

Accounting (ACC)

College of Business Administration

ACC 201 Introduction to Financial Accounting (3) Introduction to financial accounting and methods used to record and report financial information to decision makers external to the firm. Use and limitations of financial reports. Pre: sophomore standing.

ACC 202 Introduction to Management Accounting (3) Introduction to managerial accounting and methods used to report information to decision makers internal to the firm. Cost accounting, budgeting, standard cost systems, reporting and analyzing performance. Pre: 201, ICS 101 (or concurrent), and ICS 101L (or concurrent).

ACC 305 Management Accounting (3) Information for managerial decision-making, planning, and control: job order and process costing, direct and absorption costing, normal and standard cost systems. Problem solving and application. Pre: 202.

ACC 321 Intermediate Financial Accounting I (3) Accounting process and the application of GAAP to the recognition and measurement of cash, receivables, inventories, property plant and equipment, depreciation and depletion, intangibles, and current liabilities. Pre: 202.

ACC 323 Intermediate Financial Accounting II (3) Application of GAAP to the recognition and measurement of long-term liabilities, investments, contributed capital, retained earnings, accounting changes and errors, income recognition, accounting for income taxes, pensions, leases, and statement of cash flows. Pre: 321.

ACC 367 Reporting for Accountants (1) Stresses the various forms of reporting used to communicate accounting information to clients, management, boards of directors, and public-at-large. Written reports. Pre: 202.

ACC 399 Directed Reading and Research (V) Reading and research of a special area in major under direction of faculty member(s). Project must include statement of objectives, outline of activities planned, results expected, and how they are to be reported and evaluated. Must be approved in advance by the department chair and faculty adviser.

ACC 401 Federal Income Taxation (3) Examines federal income tax concepts, such as gross income, exclusions, deductions, exemptions, and tax credits, especially for sole proprietors. Introduces taxation of property transactions. Pre: 202 or BUS 610.

ACC 407 Taxation of Business Entities (3) A survey of the general concepts, rules, and practices involved in the taxation of sole-proprietorships, corporations, partnerships, and subchapter C Corporation. Pre: 401.

ACC 413 Law for the Accountant (3) Intensive study of areas of law of particular importance to accountants. Particular attention is given to principles of law relating to sales, commercial paper, property, secured transactions, contracts, and antitrust regulation. Pre: BLAW 200 or consent.

ACC 415 Advanced Financial Accounting (3) Accounting topics relating to consolidation requirements and introduction to the fundamen-

als of fund accounting, including the general fund, restricted funds, debt service funds, enterprise funds, general long-term account group, general fixed assets accounting group, and accounting entries for encumbrances. Pre: 323 or 611.

ACC 416 Special Topics in Accounting (3) This course addresses current issues impacting the accounting profession. Topics vary each semester. Repeatable three times. Pre: 323 or 611.

ACC 418 Auditing and Assurance (3) Auditing concepts including standards, objectives, and ethics for external auditors. Emphasis on reporting standards, internal control, evidence, statistical sampling, EDP audits, and assurance. Pre: 323 or 611.

ACC 419 Accounting Information Systems (3) Accounting systems analysis, control and design in manual and computerized environments. Knowledge and skills of information technology for auditing AIS systems. Hands-on experience with microcomputers and a computerized accounting system. A-F only. Pre: 323 or 611; or consent.

ACC 435 Public Sector Accounting (3) Concepts and principles of accountability for not-for-profit entities, with emphasis on governmental units. Includes budgetary control and fund accounting systems and principles. Pre: 323 or 611, or consent.

ACC 500 Master's Plan B/C Studies (1) Enrollment for degree completion. Pre: master's Plan B or C candidate and consent.

ACC 606 Tax Research (3) In-depth examination of tax research, IRS administrative procedures, and potential penalties. Extensive practice in issue spotting, reading and analyzing primary authority, and communicating results. Pre: 401.

ACC 609 Advanced Enterprise Systems and Technologies (3) Computer technologies, database design, use of various software packages, hands-on experience with accounting databases, computer security and EDP auditing, hardware and software evaluation and implementation of business solution systems. Pre: 323 or 611.

ACC 611 External Financial Reporting (3) This is an external financial reporting course for non-accounting majors only. It applies the financial accounting principles learned in BUS 610 to more complex transactions. Pre: 201 and 202, or BUS 610.

ACC 616 Accounting History and Theory (3) Historical development of accounting theory emphasizing pronouncements of AICPA, FASB, AAA, and SEC. Pre: 323 or 611.

ACC 619 Assurance in the Information Age (3) Advanced treatment of assurance derived from modern information systems. Stresses the effect of changing information technology on the auditor's attestation function. Includes research, critical thinking, and communication skills applied to contemporary auditing issues. Pre: 418.

ACC 620 Global Accounting (3) Theory and fundamental causes of international variations in accounting. Special emphasis on problems such variations create for financial reporting, control, and decision-making within multinational business enterprises. Pre: 323 or 611, or consent.

ACC 625 Accounting and Tax Research (3) Emphasis on business research in accounting and taxation. Stresses research design, problem, definition, sources of information, and current research areas in accounting and taxation. Credit not given for both 606 and 625. Pre: 401.

ACC 631 Tax of Partners/Partnerships (3) Examines advanced topics in federal taxation of partners and partnerships regarding the contribution, operation, and distribution from partnerships and transfers of partnership interests. Pre: 606 or 625, and 407.

ACC 633 Advanced Corporate Taxation (3) Examines international tax, inbound and outbound, and advanced topics in corporate taxation, such as corporate reorganizations and divisions. Pre: 606 or 625, and 407.

ACC 635 Advanced Public Sector Accounting (3) Provides the tools necessary for understanding the principles of fiscal accountability and reporting in governmental and non-for-profit organizations. Pre: 415.

ACC 638 Estate and Gift Taxes (3) Examines estate and gift tax provisions and basic planning techniques to save taxes. Overviews generation-skipping transfer taxes and income taxes on estates and trusts. Pre: 401 and either 407, 606 or consent.

ACC 639 Hawai'i Taxes (3) Examines Hawai'i taxes. General Excise Tax issues include pyramiding, exemptions, and nexus. Income Tax issues include conformity, apportionment, and allocation. Various other topics include property taxes, foreign trade zones, and audits. Pre: 401.

ACC 660 Analysis and Decision-Making (3) Integrates learning through analysis and communication of comprehensive business problems. Stresses research, critical thinking, and analytical and communication skills applied to contemporary accounting and tax issues. Pre: 407 or 606, and 619 (or concurrent), or consent.

ACC 690 Current Topics in Accounting (3) Concentration on current issues impacting the accounting profession. Topics vary each semester. May be repeated for credit.

ACC 695 Accounting Internship (3) On-the-job experience in the accounting community. Necessary evaluation reports and meetings with faculty adviser required. Pre: consent.

Aerospace Studies (AS)

ROTC Programs

The leadership laboratory is required for all courses except AS 304 and 306. Conducted within the framework of organized cadet corps with progression of experiences designed to develop leadership potential. Involves Air Force customs and courtesies, drills, and career progression.

AS 101 U.S. Air Force (1) Study of the total force structure, strategic offensive and defensive, general purpose, and aerospace support forces of the Air Force in the contemporary world.

AS 102 U.S. Air Force (1) Continuation of 101.

AS 201 The Air Force Way (2) Study of Air

Force heritage, Quality Air Force principles, ethics, and an introduction to leadership and group leadership problems. Application of written and verbal communication skills is included.

AS 202 The Air Force Way (2) Continuation of 201.

AS 304 AFROTC Four-Week Field Training (4) Four-week field experience and training at selected Air Force bases on the Mainland. Required of AFROTC students for Air Force commission. Pre: 101, 102, 201, 202, enrolled in AFROTC program, and consent.

AS 306 AFROTC Six-Week Field Training (6) Six-week field experience and training at selected Air Force bases on the Mainland. Required of AFROTC students for Air Force commission. Pre: enrolled in AFROTC program and consent.

AS 351 Air Force Leadership and Management (3) Integrated management course emphasizing the military officer as manager in Air Force milieu, including individual motivational and behavioral processes, leadership, communication and group dynamics.

AS 352 Air Force Leadership and Management (3) Continuation of 351.

AS 401 Preparation for Active Duty (3) Study of the national security process, regional studies, advanced leadership, ethics, and Air Force doctrine. Special focus placed on preparation for active duty and current issues affecting professionalism.

AS 402 Preparation for Active Duty (3) Continuation of 401.

Agricultural and Resource Economics (AREC)

College of Tropical Agriculture and Human Resources

AREC 210 Applied Calculus for Management, Life Sciences, and Human Resources (3) Applications of mathematics/quantitative methods to agribusiness, life sciences, human resources: equations, graphs, limits, continuity, derivatives, partials, integrals. Pre: two years of high school algebra and one year of geometry, or equivalents.

AREC 220 Agricultural and Resource Economics (3) Introduction to economics of agricultural production, marketing, prices, income, policy. Includes government policy and programs related to agriculture, land use, farm tenancy, socio-economic problems of farmers in the United States and the world. SS

AREC 310 Statistics in Agriculture and Human Resources (3) (2 Lec, 1 3-hr Lab) Principles/applications of statistical methods. Descriptive and inferential statistics, analysis of variance, regression, non-parametric statistics.

AREC 322 Marketing Agricultural Products (3) Problems, agencies, functions, costs, prices, regulations affecting marketing; proposed improvements. Pre: introductory course in economics or consent. (Alt. years)

AREC 341 Agricultural Accounting and Financial Analysis (3) Principles and methods of agricultural accounting. Preparing and interpreting financial statements. Sources and costs of credit, capital budgeting, tax management, estate

planning. Pre: 220, ECON 130, or consent. (Alt. years)

AREC 342 Agribusiness Decision-Making (3) Management and organization, production analysis concerning inputs/outputs, planning/budgeting for economic decision-making, acquiring and managing factors of production. Pre: 220, ECON 130, or consent.

AREC 399 Directed Study (V) Limited to exceptional undergraduate students qualified to carry on advanced study. Pre: consent.

AREC 410 Operations Research for Agricultural Management (3) Techniques of operations research in agricultural decision-making. Classical optimization, linear/non-linear programming, inventory control, queuing, stochastic processes, simulation, decision analysis, and game theory. Pre: 210 and 310, or consent.

AREC 429 Computer Applications in Economic Research (3) Introduction to use of computers for economic and agricultural analysis. Employment of BASIC, electronic spreadsheets, software packages for statistics, regression, and linear programming. Pre: 220 or ECON 130, and 310 or ECON 321; or consent. (Cross-listed as ECON 429)

AREC 432 Natural Resource Economics (3) Introduction to the economic theory of optimal management of natural resources and the environment. Property rights, externalities and welfare economics, non-renewable and renewable resource management and regulation, pollution control in theory and practice. Pre: ECON 301 or consent.

AREC 454 Economics of Aquaculture (3) Management of aquaculture business: production, financing, marketing. Industrial development: potentials, constraints, government policies. Pre: 220 or ECON 130.

AREC 456 Marine Resource Economics (3) Major problems and economic issues facing countries in Asia and the Pacific in effectively managing marine resources. Repeatable once. Pre: 220, ECON 130, or consent. (Cross-listed as ECON 491)

AREC 458 Project Evaluation and Resource Management (3) Fundamentals of benefit-cost analysis with extensions to environmental impacts and projects; case studies. Pre: ECON 301 or consent. (Cross-listed as ECON 458)

AREC 492 Internship (4) Integration and application of academic knowledge and critical skills emphasizing professional development. Placement with an approved cooperating supervisor/employer. Pre: consent.

AREC 500 Master's Plan B/C Studies (1) Enrollment for degree completion. Pre: master's Plan B or C candidate and consent.

AREC 610 Biosystems Modeling (3) Introduction to system thinking, procedures for developing system models, characteristics of important agricultural system modes, computer approach to evaluation and optimization of system models. A–F only. Pre: MATH 242 or consent. (Cross-listed as BE 638)

AREC 624 Research Methodology (3) Philosophical setting for scientific inquiry, scientific method and its antecedents, application in agricultural economics research. Original

research project required. Pre: 634 and ECON 608, or consent.

AREC 626 Quantitative Methods in Agricultural Economics I (3) Elementary statistics and probability theory, two variable and multiple variable regression modeling, hypothesis testing and confidence intervals, multicollinearity, serial correlation, and heteroskedasticity. Pre: 310 or ECON 321, and MATH 241; or consent. (Cross-listed as ECON 628)

AREC 627 Applied Microeconomic Analysis (3) Economic applications to the agricultural and nonagricultural industries are emphasized. Econometric techniques are used to estimate demand, supply, production and cost functions which are analyzed in terms of economic theory and market information. A–F only. Pre: 626 or ECON 425, ECON 627 or ECON 420, and ECON 604 or ECON 606, or consent. (Alt. years)

AREC 628 Applied Production Economics (3) The theoretical foundation of production economics and the theory of the firm are developed. Econometric techniques are used to estimate and explain production and cost functions. Pre: 626 and ECON 627, or consent.

AREC 629 Advanced Production Economics (3) Economics of resource allocation at consumer, firm, and industry levels. Advanced analytical techniques of analysis: programming, synthesis, statistical analysis. Pre: 634 and ECON 608, or consent.

AREC 630 Advanced Agricultural Market Analysis (3) Industrial organization—market analysis encompassing several approaches, such as structure, conduct and performance, contestable markets, and transactions costs. Emphasis on efficiency, productivity, vertical coordination, and equity. Application will focus on the food system, including important marketing institutions and research issues. Pre: 634 and ECON 608, or consent.

AREC 631 International Trade in Agricultural Products (3) Nature of trade in agricultural products; agricultural trade policy issues; role of trade in economic development; multilateral policies, commodity markets, and other current issues in agricultural trade. Pre: 634 and ECON 608, or consent.

AREC 634 Quantitative Methods in Agricultural Economics II (3) Specification, statistical estimation, inference, and forecasting of economic models. Includes advanced topics for single-equation models, pooled models, qualitative dependent variables, simultaneous systems, distributed lags, and time series. Pre: 626 or consent. (Cross-listed as ECON 629)

AREC 636 Advanced Agricultural Policy Analysis (3) Agricultural policy objectives, tools, issues. Analytical framework, approaches, and techniques, with empirical application to developed and developing country policies. Pre: 634 and ECON 608, or consent.

AREC 637 Resource Economics (3) Analysis of problems of development and management of natural resources with emphasis on resources in agriculture and role in economic development. Pre: 432, 634, and ECON 608; or consent. (Cross-listed as ECON 637)

AREC 638 Resource and Environmental Policy (3) Exploration of institutional and policy dimensions of natural resource development, management, allocation, markets and pricing, focusing on their environmental impacts. Emphasis on policy analysis using case studies and empirical findings. Original paper required. A–F only. Pre: 634 and ECON 608; or consent. (Alt. years)

AREC 670 Agrarian Systems Analysis (3) Comparative analysis of philosophy and process of interdisciplinary and participatory approaches to sustainable development and rural resource management including farming systems research and extension (FSRandE), agroecosystem analysis (AEA), participatory action research (PAR), and rapid rural appraisal (RRA). Repeatable. Pre: consent. (Cross-listed as AGRS 670)

AREC 694 Economics of Marine Resources (3)

AREC 699 Directed Research (V) Pre: consent.

AREC 700 Thesis Research (V)

AREC 701 (Alpha) Seminar in Agriculture and Resource Economics (3) Topics: (G) general; (I) international trade development and policy; (M) marketing economics; (Q) quantitative methods; (P) production and systems analysis; (R) resource economics. Pre: consent.

AREC 705 Research Seminar (1) Presentation and discussion of student thesis, dissertation, other current research activities. Required for all graduate students. Repeatable. CR/NC only. Pre: consent.

