography on forest and range fires.

F 525 04(3-0-1). Silvicultural Practices. S. Prerequisite: F 311.
Comprehensive coverage of silvicultural practices as applied in U.S. forestry.

F 540 03(2-3-0). Fuels, Vegetation and Fire Management. F, S, SS. Prerequisite: Admission to the Continuing Education in Fuels Management program through the Office of Conference Services.
Develop, test, and display the impact of alternative fuels and vegetation treatments on vegetation development, fuels and fire behavior.

F 541 03(3-0-0). Data Analysis/Interpretation-Fire Managers. F. Prerequisite: Employment as wildfire manager. Offered only through Division of Continuing Education
Knowledge and skills for complex analyses of fire information. (NT)

F 542 03(3-0-0). Wildland Fire Economics and Management. S. Prerequisite: Employment as wildland fire manager.

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Managerial economics and management techniques applied to wildland fire situations. (NT)

F 544 03(3-0-0). Decision Methods for Fire Managers.  F, S, SS.  Prerequisite: Written consent of instructor.
Application of decision methods, including optimization techniques, finance, and decision trees to initial attack and fuels management problems.

F 593 01(0-0-1). Seminar-Fire Science.  F.

F 624 03(2-2-0). Fire Ecology.  S.  Prerequisite: F 424; one course in ecology.
Fire in forest and range ecosystems; principles and techniques for evaluating fire effects on vegetation, soils, watersheds, and wildlife.

*F 625/ESS 625 03(3-0-0). Ecology of Forest Production.  S.  Prerequisite: 300-level course in ecology.  Credit not allowed for both F625 and ESS 625.
Develops student expertise in understanding carbon and nutrient flows in forests. (NT-O)

F 693 01(0-0-1). Seminar.  F, S.

F 695 Var. Independent Study.

F 698 Var. Research.


*F 721 03(3-0-0). Forest Policy.  S.  Prerequisite: NR 320.
Policies and institutions affecting management of forest lands in U.S.

F 798 Var. Research.

F 799 Var. Dissertation.

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### FAMILY AND CONSUMER SCIENCES COURSES

**School of Education**

**College of Health and Human Sciences**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Offerings</th>
<th>Prerequisite</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FACS 179</td>
<td>Introduction to Family and Consumer Sciences</td>
<td>S</td>
<td>None</td>
<td>Career options in family and consumer sciences; professional leadership responsibilities.</td>
</tr>
<tr>
<td>FACS 320</td>
<td>Finance—Personal and Family</td>
<td>F, S, SS</td>
<td>None</td>
<td>Management of income, expenditures, credit, savings, investment, insurance, taxes, and assets considering legislation and economic conditions. (NT-O)</td>
</tr>
<tr>
<td>FACS 479</td>
<td>Colloquium-Family and Consumer Sciences</td>
<td>S</td>
<td>FACS 179</td>
<td>Current topics and issues related to professional roles, responsibilities, and opportunities.</td>
</tr>
<tr>
<td>FACS 487A-C</td>
<td>Internship</td>
<td>A) Extension, B) Community service, C) Business</td>
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<tr>
<td>FACS 494</td>
<td>Independent Study</td>
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<tr>
<td>FACS 590</td>
<td>Workshop</td>
<td>[1-3]</td>
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<tr>
<td>FACS 698</td>
<td>Research</td>
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FIRE AND EMERGENCY SERVICES ADMINISTRATION COURSES
Department of Forest and Rangeland Stewardship
College of Natural Resources

FESA 310 03(0-0-3). Fire Service Leadership. F, S, SS. Prerequisite: None.
Theory, practice and application of ethical leadership in public safety; developing personal ethics and leadership skills and abilities. (NT-O)

FESA 330 03(3-0-0). Industrial Processes and Fire Protection. S. Prerequisite: None. Offered only through the Division of Continuing Education.
Industrial processes and fire protection managed by fire and safety personnel. (NT-O/V)

FESA 331 03(3-0-0). Structure Influence on Tactics and Strategy. F, S. Prerequisite: None. Offered only through the Division of Continuing Education.
How construction type, alterations, design and materials influence a building’s reaction to fire. Fireground influence on tactics and strategy. (NT-O/V)

FESA 333 03(3-0-0). Proposals/Reports in Fire Service Administration. F, S. Prerequisite: None. Offered only through the Division of Continuing Education.
Process of preparing reports and developing a proposal supported by research. Introduction to research techniques, Internet and library use; conventions of documentation. (NT-O)

FESA 334 01(1-0-0). Orientation to Experiential Learning. F, S. Prerequisite: None. Offered only through the Division of Continuing Education.
Demonstration of knowledge, skill, and professional experience for the purpose of enhancing documentation and career development skills. (NT-O/V)

FESA 335 03(3-0-0). Trends in Fire Science Technologies. F. Prerequisite: None. Offered only through the Division of Continuing Education.
Analytical tools designed to evaluate, align, select, and implement emerging fire science technologies. (NT-O)

FESA 336 03(3-0-0). Fire and Emergency Services Management. F, S. Prerequisite: None. Offered only through the Division of Continuing Education.
Fire and emergency service administrative structures and processes. Examination of management and leadership models and applications. (NT-O)

FESA 337 03(3-0-0). Policy and Public Administration. F, S. Prerequisite: FESA 336. Offered only through the Division of Continuing Education.
Political and legal foundations of fire and emergency services. Public administration concepts, decision making and policy development. (NT-O)

FESA 338 03(3-0-0). Essentials of Emergency Management. F, S. Prerequisite: None. Offered only through the Division of Continuing Education.
Emergency management theory; mitigation, planning, response, and recovery in large-scale incidents. Development/operation of emergency operation centers. (NT-O)

FESA 339 03(3-0-0). Incident Command Systems. S. Prerequisite: FESA 331 or FESA 338. Offered only through the Division of Continuing Education.
Theory and application of incident command systems (ICS) to the command and coordination of major emergency operations. (NT-O)

FESA 341 03(3-0-0). Fire Officer I-A. F, S. Prerequisite: Enrollment in FESA program or written consent of instructor. Offered only online.
Fire officer competencies at the supervisory level of performance, as confirmed by NFPA Standard 1021, Level I, 4.1 to 4.4. (NT-O)

FESA 342 03(3-0-0). Fire Officer I-B. F, S. Prerequisite: FESA 341 with a grade of C or better. Offered only online.
Fire officer competencies at the supervisory level of performance, as confirmed by NFPA Standard 1021, Level II, 4.5 to 4.7. (NT-O)

FESA 431 03(3-0-0). Emergency Medical Services Management. F. Prerequisite: FESA 432; FESA 433. Offered only through the Division of Continuing Education.
Emergency medical service models, design implementation evaluation, interactions with health care systems, public policy and public health systems. (NT-O)

FESA 432 03(3-0-0). Fire and Emergency Services Budgeting. F, S. Prerequisite: FESA 333; FESA 336. Offered only through the Division of Continuing Education.
Application of emergency service budgeting systems with emphasis on revenues, public financial controls, capital funding and performance measures. (NT-O)

FESA 433 03(3-0-0). Fire and Emergency: Human Resources. F, S. Prerequisite: FESA 333; FESA 336. Offered only through the Division of Continuing Education.
Theory, practice, and models of human resources applied to emergency organizations; workforce development, HR functions, and labor relation. (NT-O)

FESA 434 03(3-0-0). Training Program Management. F. Prerequisite: FESA 432, FESA 433. Offered only through the Division of Continuing Education.
Development of agency training and education programs. Utilization of training and education practices, resources, facilities and technologies. (NT-O)

FESA 435 03(3-0-0). Volunteer/Combination Organization Management. S. Prerequisite: FESA 432; FESA 433. Offered only through the Division of Continuing Education.
Development and management of fire and emergency service organizations with volunteer and combination resources. (NT-O)

FESA 436 03(3-0-0). Fire Protection Through Model Building Codes. S. Prerequisite: None. Offered only through the Division of Continuing Education.
Overview of the most current fire codes that are used across the United States. Discussion of fire inspection methodology and enforcement practices. (NT-O/V)

FESA 437 03(0-0-3). Fire and Emergency: Legal Considerations. F, S, SS. Prerequisite: FESA 432; FESA 433.
Fire service in relation to the complex legal system of the United States, individual states, and local jurisdictions. (NT-O)

FESA 438 03(3-0-0). Prevention Program Management. F. Prerequisite: FESA 432; FESA 433. Offered only through the Division of Continuing Education.
Design, implementation, and evaluation of fire and risk prevention programs using education, engineering, and enforcement approaches. (NT-O)

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FESA 441 03(3-0-0). Fire Officer II-A. F, S. Prerequisite: FESA 342 with a grade of C or better. Offered only online.
Fire officer competencies at the supervisory/managerial level of performance, as confirmed by NFPA Standard 1021, Level II, 5.1 to 5.4. (NT-O)

FESA 442 03(3-0-0). Fire Officer II-B. F, S. Prerequisite: FESA 441 with a grade of C or better. Offered only online.
Fire officer competencies at the supervisory/managerial level of performance, as confirmed by NFPA Standard 1021, Level II, 5.5 to 5.7. (NT-O)

FESA 467 03(3-0-0). Integrated Management Simulation. F, S. Prerequisite: FESA 331; FESA 338; FESA 432; FESA 433; completion of 15 credits of selected electives. Offered only through the Division of Continuing Education.
Integration management and administrative knowledge and skills in the development of a fire and emergency service management simulation. (NT-O)

FESA 492 Var[1-3]. Seminar. F, S. Prerequisite; Written consent of instructor. Offered only through the Division of Continuing Education.
Discussion and documentation of professional experience in fire and emergency services. (NT-O)

FESA 495 Var[1-6]. Independent Study. F, S. Prerequisite: FESA 334; completion of 30 credits of FESA coursework. Offered only through Division of Continuing Education. (NT-O)