AREC 800 Dissertation Research (V)

Agronomy (AGRN)

College of Tropical Agriculture and Human Resources

AGRN 200 Introduction to Crop Science (3) Relation of plants, nutrients, environment, cultural practices to crop production. Pre: BOT 101 and CHEM 151. (Cross-listed as HORT 200)

AGRN 460 Cropping Systems (3) (2 Lec, 1 3-hr Lab) Schemes for managing sequences and combinations of crops and crop production activities. Ecosystem and social determinants. Multiple cropping. Analysis of alternative cropping systems. Pre: 200 or HORT 200, or consent.

AGRN 480 Tropical Forestry/Agroforestry (3) (2 Lec, 1 3-hr Lab) Distribution, species, productivity, nutrient cycling, hydrology, sustainability, modeling, design, and future of tree-based land-use systems. Pre: consent.

AGRN 603 Experimental Design (4) (3 Lec, 1 3-hr Lab) Design of experiments and variance analyses in biological and agricultural research. Pre: AREC 310 or ZOOL 631. Recommended: ZOOL 632. (Cross-listed as HORT 603)

AGRN 610 Crop Photosynthetic Productions (3) Photosynthetic pathways, leaf gas exchange, effects of environmental factors on photosynthesis, photosynthate partitioning, factors influencing plant dry matter accumulation. Pre: consent.

AGRN 660 Cropping Systems Analysis (3) (2 Lec, 1 3-hr Lab) Advanced methods for evaluating and improving agronomic production systems: specialized empirical analysis (experimental design, indexes of performance) and systems simulation. Pre: 460 or consent.

AGRN 680 Forest/Agroforest Ecosystem Analysis (3) Quantitative analysis of ecosystem processes in tropical forests and agroforestry systems. Productivity, nutrient cycling, hydrology, and interactions of processes will be examined using recent literature and computer models. Pre: consent.

AGRN 710 Mineral Nutrition of Tropical Crops (3) Mineral nutrition of plants in relation to plant metabolism, mechanisms of ion uptake, long-distance transport of solutes, and interactions at the root-soil interface. Special emphasis on problems associated with tropical crops. Pre: BOT 470 and SOIL 450. (Cross-listed as HORT 710)

Agronomy and Soil Science (AGRS)

College of Tropical Agriculture and Human Resources

AGRS 210 Environmental Resources: Issues and Options (3) Analysis of our environment with emphasis on understanding relationships and interactions of physical, biological, technological, and political components using scientific methods of inquiry. Food supply and safety, water quality, pollution control, biodiversity, environmental policy. Open to nonmajors. (Cross-listed as PPTH 210) NSI

AGRS 491 Topics in Agronomy and Soil Science (V) Study and discussion of significant topics, problems. Offered by visiting faculty and/or for extension programs. Repeatable.

AGRS 492 Internship (4) Integration and application of academic knowledge and critical skills emphasizing professional development. Placement with an approved cooperating supervisor/employer. Pre: consent. (Cross-listed as ENTO 492 and HORT 492)

AGRS 499 Directed Study (V) Pre: senior standing in agronomy and consent.

AGRS 500 Master's Plan B/C Studies (1) Enrollment for degree completion. Pre: master's Plan B or C candidate and consent.

AGRS 630 Agriculture and the Environment (2) Land use issues, principles, and strategies for environmentally sound agriculture. Degradative and aggradative impacts of alternative management on natural, land, and water resources and environmental quality. Pre: graduate standing or advanced undergraduate standing, and consent.

AGRS 631 Sustainable Agriculture Seminar (2) Critical evaluation of existing and alternative cropping systems from a long-term perspective. Value conflicts and resolution. Pre: graduate standing or advanced undergraduate standing, and consent.

AGRS 651 Instrumental Techniques of Plant and Soil Analysis (3) (2 Lec, 1 3-hr Lab) Theory, sample preparation, and analysis of data by currently used instrumental techniques including photon (visible through x-ray) emission and absorption, electron microscopy (TEM and SEM), and synchrotron radiation. Pre: CHEM 253 or equivalent and SOIL 430; or consent.

AGRS 654 Communications in Agriculture (1) Laboratory-type course for improving communication abilities; presentations to lay audiences are emphasized. Hands-on experience in techniques and methods is provided.

AGRS 661 Agricultural Meteorology (4) Physical exchange processes of radiation, water, carbon dioxide, and heat between soil, plants/animals, and atmosphere; moisture and temperature relationships; crop requirements, suitability, and scheduling. Pre: MATH 140 and either PHYS 151 or PHYS 152, or consent.

AGRS 670 Agrarian Systems Analysis (3) Comparative analysis of philosophy and process of interdisciplinary and participatory approaches to sustainable development and rural resource management including farming systems research and extension (FSRandE), agroecosystem analysis (AEA), participatory action research (PAR), and rapid rural appraisal (RRA). Repeatable. Pre: consent. (Cross-listed as AREC 670)

AGRS 671 International Agricultural Systems (2) Analysis of trends and strategies in international agricultural research and development. International agricultural research centers (IARC), Food and Agriculture Organization (FAO), university networks and consortia, and private voluntary organizations (PVOs). Pre: graduate standing.

AGRS 699 Directed Research (V) Pre: candidacy for MS or PhD degree and consent.

AGRS 700 Thesis Research (V)

AGRS 701 Seminar in Advanced Agronomy and Soil Science (1) Oral presentation and discussion of recent research in tropical agronomy and soil science. Pre: graduate standing.

AGRS 800 Dissertation Research (V)

AH

See Arts and Humanities

American Studies (AMST)

College of Arts and Humanities

Sophomore standing or consent is required for all 300-level courses except as noted.

AMST 201 American Experience: Institutions and Movements (3) Interdisciplinary course that examines diversity and changes in American values and institutions--political, economic, legal, and social. AHL2

AMST 202 American Experience: Culture and the Arts (3) Interdisciplinary course that examines diversity and changes in American values and culture - literature, film, visual arts, and architecture. AHL2

AMST 211 Contemporary American Domestic Issues (3) Interdisciplinary exploration of such current American domestic issues topics as politics, economics, civil rights, family life, the justice system, and the environment. SS

AMST 212 Contemporary American Global Issues (3) Interdisciplinary exploration of such current global issues as international diplomacy, economic development, national security, demographic change, and the environmental protection. SS

AMST 310 Japanese Americans: History, Culture, Lifestyles (3) Explores the experiences of Japanese Americans in Hawai'i and the USA at large: historical and cultural heritage, biographical portraits, changing family ties, ethnic lifeways, gender relations, local identity, and the future of island living.

AMST 313 African Americans (3) American national character and the role African Americans have played in its making.

AMST 314 The Immigrant in America (3) Immigration from Colonial period to present; English, Irish, Jews, Asians. Uniqueness, similarity of immigrant experience.

AMST 315 U.S. Women's History to 1890s (3) A survey of history of U.S. women and gender relations up to 1890s. Emphasis on women's labor, women's involvement in social movement, development of suffrage movement, women's literary and popular culture. Pre: 201 (or concurrent) or 202 (or concurrent) or WS 151 (or concurrent), or consent. (Cross-listed as HIST 360 and WS 310)

AMST 316 U.S. Women's History since 1890s (3) A survey of history of U.S. women and gender relations since 1890s. Emphasis on social reform, suffrage and the New Woman, women's wartime labor, gender and the Cold War, second wave feminism, divisions among women. Pre: 201 (or concurrent) or 202 (or concurrent) or WS 151 (or concurrent); or consent. (Cross-listed as HIST 361 and WS 311)

AMST 318 Asian America: Survey (3) History of selected Asian immigrant groups from the 19th century to the present. Topics include: immigration and labor history, Asian American movements, literature and cultural productions, community adaptations and identity formation. Pre: junior standing and one of 201 (or concurrent), 202 (or concurrent), SOC 100 (or concurrent), or SOC 214 (or concurrent); or consent. (Cross-listed as ES 318)

AMST 320 American Environments: Survey (3) Ecological approach to national and regional development; changes in population, landscape, resource use, and environmental values.

AMST 321 The American City (3) Evolution since 17th century; role in contemporary American culture; related problems, perceptions, values. (Cross-listed as HIST 375)

AMST 322 Asian Architecture and Culture (3) Study of cultural influences affecting the architectural expression of selected Asian countries. Architecture is studied in the context of socioeconomic influences, historical perspectives, geography, and climate. Pre: ART 180, HIST 151, or HIST 152. (Cross-listed as ARCH 371)

AMST 330 American Institutions: Survey (3) Representative social, political, and economic institutions.

AMST 343 American Thought and Culture (3) Politics, family, philosophy, technology, etc.; their interrelationship with the total society. Pre-Colonial to end of Reconstruction. Pre: HIST 151 and HIST 152. (Cross-listed as HIST 373)

AMST 344 American Thought and Culture (3) Continuation of 343: 20th century. Pre: HIST 151 and HIST 152. (Cross-listed as HIST 374)

AMST 345 Men and Women in American Thought (3) Interpretations of masculine and feminine role behavior as expressions of American cultural values.

AMST 350 Culture and Art in America: Survey (3) Popular attitudes toward arts, travel, fashions, craft and industrial productions, recreation. Past used to explain the present.

AMST 353 Television in American Life (3) Explores the role of television in American culture today. Pre: 201, 202, or consent.

AMST 365 American Empire (3) Examines the interplay between an "American culture of empire" and the rise of the United States as a superpower. Topics: imperialism and political culture, social movements and international affairs, race, gender and class relations. (Cross-listed as HIST 379)

AMST 381 Junior Seminar (3) Materials and methods for the study of American life and thought. Pre: consent.

AMST 382 Junior Seminar (3) Continuation of 381. Pre: consent.

Junior standing or consent required for all 400-level courses.

AMST 411 Japanese Americans (3) Major themes and research problems. Pre: 310 or consent.

AMST 413 Regionalism: The South (3) Definition of a Southern identity and its relation to the larger U.S. culture, using literary and polemical works of 19th- and 20th-century.

AMST 414 Regionalism: The West (3) Relevance of American West to contemporary society; Western mythology in novels, biographies, and mass media. (Cross-listed as HIST 474C)

AMST 415 Nonethnic Minorities (3) Survey of nonethnic minority group movements, e.g., the blind, the aged, homosexuals. Common denominators, traditional "mistaken identity," contemporary search for new identity.

AMST 416 Plantation Studies Seminar (3) An interdisciplinary inquiry into the Hawaiian plantation experience; topics include women and the family, ethnic relations, environment, work, etc. (Cross-listed as ES 430)

AMST 417 Native Peoples (3) Native Americans' and Hawaiians' world views, life ways, and conflicts with whites as expressed in oral and written literature.

AMST 418 Hawai'i's Multiculturalism (3) A multidisciplinary examination of the dynamics of the Hawaiian Islands' racial and cultural diversity from the perspectives of historical trends, social processes, and contemporary political, social, and economic issues as they impact interracial relations.

AMST 419 Community, Culture and Change (3) As a complement to AMST 418, the course objective is to learn about Hawai'i's multi-racial and multicultural diversity firsthand through various field study projects. Pre: 418 (or concurrent) or consent.

AMST 420 American Ideas of Nature (3) The natural world in American thought from Native

Americans to modern ecologists. Pre: 201 and 202, or HIST 281 and HIST 282.

AMST 423 History of American Architecture (3) History of American architecture in terms of style, techniques, and symbolic meaning. (Cross-listed as ARCH 473)

AMST 425 American Environmental History (3) Survey history of the complex relations between American societies and diverse U.S. ecosystems, from European contact and colonization to the present. Pre: 201 or 320 or HIST 281 or HIST 282 or GEOG 101; or consent.

AMST 431 American Labor History (3) Conditions of labor in major phases of American development; response of labor and community to changing work environment. Capitalism, unionism, race, gender, law, etc. Emphasis on 20th century. (Cross-listed as HIST 477)

AMST 432 Slavery (3) Examines the origins, practices, and historical evolution of slavery from the 18th to the 20th century. Considers diverse forced labor regimes: chattel slavery, plantation agriculture, convict labor, "wage slavery," and patriarchal domination. Pre: 201 or 313 or ES 305 or ES 306 or HIST 152 or HIST 281; or consent. (Cross-listed as HIST 473)

AMST 434 Politics in Hawai'i (3) Discussion of modern politics against the background of recent history and major contemporary issues.

AMST 436 Women and the Law (3) Past and present roles of women in American political and legal institutions; common law, judicial decisions, and federal and state legislation affecting women of various socioeconomic groups. (Cross-listed as WS 436)

AMST 438 Asian Women (3) History, culture, and contemporary reality of Asian women in Asia and the United States. Includes critical analysis of American feminist methodology and theory. Pre: one of POLS 305D, WS 360, WS 361, WS 405, or consent. (Cross-listed as POLS 462 and WS 462)

AMST 440 Race and Racism in America (3) Racial ideas and ideologies, and their effects, throughout American history.

AMST 442 Radical Traditions (3) Varieties of radicalism that have provided a continuing critique of prevailing values and structures.

AMST 443 Leaders and Movements (3) Examination of two or three significant personalities in American history and culture and the movements they inspired. Topics vary each semester. Repeatable.

AMST 451 Popular Culture (3) Major themes, modes, and media of popular or mass culture in the United States; emphasis on cultural trends and social implications.

AMST 452 The '20s and '30s (3) Novelists, painters, poets, jazz musicians as examples of culture of the 1920s and 1930s in America.

AMST 453 Culture, Society, and Literature (3) Literary and non-fictional exploration of the intellectual and moral response of Americans to institutions and culture of 20th-century marketplace economy.

AMST 456 Arts of the United States (3) Emphasis on the 18th and 19th centuries. Pre: ART 172 or consent. (Cross-listed as ART 472)

AMST 458 Film in American Culture (3)

Comprehensive survey of varieties of film experience from historical and contemporary points of view.

AMST 459 Sports in America (3) Sports as reflected in literature, films, and TV.

AMST 461 America's World Role (3) Examination of America's role in modern world affairs, against the background of history, perceptions, and values. Pre: 211, 212, HIST 282, POLS 220, or consent.

AMST 463 As Others See Us (3) The image of American society, past and present, as expressed through travelers' reports, film, foreign press, and other media.

AMST 464 America and Africa (3) American attitudes toward Africa, as well as how Africa has functioned within the dynamics of American culture and history.

AMST 465 American Experience in Asia (3) Comparison of American experiences in Japan, China, and Southeast Asia within historical and perceptual framework. (Cross-listed as ASAN 465)

AMST 467 Americans in China (3) Exploration of contemporary Chinese-American relationship against 19th- and 20th-century background. (Cross-listed as ASAN 467)

AMST 475 Documentation of Historic Architecture (V) Study and documentation of existing buildings, structures, sites of historic and/or cultural significance, including field measurements and drawings, historical research, photo documentation, and preparation of archival drawings to be deposited in the Library of Congress. Documentation conducted according to standards of the Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER). Repeatable. Pre: consent. (Cross-listed as ARCH 472).

AMST 490 (Alpha) Topics in American Studies (3) Themes, problems, and issues not addressed in other American studies undergraduate courses, focused within these areas: (B) social structure and interaction; (C) thought and belief; (D) arts and environment; (E) historic preservation. Repeatable with consent.

AMST 499 Readings in American Studies (V) Directed readings and research for majors. Pre: consent.

AMST 500 Master's Plan B/C Studies (1)

Graduate standing or consent required for all 600-level courses.

AMST 600 Approaches to American Studies (3) Introductory survey of methodological issues underlying research in American studies.

AMST 601 Patterns of American Cultures (3) American cultural origins and development. Beginnings to late 18th century.

AMST 602 Patterns of American Cultures (3) American cultural origins and development. Late 18th century to late 19th century.

AMST 603 Patterns of American Cultures (3) American cultural origins and development. Late 19th century to present.

AMST 611 Asian America (3) The Asian American experience from an interdisciplinary and humanities perspective. Asian American history,

literature, media, and theater arts. Comparative study of Hawai'i and the Continental United States.

AMST 612 Women in American Culture (3) Historical/contemporary status of women in the United States; women's roles as defined by legal, educational, political, economic, and social institutions; implications for social science method. (Cross-listed as WS 612)

AMST 613 Regionalism in America (3) Case studies of regional identity as exemplified by selected works of literature and social commentary.

AMST 616 Inter-ethnic Communication (3) Inter-ethnic communication in American society; investigation of traditional approaches, contemporary issues, and future trends, particularly as the process relates to Asian Americans.

AMST 617 Social and Cultural Diversity in America (3) Examination of selected subcultures in America.

AMST 618 American Sexualities (3) Aspects of sexual identity within the context of American culture. Pre: 345 or consent.

AMST 623 American Architecture (3) Cultural analysis of the evolution of American architecture from the Colonial period to the present involving sociopolitical and economic, as well as aesthetic, considerations. (Cross-listed as ARCH 671)

AMST 624 Wilderness in America (3) American wilderness as both physical setting and social construction. Pre: 420 or consent.

AMST 625 Material Culture (3) Physical artifacts considered as documents of American cultural and regional development. (Cross-listed as ARCH 625)

AMST 626 Environment and Society (3) Technological development in cultural perspective; its relation to the American environment, science, capitalism, public policy, and values.

AMST 627 The American City (3) Urban life and culture in contemporary and historical perspective; emphasis upon promises and problems of city in American culture. (Cross-listed as ARCH 627 and HIST 639E)

AMST 632 Mass Media (3) Appraisal of major media of communications in American society with attention to political, educational, cultural, and ethical implications.

AMST 633 The Presidency (3) Development of institution of the presidency in context of historical and contemporary political, economic, and social forces.

AMST 639 Political Institutions in American Culture (3) Historical development and current status of American political institutions set in the context of larger cultural and economic issues.

AMST 642 Philosophic Origins of American Thought (3) Examination of major currents of American thought and belief against background of Western intellectual tradition.

AMST 643 Critical Traditions in America (3) Examination of various dissident movements in American history.

AMST 644 Religion in America (3) Religious ideas and churches in American history and politics. (Cross-listed as HIST 639D)

AMST 646 Advanced Topics: Social/Cultural/Intellectual (3) Readings and research on

American social and intellectual history. Repeatable. (Cross-listed as HIST 639B)

AMST 647 Advanced Topics: Business/Labor/Technology (3) Readings and research on American business, labor, and technological history. Repeatable. Pre: graduate standing or consent. (Cross-listed as HIST 639K)

AMST 649 American Intellectual Traditions (3) Examination of intellectual figures and movements in American history.

AMST 655 Folk Traditions (3) Reading and research examining traditional pre-20th-century folk arts, folk music, and folklore and relevance to contemporary American life.

AMST 656 Film in America (3) Examination of various roles of motion picture film in America with particular respect to art form, cultural artifact, document, and myth.

AMST 659 Arts in America: Modern to Post-Modern (3) Survey of the literature of the field.

AMST 664 America in Asia (3) Topics in U.S. economic, political, military, and cultural relations with East and Southeast Asia, from the 18th century to the present.

AMST 665 Comparative Cultures (3) Study of American culture in comparison with other selected cultures.

AMST 669 America and the World (3) Historical and contemporary issues in America's global relationships.

AMST 671 19th Century U.S. Literature (3) Selected works of 19th-century literature as cultural documents.

AMST 672 20th Century U.S. Literature (3) Selected works of 20th-century literature as cultural documents.

AMST 673 African American Literature (3) Cultural and social imagination of blacks and whites as revealed in literature, poetry, and drama.

AMST 674 Harlem Renaissance (3) Politics and literature of culture and race with the focus on Harlem in the 1920s.

AMST 675 Preservation: Theory and Practice (3) History and philosophy of historic preservation movement. Analysis of values and assumptions, methodologies and tactics, implications for society and public policy. (Cross-listed as ARCH 628)

AMST 676 Recording Historic Resources (3) Techniques in recording and evaluation of historic buildings and other resources, with an emphasis on field recordings and state and federal registration procedures. Pre: 675 or ARCH 628, or consent. (Cross-listed as PLAN 676)

AMST 677 Community Preservation (3) Local-level historic preservation, with an emphasis on historic districts, design guidelines, regulatory controls, and community consensus-building. (Cross-listed as PLAN 677)

AMST 679 Elements of Style (3) The manifestations, visual characteristics, and social/cultural meaning of "style" in American architecture and decorative arts from the early settlement period through the present. Pre: 623, 675, ARCH 628, or ARCH 671.

AMST 680 Historic Building Technology (3) History of buildings, building technologies, materials, and finishes, including construction techniques and methods of investigating older buildings. Emphasis on North American building practices c.1600–c.1960. Pre: 675 (or concurrent) or ARCH 628 (or concurrent).

AMST 681 American Vernacular Traditions (3) Methods and approaches in the study of vernacular architecture, cultural landscapes, and material culture, with an emphasis on traditions and innovations in the Americas. (Cross-listed as ARCH 650)

AMST 690 Research Seminar (3) Themes, problems, and issues not addressed in other American studies graduate courses; emphasis upon research methods. Repeatable.

AMST 695 Historic Preservation Practicum (3) Applies course work in historic preservation to hands-on activities under the direction of practicing professionals and University faculty. Historic preservation certificate students only. Pre: consent.

AMST 696 (Alpha) Preservation Field Study (6) On-site historic preservation field study. Site will rotate. Academic and hands-on preservation training. (B) Hawai'i; (C) Asia; (D) Pacific. Repeatable in each alpha to a maximum of 18 credit hours. Pre: consent.

AMST 699 Directed Reading/Research (V)

AMST 700 Thesis Research (V)

AMST 800 Dissertation Research (V)

Anatomy (ANAT)

School of Medicine

ANAT 499 Directed Reading Research (V)

ANAT 512 (Alpha) Unit II Concurrent Electives (1) Elective courses for first-year medical students. (B) human anatomy of the thorax and upper limb; (C) histology. CR/NC only. Pre: BIOM 551 and consent.

ANAT 513 Unit II Concurrent Elective (1) Elective courses for first-year medical students. CR/NC only. Pre: BIOM 551 and consent.

ANAT 514 (Alpha) Unit IV Concurrent Electives (1) Concurrent electives in anatomy. (B) functional anatomy of the head, neck, and lower limb with review of the upper limb anatomy included; (C) human embryology; systematic study of human development including implantation, placentation, basics of development of each organ system with reference to pertinent congenital anomalies and their surgical repair; (D) neuroanatomy: spinal cord, brain stem and the regions of the cerebrum will be discussed. CR/NC only. Pre: BIOM 551 and consent.

ANAT 515 Unit V Concurrent Elective (1) Elective course for second-year medical students. CR/NC only. Pre: BIOM 551 and consent.

ANAT 545 (Alpha) Unit VII Anatomy Electives (V) Advanced study of human anatomy by dissection and individual observation of surgical procedures. (C) topics in reproductive biology. CR/NC only. Pre: FPCH, MED, OBGYN, PED, PSTY, SURG 531 or 532; or consent.

ANAT 599 Independent Study in Anatomy (1) Independent dissection and study of human anatomy for advanced medical students. Repeatable. Pre: BIOM 553 or consent.

ANAT 601 Histopathology (2) Introduction to normal tissue structure and basic principles of pathological processes. Histological preparations of normal and abnormal tissues will be studied. Pre: consent.

ANAT 602 Anatomy of the Head and Neck (1) Human gross anatomy overview of the head and neck utilizing dissections and emphasizing muscular, innervation and vascular supply. A-F only. Repeatable one time. Pre: departmental approval. Fall only.

ANAT 603 Anatomy of the Abdomen and Lower Limb (3) Human gross anatomy dissection of the abdominal viscera and muscles of the lower extremity with emphasis on function, innervation and vascular supply. A-F only. Repeatable one time. Pre: departmental approval. Spring only.

ANAT 604 Anatomy of the Thorax and Upper Limb (3) Human gross anatomy dissection of the thoracic viscera and muscles of the upper extremity with emphasis on function, innervation and vascular supply. A-F only. Repeatable one time. Pre: departmental approval. Fall only.

ANAT 607 Human Embryology (2) Systematic study of human development, including implantation, placentation, basics of development of each organ system with reference to pertinent congenital anomalies and their surgical repair. Pre: consent. Recommended: gross anatomy course.

ANAT 612 Seminar in Anatomy Teaching (1) Effective teaching methods, organization of courses in anatomical sciences, development and evaluation of exams, experience in teaching with audiovisual/computer aids. Open to graduate students in anatomy or reproductive biology. Repeatable. Pre: 601, 602, 603, 604, or BIOM 606.

ANAT 699 Directed Research (V)

ANAT 700 Thesis Research (V) Pre: admission to candidacy (master's program).

ANAT 800 Dissertation Research (V)

Animal Sciences (ANSC)

College of Tropical Agriculture and Human Resources

ANSC 200 Humans, Animals, and Agriculture (3) (2 Lec, 1 3-hr Lab) Introduction to animal agriculture, animal science, and the use of animals by humans. Ethics and importance of human use of animals in agriculture are emphasized.

ANSC 201 Principles and Practices of Animal Science (3) Breeds, their origin, distribution/evaluation; management practices for food, fiber, work, pleasure. Beef, dairy, sheep, swine, poultry, horses, aquacultured species emphasized.

ANSC 244 Fundamental Animal Nutrition (3) Comparative animal digestive systems and metabolism. Essential nutrients, their function and interrelationships. Pre: CHEM 161.

ANSC 251 Livestock Management Practices (3) Management of livestock and poultry emphasizing animal handling, behavior, and techniques with

practical application by the student. Pre: 200, 201, and consent.

ANSC 301 Anatomy of Agricultural Animals (4) (3 Lec, 1 3-hr Lab) Micro and gross anatomical arrangements of tissues and organ systems of domestic animals. Pre: 200.

ANSC 321 Applied Animal Nutrition (3) (2 Lec, 1 3-hr Lab) Application of the principles of nutrition to feeding of farm animals; composition and nutritional value of feed stuffs; nutritional requirements of beef cattle, dairy cattle, horses, poultry, and swine. Pre: 244.

ANSC 353 Horses and Horsemanship (3) (2 Lec, 1 3-hr Lab) Origin of species, breeds, nutrition, care, management. Lab on management practices with work on light horses.

ANSC 360 Topics in Aquaculture Science (3) Survey of specific areas in aquaculture including biological, physical, economic aspects of intensive/extensive crustacean, fish, mollusc, aquatic plant culture; terrestrial system integration. Pre: 200 and 201, or BIOL 222; or consent.

ANSC 431 Beef Production (3) (2 Lec, 1 3-hr Lab) Principles of economic beef production, including beef breeds, selection, breeding, management systems, feeding, and marketing under tropical conditions. Pre: 201 and 244.

ANSC 432 Swine Production (3) (2 Lec, 1 3-hr Lab) Principles of efficient pork production, including comparative breed evaluation, breeding, feeding, management, marketing, and business aspects. Problems and practices associated with tropical environment emphasized. Pre: 201 and 244.

ANSC 433 Tropical Dairying (3) (2 Lec, 1 3-hr Lab) Principles involved in economical milk production in the tropics, including management, recordkeeping, breeds, breeding, selection, culling, feeding, housing, milking, quality control, and raising young animals. Pre: 201 and 244.

ANSC 445 Genetics and Animal Breeding (3) Review and application of genetic principles to livestock, poultry, companion, aquatic, and laboratory research animals. Current practices and future developments. Pre: BIOL 222, ZOOL 101, or equivalent; or consent. Recommended: biochemistry and genetics or equivalent.

ANSC 450 Aquaculture Production (3) Theory and practice of aquaculture: reproduction, yield trials, management, economics and business case studies of fish, crustaceans, and molluscs. Field classes held at commercial farm and hatchery. Repeatable. Pre: 200 (or concurrent) and 201 (or concurrent), or BIOL 172 (or concurrent). (Cross-listed as OCN 450)

ANSC 451 Physiology of Domestic Animals (3) Functions and relationships of organs and organ systems of domestic animals excluding reproduction and lactation. Problem-based learning and case studies are emphasized. Pre: 301 or consent.

ANSC 453 Animal Diseases and Their Control (3) Disease problems of livestock, poultry, and companion animals; their economic significance, causes, public health implications, and control. Pre: 200 or consent.

ANSC 454 Meat Science and Muscle Biology (3) Development, growth, function, carcass evaluation of muscle tissue. Pre: 301.

ANSC 454L Meat Science and Muscle Biology Lab (1) (1 3-hr Lab) Livestock and poultry slaughter, carcass evaluation, meat chemistry, muscle physiology and biochemistry, meat microbiology, and meat processing. Pre: 454 (or concurrent).

ANSC 460 Biology and Culture of Shrimp and Prawns (2) Aspects of the biology and culture of the freshwater prawn *Macrobrachium rosenbergii* and marine shrimp *Penaeus* (sp) species. Scientific research results and case studies presented and analyzed. Pre: BIOL 222, ZOOL 101, or equivalent; or consent.

ANSC 462 Reproduction and Artificial Insemination (4) (3 Lec, 1 3-hr Lab) Introductory exploration of anatomy, development, and physiology of reproduction of domestic animals and artificial insemination. Pre: 200 or consent.

ANSC 472 Endocrinology of Domestic Animals (3) Physiology of secretion and actions of hormones of pituitary, thyroid, adrenal, pancreas, parathyroid, thymus, other endocrine organs excluding reproduction. Pre: 200 or consent.

ANSC 491 Topics in Animal Sciences (V) Study and discussion of significant topics, problems. Offered by visiting faculty and/or for extension programs. Repeatable.

ANSC 492 Internship (4) Integration and application of academic knowledge and critical skills emphasizing professional development. Placement with an approved cooperating supervisor/employer. Pre: consent.

ANSC 499 Directed Study or Research (V) Limited to exceptional undergraduate students, generally with a minimum cumulative GPA of 2.7 or a minimum GPA of 3.0 in major. Exceptions may be granted for students with high achievement in last three semesters.

ANSC 500 Master's Plan B/C Studies (1)

ANSC 641 Seminar in Animal Sciences (1) Topics of current interest and current research related to nutrition, genetics, and physiology. Pre: consent.

ANSC 642 Advanced Animal Nutrition (3) An advanced course in the nutrition of mono-gastric, ruminant, avian, and aquatic species. Topics include digestive system structures, utilization of nutrients, energy metabolism, and experimental techniques used in the study of animal nutrition. Pre: introductory biochemistry or animal nutrition; or consent.

ANSC 643 Physiology of Reproduction (3) Comparative differentiation, development, growth, and function of the reproductive systems of mammals and birds; external factors that influence response; artificial insemination. Pre: 451 or consent.

ANSC 644 Growth Biology of Meat Animals (2) Growth and development of meat-producing animals; skeletal muscle, adipose tissue, and bone; protein turnover, lipid metabolism, and bioenergetics; regulation of animal growth.

ANSC 687 Advanced Laboratory Techniques (3) (1 Lec, 2 3-hr Lab) Advanced laboratory techniques used in animal science, food science, and human nutrition research. (Cross-listed as ENBI 687 and FSHN 687)

ANSC 699 Directed Research (V) Pre: consent.

ANSC 700 Thesis Research (V)

Anthropology (ANTH)

College of Social Sciences

Most 300- and 400-level courses have as a prerequisite one of the 200-level courses. If passed with a grade of A or B, or upon written consent of instructor, ANTH 150 may be substituted. Additionally, 300- and 400-level courses may be taken for graduate credit with prior approval of the student's adviser.