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### FINANCE COURSES

**Department of Finance and Real Estate**

**College of Business**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Prerequisite(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIN 300 03(3-0-0)</td>
<td>Principles of Finance</td>
<td>ACT 205 or ACT 210; AREC 202 or ECON 202; ECON 204; MATH 141 or MATH 155 or MATH 160. Credit not allowed for both FIN 300 and FIN 305. Overview of financial markets and institutions, analysis of securities and investigation of financial management techniques.</td>
</tr>
<tr>
<td>FIN 305 03(3-0-0)</td>
<td>Fundamentals of Finance</td>
<td>ACT 205 or ACT 210; ECON 204. Credit not allowed for both FIN 305 and FIN 300. Role of finance in management of the firm; role, structure of financial markets and institutions, valuation of basic securities. (NT-O)</td>
</tr>
<tr>
<td>FIN 310 03(3-0-0)</td>
<td>Financial Markets and Institutions</td>
<td>ECON 204. Analysis of the functions and operations of financial markets and the primary and secondary securities created in those markets.</td>
</tr>
<tr>
<td>FIN 311 03(3-0-0)</td>
<td>Debt Securities Analysis</td>
<td>ECON 315 or FIN 310; FIN 300; FIN 355. Analysis of corporate, government, and mortgage-based debt securities. Emphasis on securitization of asset-backed obligations.</td>
</tr>
<tr>
<td>FIN 320 03(3-0-0)</td>
<td>Introduction to Financial Planning</td>
<td>ACT 210; ECON 202. Personal financial planning including budgeting, tax planning, credit management, investing, retirement, and estate planning.</td>
</tr>
<tr>
<td>FIN 342 03(3-0-0)</td>
<td>Risk Management and Insurance</td>
<td>FIN 300 or FIN 305. Management of insurable risks for the individual and business firm.</td>
</tr>
<tr>
<td>FIN 355 03(3-0-0)</td>
<td>Principles of Investments</td>
<td>FIN 300; FIN 310. Modern investment theory with applications in the debt and equity markets, with introduction to portfolio management.</td>
</tr>
<tr>
<td>FIN 370 03(3-0-0)</td>
<td>Financial Management—Theory and Application</td>
<td>FIN 300. Theory and application of financial management to business firms; case problems used for illustration.</td>
</tr>
<tr>
<td>FIN 440 03(3-0-0)</td>
<td>Estate Planning</td>
<td>ACT 330; FIN 320. Methods for conservation and transfer of wealth, considering aspects of tax, trusts, wills, probate, advanced directives, and charitable giving.</td>
</tr>
<tr>
<td>FIN 445 03(3-0-0)</td>
<td>Financial Plan Development</td>
<td>ACT 330; FIN 320; FIN 342. Analyze client finances and economic conditions, develop and communicate comprehensive financial plan using financial planning professional standards.</td>
</tr>
<tr>
<td>FIN 455 03(3-0-0)</td>
<td>Advanced Portfolio Management</td>
<td>FIN 355. Advanced hedging and portfolio management theory and techniques.</td>
</tr>
<tr>
<td>FIN 470 03(3-0-0)</td>
<td>Financial Risk Management</td>
<td>FIN 355. Futures, options, asset-backed securities and other derivatives as they are used in financial risk management.</td>
</tr>
<tr>
<td>FIN 471 03(3-0-0)</td>
<td>Enterprise Valuation</td>
<td>FIN 355; FIN 370. Analytical framework for measuring, managing, and applying principles and tools to value enterprises.</td>
</tr>
</tbody>
</table>

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FIN 669 03(3-0-0). Financing, Evaluating Sustainable Enterprise. F.
Prerequisite: BUS 601; FIN 601. Credit not allowed for both FIN 669 and BUS 669.
Theoretical and applied approaches to the funding and evaluation of enterprises.

FIN 670 03(3-0-0). Risk Management Theory and Application. S.
Prerequisite: FIN 605; FIN 625; FIN 655.
Fundamentals of financial risk management using quantitative techniques and models to identify, measure, and manage corporate risk.

FIN 675 03(3-0-0). International Finance. S. Prerequisite: None.
Analysis of the foreign exchange market and international financial markets. (NT-T/V)

FIN 678 03(3-0-0). Financial Decisions-Theory and Practice. S.
Prerequisite: FIN 600.
Analysis of theory of corporate finance with emphasis on underlying assumptions and implications for financial decisions.

FIN 695 Var. Independent Study.

FIN 696 Var. Group Study.

FIN 698 Var[1-6]. Research. F. S.

**FOOD SCIENCE AND HUMAN NUTRITION COURSES**

**Department of Food Science and Human Nutrition**

**College of Health and Human Sciences**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Prerequisites</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSHN 125 02(2-0-0)</td>
<td>Food and Nutrition in Health</td>
<td>F, S</td>
<td>Nutritional quality and safety of food related to human health.</td>
</tr>
<tr>
<td>FSHN 150 03(3-0-0)</td>
<td>Survey of Human Nutrition</td>
<td>F, S, SS</td>
<td>Basic nutrition principles and concepts; their application to personal health and interactions with societal and environmental issues.</td>
</tr>
<tr>
<td>FSHN 192 01(0-0-1)</td>
<td>First Year Seminar</td>
<td>F</td>
<td>Facilitate a successful transition to college for new incoming students by emphasizing personal growth and identifying campus resources.</td>
</tr>
<tr>
<td>FSHN 300 03(3-0-0)</td>
<td>Food Principles and Applications</td>
<td>F, S</td>
<td>Application of food preparation theories to modification and evaluation of food products.</td>
</tr>
<tr>
<td>FSHN 301 02(0-6-0)</td>
<td>Food Principles and Applications Laboratory</td>
<td>F, S</td>
<td>Techniques and manipulative skills for preparation and evaluation of standard and modified food products. ($)</td>
</tr>
<tr>
<td>FSHN 350 03(3-0-0)</td>
<td>Human Nutrition</td>
<td>F, S, SS</td>
<td>Metabolism of macro and micronutrients; physiologic basis underlying dietary recommendations for human health. Nutrients, dietary requirements for physical well-being; evaluation of various diets.</td>
</tr>
<tr>
<td>FSHN 360 02(2-0-0)</td>
<td>Nutrition Assessment</td>
<td>S</td>
<td>Principles of anthropometric, dietary, and biochemical assessment of nutritional status.</td>
</tr>
<tr>
<td>FSHN 386A-C</td>
<td>Practicum</td>
<td></td>
<td>A) Food Service Management 02(0-0-4); B) Gerontology 03(0-0-9); C) School Nutrition 03(0-0-9); F, S, SS.</td>
</tr>
<tr>
<td>FSHN 392 01(0-0-1)</td>
<td>Dietetic Practice Seminar</td>
<td>F, S</td>
<td>Pre-professional skills to prepare students for the pursuit of careers in the field of dietetics.</td>
</tr>
<tr>
<td>FSHN 428 03(3-0-0)</td>
<td>Nutrition Teaching and Counseling Techniques</td>
<td>S</td>
<td>Objectives, principles, and organization of subject matter for nutrition education and counseling.</td>
</tr>
<tr>
<td>FSHN 444 01(1-0-0)</td>
<td>Nutrition and Aging</td>
<td>F</td>
<td>Effect of aging on nutrient needs and impact of nutrition on successful aging and health in the elderly. (NT-O)</td>
</tr>
<tr>
<td>FSHN 445/HDFS 445 03(0-0-3)</td>
<td>Early Childhood Health, Safety, and Nutrition</td>
<td>F</td>
<td>Planning, promoting and maintaining healthy lifestyle and safe learning environment for preschool children. (NT-O)</td>
</tr>
<tr>
<td>FSHN 450 05(4-2-0)</td>
<td>Medical Nutrition Therapy</td>
<td>F</td>
<td>Use of nutrition therapy in the treatment of acute conditions and chronic disease states. ($)</td>
</tr>
</tbody>
</table>

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FSHN 506 03(3-0-0). Nutrition and Human Performance. S. Prerequisite: Admission to GP-IDEA program in dietetics. Offered as an online course only.

- Relationship of specific nutrients and optimal nutrition to physical efficiency and performance. (NT-O)

FSHN 507 03(3-0-0). Nutrition Education in the Community. F, S. Prerequisite: Admission to GP-IDEA program in dietetics. Offered as an online course only.

- Principles and practices of teaching individuals and groups to translate nutrition knowledge into action. Emphasis on research and evaluation. (NT-O)

FSHN 508 03(3-0-0). International Nutrition and World Hunger. S. Prerequisite: Admission to GP-IDEA program in dietetics. Offered only as an online course.

- Magnitude, causes, and nature of hunger and under-nutrition; programs and policies to alleviate hunger. (NT-O)

FSHN 509 03(0-0-3). Nutrition Counseling and Education Methods. F. Prerequisite: Admission to the GPidea online M.S. in Dietetics. Offered only online.

- Application of learning theories and nutrition counseling with individuals and groups in the community and clinical settings. (NT-O)

FSHN 510 03(0-0-3). Pediatric Clinical Nutrition. F. Prerequisite: Admission to the GP IDEA program in Dietetics.

- Physiological, biochemical and nutritional aspects of diseases processes relevant to infants and children up to 18 years of age. (NT-O)

FSHN 511 03(3-0-0). Maternal and Child Nutrition. F, SS. Prerequisite: Admission to the GPidea Program in Dietetics; written permission of instructor.

- Behavioral, physiological and public health issues impacting dietary and nutritional factors that support growth and development. (NT-O)

FSHN 512 03(0-0-3). Nutritional Aspects of Oncology. S. Prerequisite: Enrolled in the GPidea Online M.S. in Dietetics. Offered as an online course only through the Division of Continuing Education.