ANTH 150 Human Adaptation (3) Human variation, physical and cultural, examined for its adaptiveness. Alternative explanations of human behavior; implications for future. For nonmajors. SS

ANTH 160 World Prehistory (3) Survey based on archaeological evidence of human diversification and spread over past four million years; development of agriculture; origin of ancient civilizations.

ANTH 200 Cultural Anthropology (3) Nature of culture; introduction to basic concepts for analyzing cultural behavior; patterning, integration, and dynamics of culture; culture and the individual. SS

ANTH 210 Archaeology (3) Introduction to prehistoric archaeology; methods and techniques of excavation and laboratory analysis; brief survey of theory in relation to change and diversity in prehistoric human groups.

ANTH 215 Physical Anthropology (3) Human evolution, primatology, human genetics, biological variation, human adaptability, growth and development. Co-requisite: 215L.

ANTH 215L Physical Anthropology Laboratory (1) Laboratory to accompany 215. Co-requisite: 215.

ANTH 300 Study of Contemporary Problems (3) Significance of anthropology for contemporary affairs, particularly American ethnic and minority group relations. Relevance to various professions, governmental policy, political action, and accomplishment of change.

ANTH 303 Technology and Culture (3) Theory of culture and technology; development of technology in context of cultures since the stone ages. The present and future are considered. Pre: one of 150, 200, 210, or consent.

ANTH 305 History of Anthropology (3) Development of anthropological ideas, focusing on theoretical issues concerning culture, society, and human nature. Required of majors. Pre: 200.

ANTH 307 Theory in Contemporary Anthropology (3) Theoretical issues that have generated current research and controversies in more than one specialty within social/cultural anthropology; historical roots. Pre: 200 or consent.

ANTH 308 American Culture (3) Contemporary culture of the United States. Variations in kinship, family, work, play, values, religion; selected topics such as ethnicity, alternate lifestyles, consumerism, addiction. Pre: 150, 200, or consent.

ANTH 310 Human Origins (3) Theory of evolution, evolutionary systematics, and taxonomy; evolutionary biology of primates; fossil records for primate and human evolution. Laboratory included. Pre: 215, ZOOL 101, or consent.

ANTH 313 Visual Anthropology (3) Historical development of documentary films of non-Western peoples; critical examination of ways in which ethnographic films represent different cultures. Pre: 150 and 200, or concurrent; or consent.

ANTH 315 Sex and Gender (3) Cross-cultural theories and perceptions of sexual differences; linkage between biology and cultural constructions of gender; relationship of gender ideology to women's status. Pre: 200 or consent. (Cross-listed as WS 315)

ANTH 316 Anthropology of Tourism (3) Anthropological perspectives on the subject of the global phenomenon of tourism. Includes issues of cultural performance, identity, and commoditization. Open to nonmajors.

ANTH 321 World Archaeology I (3) Archaeology of human origins, early cultures, and origins of agriculture. Pre: 210 or consent.

ANTH 322 World Archaeology II (3) Archaeology of complex societies, including the rise of urbanism, state-level society, historical and industrial archaeology. Pre: 210 or consent.

ANTH 323 Pacific Island Archaeology (3) Origins of Pacific peoples; chronology of settlement; sequences of culture in Australia, Melanesia, Micronesia, and Polynesia. Pre: 200 or consent.

ANTH 330 Social Organization (3) Systematic study of human institutions; general principles of social interaction formulated from ethnographic data. Pre: 200 or consent.

ANTH 335 Anthropology of Aging (3) Sociocultural factors of aging in different societies as a background for a more detailed exploration of the culture of aging in American culture. Pre: 150, 200, or consent.

ANTH 340 Primate Behavior and Ecology (3) Comparative survey of social behavior and ecology of free-ranging nonhuman primates in natural habitat; topical aspects, methods, relevance to human behavior and anthropology. Pre: one of 150, 200, BIOL 172, PSY 100, ZOOL 101, or consent.

ANTH 345 Aggression, War, and Peace (3) Biocultural, evolutionary, and cross-cultural perspectives on the conditions, patterns, and processes of violence, war, nonviolence, and peace. Pre: ANTH 200 or consent. (Cross-listed as PACE 345)

ANTH 350 Pacific Island Cultures (3) Introduction to cultures of Polynesia, Micronesia, and Melanesia from time of first settlement to emergence of modern nation states. Pre: 200 or consent.

ANTH 370 Ethnographic Field Techniques (V) Problems and techniques of social-cultural anthropological fieldwork; ethnographic literature; work with informants. Pre: 200 or consent.

ANTH 380 Archaeological Lab Techniques (4) Laboratory analysis and evaluation of field data; preservation and restoration of artifacts. Preparation for publication. Pre: 210 or consent.

ANTH 381 Archaeological Field Techniques (V) Archaeological survey and excavations; field trips, mapping, photography. Repeatable once with consent. Pre: 210 or consent.

ANTH 384 Skeletal Biology (3) Introduction to the human skeleton and methods for analyzing archaeological human remains including age, sex, ethnicity, paleodemography, skeletal and dental variation, paleopathology, population studies. Co-requisite: 384L.

ANTH 384L Skeletal Biology Laboratory (1) Laboratory to accompany 384. Co-requisite: 384.

ANTH 385 (Alpha) Undergraduate Proseminar (3) Selected problems in current research. (B) archaeology; (C) ethnography; (D) social anthropology; (E) applied; (F) psychological; (G) biological. Repeatable. Pre: consent.

ANTH 399 Directed Reading or Research (V) Pre: minimum cumulative GPA of 2.7, minimum GPA of 3.0 in anthropology, or consent.

ANTH 400 Anthropological Statistics (3) Introduction to statistical methods and their use in analysis of anthropological data. Pre: 200, 210, or 215.

ANTH 414 Introduction to Linguistic Anthropology (3) Introduction to ethnographic study of speech and language. Pre: 200 or consent. (Cross-listed as LING 414)

ANTH 415 Ecological Anthropology (3) Relationship of humans with natural environment; role of culture in ecological systems. Pre: 200 or consent.

ANTH 416 Economic Anthropology (3) Analysis of economic activities in non-Western, non-industrial societies; production, distribution, and consumption of goods and services in a variety of cultures. Pre: 200 or consent.

ANTH 417 Political Anthropology (3) Character of political institutions and their development in non-Western and non-industrial societies. Pre: 200 or consent.

ANTH 418 The Anthropology of Homosexualities (3) An anthropological examination of homosexualities; consideration of nature/nurture in the origins and expressions of identity and sexuality; social and political aspects of homophobia; queer theory. A-F only. Pre: 200.

ANTH 420 Communication and Culture (3) Anthropological introduction to communication; intercultural and interspecies comparisons; verbal and nonverbal. Ethnography of communication, discourse and structural analyses, ethnomethodology. Pre: 200 or consent.

ANTH 421 Anthropology and Mass Media (3) Anthropological critique of mass media research; role of mass media in social and cultural processes of authority, economic exchange, and identity formation in Western, nonwestern, and global contexts. A-F only. Pre: 200 or consent.

ANTH 422 Anthropology of Religion (3) Myth, witchcraft, symbolism, values, ritual, spirit possession, shamanism, religious healing, and millennial cults in primitive, folk, and urban societies. Pre: 200 or consent. (Cross-listed as REL 422)

ANTH 423 Social and Cultural Change (3) Various approaches to examples of social and cultural change in non-literate societies; evolution, diffusion, acculturation, revolution, etc. Historical features and social processes of colonialism. Pre: 200 or consent.

ANTH 424 Psychological Anthropology (3) Articulation of psychological states or syndromes with cultural patterns involving symbol-processing. Cultural uniformity and diversity in socialization, sexuality, personality types, supernatural preoccupation, management of crises. Pre: 150, 200, or consent.

ANTH 425 Medical Anthropology (3) Social and cultural aspects of medicine; the relationship of medicine to the beliefs, social systems, ecological adaptations, and cultural changes of human groups.

ANTH 426 Folk Medicine: Cross-Cultural Studies (3) Comparative study of folk (traditional) medical systems in diverse settings, with attention to the relationships among belief systems and medical practices, including biological outcomes. Pre: 150, 200, or consent.

ANTH 427 Food, Health, and Society (3) How human groups identify, collect, create, and transform foods; how they shape those into dietary behaviors, and the influence of those behaviors on health. Pre: 150 (or concurrent) or 200 (or concurrent), or consent.

ANTH 430 Human Adaptation to the Sea (3) How people from prehistoric to modern times have sailed, fished, or otherwise exploited and enjoyed the sea; how the sea has molded human life. Pre: upper division standing or consent.

ANTH 432 Human Adaptation to Living in Space (3) Plans for establishing space settlements; implications for humanity of migration into solar system and beyond. Pre: 150, ASTR 281, or consent.

ANTH 435 Human Adaptation to Forests (3) Cultural ecology of human societies in forest habitats. Emphasis on case studies of traditional and changing adaptations in the tropics. Pre: 200 (or concurrent) or consent.

ANTH 446 Southeast Asian Cultures (3) Cultures of Southeast Asia from hunting and gathering groups to high civilizations; kinship, economic, political, and religious systems; recent developments. Pre: 200 or consent.

ANTH 447 Polynesian Cultures (3) Analysis of Polynesian cultures from their origins to contemporary states. Pre: 200 or consent.

ANTH 448 Micronesian Cultures (3) Intensive survey of Micronesian societies, with emphasis on physical and cultural environment and processes of change from initial colonization to the present. Pre: 200 or consent.

ANTH 449 Melanesian Cultures (3) Belief systems, economic organization, and social and political structures in Melanesia; examination of selected societies; analysis of rise of nationalism and independence. Pre: 200 or consent.

ANTH 450 Physiological Anthropology (3) Human variation; ecological factors; biological and cultural response to heat, cold, altitude, diet, disease, urbanization. Lab exercises in data collection under field conditions. Pre: 215, PHYL 103, or consent. (Cross-listed as PHYL 450)

ANTH 455 Human Biology of the Pacific (3) Human biology of prehistoric and living populations of the Pacific: mainland and island Southeast Asia, Australia, Melanesia, Micronesia, and Polynesia. Fossil humans, microevolution, human variation, origins. Pre: 215 or consent.

ANTH 458 Forensic Anthropology (3) Application of physical anthropology to problems in human identification. Determination of age, sex, ancestry, etc., of the skeleton and preparation of reports for legal medicine. Pre: 384 (or concurrent) or consent.

ANTH 461 Southeast Asian Archaeology (3) Prehistory and protohistory of Southeast Asia and of Southeast Asian contacts with East Asia, India, Australia, and Oceania. Pre: 210 or consent.

ANTH 462 East Asian Archaeology (3) Prehistory and protohistory of China, Japan, and Korea from earliest human occupation to historic times. Geographical emphasis may vary between China and Japan/Korea. Pre: 210 or consent.

ANTH 463 South Asian Archaeology (3) Archaeological perspective on the South Asian past. Covers earliest human occupation to the period of British colonialism. Topics include the beginnings of agriculture, urbanism, and the interaction of the diverse peoples of South Asia. Pre: 210 (or concurrent) or consent.

ANTH 464 Hawaiian Archaeology (3) Archaeological perspective in Hawai'i's past; origins of Hawaiians; early settlement and culture change; settlement patterns and material culture; historic sites preservation. Pre: 210 and consent.

ANTH 468 Archaeological Theory and Interpretation (3) Introduction to theory in archaeology; interpretive paradigms; the relation of archaeological methods to interpretation and evaluation of theories. Pre: 210.

ANTH 469 History of Archaeological Thought (3) Historical survey of archaeology as a discipline; focusing on theoretical, methodological, and substantive advances that changed archaeology. Pre: 210 or consent.

ANTH 470 Folklore (3) Theory and method of comparative and analytical folklore study, with special applications to Pacific traditions. Pre: 200 or consent. (Cross-listed as IP 470)

ANTH 472 Ceramic Analysis in Archaeology (3) Concepts, methods, and approaches used in the analysis of ancient pottery. Emphasis placed on ceramic technology, stylistic analysis. Pre: 210 or consent.

ANTH 473 Lithic Analysis in Archaeology (3) How archaeologists infer procurement, production, distribution, and use of lithic resources, with emphasis on the manufacturing process. Includes lab for replicating prehistoric technologies. Pre: 210 or consent.

ANTH 474 Geoarchaeology (3) Field and laboratory analysis of sediments and soils in 98 environments, site formation, post-depositional processes, landscape change, and paleogeomorphic reconstruction. Pre: 210 or consent.

ANTH 475 Faunal Analysis in Archaeology (3) Analysis of archaeologically recovered faunal collections with emphasis on identification and interpretation of nonhuman vertebrate remains. Pre: 210 or consent.

ANTH 476 Paleobotanical Analysis (3) Paleobotanical analysis is directed toward the understanding of human-plant relationships and their change through time. Theoretical and methodological consideration of pollen, phytoliths, wood charcoal, seeds, and other macro-plant remains in archaeology. Pre: 210 or consent.

ANTH 480 (Alpha) Anthropological Applications (3) Anthropological theory, method, and data applied to problems in specialized fields. For students in professional fields who lack anthropological background. (B) development; (C) health; (D) education. (480D cross-listed as EDEF 480)

ANTH 481 Applied Anthropology (3) Methods and results in application of anthropological concepts to the practical problems of agricultural, commercial, and industrial development. Pre: 200 or consent.

ANTH 482 Okinawan Culture (3) Ryukyuan culture, society, and personality; family, community, kin group, class, religion, values, and socialization. Cultural relationships with Japan, Korea, China, and Taiwan. Pre: upper division standing or consent.

ANTH 483 Japanese Culture and Behavior I (3) Sociocultural factors in Japanese behavior. Social structure; traditional institutions.

ANTH 484 Japanese Culture and Behavior II (3) Sociocultural factors in Japanese behavior. Behavior patterns; cultural values, norms, and beliefs.

ANTH 485 Pre-European Hawai'i (3) Pre-European society and culture from an anthropological viewpoint. Pre: 200 or consent.

ANTH 486 Peoples of Hawai'i (3) Historic and contemporary society and culture from an anthropological viewpoint. Pre: 200 or consent.

ANTH 487 Philippine Culture and Society (3) Patterns of belief and behavior among peoples of the Philippines; development, persistence, and change of institutions. Pre: upper division standing or consent.

ANTH 488 Chinese Culture: Ethnography (3) Critical interpretations of ethnographic and biographic texts depicting individual and family lives in different socioeconomic circumstances, geographical regions, and historical periods of modern China.

ANTH 489 Chinese Culture: Current (3) Contemporary topics including the modern revolution, ideology, work, popular Confucianism, entrepreneurial activities, emigration, overseas settlements.

ANTH 490 Teaching Human Adaptation (6) For anthropology majors who lead, under supervision, a freshman seminar section of 150. Pre: senior standing and consent.

ANTH 491 Teaching Cultural Anthropology (6) For anthropology majors who lead, under supervision, a freshman seminar section of 200. Pre: senior standing and consent.

ANTH 495 Senior Thesis (3) Preparation of a major paper with a committee of one chairperson and one other member; paper on topic of interest in anthropology. Optional for majors. Pre: 305 or consent, and senior standing.

ANTH 496 Senior Thesis (3) Preparation of a major paper with a committee of one chairperson and one other member; paper on topic of interest in anthropology. Optional for majors. Pre: 305 or consent, and senior standing.

ANTH 500 Master's Plan B/C Studies (1)

ANTH 601 Ethnology (3) Survey, in historical perspective, of theory in social and cultural anthropology. A course in the graduate core of anthropology. Pre: graduate status and consent.

ANTH 602 Linguistic Anthropology (3) Investigation of mutual influences of linguistic theory and methodology and anthropological theory and methodology. A course in the graduate core of anthropology. Pre: LING 102, graduate status, and consent.

ANTH 603 Archaeology (3) Development of critical and analytical skills in assessment of archaeological literature; emphasis on the science, theory, explanation, and paradigms that comprise archaeology. A course in the graduate core of anthropology. Pre: graduate status and consent.

ANTH 604 Physical Anthropology (3) Human evolution and human variability in extant and previously existing populations; emphasis on history of physical anthropology, evolutionary systematics, primate biology and behavior, paleontology, anthropological genetics, climatic adaptation, growth, and nutrition. A course in the graduate core of anthropology. Pre: graduate status and consent.

ANTH 605 Discursive Practices (3) Emphasizes linguistic, semantic, and interactional aspects of culture, exploring ways that discourse constructs social action and social realities, examining processes by which culture is produced as meaningful behavior in actual situations. Pre: graduate status.

ANTH 606 Anthropology of Infectious Disease (3) The role of human behavior, including its social and cultural determinants, in understanding the distribution of infectious diseases and in shaping preventive and therapeutic strategies. Pre: graduate status or consent.

ANTH 608 History and Memory (3) History and collective memory as culturally formed and politically contested realities. The role of narrative, ritual, and media technologies in shaping representations of the past. Pre: consent.

ANTH 607 The Media and Discursive Practice (3) Role of the mass media in constructing meaning in social cultural processes such as nationalism, ritual, identity, and collective memory. Attention to interactional and poststructural theories of discourse that link the mass media to discursive practice. A-F only.

ANTH 610 Anthropology of Tourism (3) Social and cultural analysis of tourism practices, with emphasis on Hawai'i, Asia and the Pacific. Tourism in relation to consumer culture, transnational flows of people and images, post-colonial politics, performance and identity formation.

ANTH 620 (Alpha) Theory in Social and Cultural Anthropology (3) Major theoretical problems in (B) kinship; (C) cognitive systems; (D) religion; (E) political institutions; (F) law and social control; (G) economics; (H) ecology; (I) other to be announced. Repeatable. Pre: consent.

ANTH 632 Field Study of Population (3) Concepts and techniques in field study of non-literate (tribal and peasant) populations. For graduate students in the social sciences planning field research that involves taking a census. Pre: consent. (Cross-listed as GEOG 632)

ANTH 635 History in Anthropological Interpretation (3) Historical research involving archaeological, anthropological, linguistic, documentary, and oral historical forms of evidence. Emphasis on interpretation and methodology. Pre: consent.

ANTH 640 (Alpha) Methods and Theory in Archaeology (3) Focused seminars pertaining to distinct areas of archaeological method and theory. (B) analytical; (C) environmental; (D) ethnoarchaeology; (E) economic; (F) underwater. Repeatable twice. Pre: 603 or consent.

ANTH 645 Historic Preservation (3) Federal, state, and local laws and regulations that regulate and provide protection to significant archaeological and historical resources in Hawai'i and the region. Pre: 210.

ANTH 650 Women and Culture (3) Cultural diversity and uniformity in the sex-linked role repertoire, interaction, exchange, rituals, symbolization, role reversal, life cycle, socialization, personality, stress, pathology, acculturation, and movement. Pre: classified graduate standing and consent.

ANTH 668 Maritime Archaeology Techniques (6) (5 7-hr Lab) Laboratory and field training in the principles and practice of methods of maritime archaeology—coastal habitations, shipwrecks, waterlogged artifacts; survey, mapping, excavation, conservation. Summer only, full-time. Repeatable. Pre: 210 or consent. (Cross-listed as OEST 668)

ANTH 699 Directed Reading or Research (V) Pre: classified graduate standing and consent.

ANTH 700 Thesis Research (V) Research for master's thesis.

ANTH 710 Seminar in Research Methods (3) Theory construction and research design in social and cultural anthropology; techniques for collection, processing, and evaluation of data. For students preparing research. Repeatable. Pre: classified graduate status in anthropology or consent.

ANTH 712 Data Processing in Anthropology (3) Techniques of data retrieval; strategies of fieldwork and data analysis for identifying, sampling, and processing large bodies of materials. Repeatable. Pre: classified graduate standing and consent.

ANTH 720 Anthropology of Japan (3) Japan examined through three dimensions of cultural anthropology: cultural/symbolic, social/organizational, and individual/psychological. Selected topics analyzed and interpreted in terms of conjunctions of these dimensions. Pre: 483 or 484; or consent.

ANTH 750 (Alpha) Research Seminar (3) Selected problems in current research. (B) archaeology; (C) medical; (D) ethnography; (E) social; (F) psychological; (G) biological. Pre: classified graduate status and consent.

ANTH 800 Dissertation Research (V) Research for doctoral dissertation.

Architecture (ARCH)

School of Architecture

All courses except 100, 241, 251, 261, 271, and 272 are restricted to declared architecture majors, unless otherwise specified. Exceptions must have prior approval of the associate dean or dean.

ARCH 100 Introduction to the Built Environment (3) Broad exploration of creative human responses to place, climate, culture, communication, technology, and time. A study of the human-

environment relationship with emphasis on the impact of scientific knowledge and architectural design theory on history, culture, sociology, technology and the built form.

ARCH 101 Basic Architecture Studio A (4)

Perception, design and communication. Exploration of human perception, including multi-sensory reception, interpretation of sensory input by the brain, and emotional and cultural factors. Elements and principles of basic two and three-dimensional design concepts. Formal/spatial exercises that explore elements, surfaces, measure and order in both graphic and architectonic contexts. Analytical exercises which examine both existing and self-created orders and studio activities involving thinking, reading, writing, drafting, model making, and especially drawing (freehand, with instruments and computer). A-F only. Pre: consent.

ARCH 102 Basic Architecture Studio B (4)

Materials, design and communication. Hands-on exploration of various materials and construction techniques and an introduction to various design processes as systematic approaches to solving architectural/environmental design problems. Analysis of architecture as the creation of spaces generated by human needs and aspirations and developing concepts to explore and achieve innovative solutions responding to these needs. Studio activities involving thinking, reading, writing, model making and a variety of communication techniques, with emphasis on the delineation of 3-D spaces using perspective drawing techniques, light notation and computer modeling. A-F only. Pre: 100 and 101, or consent.

ARCH 121 Design Drawing (3) Drawing techniques as necessary tools of design process. Orthographic projection, paraline, other mechanical drawing skills. Perspectives, shades, and shadows. Pre: 122 or ART 113 (or concurrent).

ARCH 122 Freehand Drawing (3) Basic freehand drawing in black and white media. Contour, gesture, perspective, and value delineation based on careful observation of actual subject. Emphasis on use of drawing as a tool for visualization and communication.

ARCH 200 Professional Practice of Architecture (3) Introduction to the professional practice of architecture with emphasis on the Asia/Pacific context. Explorations of architects' responsibilities and privileges, how, and with whom they collaborate to accomplish their work. Introduction of professional ethics, attitude, and communication skills; practice formation and organization; and the project delivery process. Exposure to design and practice management, planning and engineering innovations, information and construction technology advancements, and related built environment issues. Includes presentation by practitioners and project case studies. A-F only. Co-requisite: 201 (for architecture majors). Pre: 100 and 201 (or concurrent for architecture majors); or consent.

ARCH 201 Intermediate Architecture Studio A (4) Emphasis on space planning and introduction to building materials and technology and statutory requirements (building codes, life safety issues, etc.). Problems dealing with fairly complex functional requirements, multi-story design issues, vertical transportation, interior finishes, etc.. Production of schematic designs and introduction

to design development. A-F only. Co-requisite: 200. Pre: 102, 200 (or concurrent), 235, 235L, and ART elective; or consent.

ARCH 202 Intermediate Architecture Studio B (4)

Architecture design with emphasis on site development and analysis and response to climate and other environmental factors. Site analysis techniques; introduction to passive systems, sustainability and statutory requirements (zoning, land use ordinances, etc.); description and delineation of property and land features; understanding of neighborhoods, regions, community based issues, etc.. A-F only. Co-requisite: 218. Pre: 200, 201, 218 (or concurrent), and PHYS 151; or consent.

ARCH 211 Structure in Architecture (4)

Analysis and design of elementary structural systems. Statics, determinant structures. Pre: 101 and PHYS 151.

ARCH 212 Structural Design in Architecture (3)

Analysis and design of structural systems and components; strength of materials; seismic and wind forces, indeterminate structures, handbooks, and codes. Basic materials. Pre: 211.

ARCH 213 Lighting, Illumination, and Power (3)

Theory of lighting and lighting design. Artificial light sources as positive design elements. Electrical theory; solar and acoustical considerations. Power sources and equipment; integration into design process. Pre: 201 and PHYS 152.

ARCH 214 Mechanical Systems (3) Occupant comfort (environmental and ambulatory) in buildings: heating, ventilation, air conditioning, vertical transportation. Pre: 201 and PHYS 152.

ARCH 218 Introduction to Architecture Systems (3)

Introduction to the basic systems that affect architectural design, including structural, environmental, life-safety, building envelope, building materials and assemblies. Develop the fundamental skills of teamwork to collaborate with others, and design, with the ability to assess, select and integrate these systems into building design. A-F only. Co-requisite: CHEM 151. Pre: MATH 140, PHYS 151, and CHEM 151 (or concurrent); or consent.

ARCH 221 Color Theory and Application (2)

Basic color theory (color wheel, value, complementary mixing, relativity or color, color harmony, etc.); architectural applications using color as primary design element; color media. Open to nonmajors if space available. Pre: 122 or ART 113.

ARCH 231 Architectural Chemistry (3) Review of organic and inorganic chemistry as it relates to building use and techniques. Pre: MATH 140.

ARCH 235 Computer Applications in Architecture (2)

Fundamentals of computers; general and potential use in architecture. Programming to solve everyday practical problems in planning/design of buildings. Open to nonmajors if space available. Pre: MATH 140. Co-requisite: ARCH 235L.

ARCH 235L Computer Applications Laboratory (1)

Direct use of computers toward applications in architecture. Pre: MATH 140. Co-requisite: ARCH 235.

ARCH 241 Introduction to Urban Design (3)

Principles and practice of urban design within the comprehensive planning process. Sociocultural, economic, political, environmental determinants

of urban form and pattern. Open to nonmajors if space available. (Cross-listed as PLAN 240)

ARCH 251 Introduction to Landscape Architecture (3)

Principles and practice of landscape planning, design, and technology. Ecological, sociocultural, and natural science determinants of landscape form and pattern. Open to nonmajors if space available.

ARCH 261 Introduction to Interior Architecture (3)

Introduction and orientation to the field. Fundamental design principles and elements as applied to interiors. Basic materials and methods of interior construction; basic professional and business practices. Critical analysis of an existing interior space. Open to nonmajors if space available.

ARCH 271 World Architecture and Urbanism A (3)

The significance of architecture in recording the development and aspirations of societies in the world's major cultural regions, from early agricultural settlements to 1500 C.E. Prerequisite for advanced courses in architectural history and theory. Open to non-majors. **AHL2**

ARCH 272 World Architecture and Urbanism B (3)

The significance of architecture in recording the development and aspirations of societies in the world's major cultural regions, from the 15th century C.E. until the contemporary period. Prerequisite for advanced courses in architectural history and theory. Open to non-majors. **AHL2**

ARCH 301 Advanced Architectural Studio A (4)

Design of complex buildings on simple sites and simple buildings on complex sites. Research of specific building types; introduction to building systems and technology. Production of schematic drawings and partial design development documents. A-F only. Pre: 202, 218, CHEM 151, and PHYS 151; or consent.

ARCH 302 Advanced Architecture Studio B (4)

Design of complex buildings on complex sites. Investigation of complex programmatic requirements, building systems and technology. Production of schematic drawings and partial design development documents. A-F only. Co-requisite: 316 and 318. Pre: 271, 272, 301, 315, 316 (or concurrent), 317, and 318 (or concurrent); or consent.

ARCH 311 Advanced Structural Design in Architecture (3)

Analysis and design of advanced structural systems and components; integration into total design. Codes, seismic and wind forces, concrete and steel. Computer applications. Pre: 212.

ARCH 313 Hydraulic Systems (2) Water, sanitary, and storm sewage and systems that transport them. Pipes and piping materials, plumbing, fire protection devices. Solar energy applications. Pre: 201 and PHYS 152.

ARCH 315 Lighting, Power, Acoustical Systems (3)

Qualitative and quantitative issues of natural and artificial lighting, natural and manufactured power, and natural and reinforced acoustical systems, and the desirable and appropriate applications to building design. A-F only. Pre: 218 or consent.

ARCH 316 HVAC and Mechanical Systems (3)

Qualitative and quantitative issues of mechanical systems, including heating, natural ventilation, air conditioning, hydraulics, vertical transportation, security and fire protection systems, and the

desirable and appropriate applications to building design. A-F only. Pre: 218 or consent.

ARCH 317 Structure/Material Systems A - Wood (3) Properties, evolution and range of wood and its use in structural systems and the ability to assess, select design, and integrate wood structural systems into building design. A-F only. Pre: 218 or consent.

ARCH 318 Structure/Material Systems B - Steel (3) Properties, evolution and range of steel and its use in structural systems and the ability to assess, select design, and integrate steel structural systems into building design. A-F only. Pre: 317 or consent.

ARCH 321 Architectural Presentation Techniques (2) Analysis and application: sepia, mylar, acrylics, perspectives, models, slides, photographs, etc. Pre: 121 or consent.

ARCH 331 Materials and Methods of Construction A (3) Comprehensive study of materials and systems available in construction industry; methods of assembly to create complete, functional, and safe facilities. Pre: PHYS 151 and PHYS 152.

ARCH 332 Contract Documentation (3) Preparation of construction documents for a small-scale building. Pre: 202 and 331.

ARCH 334 Materials and Methods of Construction B (3) Continuation of study on materials and systems available in construction industry; methods of assembly to create complete, functional, and safe facilities. Pre: 331.

ARCH 341 Introduction to Planning (3) Perspectives on planning; planning tools and methods; specific Hawai'i planning/research problems from a multidisciplinary approach. Pre: consent. (Cross-listed as PLAN 310)

ARCH 361 Intermediate Interior Architectural Design B (5) Design of small- to moderate-size interior spaces and relationship to external form. Exercises in detailed program writing. Space planning for existing spaces. Consideration of statutory requirements, building materials, systems and technology, and furniture and equipment. Production of schematic and design development documents. Introduction to construction documents and cost opinions. Pre: 202, 212, 261, and 331.

ARCH 362 Advanced Interior Architectural Design A (5) Programming and design of moderate- to large-scale spaces, including choice of furnishings and equipment. Development of total interior environments and integration of interior architectural projects for adaptive re-use developments. Production of schematic, design development, partial construction documents, and cost opinions. Pre: 301 or 361, 311, 6 credit hours of English, and two semesters of 200-level foreign or Hawaiian language.

ARCH 369 Study Abroad: Architectural Study Tour (V) Firsthand examination of the architecture of various countries, with emphasis on experiencing and comprehending significant spaces within historical, cultural, and physical contexts. Topics and countries visited change with each offering. Open to nonmajors. Repeatable.

ARCH 372 Special Topics in Architectural History and Theory (3) An examination of specific theories, movements, or periods of architectural history. Changing topics to be taught

by both regular and visiting faculty. Repeatable. Pre: 271, 272, or 371; and consent.

ARCH 390 Special Topics (V) Selected topics in any aspect of architecture. Content to be announced. Repeatable. Pre: consent.

ARCH 399 Directed Work (V) Pre: consent.

ARCH 400 Project Management (3) Exploration of the management of architectural services from project initiation through project completion. Investigation of project delivery options; management of project design teams, project operations and services; design parameter definition; design service documentation; and project execution. A-F only. Pre: 200 or consent.