- Relationships between nutrition and cancer including the role of nutrition in specific cancers, cancer prevention and patient management. (NT-O)

FSHN 520 03(3-0-0). Advanced Medical Nutrition Therapy. SS. Prerequisite: FSHN 550 or FSHN 551 or admission to GP-IDEA program in dietetics.

- Role of nutrition in etiology and treatment of selected disorders. (NT-O)

FSHN 525 02(2-0-0). Nutrition Education Theories and Practice. F. Prerequisite: FSHN 350.

- Examination of current theories, skills, and models used in nutrition education programs as preparation for research and practice.

FSHN 540 03(3-0-0). Nutrigenomics and Advanced Lipid Metabolism. S. Prerequisite: Admission to GP-IDEA program in dietetics. Offered as an online course only.

- How nutrients regulate gene expression (nurigenetics) and how genotype influences an individual's nutrient requirements (nutrigenomics). (NT-O)

FSHN 550 03(3-0-0). Advanced Nutritional Science I. S. Prerequisite: BC 351 or BC 403; FSHN 350.

- Protein, vitamin, mineral metabolism; human studies, animal models.

FSHN 551 03(3-0-0). Advanced Nutritional Science II. F. Prerequisite: BC 351 or BC 403; FSHN 350.

- Carbohydrate, lipid, energy metabolism; human studies, animal models.

FSHN 575 01(1-0-0). Nutrition Education for a Healthy Heart. F, SS. Prerequisite: None. Offered only as a correspondence course only.

- Nutrition-related issues of atherosclerotic cardiovascular disease risk reduction and background in the art/science of facilitating behavior change. (NT-C)

FSHN 586 Var[1-3] Practicum-Advanced Clinical Nutrition. SS.

- Community nutrition assessment; nutrition program planning and evaluation, nutrition policy analysis.

FSHN 587A-C 06(0-18-0). Internship.


FSHN 590 Var. Workshop. SS.

FSHN 620 03(2-0-1). Community Nutrition Planning and Evaluation. S. Prerequisite: FSHN 350.

- Community nutrition assessment; nutrition program planning and evaluation, nutrition policy analysis.

FSHN 628 02(2-0-0). Advanced Nutrition Counseling Techniques. F. Prerequisite: None.

- Principles, strategies, and techniques for interviewing, assessing, and providing nutrition counseling in community settings.

FSHN 630/HES 630 03(3-0-0). Integrative Exercise and Nutrition Metabolism. S. Prerequisite: FSHN 551; HES 610. Credit not allowed for both FSHN 630 and HES 630.

- Advances in integrative human metabolism under conditions of changing energy flux.

FSHN 640 02(2-0-0). Selected Topics in Nutritional Epidemiology. F. Prerequisite: FSHN 350; STAT 301 or STAT 307/ERHS 307.

- Overview of topics in nutritional epidemiology; study design, interpretation of findings, linkage of data to action.

FSHN 650A-C 02(2-0-0). Recent Developments in Human Nutrition.


FSHN 660 02(2-0-0). Women’s Issues in Lifecycle Nutrition. S. Prerequisite: FSHN 459.

- Current nutritional issues related to selected stages of lifecycle compared to normal adult nutritional needs.

*FSHN 661 02(2-0-0). International Nutrition. F. Prerequisite: FSHN 350.

- Roles of technological programs and international agencies in meeting nutritional needs.

*FSHN 670 02(1-2-0). Laboratory Methods. F. Prerequisite: CHEM 245; CHEM 246.

- Laboratory techniques and instrumentation in nutrition and food science.

FSHN 675 03(3-0-0). Regulation of Energy Intake. S. Prerequisite: FSHN 350; PSY 454.

- Central and peripheral mechanisms controlling energy intake with emphasis on humans. Current theories, experimental approaches, and new research.

FSHN 684 Var. Supervised College Teaching. F, S.

FSHN 686A-C Var. Practicum.

- A) Counseling. Prerequisite: FSHN 520. (S) B) Nutrition. (C) Food service.

FSHN 692 01(0-0-1). Seminar.

FSHN 695A-C Var. Independent Study.


- Alternate year offering (odd); * Alternate year offering (even); + Field trips; $ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCC-subcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)
FSHN 696A-D Var. Group Study. F, S, SS.
   A) Food science. B) Nutrition. C) Dietetics. 01(0-0-1). F, S.
   Prerequisite: Admission to the GPIdea online M.S. in Dietetics. (NT-O)
D) Exercise and nutrition.

FSHN 698A-C Var. Research.
   A) Dietetics. F, S. Prerequisite: Enrollment in the Great Plains Idea
   program in Dietetics. Offered as an online only course through the
   Division of Continuing Education. (NT-O). B) Nutrition. F, S, SS. C)
   Food service management. F, S, SS.

   B) Nutrition. C) Food service management.

   B) Nutrition. C) Food service management.

FSHN 700 02(2-0-0). Cellular Nutrition. F. Prerequisite: FSHN 550
   and FSHN 551 or BC 403 and BMS 501.
   Essential nutrient requirements of cells and organs.

FSHN 792 01(0-0-1). Seminar-Research Topics in Nutrition. F, S.
   Ph.D. seminar in literature review.

FSHN 795 Var. Independent Study.

FSHN 796 01(0-0-1). Group Study.


Alternate year offering (odd); * Alternate year offering (even); + Field trips; $ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All
University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)
FOOD TECHNOLOGY COURSES  
Department of Food Science and Human Nutrition  
College of Health and Human Sciences

FTEC 110 03(3-0-0). Food—From Farm to Table.  S. Prerequisite: None.  
Commercial food processing related to preservation and enhancing of food quality, safety, and value.

FTEC 210 03(2-2-0). Science of Food Fermentation.  F. Prerequisite: CHEM 107 or CHEM 111; LIFE 205 or MIP 300.  
Science, history, culture, gastronomy, safety, health, and nutrition aspects of fermented foods and beverages. ($)

FTEC 350 02(2-0-0). Fermentation Microbiology.  S. Prerequisite: CHEM 245 or FTEC 210 or LIFE 206 or MIP 302.  
Integration of fermentation science, microbiology, and chemistry.

FTEC 360 03(1-4-0). Brewing Processes.  F. Prerequisite: CHEM 245; FTEC 210.  
Influence of raw material selection, malting, mashing, boiling, and fermentation on quality of beverages.

FTEC 400 03(3-0-0). Food Safety.  F. Prerequisite: CHEM 107 or CHEM 111.  
Safety of human food emphasizing safe production, processing, marketing, preparation, consumption, and regulations.

*FTEC 420 03(2-2-0). Quality Assessment of Food Products.  S. Prerequisite: FTEC 110; LIFE 205.  
Quality control of raw ingredients to manufactured products; assessment and sensory evaluation of foods.

+FTEC 422 02(1-2-0). Brewing Analysis and Quality Control.  S. Prerequisite: FTEC 460. Required field trips.  
Assessment, quantification, and control of various aspects of commercial beer production.

°FTEC 430 02(1-2-0). Sensory Evaluation of Fermented Products.  S. Prerequisite: FSHN 301 or FTEC 210.  
Application of sensory evaluation techniques to the study of fermented foods.

FTEC 440 02(2-0-0). Refining and Packaging Technology.  S. Prerequisite: FTEC 360.  
Science, technology and management of refining and packaging.

*FTEC 447 02(2-0-0). Food Chemistry.  S. Prerequisite: CHEM 245 or CHEM 345.  
Chemistry of food constituents as related to food quality and stability.

FTEC 460 03(2-2-0). Brewing Science and Technology.  F. S. Prerequisite: CHEM 245; MATH 118; 21 years of age; completed 60 credits.  
Scientific and technical aspects of brewing, fermenting, finishing, and evaluating microbrewed style of lagers and ales. ($)

FTEC 487 Var[1-15]. Internship.

FTEC 492 02(1-0-1). Seminar: Fermentation Science & Technology.  F. Prerequisite: FTEC 460; FTEC 465.  
Capstone seminar in fermentation science and technology.

FTEC 495 Var. Independent Study.

*FTEC 496A-B 01(0-0-1). Group Study in Fermentation Science.  S. Prerequisite: FSHN 350 or FTEC 360.  

*FTEC 570 02(2-0-0). Food Product Development.  F. Prerequisite: FTEC 447.  
Food product concepts, feasibility, and evaluation.

*FTEC 572 02(2-0-0). Food Biotechnology.  S. Prerequisite: MIP 334.  
Interrelationships among microorganisms, food processing methods, advances in biotechnology and food quality, spoilage, shelf-life and safety.

FTEC 574 02(2-0-0). Current Issues in Food Safety.  S. Prerequisite: None.  
Current food safety issues from field to table; microbiological, consumer, processing, and agricultural issues.

*FTEC 576 02(2-0-0). Cereal Science.  F. Prerequisite: FTEC 447.  
Chemistry and functionality of cereal grain components and their importance in human nutrition.

*FTEC 578 03(2-0-1). Bioactives and Probiotics for Health.  S. Prerequisite: BC 351; LIFE 205 or MIP 300.  
Mechanisms through which functional foods and probiotics modulate intracellular signal transduction and protein expression in chronic disease states. (NT-O)

FTEC 698 Var. Research.


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FISH, WILDLIFE, AND CONSERVATION BIOLOGY COURSES

Department of Fish, Wildlife, and Conservation Biology
Warner College of Natural Resources

   Essentials of wildlife ecology as a foundation for understanding issues on the origins, management and conservation of biodiversity. (NT-O)

+FW 111 01(5-1-0). Basic Outdoor Skills in FWCB. F, S. Prerequisite: May be taken up to 3 times for a maximum of 3 credits. Required field trips.
   Basic outdoor skills crucial for FWCB and outdoor novices. History of wildlife conservation and reasons for declining outdoor participation. ($)

+FW 204 03(2-3-0). Introduction to Fishery Biology. F. Prerequisite: None. Required field trips.
   Exposure to sampling techniques, agencies, and topics in fishery biology careers. ($)

FW 260 03(3-0-0). Principles of Wildlife Management. F, S. Prerequisite: MATH 124; BZ 110 or LIFE 103.
   Ecology principles applied to conservation and management of fish/wildlife resources. Quantitative methods, socioeconomic factors, population dynamics.

FW 300 02(2-0-0). Ichthyology. S. Prerequisite: BZ 111 or LIFE 103.
   Biology of fishes: anatomy, taxonomy, physiology, behavior, ecology, evolution, and zoogeography.

+FW 301 01(0-2-0). Ichthyology Laboratory. F, S. Prerequisite: FW 300 or concurrent registration. Required field trips.
   Anatomy, taxonomy, evolution, and ecology of North American freshwater fishes. ($)

FW 350 04(3-2-0). Teaching Shooting Responsibility. S. Prerequisite: None.
   Education and instructor certification course to develop knowledge, skills, behavior for teaching about firearms, shooting sports, and associated ethics.

FW 355 02(0-0-2). Hunter Education for Instructors. F, S. SS. Prerequisite: None. Offered only through the Division of Continuing Education.
   Principles of learning and teaching for instructors of state hunter education courses. (NT-O)

FW 356 03. Leopold's Ethic for Wildlife and Land. F, S. SS. Prerequisite: None. Offered as a correspondence course only.
   Philosophy, art, history, and science of wildlife and land management from writings of Aldo Leopold. (NT-C)

FW 357 03. Wildlife Habitat on the Great Plains. F, S. SS. Prerequisite: None. Offered as a correspondence course only.
   Management of cover, food, and water for wildlife and fish in the Great Plains. Emphasis on practices compatible with other uses of private land. (NT-C)

FW 370 03(2-2-0). Design of Fish and Wildlife Projects. F, S. Prerequisite: FW 260 or FW 360; LAND 220/LIFE 220 or LIFE 320; MATH 155 or MATH 160; NR 220; STAT 301 or STAT 307.
   Design, analysis, and evaluation of wildlife projects; lab exercises in design and data analysis; preparation and presentation of project proposals.

+FW 375 03(1-4-0). Field Wildlife Studies. S, SS. Prerequisite: FW 260; LAND 220/LIFE 220 or LIFE 320. Required field trips.
   Field trip to see wildlife management and habitats and to discuss problems and practices with professional ecologists and resources managers. ($)

FW 384 Var[1-5]. Supervised College Teaching. F, S, SS. Prerequisite: Written consent of instructor. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.
   Instruction and practice in laboratory instruction in lower-division departmental courses.

FW 400 03(2-0-1). Conservation of Fish in Aquatic Ecosystems. F. Prerequisite: FW 300; LIFE 320. Ecological processes that create habitat and biotic template for fish in aquatic ecosystems; human effects; strategies for conserving fishes. ($)

FW 401 03(2-3-0). Fishery Science. F. Prerequisite: FW 300; MATH 141 or MATH 155 or MATH 160; STAT 301 or STAT 307.
   Theory, philosophy, and applications for study and management of fishery resources. (S)

FW 402 04(3-2-0). Fish Culture. S. Prerequisite: FW 300.
   Principles and practices to produce food, bait, and sport fishes. ($)

*FW 405 03(2-3-0). Fish Physiology. S. Prerequisite: BZ 214 or FW 300. Credit not allowed for both FW 405 and FW 605.
   Physiological ecology of fishes; functional adaptations and adjustments used to cope with environmental and physiological states. ($)

FW 455 03(3-0-0). Principles of Conservation Biology. F, S. Prerequisite: FW 260; LIFE 320; STAT 301 or STAT 307. Credit not allowed for both FW 455 and FW 555.
   Review of efforts to study and conserve biological diversity, focused on fish and wildlife populations.

*+FW 465 03(2-2-0). Managing Human-Wildlife Conflicts. S. Prerequisite: FW 260. Required field trips.
   Methods for resolving conflicts caused by wildlife: integrating animal behavior, population dynamics, economics, and human dimensions into solutions.

*FW 467 03(2-0-1). Wildlife Disease Ecology. F. Prerequisite: LIFE 320.
   Ecological, epidemiological, and evolutionary principles of disease in fish and wildlife populations; contemporary issues in disease ecology.

*FW 468 03(2-3-0). Wild Bird Management. S. Prerequisite: FW 360.
   Ecology and management of game, pest, and rare bird populations and nongame bird communities.

*+FW 469 03(3-4-0). Conservation and Management of Large Mammals. F. Prerequisite: BZ 330; FW 360; LIFE 320; STAT 301 or STAT 307. Required field trips.
   Principles of behavior, ecology, population dynamics, and conservation related to large mammals. ($)

*FW 471 04(2-4-0). Wildlife Data Collection and Analysis. F, S. Prerequisite: FW 370; NR 220. Required field trips.
   Analysis methods used in wildlife management and research; adaptive resource management with emphasis on learning through field and computer labs. ($)

FW 472 03(2-0-1). Issues in Animal Conservation and Management. F. Prerequisite: FW 260; LIFE 320.
   Current and emerging issues in fish and wildlife conservation and management at the state, national and global scales.

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**FW 475 03(3-0-0). Conservation Decision Making** S. Prerequisite: MATH 155 or MATH 160; STAT 301; an ecology class; junior or senior standing.

Structured approaches to conservation and management of vertebrates; articulating objectives, developing management options, and predicting outcomes.

*FW 477 03(1-3-1). Wildlife Habitat Use and Management. F. Prerequisite: FW 260; NR319 or NR322. Credit not allowed for both FW 477 and FW 677. Required field trips.

Wildlife habitat evaluation, classification, and improvement; analysis of habitat use patterns; planning and implementation of management plans. (S)

**FW 487 Var[1-6]. Internship.** Prerequisite: Written consent of instructor.

Field experience in fish and wildlife management.

**FW 492 01(0-0-1). Seminar-Wildlife Biology.**

**FW 495A-B Var. Independent Study.** Prerequisite: One course in resource management; one course in ecology; written consent of instructor.


**FW 496A-B Var. Group Study.** Prerequisite: One course in resource management; one course in ecology.


*FW 540 03(2-0-1). Fisheries Ecology. S. Prerequisite: One course in fishery science; one course in aquatic ecology.

Population, community, and ecosystem management for fishes and other aquatic organisms in freshwater habitats.

**FW 544 03(2-0-1). Ecotoxicology. S. Prerequisite: LAND 220/LIFE 220 or LIFE 320; STAT 301 or STAT 307.

Ecological effects of contaminants on populations, communities, and ecosystems.

**FW 551 03(2-0-1). Design of Fish and Wildlife Studies. F. Prerequisite: STAT 301 or STAT 307.

Principles, types of studies and philosophy of science in design of experimental, observational, and sampling studies for wildlife investigations. (NT-O)

*FW 552 03(3-0-0). Applied Sampling for Wildlife/Fish Studies. S. Prerequisite: STAT 301 or STAT 307.

Survey sampling theory and techniques, including distance sampling, with emphasis on wildlife and fish studies.

**FW 555 03(3-0-0). Conservation Biology. S. Prerequisite: LAND 220/LIFE 220 or LIFE 320; STAT 301 or STAT 307.

Ecological factors in conservation of biological diversity.

**FW 561A-E Var[1-3]. Advanced Topics. F, S. Prerequisite: Written consent of instructor.


*FW 567 03(2-0-1). Wildlife Disease Ecology. F. Prerequisite: Graduate standing; LIFE 320; STAT 301 or STAT 307.

Ecological, epidemiological, and evolutionary principles of disease in fish and wildlife populations; contemporary issues in disease ecology. (NT-O)

**FW 573 03(3-0-0). Travel Abroad-Wildlife Ecology/Conservation. SS. Prerequisite: Written consent of instructor.

Study tour of various overseas ecosystems and natural resources conservation programs; discussions with local ecologists/managers.

**FW 575 03(0-0-3). Wildlife Habitat Evaluation for Educators. F, S, SS. Prerequisite: Graduate standing. Offered only through the Division of Continuing Education.

Teachers or leaders implement wildlife habitat evaluation procedures in classroom or community programs and evaluate performance of students. (NT-C/O)

**FW 576 03(0-0-3). Wildlife Policy, Administration, and Law. F, S, SS. Offered only through the Division of Continuing Education.

Recommended preparation: One course in political science; introductory course in natural resources management.

Evolution of policy affecting wildlife and humans using historical, current, philosophical, legal, and administrative constructs. (NT-C/O)

*FW 605 04(2-3-1). Advanced Physiological Ecology of Fishes. S. Prerequisite: FW 300. Credit not allowed for both FW 605 and FW 405.

Physiological ecology of fishes; functional adaptations and adjustments used to cope with environmental and physiological states. (S)

**FW 662 03(1-2-1). Wildlife Population Dynamics. S. Prerequisite: FW 260; MATH 155 or MATH 160; STAT 301.

Population models; experimental evidence and analysis of theories of population regulation; case studies.

**FW 663 05(3-3-1). Sampling and Analysis of Vertebrate Populations. S. Prerequisite: FW 260; STAT 301.

Sampling and analysis of fish and wildlife populations, including survival estimation, capture-recapture sampling, and transect sampling.

*FW/STAT 673 03(3-0-0). Hierarchical Modeling in Ecology. F. Prerequisite: ESS 575 or STAT 420. Credit not allowed for both FW 673 and STAT 673.

Hierarchical ecological modeling using common forms of data in fish and wildlife studies and emphasizing spatial and temporal aspects of analysis.

+FW 677 03(1-3-1). Wildlife Habitat Management. F. Prerequisite: FW 260. Credit not allowed for both FW 477 and FW 677.