ARCH 401 Asia-Pacific Topical Architecture Studio A (5) Variety of changing topics each semester depending upon faculty's and students' research interests, with exploration of different design issues at the urban scale within the Asia-Pacific region. A-F only. Pre: 302 and 474, or consent.

ARCH 402 Comprehensive Architectural Design (5) Semester-long individual design project. Comprehensive design of moderate-size building. Production of schematic, design development, and partial construction documents and cost opinions. Pre: 401, 8 credit hours of environmental systems, and 7 credit hours of architectural electives.

ARCH 403 Comprehensive Architecture Design A (5) Assemble comprehensive architectural program including user needs, appropriate precedents, space and equipment requirements, site analysis, laws and standards, site selection, and design assessment criteria. Produce an architectural schematic design, informed by the program, including programmatic spaces, structural and environmental systems, life safety provisions and building assemblies. A-F only. Pre: 213, 214, 311, 313, 334, and 402; or consent.

ARCH 404 Comprehensive Architecture Design B (5) Continuation of architectural design project in 403. Produce a detailed development of programmatic spaces, structural and environmental systems, life-safety provisions, wall sections and building assemblies, as may be appropriate, and assess the completed project with respect to the program's design criteria. Assess, select, configure and detail as integral part of design, appropriate combinations of building materials, components and assemblies. Make technically precise descriptions and documentation for review and construction purposes. A-F only. Pre: 403 or consent.

ARCH 405 Selected Design Studio (V) Special architecture/interior architecture problems individually selected by students or faculty to sharpen design skills. Repeatable. Pre: consent.

ARCH 416 Architectural Acoustics (3) Basic properties and behavior of sound. Principles of room acoustics and noise control. Acoustical design in architecture for sound isolation. Pre: 201 and PHYS 152; or consent.

ARCH 417 Structure/Material Systems C - Concrete (3) Properties, evolution and range of concrete and masonry and its use in structural systems and the ability to assess, select, design, and integrate concrete and masonry structural systems into building design. A-F only. Pre: 318 or consent.

ARCH 418 Non-Structural Materials (3) Properties, evolution and range of materials used for non-structural purposes and their applications in building design. A-F only. Pre: 218 or consent.

ARCH 431 Computer-Aided Design (2) Design theory applications to computer graphics systems and current developments in practice and research. Pre: 202, 235, and 235L. Co-requisite: 431L.

ARCH 431L Computer-Aided Design Laboratory (1) Use of computer graphics systems in architectural design applications. Pre: 202, 235, and 235L. Co-requisite: 431.

ARCH 432 Construction Management (3) Design professional's role during the building procurement process, particular emphasis on documentation and construction phases. Analysis of value of professional construction management services. Pre: 202 and 331.

ARCH 434 Professional Practice and Ethics (3) Professionalism, office organization, administration; public, client, consultants, and contractor relations; project administration, procedures, and compensation. Pre: 301 or 361.

ARCH 435 Architectural Economics (3) Survey of fundamental business principles and economic theories as they relate to professional practice for design professionals. Pre: 202.

ARCH 436 Dean's Seminar (V) Lecture/seminar on professionalism, ethics, design, technology, building performance. Transition from academia to professional practice. Pre: consent.

ARCH 461 Advanced Interior Architectural Design B (5) Programming and design of large-scale, complex spaces, including choice of furnishings, fixtures, equipment, finishes, and color. Development of total interior environments, integrating building systems. Relationship of interior spaces to external form and integration into large-scale, complex architectural solutions. Production of schematic, design development, and partial construction documents and cost opinions. Pre: 302 or 362, 334, 5 credit hours of environmental systems, and 4 credit hours of architecture electives.

ARCH 462 Comprehensive Interior Architectural Design (5) Semester long individual final design project. Programming and comprehensive design of moderate-size interior space integrated into the larger architectural environment. Production of schematic, design development, and partial construction documents and cost opinions. Pre: 461, 8 credit hours of environmental systems, and 7 credit hours of architectural electives.

ARCH 472 Documentation of Historic Architecture (V) Study and documentation of existing buildings, structures, and sites of historic and/or cultural significance, including field measurements and drawings, historical research, photo documentation, and preparation of archival drawings to be deposited in the Library of Congress. Documentation conducted according to standards of the Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER). Repeatable. Pre: consent. (Cross-listed as AMST 475)

ARCH 473 History of American Architecture (3) History of American architecture in terms of style, techniques, and symbolic meaning. (Cross-listed as AMST 423)

ARCH 474 Theories of Architecture and Urban Design (3) An overview of major theories of architecture and urban design, covering important individuals and movements, and examining their impact on contemporary architectural practice and on life in a broad range of local, national, Asia-Pacific and international settings. Pre-requisite for advanced electives in architectural history and theory. Open to non-majors and writing intensive. Pre: 272 or consent.

ARCH 477 Research Seminar (V) Research methodology for the qualitative development of an optimum environment. Repeatable. Pre: consent.

ARCH 500 Master's Plan B/C Studies (1) Enrollment for degree completion. Pre: 702, master's Plan B candidate, and consent.

ARCH 502 Comprehensive Architecture Studio A (5) Assemble comprehensive architectural program including user needs, appropriate precedents, space and equipment requirements, site analysis, laws and standards, site selection, and design assessment criteria. Produce an architectural schematic design informed by the program and other design determinants with statement of probable cost of construction. A-F only. Co-requisite: 315, 316, and 417. Pre: 315 (or concurrent), 316 (or concurrent), 401, and 417 (or concurrent); or consent.

ARCH 503 Comprehensive Architecture Studio B (5) Continuation of architectural design project in ARCH 502. Produce detailed design development of programmatic spaces, structural and environmental systems, life safety provisions, wall sections and building assemblies. Assess completed project with respect to program criteria. Make technically precise descriptions and documentation for review and construction purposes. A-F only. Pre: 502 and 518, or consent.

ARCH 504 Practicum Studio A (12) Scholarly pursuit integrated with architecture firm based practical experience under the direction of practicum faculty who is a licensed architect. Investigation of basic project definition proficiencies including office management, project management, programming, site and environmental analysis, schematic design, engineering systems coordination, building cost analysis, and code research. Application of skills based on proficiency areas will include weekly assignments, completion and compilation of professional training and scholarly endeavors, and semester long research projects. CR/NC only. Pre: 503 and 533; or consent.

ARCH 505 Practicum Studio B (12) Scholarly pursuit integrated with architecture firm based practical experience under the direction of practicum faculty who is a licensed architect. Investigation of basic project execution proficiencies including office management, project management, programming, design development, construction documents, specifications and materials research, document checking and coordination, construction procurement, and construction contract administration. Application of skills based on proficiency areas will include weekly assignments, completion and compilation of professional training and scholarly endeavors, and semester long research projects. CR/NC only. Pre: 503 and 533, or consent.

ARCH 506 Asia-Pacific Topical Architecture Studio B (5) Studio based research and design related to a professional project in architectural

design, architectural technology, historic preservation, urban design, or other topics that consults and benefits a specific identified community in the Asia-Pacific region. A-F only. Pre: 504, 505, and 573; or consent.

ARCH 507 Architecture Doctorate Studio A (6) Development of an individual Arch.D. project proposal with an approved advising committee and under the guidance of the faculty coordinator of several committees. This studio encourages interaction between returning practicum students and previously licensed candidates through shared proposal development and research techniques. Pre: 505, 506, and 534; or consent.

ARCH 508 Architecture Doctorate Studio B (6) Development of an individual Arch.D. project proposal with an approved advising committee and under the guidance of the faculty coordinator of several committees. This studio encourages interacting between all graduating candidates through shared research techniques and project development. Co-requisite: 507. Pre: 705 (or concurrent) or consent.

ARCH 533 Professional Practice, Law and Ethics (3) Exploration of the practice of architecture including: professionalism; office organization and administration; public, client, consultant, and other contractor relations; project administration, procedure and compensation; construction law and contract administration. A-F only. Pre: 400 and 503 (or concurrent); or consent.

ARCH 534 Forms and Frames of Practice (2) Comprehensive study of architectural practice as it relates to the varying roles which architects assume in response to societal demands. A look at the changing role of the architect. Architecture as it relates to form and integration within the frame of the global context. A study of diverse architecture practices, especially in the Asia Pacific region. Exploration of creative challenges including the application of information technology systems, materials and design process research, construction technology, computer-aided manufacturing, and entrepreneurial approaches in contemporary practice. A-F only. Pre: 504, 505, and 533; or consent.

ARCH 535 Architecture Doctorate Seminar: History, Theory, Culture (2) Assessment of both contemporary and future architectural education, research and practice, by examining existing and evolving consistencies and shared visions that cut across distinct architectural approaches and other disciplines. Pre: 474 or consent.

ARCH 536 Architecture Doctorate Seminar: Science and Environment (2) Conceptual skills in the production of architecture that links environmental concerns with advances in building construction, computational and informational technologies. It includes study of collaboration in design and on the technologies and spaces that support it; the study of encoding design knowledge in material resolution. Pre: 535 or consent.

ARCH 573 Asia-Pacific Architecture and Culture (3) To provide both theoretical and historical basis for the built environment of the Asia-Pacific region. A-F only. 271 and 272 and undergraduate language core; or consent.

ARCH 600 Research Methods Seminar (3) Comprehensive review and assessment of objectives, role, and function of research in

architecture. Lecture, seminar, and independent study. Pre: graduate standing or consent.

ARCH 625 Material Culture (3) Physical artifacts considered as documents of American cultural and regional development. (Cross-listed as AMST 625)

ARCH 627 The American City (3) Urban life and culture in contemporary and historical perspective; emphasis upon promises and problems of city in American culture. (Cross-listed as AMST 627 and HIST 639E)

ARCH 628 Preservation: Theory and Practice (3) History and philosophy of historic preservation movement. Analysis of values and assumptions, methodologies and tactics, implications for society and public policy. (Cross-listed as AMST 675)

ARCH 640 Urban Form (3) City spatial organization; principles of neighborhood, town, and city design and planning; spatial dimension of building and land use. Pre: PLAN 640 or consent. (Cross-listed as PLAN 646)

ARCH 641 Land Use Planning (3) Theory and practice; selected modes of land use analysis; growth management strategies. Pre: PLAN 600 and PLAN 601, or consent. (Cross-listed as PLAN 640)

ARCH 642 Urban Design Studio (6) Group experience in defining urban and regional design problems and potentials in developing and evaluating alternative schemes and formulating strategies for implementation of planning and design solutions. Pre: 641 or consent.

ARCH 650 American Vernacular Traditions (3) Methods and approaches in the study of vernacular architecture, cultural landscapes and material culture, with an emphasis on traditions and innovations in the Americas. (Cross-listed as AMST 681)

ARCH 671 American Architecture (3) Cultural analysis of the evolution of American architecture from the Colonial period to the present involving socio-political and economic as well as aesthetic considerations. Pre: graduate standing or consent. (Cross-listed as AMST 623)

ARCH 672 Research Studio (5) Activity devoted to specialized focus of student in architectural technology. Emphasis in basic or applied research. Repeatable. Pre: graduate standing or consent.

ARCH 675 Professional Ethics (3) Philosophical and analytical study of professional ethics. Lecture and seminar. Pre: graduate standing in architecture or planning, or consent.

ARCH 680 Community Development (3) Social, physical, ecological, and economic problems of communities in the Pacific Basin; examination of solutions emphasizing the application of community organization and services, environmental management, and appropriate technology to communities. Pre: graduate standing or consent. Co-requisite: 680L. (Cross-listed as PLAN 685)

ARCH 680L Community Development Design Lab (2) Application of social, physical, ecological, and economic data to selected studio problems in the design of communities. Pre: 302 or 362, and consent. Co-requisite: 680.

ARCH 681 Housing Delivery (3) Application of ecology, appropriate technology, and local resources to problems of housing development in

Pacific Basin countries; building design and implementation strategies for housing delivery. Pre: 680 and graduate standing, or consent. Co-requisite: 681L. (Cross-listed as PLAN 686)

ARCH 681L Housing Delivery Lab (2)

Application of ecology, appropriate technology, and local resources to selected studio problems in the design of housing. Pre: 302 or 362, and consent. Co-requisite: 681.

ARCH 683 Housing and Community Development Practicum (V) Laboratory and field testing of selected topics related to housing design and technology; site development and infrastructure; social, health, and economic community development; and housing implementation strategies. Repeatable. Pre: 680 (or concurrent), 681 (or concurrent), or consent. (Cross-listed as PLAN 683)

ARCH 687 Urban Design in Asia and Pacific (3) Social behavior in urban space; design for individual, society and state functions; urban designing ideas and concepts in the European/American tradition and the variant Asia Pacific traditions. Pre: ASAN 312, PLAN 310 or PLAN 600. (Cross-listed as PLAN 636 and ASAN 636)

ARCH 690 Special Topics Seminar (3) Seminar on a wide range of architectural topics to be directed by both visiting and regular faculty. Repeatable. Pre: consent.

ARCH 691 Special Topics: Architecture History/Theory (V) Specialized work at an advanced level on the history and theory of architecture. Repeatable. Pre: consent.

ARCH 692 Special Topics in Architectural Technology (V) Specialized investigation at an advanced level of technological developments in structural systems, environmental control systems, or materials and methods of construction. Repeatable. Pre: consent.

ARCH 693 Special Topics in Architecture and Design (V) Intensive work on specialized topics in the fields of architecture and design. May include research and/or studio experiences in architecture, interior architecture, computer-aided design, professional practice, advanced visual design, and architectural graphics. Repeatable. Pre: consent.

ARCH 699 Directed Work (V) Pre: graduate standing or consent.

ARCH 700 Thesis Research (V) Pre: completion of graduate requirements or consent.

ARCH 701 Graduate Studio I (6) Planning, programming, and schematic design of a project selected by student as the focus of graduate study with emphasis on the thorough performance of all required tasks. Pre: one of 401, 402, 461, or 462; 600; and consent.

ARCH 702 Graduate Studio II (6) Design development of a project selected by student as the focus of graduate study with emphasis on the thorough performance of all required tasks. Pre: 701 with a grade of B or better, or consent.

ARCH 703 Urban Design and Planning Studio (6) Group experience in defining urban and regional design problems and potentials, developing and evaluating alternatives, formulating strategies for implementation. Pre: 641, PLAN 640, or consent. (Cross-listed as PLAN 754)

AREC

See Agricultural and Resource Economics

Art (ART)

College of Arts and Humanities

It is recommended that art majors complete 113, 115, and 116 of the art required courses prior to undertaking studio courses at the 200 level. Courses labeled repeatable may be taken for a maximum of 6 credit hours unless a second repetition requires department chair's consent.

ART CORE COURSES

ART 101 Introduction to the Visual Arts (3)

Nature of the world's visual arts and their influences on quality of life. Lectures, demonstrations. **AHL1**

ART 113 Introduction to Drawing (3)

Descriptive, expressive, and formal aspects of visual language through drawing practice. **AHL1**

ART 115 Introduction to Two-Dimensional Composition (3)

Basic design concepts, elements, and principles of art. **AHL1**

ART 116 Introduction to Three-Dimensional Composition (3)

Basic concepts, elements, and principles of art. **AHL1**

ART 201 Expanded Arts (3) Theory and practice course investigating language common to all arts activity particularly as related to the contemporary arts. Pre: one 100-level 2D studio course and one 100-level 3D studio course; or consent.

EXPANDED ARTS/CONTEMPORARY ISSUES

ART 301 (Alpha) Art and Technology Studio I (3)

(6 Lec/Lab) Combined theory and practice studio course(s) that investigate language, processes, and personalized composing systems related to the use of technological media and its application to a variety of contemporary art areas and related disciplines. (B) imaging systems; (C) electronic and electro-acoustic sound; (D) interactive systems and installations. Pre: 201 and one 200-level studio; or consent.