Habitat models; vegetation manipulation and monitoring for wildlife; extended field trips. (S)

**FW 684 Var[1-5]. Supervised College Teaching.** Prerequisite: Written consent of instructor.

**FW 692A-B Var. Seminar.**


**FW 695A-B Var. Independent Study.**


**FW 696A-B Var. Group Study.**


**FW 698A-B Var. Research.**


**FW 699A-B Var. Thesis.**


**FW 798A-B Var. Research.**


**FW 799A-B Var. Dissertation.**


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GEOSCIENCE COURSES
Department of Geosciences
Warner College of Natural Resources

+GEOL 120 03(3-0-0). Exploring Earth: Physical Geology. (GT-SC2, AUCC 3A) F, S, SS. Prerequisite: None. Credit allowed for only one of the following: GEOL 120, GEOL 122, GEOL 124I, GEOL 150. Required field trips.

Develops scientific understanding through introduction to earth processes, materials, resources, and hazards.

GEOL 121 01(0-2-0). Introductory Geology Laboratory. (GT-SC1, AUCC 3A) F, S, SS. Prerequisite: GEOL 120 or GEOL 122 or GEOL 124 or concurrent registration in GEOL 120 or GEOL 122 or GEOL 124. Credit allowed for only one of the following: GEOL 120, GEOL 121.

Laboratory applications of introductory geology. ($)

GEOL 122 03(3-0-0). The Blue Planet: Geology of Our Environment. (GT-SC2, AUCC 3A) F, S, SS. Prerequisite: None. Credit allowed for only one of the following: GEOL 120, GEOL 122, GEOL 124, GEOL 150.

Develops scientific understanding through introduction to geological processes, natural hazards, earth resources, and their impacts on society.

GEOL 124 03(3-0-0). Geology of Natural Resources. (GT-SC2, AUCC 3A). S. Prerequisite: None. Credit allowed for only one of the following: GEOL 120, GEOL 122, GEOL 124, GEOL 150.

Develops scientific understanding through introduction to the origin, use, and environmental impact of geological resources extracted from the Earth.

+GEOL 150 04(3-3-0). Physical Geology for Scientists and Engineers. F. Prerequisite: None. Credit allowed for only one of the following: GEOL 120, GEOL 122, GEOL 124, GEOL 150. Required field trips.

Earth materials, structures, and surface processes. Geologic analysis using field data, topographic and geologic maps, and aerial photos. ($)

+GEOL 154 04(3-3-0). Historical and Analytical Geology. S. Prerequisite: GEOL 120 or GEOL 122 or GEOL 124 or GEOL 150.

Physical and biological history of Earth with introduction to laboratory, computer, and field techniques. (S)

+GEOL 232 03(2-3-0). Mineralogy. F. Prerequisite: CHEM 111 or concurrent registration; GEOL 120 or GEOL 122 or GEOL 124 or GEOL 150; MATH 124. Required field trips.

Crystal structures, chemistry, rock-forming and economically important minerals, crystal growth and defects, physical properties of minerals. ($)

GEOL 250 03(2-2-0). The Solid Earth. S. Prerequisite: GEOL 120 or GEOL 122 or GEOL 124 or GEOL 150; MATH 124; MATH 125.

Structure, flow, and composition of the deep Earth; introduction to geophysics; tests of plate tectonic theory.

GEOL 332 02(1-2-0). Optical Mineralogy. F. Prerequisite: GEOL 232 or concurrent registration.

Fundamental light optics in crystalline substances; optical indicatrix; isotropic, uniaxial, and biaxial substances; common minerals in thin section. ($)

GEOL 342 03(3-0-0). Paleontology. F. Prerequisite: GEOL 154.

Description of invertebrates, vertebrates, and plants and their distribution in earth history.

+GEOL 344 04(3-3-0). Stratigraphy and Sedimentology. F. Prerequisite: GEOL 154 with a C or better. Required field trips.

Description, genesis, correlation and age of sediments, sedimentary rocks and layered rock sequences. ($)

+GEOL 364 04(3-3-0). Igneous and Metamorphic Petrology. S. Prerequisite: GEOL 232, with a grade of C- or better. Required field trips.

Identification, classification, geochemistry, petrogenesis of igneous and metamorphic rocks; textural interpretation of hand samples and thin sections. ($)

+GEOL 366 04(3-3-0). Sedimentary Petrology and Geochemistry. F. Prerequisite: CHEM 113; GEOL 154; GEOL 364. Required field trips.

Composition, identification, and classification of sedimentary rocks; geochemical processes affecting sedimentary rocks and surficial deposits. ($)

GEOL 372 04(3-3-0). Structural Geology. S. Prerequisite: GEOL 154; MATH 125; concurrent registration in PH 141. Required field trips.

Stress and strain in rocks, geometry of deformed rocks, and tectonic principles. ($)

+GEOL 376 03(1-4-0). Geologic Field Methods. S. Prerequisite: GEOL 344; GEOL 372 or concurrent registration.

Scientific, surveying, and mapping methods used in geologic field studies; proposal, map, and report preparation. ($)

GEOL 384 Var[1-5]. Supervised College Teaching. Prerequisite: Written consent of instructor. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

Instruction and practice in laboratory instruction in lower-division departmental courses.

GEOL 401 01(0-3-0). Geology of the Rocky Mountain Region. F. Prerequisite: GEOL 154. May be taken up to three times for credit. Does not count as a geology elective in the departmental major.

Field course; geology of the local Rocky Mountain region. ($)

GEOL 498 Var[1-6]. Research. S. Prerequisite: Written consent of instructor.

*GEOL 530 03(2-2-0). Advanced Petrology. S. Prerequisite: GEOL 364.
Igneous and metamorphic processes and products explored through thermodynamics, phase equilibria, and textural analysis.

+GEOL 546 04(3-3-0). Sedimentary Basin Analysis. S. Prerequisite: GEOL 344. Required field trips.
Sedimentologic data base, correlation, mapping, facies models, classification, and evolution of sedimentary basins. Applications to petroleum exploration. ($) 

°GEOL 547 03(0-0-0). Ore Deposit Geochemistry. S. Prerequisite: GEOL 447.
Geochemical techniques applied to the geology, exploration, and environmental analysis of ore deposits.

GEOL 551 03(3-0-0). Groundwater Modeling. S. Prerequisite: GEOL 452 or CIVE 423.
Groundwater modeling from a geologic perspective. Conceptual models and computer modeling of groundwater flow and solute transport.

GEOL 552 Var[2-3]. Advanced Topics in Hydrogeology. S. Prerequisite: GEOL 452.
Current literature, new techniques, legislative and political developments in hydrogeology, and appropriate case histories.

°GEOL 560 03(3-3-0). Clay Mineralogy. F. Prerequisite: GEOL 364.
Crystallography and chemistry of clay minerals. Applications to geology, engineering, and soil sciences, X-ray analysis of clays.

°GEOL 562 03(3-0-0). Statistical Data Analysis in Earth Resources. F. Prerequisite: STAT 340; STAT 350.
Statistical parameters, sequential data, map analysis, and multivariate data.

°GEOL 565 03(3-0-0). Petroleum Geochemistry and Geology. S. Prerequisite: GEOL 366; GEOL 372.
Geochemistry and geology of hydrocarbon generation, migration, and accumulation. Applications to hydrocarbon exploration.

°GEOL 567 03(3-0-0). Sedimentary Geochemistry. S. Prerequisite: GEOL 366.
Geochemical processes affecting sedimentary rocks and other surficial materials.

°GEOL 570 03(3-0-0). Plate Tectonics. S. Prerequisite: GEOL 364; GEOL 372; PH 142.
Examination of the historical development of plate tectonic theory and its application to understanding geological processes.

*GEOL 575 04(3-2-0). Subsurface Geophysical Mapping. S. Prerequisite: GEOL 344; GEOL 372; MATH 161; PH 142.
Advanced techniques for creating subsurface geological maps based on seismic reflection and well log data.

°GEOL 576 03(3-0-0). Exploration Seismology. S. Prerequisite: GEOL 344; GEOL 372; MATH 161; PH 142.
Seismic exploration methods, including theory, data acquisition, and data processing.

GEOL 578 04(3-2-0). Global Seismology. F. Prerequisite: PH 142; MATH 261.
Quantitative introduction to seismology; basics of seismic data analysis; fundamentals of wave propagation; earthquakes; structure of the Earth.
GLOBAL ENVIRONMENTAL SUSTAINABILITY COURSES
Nondepartmental, Interdisciplinary
School of Global Environmental Sustainability
Office of Provost and Executive Vice President

GES 101 03(3-0-0). Foundations of Environmental Sustainability. F.
Prerequisite: None.
Concepts, foundations, and metrics of global environmental sustainability applied to global challenges. (NT-O)

GES 192 Var[1-3]. Global Environmental Sustainability Seminar. F, S.
Prerequisite: None.
Critical interconnections of global environmental sustainability, the environment, economics, and society.

GES 470 03(3-0-0). Applications of Environmental Sustainability. S.
Prerequisite: GES 101; 12 credits of GES interdisciplinary minor; junior or senior standing.
Integration of dimensions of global environmental sustainability—environment, society, and economy—through case studies and team project.

GES 520 03(3-0-0). Issues in Global Environmental Sustainability.
F, S. Prerequisite: Graduate standing.
Analysis of the different major dimensions/definitions of sustainability in current issues involving environmental, social and economic systems.

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GEOGRAPHY COURSES  
Department of Anthropology  
College of Liberal Arts

GR 100 03(3-0-0). Introduction to Geography. F, S. (GT-SS2, AUCC 3C) Prerequisite: None.  
Major geographic themes applied to selected regions; physical environment, human-land relationships, regional analysis. (NT-O)

GR 210 03(3-0-0). Physical Geography. F, S. Prerequisite: None. Credit not allowed for both GR 210 and ESS 210.  
Energy, mass budget, and human impacts on atmosphere, hydrosphere, and continental land surfaces.

GR 304/WR 304 03(3-0-0). Sustainable Watersheds. F, S. Prerequisite: Completion of the AUCC 1B mathematics requirement. Credit not allowed for both GR 304 and WR 304.  
Effects of climate, land use, and water use on the sustainability of water quantity and quality.

GR 311 03(1-4-0). GIS for Social Scientists. F, S, SS. Prerequisite: GR 100.  
Applications of GIS techniques useful to the social sciences. Mapping techniques and GIS toolkits are practiced in lab. (NT-O)

GR 320 03(3-0-0). Cultural Geography. F. Prerequisite: GR 100.  
Geographic analysis of cultural phenomena, elements emphasizing human-land relationships and spatial patterns of agriculture, cities, language, religion. (NT-O)

GR 323/NR 323 03(2-2-0). Remote Sensing and Image Interpretation. F. Prerequisite: None. Credit allowed for only one of the following: GR323, NR 323, GR 503, NR 503.  
Remote sensing systems and applications; characteristics of photographic, scanner and radar images; imagery interpretation.

GR 330 03(3-0-0). Urban Geography. F, S, SS. Prerequisite: GR 100.  
Spatial distribution of urban areas and the geographic similarities and contrasts that exist between and within them. (NT-O)

GR 342 03(3-0-0). Geography of Water Resources. F. Prerequisite: None. Required field trips.  
Overview of spatial and temporal issues. ($)

GR 345 03(3-0-0). Geography of Hazards. S. Prerequisite: ESS 210/GR 210.  
Causes, effects, distributional patterns, and human adjustments to environmental hazards.

GR 410 03(3-0-0). Climate Change: Science, Policy, Implications. S. Prerequisite: 3 credits of geography (GR) course work.  
Implications and consequences for earth systems including the cryosphere, hydrosphere, and biosphere.

GR 415 03(3-0-0). The Geography of Commodities. F, S, SS. Prerequisite: GR 100.  
Social relations, international trade, and environmental impacts surrounding the production, transportation, exchange and consumption of commodities.

GR 420 04(3-2-0). Spatial Analysis with GIS. F. Prerequisite: 3 credits of geography (GR) course work. Credit not allowed for both GR 420 and NR 322.  
Theory, application of geographic information systems for spatial analysis; conceptual basis of GIS, nature and use of geographic data, case studies.

*GR 430 03(3-0-0). Land Change Science and Remote Sensing. S. Prerequisite: GR 100.  
Local case studies and global cases of land-use/land-cover changes in rural, peri-urban, and urban areas.

GR 487 Var[1-9]. Internship. F, S, SS. Prerequisite: 9 credits of anthropology.  
Academic-based work experience with selected organizations or agencies. Supervised application of principles of geography.

GR 495 Var. Independent Study. F, S.

GR 503/NR 503 04(3-3-0). Remote Sensing and Image Analysis. F. Prerequisite: None. Credit allowed for only one of the following: GR503, NR 503, GR 323, NR 323.  
Interpretation and analysis of photographic, multispectral scanner, and radar data; sensor systems; applications to resource management.

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GRADUATE SCHOOL COURSES
Nondepartmental
Graduate School

GRAD 510 03(2-2-0). Fundamentals of High Performance Computing. S. Prerequisite: None.
UNIX; networks; scalar, vector, and parallel architectures; performance programming.

GRAD 511 03(2-2-0). High Performance Computing and Visualization. F. Prerequisite: GRAD 510.
Interactive methods for linear systems; Monte Carlo methods; visualization and image processing.

GRAD 544 01(1-0-0). Ethical Conduct of Research. F, S. Prerequisite: None. This is a partial-semester course.
Principles and practice of ethical conduct of research.

GRAD 550 01(1-0-0). STEM Communication. F. Prerequisite: None.
Review and practice of key communication principles for Science, Technology, Engineering, and Mathematics (STEM) professionals.

GRAD 592 01(0-0-1). Water Resources Seminar. F. Prerequisite: None.
Interdisciplinary seminar emphasizing issues important to water resources community. Content relates to a preselected theme each semester.

GRAD 596 Var[1-3]. Group Study-Graduate Education. SS. Prerequisite: Graduate School approval.
Preparation for graduate education.

GRAD 792 02(0-0-2). Seminar on College Teaching. F, S. Prerequisite: None.
Role of college teacher emphasizing applied principles and practices derived from empirical research and collective experience of teaching professors.

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HUMAN DEVELOPMENT AND FAMILY STUDIES COURSES

Department of Human Development and Family Studies

College of Health and Human Sciences

HDFS 101 03(3-0-0), Individual and Family Development. (GT-SS3, AUCC 3C). F, S, SS. Prerequisite: None.
   Principles of life-span human development in the context of the family. Theory and research on the influence of family systems on individuals. (NT-O)

HDFS 175/PSY 175 03. Developmental Psychology Across the Life Span. F, S, SS. Prerequisite: None. Credit not allowed for both HDFS 175 and PSY 175. Offered as telecourse only.
   Theory and research on physical, cognitive, and psychosocial human development across the life span. (NT-T)

HDFS 217 03(3-0-0). Creative Experiences for Children. F, S, SS. Prerequisite: HDFS 101 or PSY 100; HDFS 277 or concurrent registration.
   Theories of play; art, music, literature as related to child development. (NT-O)

HDFS 277 01(1-0-0). Professional Skills Development I. F, S, SS. Prerequisite: CO 150 or concurrent registration or HONR 193 or concurrent registration; Human Development and Family Studies or Early Childhood Education majors only.
   Professional skills and opportunities relevant to contemporary issues with individuals, families and community. (NT-B)

HDFS 286 04(2-6-0). Practicum-Professional Skills. F, S, SS. Prerequisite: HDFS 101; completion of 30 credits; required background check through CBI, FBI; major in Human Development and Family Studies or Early Childhood Education only.
   Observational and applied experience with children, adolescents, adults, or families. Exploration of professional skills and opportunities. (NT-O)

HDFS 302 03(3-0-0). Marriage and Family Relationships. F, S, SS. Prerequisite: HDFS 101 or SOC 100; completion of 30 credits.
   Preparation for and adjustment to marital and family relationships throughout the life cycle. (NT-O)

HDFS 310 03(3-0-0). Infant and Child Development in Context. F, S, SS. Prerequisite: HDFS 101 or PSY 100; completion of 30 credits.
   Physical, cognitive, and socioemotional development from conception through middle childhood in context of family, relationships, and culture. (NT-O)

HDFS 311 03(3-0-0). Adolescent/Early Adult Development in Context. F, S, SS. Prerequisite: HDFS 101 or PSY 100; completion of 30 credits.
   Physical, cognitive, and socioemotional development of adolescents and young adults in context of family, relationships, and culture. (NT-O)

HDFS 312 03(3-0-0). Adult Development-Middle Age and Aging. F, S, SS. Prerequisite: HDFS 101 or PSY 100; completion of 30 credits.
   Developmental issues and processes pertaining to middle and later adulthood. Contexts in which adult development and aging occur are emphasized. (NT-O)

HDFS 317 03(0-0-3). Special Needs in Early Childhood. F, S, SS. Prerequisite: HDFS 310 or PSY 260. Offered as an online course only through the Division of Continuing Education.
   A typical development in early childhood and recommended practices for fostering development of young children with special needs. (NT-O)

HDFS 318 03(3-0-0). Infancy and Toddlerhood. F, S, SS. Prerequisite: HDFS 310 or PSY 260.
   Physical, cognitive, language, and socio-emotional development from pre-birth through 36 months with an emphasis on applied settings. (NT-O)

HDFS 320 03(3-0-0). Cognitive and Language Development. F, S, SS. Prerequisite: HDFS 310 or PSY 260.
   Cognitive and language development from birth to adulthood; including biological, social, and cultural influences. (NT-O)

HDFS 332 03(3-0-0). Death, Dying, and Grief. F, S, SS. Prerequisite: HDFS 101 or PSY 100.
   Developmental processes of death and dying related to dying individuals and their families and for human service agencies. (NT-O)

HDFS 334 03(3-0-0). Parenting Across the Lifespan. F, S, SS. Prerequisite: HDFS 310 or PSY 260; completion of 60 credits.
   Parenthood as a developmental process; child rearing as a function of variations in risk status, family systems, and ecological contexts. (NT-O)

HDFS 350 03(2-2-0). Applied Research Methods. F, S, SS. Prerequisite: HDFS 101 or PSY 100; STAT 201 or STAT 301 or STAT 311.
   Interpret, apply and write about research findings in human development and family studies. (NT-O)

HDFS 351 03(0-0-3). Promoting Early Socioemotional Competence. F, S, SS. Prerequisite: HDFS 310. Offered only online.
   Promoting positive socioemotional development and preventing challenging behaviors in early childhood, based on the Pyramid Model. (NT-O)

HDFS 375 03(3-0-0). Programming for Children and Families. F, S. Prerequisite: HDFS 310 or PSY 260; completion of 60 credits.
   Prevention and intervention programs for children and families. (NT-O)

HDFS 401 03(3-0-0). Childhood Socialization. F, S. Prerequisite: HDFS 310 or PSY 260; completion of 60 credits.
   Socialization processes that influence human development within diverse family styles and cultures. (NT-O)

HDFS 402 03(3-0-0). Family Studies. F, S, SS. Prerequisite: HDFS 101 or SOC 100; completion of 60 credits.
   Theory and research concerning relationships within families; interaction between family and other social institutions. (NT-O)

HDFS 403 03(3-0-0). Families in the Legal Environment. F, S, SS. Prerequisite: completion of 60 credits.
   Legal issues related to families, including adoption, marriage, divorce, parent and child rights, consumer issues, disability, and estate planning. (NT-O)

HDFS 404 02(2-0-0). Child Life Theory and Practice. F, S, SS. Prerequisite: HDFS 310 or PSY 260.
   Theories and skills related to effective child life practice in hospitals. (NT-O)

HDFS 439 03(3-0-0). Administration of Early Childhood Programs. F, S, SS. Prerequisite: HDFS 310 or PSY 260.
   Center administration related to program development and operations, budgeting, state regulations and licensing, and personnel issues. (NT-O)

HDFS 445/FSHN 445 03(0-0-3). Early Childhood Health, Safety, and Nutrition. F. Prerequisite: HDFS 310. Credit not allowed for both HDFS 445 and FSHN 445. Offered only online.
   Planning, promoting and maintaining healthy lifestyle and safe learning environment for preschool children. (NT-O)

HDFS 470 03(0-4-2). Campus Corps: Mentoring At-Risk Youth. F, S, SS. Prerequisite: Completion of AUCC 3C Social and Behavioral Sciences; required background check through CBI, FBI; Human Development and Family Studies majors only; written consent of instructor. Course may be taken for a maximum of 9 credits.