ART 302 Theory and Criticism of Art (3)

Examination of the significant themes and issues in contemporary theory and criticism as they relate to the production and reception of art. Pre: 201 or consent.

ART 389 Hawaiian Art: Studio (3)

A studio art course that explores art-making from a Hawaiian perspective, focusing on the concepts of 'Oli and Mo'olelo (narratives) and Kumulipo (creation mythology). Pre: one 200-level studio art course, or consent.

ART 401 Art and Technology Studio II (3)

Tutorial studio course that encourages exploration in combined and new media through independent work within an environment of theoretical and critical discourse. Repeatable once. Pre: 301 or consent.

ART 403 Contemporary Issues (3)

Art studio addressing a specific sociocultural theme. Repeatable twice. Pre: 201 or consent.

ART 404 Gender Issues in Multimedia and Video (3)

Studio/lecture course investigating social, cultural, and gendered representations as informed by contemporary theory and practice. Pre: 201 or any WS course; or consent. (Cross-listed as WS 484)

ART 405 Professional Practice (3)

Methods and skills for professional preparation. Creation of visual/written documentation of artwork and practice. Exploration of legal, financial and ethical considerations of artmaking. Student must have a 35mm camera and light meter. A-F only. Pre: BFA Art major and advanced standing in Art; or consent.

ART 490 Comparative Aspects of Arts (3)

A seminar to compare modalities of form. Methodology: experiential, descriptive, semantic, structural, and historical. Pre: 171, 172, and 180; or consent.

ART 690 Interdisciplinary Seminar (3)

Issues of contemporary art. Analysis of current literature and criticism. Pre: consent.

HISTORY OF ART

ART 171 Introduction to Western Art I (3)

Major developments in Western art from pre-history to the Middle Ages. **AHL1**

ART 172 Introduction to Western Art II (3)

Major developments in Western art from the Renaissance to the present. **AHL1**

ART 180 Introduction to Eastern Art (3) Major developments in arts of Asia. **AHL1**

ART 275 Women in Art (3)

An interdisciplinary survey of the role of women as subject/object in the visual arts, their activity as creators of art and as participants in the art world. Pre: 101 and one of PHIL 100, SOC 100, or WS 101; or consent. (Cross-listed as WS 275)

ART 290 Art of Africa, Pacific, North America (3)

Formal and contextual study of art from selected areas in Africa, the Pacific, and North America. Pre: 171, 172, or 180; or consent.

ART 370 Ancient Art (3) Arts of Egypt, Mesopotamia, Crete, and Mycenae. Pre: 171 or consent.

ART 371 Medieval Art (3) Arts of Europe from early Christian era to Renaissance. Pre: 171 or consent.

ART 373 Art of Greece and Rome (3) Minoan and Mycenaean arts; Greece and Rome. Pre: 171 or consent.

ART 374 Art of the 19th Century (3) Architecture, sculpture, and painting of Europe. Pre: 172 or consent.

ART 380 Early Art of Japan (3) Major developments, prehistoric through Kamakura; architecture, painting, sculpture. Pre: 180.

ART 381 Later Art of Japan (3) Major developments, Muromachi to modern period; painting, sculpture, architecture. Pre: 180.

ART 384 Art of Korea (3) Ceramics, sculpture, painting, and architecture; neolithic through Yi periods. Pre: 180.

ART 385 Early Art of China (3) Major developments of three-dimensional arts; emphasis on jade, bronze; secular and religious sculptures from prehistoric to 9th century. Pre: 180.

ART 386 Later Art of China (3) Major developments of style and aesthetics of applied arts; architecture, furniture, ceramics, other crafts. Pre: 180.

ART 391 Museum Interpretation (3) Theory and techniques for interpretation of museum resources and communicating with museum visitors. Consideration for interpretive programs in museums, art galleries, historic sites, and parks. Pre: consent. (Alt. years: spring only)

ART 396 (Alpha) History of Photography (3) History of photography from its beginnings to the present; emphasis on the evolution of photography as an art form. (B) nineteenth century, from the invention of photography through pictorialism; (C) twentieth century, from World War I to the present. Pre: 172 or consent.

ART 470 (Alpha) Renaissance Art (3) Painting, sculpture, and architecture: (B) early Renaissance in Italy; (C) northern Europe; (D) High Renaissance and mannerism in Italy. Pre: 172 or consent.

ART 471 Baroque and Rococo Art (3) Architecture, sculpture, and painting of Europe in the Baroque and Rococo periods. Pre: 172 or consent.

ART 472 Art of the United States (3) Emphasis on the 18th and 19th centuries. Pre: 172 or consent. (Cross-listed as AMST 456)

ART 473 Art of the First Half of 20th Century (3) Development of modern art in Europe 1900–1939. Pre: 172 or consent.

ART 474 Art Since Middle 20th Century (3) Art of Europe and the United States since 1945. Pre: 172 or consent.

ART 475 (Alpha) Art of the Pacific (3) Visual form and function of the arts in cultural context: (B) Australia, Indonesia; (C) Melanesia, Micronesia, Polynesia; (D) North Pacific coast Indian, Eskimo. Pre: 290 or consent.

ART 476 Art of Tribal Africa (3) Visual form and function of arts in cultural context. Mali, Burkina Faso, Ivory Coast, Liberia, Guinea, Nigeria, Ghana, Cameroon, Congo, Zaire. Pre: 290 or consent.

ART 479 Art of Hawai'i (3) Stylistic and aesthetic characteristics of art of ancient Hawai'i; relationship to art from other parts of Polynesia. Pre: 290 or consent.

ART 482 Women in Japanese Art (3) Issues relating to representations of women in Japanese art. Emphasis on social class and gender roles. Pre: 180 or any WS course; or consent. (Cross-listed as WS 482)

ART 483 Applied Art of Japan (3) Ceramics, metalwork, lacquer, and textiles throughout Japanese history. Pre: 180.

ART 486 Early Chinese Painting (3) Stylistic and aesthetic development of two-dimensional arts; painting and calligraphy from prehistoric to 12th century. Pre: 180.

ART 487 Later Chinese Painting (3) Stylistic and aesthetic development of two-dimensional arts; painting and calligraphy from end of Sung to the present. Pre: 180.

ART 491 (Alpha) Art of Southeast Asia (3) Critical analysis of the historical and cultural development of Buddhist and Hindu art in

Southeast Asia: (B) island Southeast Asia; (C) mainland Southeast Asia. Pre: 180 or consent.

ART 492 Art of Ancient India (3) Critical analysis of the historical and cultural development of Indian architecture, painting, and sculpture. Pre: 180 or consent.

ART 493 Art of Islam (3) Major developments in art and architecture. Pre: 171 or consent.

ART 495 History of Modern Design (3) Major design movements in Europe and America from late 19th century to present; arts and crafts movement, art nouveau, modernist trends of the 20th century. Pre: 172 or consent.

ART 496 Topics in the History of Cinema (3) Specific period or national style of cinema studied in its historical context. Repeatable. Pre: 109 or consent.

ART 670 Art Historical Methodology (3) An introduction to art historiography, analytical techniques, and research methods and materials. Pre: consent and graduate standing.

ART 677 Art of Oceania (3) Arts from Polynesia, Melanesia, Micronesia explored in context of issues involving belief systems and cultural change. Repeatable one time. A-F only. Pre: 475C or consent.

ART 679 Art of Indonesia (3) Seminar: aspects of ethnic or tribal sculpture, textiles, architecture, painting. Pre: consent.

ART 687 Chinese Painting and Calligraphy (3) Research topics in the history of Chinese painting and calligraphy. Pre: consent.

ART 688 Chinese Sculpture and Applied Arts (3) Research topics in the history of Chinese sculpture, ceramics, bronzes, jade, and textiles. Pre: consent.

ART 695 (Alpha) Seminar in Western Art History (3) Selected topics in European and American art history. Pre: consent.

ART 780 Early Japanese and Korean Art (3) Emphasis on Buddhist art, 6th to 14th century; early secular painting. Lecture and seminar. Pre: consent.

ART 781 Later Japanese and Korean Art (3) Emphasis on secular art, 14th century to modern period. Lecture and seminar. Pre: consent.

ART 790 Buddhist Art of South Asia (3) Selected research topics in South and Southeast Asian Buddhist art. Pre: consent.

ART 791 Hindu Art of South Asia (3) Selected research topics in South and Southeast Asian Hindu art. Pre: consent.

CERAMICS

ART 105 Introduction to Ceramics (3) Three-dimensional concepts in clay; hand-building and wheel-throwing techniques. **AHLI**

ART 243 Ceramics—Hand-Building (3) Includes modeling, coil, pinch, and slab techniques; introduction to glaze techniques. Repeatable. Pre: 105, 116, or 130; or consent.

ART 244 Ceramics—Wheel-Throwing (3) Techniques and aesthetics of wheel-thrown forms; introduction to glaze techniques. Repeatable. Pre: 103, 105, 116, or 130; or consent.

ART 342 Technical Ceramics (3) Clay body development, glaze development, empirical and calculation methods. Emphasis on glaze maturity, surface, and color. Pre: 243, 244, or consent.

ART 343 Ceramics—Sculpture (3) Sculptural concepts and techniques specifically related to the medium of clay; advanced hand-building, throwing, glazing, and firing techniques. Pre: 243 and 244; or consent.

ART 344 Ceramics—Vessels (3) Exploration of the ceramic vessel as function, metaphor, and expression. Advanced hand-building, throwing, glazing, and firing techniques. Pre: 243 and 244; or consent.

ART 345 Ceramics—Low Temperature (3) Form and surface problems related to earthenware clay bodies and low-temperature glazes; mold-making for ceramics. Pre: 243 and 244; or consent.

ART 346 History of Western Ceramics (3) Western ceramics history from chronological, developmental, contextual, and theoretical standpoints; influence of Asian ceramics. Pre: 243 and 244; or consent.

ART 441 Advanced Ceramics (3) Seminar and studio practice to address the content of the student's work in relation to contemporary concepts. Class exhibition is the final project. Pre: BFA major and four 300-level ceramics courses; or consent.

DRAWING/PAINTING

ART 123 Introduction to Painting (3) Theory and practice of painting; material and technical procedures. **AHLI**

ART 213 Intermediate Drawing (3) Extension of 113 with emphasis on 20th-century issues. Pre: 113 or consent.

ART 214 Introduction to Life Drawing (3) Investigations of the figure concerning anatomical construction, light, space, diagrammatic analysis, and thematic content. Pre: 113 or consent.

ART 223 Intermediate Painting (3) Survey of late 19th- and early 20th-century studio practice emphasizing developments in light notation, cubism, surrealism, and expressionism. Introduction to acrylic painting. Repeatable. Pre: 113 (or concurrent) and 123, or consent.

ART 224 Painting from Life (3) Painting from the model; a survey of the figurative tradition. Repeatable. Pre: 123 and 214 (or concurrent), or consent.

ART 225 Painting/Water-Based Media (3) An introduction to water-based media. Traditional transparent color, gouache and acrylics. Pre: 113 or consent.

ART 313 Advanced Drawing (3) Studio practice in drawing emphasizing 20th-century developments in art and independent research. Repeatable twice. Pre: 213 or consent.

ART 314 Intermediate Life Drawing (3) Further investigations of the figure concerning anatomical and diagrammatic construction, light, space, and thematic content. Pre: 214 or consent.

ART 320 Brush Art of the Far East (3) Brush techniques in classical painting and calligraphy; studio course. Pre: consent.

ART 321 Materials and Techniques of Painting (3) Experiments with various traditional and contemporary materials and procedures; discussion of their influences on painting. Pre: 123, 171, and 172; or consent.

ART 322 Advanced Color (3) Theory and application of color as related to studio practice. Pre: 115 or consent.

ART 323 Advanced Painting I (3) Studio practice in painting, emphasizing the development of abstract visual language and other 20th-century directions in art. Pre: 214, 223, and 224; or consent.

ART 414 Advanced Drawing from Life (3) Study of the figure with emphasis on the expressive function of drawing. Repeatable once. Pre: 214 or consent.

ART 423 Advanced Painting II (3) Development of greater formal means and aesthetic insight, emphasizing independent development. Repeatable once. Pre: 323 or consent.

FIBER

ART 103 Introduction to Fiber (3) Studio projects and demonstrations in basic loom weaving, indigo dyeing, and introductory non-loom fiber techniques. **AHL1**

ART 235 Papermaking (3) Studio emphasis on Western and Eastern handmade papermaking techniques. Exploration in two and three dimensions. Pre: 103 or consent.

ART 238 Intermediate Loom Weaving (3) Studio emphasis on loom weaving techniques arranged in a sequence of weave structure development. Spinning and dye technology will be introduced. Repeatable once. Pre: 103 or consent.

ART 239 Fiber—Surface Design (3) Surface design on cloth, using a variety of resist methods, direct printing, and embellishment techniques. Exploration in two and three dimensions. Repeatable once. Pre: 103 or consent.

ART 336 Fiber—Wearable Art (3) Art for the body will draw inspiration from world costume and from a variety of three-dimensional fiber forms. Repeatable once. Pre: 103 or consent.

ART 337 Fiber—Sculpture (3) Mixed-media and non-loom techniques, including the percussion textiles of feltmaking and papermaking. Exploration of ideas in contemporary basketry and other sculptural forms. Repeatable once. Pre: 103 or consent.

ART 339 (Alpha) Advanced Fiber (3) Exploration of fiber art as an expressive medium, emphasizing individual approaches and concepts in studio projects. (B) structure; (C) surface. Repeatable. Pre: 238, 239, 336 or 337, and 394B or 394C; or consent.

ART 394 (Alpha) History of Textiles (3) Textile history up to contemporary fiber art, with reference to the technical process. (B) Europe and the Americas; (C) Oceania, Asia, the Middle East, and Africa. Pre: 172 for (B); 180 for (C); or consent.

ART 437 Textile Conservation/Research (V) Independent study of textile conservation and research. Individualized directed work in the museum environment. Repeatable. Pre: 103, 180, 238, and consent.

ART 439 Advanced Fiber II (3) Advanced study in fiber leading to the development, installation, and documentation of individual projects. Repeatable. Pre: 339B or consent.

GLASS

ART 130 Introduction to Glass (3) Basic techniques of working with cold and molten glass. Theory of glass studio operation and introduction to glass theory. **AHL1**

ART 230 Glass Casting: Sand and Metal Molds (3) Expressive explorations in glass casting with wet sand, bonded sand, and metal molds. Repeatable once. Pre: 116 (or concurrent) and 130; or consent.

ART 234 Cold Glass Fabrication (3) Expressive explorations using architectural sheet glass. Development of 2D and 3D forms using engraving, sandblasting, and cold joinery techniques. Pre: 113 (or concurrent), 116 (or concurrent), and 130; or consent.

ART 303 Kiln-Formed Glass (3) Expressive explorations in the use of kiln-formed, fusible-sheet glasses and enameling on glass. Pre: 234 or consent. (Fall only)

ART 306 Lost Wax Glass Casting (3) Glass kiln casting techniques, lost wax fuse casting, pâte de verre. Repeatable once. Pre: 230, 254, and 356 (or concurrent); or consent.

ART 330 Advanced Glass (3) Glass as an expressive medium. Individual problems; construction of studio equipment. Readings and discussions of contemporary glass issues. Repeatable once. Pre: 230, 254, and 356; or consent.

ART 430 Advanced Glass II (3) Advanced study in glass leading to the development, installation, and documentation of individual projects. Pre: 330 or consent.

GRAPHIC DESIGN

ART 265 Design: Studio 1 (3) Introduction to graphic design. Explorations of rhetorical and semiotic structures and their relationship to visual form and content. Pre: 101, 113, 115, and 116 (or concurrent); or consent. Co-requisite: 265L.