°Alternate year offering (odd); * Alternate year offering (even); † Field trips; $ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCSubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)
Service-learning course engaging students as mentors with local at-risk youth.

**HDFS 477 01(1-0-0). Professional Skills Development II.** F, S, SS. Prerequisite: HDFS 277; completion of 75 credits; Human Development and Family Studies majors only. Applications and integration of human development and family background within professional settings. (NT-O)

**HDFS 484 Var[1-3]. Supervised College Teaching.** A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.


**HDFS 492 03(0-0-3). Seminar-Program Proposal Development.** F, S, SS. Prerequisite: HDFS 350; HDFS 477 or concurrent registration or EDUC 400; major in Human Development and Family Studies or Early Childhood Education; completion of 90 credits. Research, development, and oral presentations of program proposals from a family systems and development perspective. (NT-O)

**HDFS 493 03(0-0-3). Specialized Seminar.** Prerequisite: Written consent of instructor. Advanced study of theory, research, and application in a specialized area.


**HDFS 497 Var. Group Study.** S.


**HDFS 499 Var[1-6]. Thesis.** Prerequisite: Written consent of department head. Independent research project presented to a faculty committee.

**HDFS 500 03(2-3-0). Issues in Human Development and Family Studies.** F. Prerequisite: None. A selected, broad issue in human development and family studies emphasizing principles of research ($).

**HDFS 501 01(1-0-0). Readings in the Discipline.** S. Prerequisite: Admission to HDFS master’s program. Research in human development and family studies content areas; skills in writing an extended literature review.

**HDFS 520 03(1-2-1). Family Therapy Practice: Treatment Planning.** S. Prerequisite: Admission to the Marriage and Family Therapy Program. Integration of family/couple therapy theories and practice related to treatment planning and internal family systems therapy. ($)

**HDFS 521 03(1-2-1). Family Therapy Practice: Common Factors.** S. Prerequisite: Admission to the Marriage and Family Therapy Program. Application of common factors - e.g., therapeutic alliance - in family and couple therapy. ($) $)

**HDFS 524 03(3-0-0). Family Theory.** F. Prerequisite: One family studies course. Major theories and conceptual frameworks for family analysis.

**HDFS 528 04(2-4-0). Child and Family Assessment.** F. Prerequisite: Nine credits in human development and family studies or behavioral science at 300-400 level.

**HDFS 534 03(3-0-0). Marriage and Family Therapy.** F. Prerequisite: HDFS 524. Theories and techniques.

**HDFS 549 03(3-0-0). Research Methods I.** F. Prerequisite: Three credits of statistics; three credits of upper-division behavioral sciences. Introduction to empirical research, data analysis, and interpretation in Human Development and Family Studies Sciences.

**HDFS 550 03(3-0-0). Research Methods II.** S. Prerequisite: HDFS 549. Research strategies and ethical considerations.


**HDFS 592 03(1-0-2). Grant Writing-Human Services and Research.** F, S. Prerequisite: STAT 201. Writing grant proposals that support client services or for research.

**HDFS 600B-E 03(3-0-0). Advanced Studies.** F, S, SS.

**HDFS 610 03(3-0-0). Risk and Resilience.** S. Prerequisite: Six credits in behavioral sciences.

**HDFS 613 03(3-0-0). Adolescent Development.** F. Prerequisite: One course in adolescence, three credits of upper-division behavioral science. Classical and contemporary theory; review of research related to major developmental processes.

**HDFS 616 03(3-0-0). Adult Development and Aging.** S. Prerequisite: One course in adult development or three credits of upper-division behavioral science. Advanced study of developmental change and adaptation during adult years. (NT-O)

**HDFS 620 03(1-2-1). Family Therapy Practice: Addictions.** F. Prerequisite: Admission to the Marriage and Family Therapy Program. Application of marriage and family therapy theories to clinical practice with a focus on addiction and self-of-the-therapist. ($)

**HDFS 621 03(1-2-1). Family Therapy Practice: Topical Sexuality.** S. Prerequisite: Admission to the Marriage and Family Therapy Program. Integration of family therapy theories and practice related to topics in sexuality, termination and referral, and one’s personal theory of change. ($) $)

**HDFS 624 03(3-0-0). Skills and Techniques in Family Therapy.** F. Prerequisite: HDFS 534. Elaboration of techniques and therapy skills based on theory and research.

**HDFS 630 03(3-0-0). Socioemotional Development.** S. Prerequisite: Six credits of upper-division behavioral sciences. Examination of theory and research on issues in social, emotional, and personality development.

**HDFS 631 03(3-0-0). Cognitive Development.** F. Prerequisite: Six credits of upper-division behavioral sciences. Examination of child and adolescent cognitive development, including perceptual, linguistic, memory, and social cognitive skills.

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HDFS 636 03(3-0-0). Aging and the Family. S. Prerequisite: One course in adult development or six credits of upper-division behavioral science.
Theory and research relating to topics on aging during middle and late years of family life cycle.

HDFS 644 03(3-0-0). Foundations in Family Therapy. F, SS. Prerequisite: HDFS 524.
Contemporary research and treatment strategies for parenting problems, family violence, and substance abuse.

HDFS 650 03(2-0-1). Multivariate Research Methods I. F. Prerequisite: HDFS 550.
Statistical concepts and analysis.

HDFS 676 03(3-0-0). Professional Skills Development. F. Prerequisite: Admission to Marriage and Family Therapy Program.
Fundamental skills of marriage and family therapy; clinic procedures; case assessment, planning, and management.

HDFS 677 03(3-0-0). Ethical and Legal Issues. S. Prerequisite: None.
Ethical and legal issues in the field of human development and family studies.

HDFS 684 Var. Supervised College Teaching. F, S.


HDFS 687A-C Var. Internship.
Application of advanced human development skills in professional settings.
A) Human development. Prerequisite: Nine graduate credits in human development. B) Family studies. Prerequisite: Nine graduate credits in human development. C) Marriage and family therapy. Prerequisite: HDFS 677 or concurrent registration; HDFS 678 or concurrent registration; HDFS 688 or concurrent registration.

HDFS 692 03(3-0-0). Seminar-Contemporary Family Issues. Prerequisite: Six credits in behavioral sciences.
Current issues in the family with implications for intervention and therapy.

HDFS 695A-C Var. Independent Study.

HDFS 697 Var[1-6]. Group Study.

HDFS 698A-B Var[1-3]. Research.
A) Human development. B) Family studies.


HDFS 710 03(3-0-0). Multivariate Research Methods II. S. Prerequisite: HDFS 650.
Applications of multivariate methods to research in applied developmental science.

HDFS 772 03(2-0-1). Marriage and Family Therapy Supervision. S, SS. Prerequisite: Written consent of instructor.
Prepares professionals to supervise marriage and family therapists in a variety of settings.

HDFS 792 03(3-0-0). Issues in Applied Developmental Science. S. Prerequisite: HDFS 500.
Current issues in applied developmental science involving a synthesis of theory, research, and application.

Aquatic conditioning. Prerequisite: Intermediate swimming ability.

Physical activities for the development of personal motor skills.

HES 102A-G 01(0-3-0). Physical Education Activities.  

Special activities.

HES 106 01(0-3-0). Scuba Diving. F, S. Prerequisite: Intermediate ability.

HES 120 01(1-0-0). Introduction to Health and Exercise Science. F, S. Prerequisite: None.  

Health and Exercise Science major, career options, campus resources, tools for academic success, various health-related topics.

HES 145 03(3-0-0). Health and Wellness. F, S, SS. Prerequisite: None. Credit not allowed for both HES 143 and HES 145.  

Personal health behaviors and personal choice in response to wellness. (NT-O)

HES 203 03(3-0-0). Motor Learning. F, S, SS. Prerequisite: PSY 100.  

Motor skill acquisition as function of maturation and experience. Emphasis on strategies for facilitating skill learning in normal school-age population.

HES 207 03(2-2-0). Anatomical Kinesiology. F, S, SS. Prerequisite: MATH 125 or concurrent registration.  

Anatomical, physiological, and mechanical fundamentals of human movement.

HES 240 02(1-2-0). First Aid and Emergency Care. F, S. Prerequisite: None.  

Principles, applied techniques emphasizing emergency rescue and care. Meets requirements for Red Cross Advanced First Aid and Emergency Care Credential. ($)

HES 307 03(3-0-0). Biomechanical Principles of Human Movement. F, SS. Prerequisite: BMS 301 or HES 207; PHY 121 or PHY 141.  

Identify with and utilize biomechanical principles pertinent to human movement.

HES 309 02(2-0-0). Methods of Coaching. SS. Prerequisite: None.  

Preparation to coach in an interscholastic athletic situation. (NT-O)

HES 319 03(3-0-0). Neuromuscular Aspects of Human Movement. F, S. Prerequisite: BMS 300 or BMS 360; BMS 301.  

Neuromuscular anatomy and physiology of human movement. Applied/integrated topics: aging, muscle fatigue, training, and neuromuscular disease.

HES 332A-H 01(0-2-0). Techniques of Teaching Individual Sports. F, S. Prerequisite: Corresponding laboratory or competency in area.  


HES 340 01(1-0-0). Exercise Prescription. F, S, SS. Prerequisite: Concurrent registration in HES 386A.  

Theory and practice of exercise prescription for healthy individuals, cardiac patients, and other special populations.

HES 345 03(3-0-0). Population Health and Disease Prevention. F, S, SS. Prerequisite: HES 145.  

Causes of disease throughout the lifespan and interventions designed to prevent disease. (NT-O)

HES 346 03(2-2-0). Training Room Methods. F, S. Prerequisite: HES 207.  

Preventive measures, taping, bandaging, massage and manipulation, diet and conditioning of athletes.

HES 356 03(3-0-0). Wellness Programming. F, S, SS. Prerequisite: HES 386A.  

Assessment of wellness concerns and organizational problems; selection and implementation of program design.

HES 379 03(3-0-0). Psychology and Sport. F, S. Prerequisite: PSY 100; minimum GPA of 2.5 in the following courses, with no grade lower than C: HES 145; HES 207; BMS 300.  

Psychological and social implications involved in teaching of physical education and coaching of athletics.

HES 386A-B. Practicum.  

A) Adult fitness. 02(1-3-0). Prerequisite: BMS 300 with a C or better; FSHN 150 with a C or better; HES 145 with a C or better; HES 207 with a C or better; 2.750 GPA in BMS 300, FSHN 150, HES 145, and HES 207; HES 240; HES 332F; HES 332H; concurrent registration in HES 340.  

B) Wellness program management. 03(1-6-0). Prerequisite: HES 386A.

HES 403 04(3-2-0). Physiology of Exercise. F, S, SS. Prerequisite: BMS 300 or BMS 360; LIFE 102.  

Effects of exercise on tissues, organs, and systems of the body. ($)}

HES 405 02(1-2-0). Exercise Testing Instrumentation. F, S. Prerequisite: HES 403.  

Theory and operation of devices commonly employed in quantifying factors related to exercise. ($)}

HES 410 03(2-0-1). Bioethics: Concepts and Controversies. F, S. Prerequisite: PHIL 205 or 7 credits of AUCC-science category 3A.  

Origins of bioethics and analysis of cases/controversies in contemporary bioethics.

HES 420 03(2-2-0). Electrocardiography and Exercise Management. F, S. Prerequisite: BMS 300.  

Interpretation of 12-lead ECG tracings, administering exercise tests, and prescribing exercise program for healthy individuals and special populations. ($)}

HES 430 03(3-0-0). Advanced Athletic Training. F, S. Prerequisite: HES 240; HES 346.  

Theory and techniques of habilitative and rehabilitative sports medicine. Emphasis on contemporary evaluative procedures and rehabilitative modalities.

HES 434 03(3-0-0). Physical Activity Throughout the Lifespan. F, S, SS. Prerequisite: BMS 300. Credit not allowed for both HES 434 and HES 444.  

Impact of physical activity on biology and physiology of human development and aging processes.

HES 444 02(2-0-0). Successful Aging: Role of Physical Activity. F, S, SS. Prerequisite: BZ 110 or LIFE 102.  

Biology and physiology of healthy aging and impact of disease and physical activity on aging processes. (NT-O)

HES 456 03(3-0-0). Advanced Wellness Programming. F, S. Prerequisite: HES 356 or concurrent registration; HES 386B or concurrent registration.  

Investigation of established wellness programs with special emphasis on design, implementation, and evaluation of programming models.

HES 476 03(3-0-0). Exercise and Chronic Disease. F, S, SS. Prerequisite: BC 351; FSHN 350; HES 403.

© Alternate year offering (odd); * Alternate year offering (even); + Field trips; S Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCC-subcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)
Interaction of physical activity with pathophysiology and treatment of chronic diseases and conditions.

HES 484 Var[1-5]. Supervised College Teaching. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

HES 486A-C Var[1-3]. Practicum.
   A) Adaptive correctives. B) Wellness program management. Prerequisite: BMS 300 with a C or better; FSHN 150 with a C or better; HES 145 with a C or better; HES 207 with a C or better; HES 386B; 2,500 GPA. C) Coaching.

HES 487 15(0-0-40). Internship. Prerequisite: BMS 300 with a C or better; FSHN 150 with a C or better; HES 145 with a C or better; HES 207 with a C or better; HES 486B and all course work; 2,500 GPA. Practical application of knowledge and skills in a professional situation.

HES 492 02(0-0-2). Health and Exercise Science Seminar. F, S.
   Integration and reflection on health and exercise science disciplinary knowledge.

HES 495A-E Var. Independent Study.

HES 496A-E Var. Group Study.

HES 520 03(2-2-0). Advanced Exercise Testing and Prescription. S.
   Prerequisite: HES 403.
   Theory and practice of exercise testing and prescription in apparently healthy and diseased populations. (S)

HES 530 03(3-0-0). Clinical Biomechanics. S. Prerequisite: BMS 301; HES 307.
   Effect of external loads on internal tissues; concern for injury, injury prevention, and rehabilitation.

*HES 531 03(3-0-0). Muscle and Joint Mechanics. F.
   Prerequisite: BMS 301; HES 307.
   Integrate muscle, tendon, and location of bone attachment into a comprehensive understanding of human movement at the single- and multi-joint level.

HES 545 03(3-0-0). Evolutionary Basis for Health and Fitness. S.
   Prerequisite: FSHN 350; HES 403.
   Evolutionary basis for human health and fitness based upon dietary and exercise patterns of pre-agricultural humans.

HES 556 03(3-0-0). Wellness and Health Promotion Concepts. F.
   Prerequisite: None.
   Discussion of theory and application of health promotion in various settings.

HES 600 03(3-0-0). Research Design in Health/Exercise Science. F.
   Prerequisite: One course in statistics.
   The research process including design, implementation, proposal synthesis and statistical considerations applied to health and exercise science.

HES 602 03(3-0-0). Advanced Physiology of Exercise. F.
   Prerequisite: HES 403.
   Integrative exercise physiology covering metabolism, cardiovascular physiology, pulmonary physiology, and neuromuscular physiology in humans.

HES 603 03(3-0-0). Advanced Topics in Exercise Physiology. F.
   Prerequisite: HES 403.
   Advanced principles of theoretical and applied exercise physiology at molecular, cellular, and systemic levels.

HES 610 03(3-0-0). Exercise Bioenergetics. F.
   Prerequisite: HES 403.
   Biology of energy transfer reactions related to human locomotion and exercise performance in both healthy individuals and disease states.

*HES 619 03(3-0-0). Advanced Neural Control of Movement. F.
   Prerequisite: BMS 300; BMS 301; HES 403.
   Neuroanatomical, neurophysiological, and applied topics on the control of force and human movement.

HES 630/FSHN 630 03(3-0-0). Integrative Exercise and Nutrition Metabolism. S. Prerequisite: FSHN 551; HES 610. Credit not allowed for both HES 630 and FSHN 630.
   Advances in integrative human metabolism under conditions of changing energy flux.

HES 645 03(3-0-0). Epidemiology of Health and Physical Activity. S.
   Prerequisite: HES 600.
   Foundation in chronic disease epidemiology that will enable students to evaluate the current epidemiologic literature.

HES 650 03(3-0-0). Health Promotion Programming. F, S.
   Prerequisite: None.
   Development of skills in health promotion program design, implementation and evaluation.

HES 656 03(3-0-0). Comprehensive Stress Management. F, S, SS.
   Prerequisite: None.
   Relationship between stress and illness emphasizing methods to impact its detrimental effects.

HES 684 Var. Supervised College Teaching.

HES 686A-E Var[1-3]. Practicum. Prerequisite: Current CPR certification.

HES 687 Var[3-9]. Internship. Prerequisite: HES 686A or HES 686B or HES 686C or HES 686D or HES 686E.
   Practical application of knowledge and skills in a professional situation.

HES 692 01(0-0-1). Seminar.
   Consideration of graduate education in health and exercise science.

HES 693 01(0-0-1). Seminar.
   Maximum of 2 credits allowed in course.
   Current topics and issues in health and exercise science.

HES 695A-D Var. Independent Study.


HES 698 Var. Research.
   Non-thesis research in health and exercise science.


HES 700 03(2-0-1). Professional Skills in Bioenergetics. F.
   Prerequisite: Admission to doctoral program or admission to M.S. program and written consent of instructor.
   Grant writing, authorship, peer review process, responsible conduct of science, research ethics, professional conduct, career opportunities.

HES 704A-B 03(3-0-0). Advanced Topics in Bioenergetics. F.
   Prerequisite: Graduate standing.

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Advanced topics in physiology, biochemistry, biomechanics, and neural control exploring pathogenesis and treatment of chronic disease.


°HES 710 03(3-0-0). Exercise in Disease Prevention. S. Prerequisite: HES 403; HES 520.
Role of exercise/physical activity in the prevention, pathophysiology and treatment of chronic diseases.

°HES 730 03(3-0-0). Cardiovascular Pathophysiology. F. Prerequisite: HES 403; HES 520.
Cardiovascular physiology with emphasis on the development, progression, and treatment of diseases of the cardiovascular system.

*HES 735 03(2-0-1). Human Cardiovascular Control. F. Prerequisite: HES 403.
Dynamics of cardiovascular control in human health and disease.

HES 784 Var[1-3]. Supervised College Teaching.
HES 786 Var[1-3]. Practicum.
HES 793 01(0-0-1). Bioenergetics Seminar. F, S.
HES 795 Var[1-3]. Independent Study.
HES 796 Var[1-3]. Group Study.
HES 798 Var[1-6]. Research.

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