ART 265L Design: Studio I Lab (1) Operation of equipment in the graphic arts and computer labs. Photographic reproduction processes and basic computer skills. CR/NC only. Pre: 101, 113, 115, and 116 (or concurrent); or consent. Co-requisite: 265.

ART 266 Design: Typography I (3) Introduction to typography. Exploration of letterform and word composition in the context of single-page structures. Pre: 101, 113, 115, 116 (or concurrent), 265 (or concurrent), and 265L (or concurrent); or consent.

ART 360 Exhibit Design and Gallery Management (3) Design theory and techniques for presentation of artworks and mounting exhibitions. Pre: 115, junior standing, and consent.

ART 365 Design: Studio II (3) Intermediate graphic design. Emphasis on communication problems involving process and analysis. Introduction to modernist precedents and information theory. A–F only. Pre: 265 and 266; or consent.

ART 366 Design: Typography II (3) Intermediate typographic design, exploration of word and text composition in the context of multiple-page structures. A–F only. Pre: 265, 266, and 365 (or concurrent); or consent.

ART 367 Design: Internship Preparation (3) Pre-professional practice skills. Pre: 364 or consent.

ART 368 Design: Internship (4) Internship in industry under professional and faculty supervision. Pre: 367 or consent.

ART 464 Design: Studio III (3) Advanced graphic design. Emphasis on postmodernist theory, context, audience, and alternative media. A–F only. Pre: 365, 366, and positive portfolio review; or consent.

ART 465 Design: Typography III (3) Advanced typographic design. Exploration of 2D, 3D, electronic, and intermedia. Emphasis on contemporary typographic models. A–F only. Pre: 464 (or concurrent); or consent.

ART 468 Design: Thesis Project (3) Thesis project. Pre: 369 or consent.

PHOTOGRAPHY

ART 107 Introduction to Photography (3) Elements and principles of photography. Lectures, demonstrations, and projects. Assumes no prior knowledge of photography. Student must have camera with adjustable shutter speed, aperture, and light meter. **AHL1**

ART 109 Understanding Image in Motion (3) Creative aspects of film and video. Understanding forms, aesthetics, and techniques of the moving image; feature and short works (animation, documentary, and experimental).

ART 207 Intermediate Photo: Black and White (3) Black and white photography emphasizing communication and self-expression. Lectures, demonstrations, and projects. Student must supply camera and material. Pre: 107.

ART 209 Image in Motion Studio I (3) Basic theory, practice, and techniques for animation, with sequential digitized imagery and synchronized sound. Repeatable once with consent. A–F only. Pre: 107 or consent.

ART 307 Advanced Photography: Studio (3) Advanced investigation of camera, studio and lab techniques for black and white photography. Pre: 207 and positive portfolio review or consent.

ART 308 (Alpha) Advanced Photographic Techniques (3) Emphasis on aesthetic and critical analysis. (B) color; (C) hand-applied emulsion. Pre: 207 and positive portfolio review.

ART 309 Image in Motion Studio II (3) Advanced theory, practice, and techniques for sequential imagery with synchronized sound, using animation and live action video. Repeatable. A–F only. Pre: 209 and positive portfolio review; or consent.

ART 407 Advanced Photography: BFA Seminar (3) Advance study in photography leading to the development, exhibition and documentation of individual projects. A–F only. Pre: five of the following: 109, 207, 209, 307, 308B, 308C, 309, or 409; and positive BFA review.

ART 409 Image in Motion Studio III (3)

Studio/lecture course focusing on conceptualization and production of computer generated three-dimensional animation. A–F only. Pre: 309 or consent.

PRINTMAKING**ART 104 Introduction to Printmaking (3)**

Foundation explorations in the processes of relief, intaglio, and stencil printmaking. Direct workshop studio experience in the basic techniques and concepts of wood cut, linoleum cut, drypoint, monotype, and basic stencil processes. **AHLI**

ART 215 Intaglio Printmaking (3)

Studio practice in concepts and techniques of making prints from metal plates including etching, engraving, aquatint, and drypoint. Pre: 104 or 113.

ART 216 Lithography (3) Studio practice in concepts and techniques of making prints from lithographic limestone and plates. Pre: 104 or 113.

ART 217 Screenprinting (3) Studio practice in screenprinting on paper. Copy camera and basic photo-stencil techniques introduced. Pre: 104 or 113.

ART 218 Relief Printmaking (3) Studio practice in the techniques and concepts of woodblock, linoleum cut, monotype, and collagraph printmaking. Emphasis on both traditional and contemporary practices. Pre: 104 or 113, or consent.

ART 318 Intermediate Printmaking (3)

Intermediate level specialization in either intaglio, lithography, screenprinting, or relief printmaking. Concentration on the techniques and formats of color printing and sequential image development. Repeatable. Pre: two printmaking courses and portfolio review, or consent.

ART 418 Advanced Printmaking (3) Advanced work in intaglio, lithography, screenprinting, or relief printmaking. Emphasis on experimental processes, large-scale execution, and technical research. Repeatable. Pre: 318 and portfolio review, or consent.

SCULPTURE

ART 254 Sculpture—Metal Casting (3) Metal casting and development of associated practices and concepts. Repeatable. Pre: one of 103, 105, 116, or 130; or consent.

ART 255 Sculpture—Carving, Mixed Media (3) Investigations of traditional and contemporary carving concepts and methods. Repeatable. Pre: one of 103, 105, 116, or 130; or consent.

ART 351 Sculpture—Figure Modeling (3)

Figure modeling, mold making, and casting. Repeatable. Pre: 214 or 243, or consent.

ART 352 Kinetic Sculpture (3) The design and construction of objects incorporating movement as an integral element of their content. Repeatable once. Pre: any two of 254 (or concurrent), 356, or 357; or consent.

ART 356 Sculpture—Metal Fabrication (3)

Metal fabrication and development of associated practices, concepts, and historical references. Repeatable. Pre: one of 103, 105, 116, or 130; or consent.

ART 357 Sculpture—Small-Scale (3) Fabrication and casting of forms on a small scale such as jewelry. The development of related practices, concepts, and historical references. Repeatable. Pre: one of 103, 105, 116, or 130; or consent.

ART 358 Utilitarian Sculpture (3) The design and construction of objects intended for use/interaction. Emphasis on wood and synthetic materials. Repeatable once. Pre: 116 or consent.

ART 452 Advanced Sculpture (3) Individual projects. Seminar. Repeatable. Pre: five courses from 230, 243, 254, 255, 337, 351, 352, 356, 357 or 358; or consent.

ART 453 Advanced Sculpture II (3) (6 hr Lec/Lab combined) Advanced study in sculpture leading to the development, installation, and documentation of individual projects. Pre: 452 or consent.

VARIABLE CREDIT COURSES

ART 399 Directed Work (V) Individual projects; tutorial. Maximum: 3 credit hours per semester; total 6 for BA, 9 for BFA. Pre: two 200-level or above art courses in area of directed work, as well as consent of instructor and department chair.

ART 400 Special Projects (V) Intensive and specialized work at advanced level in fields of special interest of visiting or resident faculty. Repeatable. Pre: advanced standing and consent.

ART 630 Graduate Studio Teaching Practicum (3) Observation, analysis and participation in teaching a lower division course under the direction of an instructor in the student's area of concentration. Repeatable one time. A–F only. Pre: 690, admitted to candidacy for MFA in art, and consent.

GRADUATE STUDIOS

Studio concentrations for the Master of Fine Arts degree: ceramics, electronic arts, glass, fiber, graphic design, painting, photography, printmaking, and sculpture. Three sequential course levels are offered in each area, normally with 6 credit hours at level I prerequisite to level II, etc. Courses are repeatable; each carries a maximum of 6 credit hours per semester, and each requires consent of instructor. Conditional and unclassified students enroll at level I only.

Content at level I emphasizes creative exploration through research and evaluation in a personal direction; level II encourages development through analysis and definition; level III focuses on refinement and synthesis.

ART 500 Master's Plan B/C Studies (1)

Enrollment for degree completion. Pre: master's Plan B or C candidate and consent.

ART 601, 602, 603 Electronic Arts I, II, III (V)**ART 607, 608, 609 Photography I, II, III (V)****ART 615, 616, 617 Printmaking I, II, III (V)****ART 623, 624, 625 Painting I, II, III (V)****ART 631, 632, 633 Glass I, II, III (V)****ART 637, 638, 639 Fiber I, II, III (V)****ART 641, 642, 643 Ceramics I, II, III (V)****ART 653, 654, 655 Sculpture I, II, III (V)****ART 665, 666, 667 Graphic Design I, II, III (V)**

ART 699 Directed Work (V) Advanced individual projects; advanced tutorial. Maximum: 3 credit hours per semester; total 6 for MA Plan A, 9 for MA Plan B, 15 for MFA. Pre: consent of instructor and department chair.

ART 700 Thesis Research (V)**Arts and Humanities (AH)**

College of Arts and Humanities

AH 100 Introduction to the Arts (3) Team-taught interdisciplinary exploration of dance, music, theater, and visual art as means of perceiving, organizing, and communicating. Lectures, performances, field trips, group and individual participation. **AHLI**

AH 100A Introduction to the Arts (3) Team-taught interdisciplinary exploration of dance, music, theater, and visual art as means of perceiving, organizing, and communicating. Lectures, performances, field trips, group and individual participation. **AHLI**

Arts and Sciences (CAS)

Colleges of Arts and Sciences

CAS 101 RAP Foundation Course (3) Focus on communication and research skills. Multilevel work with technology, community service, linking with K–12 students, creation of museum exhibits. A–F only. Open only to RAP students.

CAS 102 RAP Foundation Course (3) Focus on communication and research skills. Multilevel work with technology, community service, linking with K–12 students, creation of museum exhibits. A–F only. Open only to RAP students.

CAS 110 Integrating Seminar I (1) An introduction to the university community; topics include critical thinking, the value of higher education, cultural and transition issues. A–F only.

CAS 110A Integrating Seminar I (1) An introduction to the University Community; topics include critical thinking, the value of high education, cultural and transitional issues. A–F only. Fall only.

CAS 111 Integrating Seminar II (1) Through the use of a unifying theme, students explore linkages with academic disciplines represented in Freshman Learning Communities. Theme examples: diversity, epistemology. A–F only. Spring only.

CAS 111A Integrating Seminar II (1) Through the use of a unifying theme, students explore linkages with academic disciplines represented in freshman learning communities. Theme examples: diversity, epistemology. A–F only. Spring only.

CAS 200 (Alpha) Scholar Seminars (1)

Discussion-based seminar led by senior faculty/administrator. Students meet with instructor for 1 hour once a week. Freshmen may take up to three alphas.

AS

See *Aerospace Studies*

Asian Studies (ASAN)

School of Hawaiian, Asian, and Pacific Studies

ASAN 201 Introduction to Asian Studies: East Asia (3) Understanding East Asia through multidisciplinary approaches. Examines the interrelationship of policies, economy, literature, religion, the arts, and history as the basis for such an understanding.

ASAN 202 Introduction to Asian Studies: South/Southeast Asia (3) Understanding South and Southeast Asia through multidisciplinary approaches. Examines the interrelationship of policies, economy, literature, religion, the arts, and history as the basis for such an understanding.

ASAN 241 Civilizations of Asia (3) Historical survey of major civilizations of Asia from earliest times: East Asia, Southeast Asia, and South Asia. (Cross-listed as HIST 241) **AHL2**

ASAN 242 Civilizations of Asia (3) Continuation of 241. (Cross-listed as HIST 242) **AHL2**

ASAN 310 Asian Humanities (3) Multidisciplinary. Classics of literature, philosophy, and religion shaping Asian beliefs and values. Pre: 201 and 202, or consent.

ASAN 312 Contemporary Asian Civilization (3) Multidisciplinary examination of problems and issues affecting peoples and institutions of contemporary Asia: ethnic, language, religious, and cultural differences; population growth; public health; economic development; political and social change; environmental problems; etc. Pre: 201 and 202, or consent. **SS**

ASAN 320 (Alpha) Asian Nation Studies (3) Multidisciplinary examination of major Asian countries; cultural, social, economic, and political lives of their peoples. (C) China; (I) South Asia; (J) Japan; (K) Korea; (P) Philippines; (S) Southeast Asia; (Z) Other. Pre: 201 and 202, or consent.

ASAN 323 The Way of Tea in Japanese History and Culture (3) History and culture of Japan as revealed in study and practice of tea ceremony: Zen, aesthetics, calligraphy, architecture, ceramics, gardens, politics. Pre: HIST 151 and HIST 152. (Cross-listed as HIST 323)

ASAN 325 (Alpha) Japanese Film: Art and History (3) Study and analysis of Japanese film; its history and relationship to cultural, social, philosophical, and aesthetic contexts. (B) 1900-1960; (C) 1960-present; (D) special topics. Pre: upper division standing or consent. (Cross-listed as EALL 325)

ASAN 330 Chinese Film: Art and History (3) Study and analysis of Chinese film; its history and relationship to cultural, social, philosophical, and aesthetic contexts. Pre: 201 and 202, or consent.

ASAN 393 (Alpha) Field Study in Asia (3) Students may submit proposals to have academic course work, field research, or work experience in Asia. See specific center for guidelines and procedures. (C) China; (I) South Asia; (J) Japan; (K) Korea; (P) Philippines; (S) Southeast Asia; (Z) Other.

ASAN 458 Russia in Asia and the Pacific (3) Covers the economic, political, and social development of Russian Asia (Siberia) and Russian relations with the countries of Asia and the Pacific. Pre: HIST 306 or HIST 310; or consent.

ASAN 463 Gender Issues in Asian Society (3) Construction of gender identities in contemporary Asia. How these interface with other aspects of social difference and inequality (e.g., with class, religion, ethnicity). Pre: 201 and 202, or any WS course, or consent. (Cross-listed as WS 463)

ASAN 465 American Experience in Asia (3) Comparison of American experiences in Japan, China, and Southeast Asia within historical and perceptual framework. (Cross-listed as AMST 465)

ASAN 467 Americans in China (3) Exploration of contemporary Chinese-American relationship against 19th- and 20th-century background. (Cross-listed as AMST 467)

ASAN 469 Ethnic Diversity in China (3) Surveying Tibetans, Mongols, Manchus, Muslims, and other minorities, as well as analyzing the nature of minority/majority identity in China from an anthropological perspective. Pre: 201 and 202, or consent.

ASAN 480 Culture and Economy of Southeast Asia (3) An exploration of the cultural and economic development of the countries of Southeast Asia from early times to the present day, with an emphasis on the effects of outside influences. Pre: 201 and 202, or consent.

ASAN 482 The Political Economy of Japan (3) Examination of the institutions of the contemporary Japanese political economy including economic policy and politics, labor-management relations, and international dimensions. Pre: 201 and 202, or consent.

ASAN 484 Society and Politics in China (3) Interdisciplinary review and analysis of social and political issues in contemporary China, interchange between state and society in national policies, relationship between cultural tradition and technological modernization in the socialist transformation process. Pre: 310, 312, or SOC 356; or consent. (Cross-listed as POLS 484)

ASAN 485 Contemporary Chinese Development (3) Development and planning in contemporary China: economic policy and institutional structure in the development and urbanization process; urban and rural transformation in a socialist economy. Pre: upper division standing or consent.

ASAN 486 Contemporary Vietnam (3) Vietnam's 20th-century intellectual and organizational transformation, wars, revolution, social change, and development dilemmas in historical, cultural, and international perspective.

ASAN 491 (Alpha) Topics in Asian Studies (3) Selected topics in Asian studies. (B) Buddhist studies; (C) China; (G) Asia; (I) South Asia; (J) Japan; (K) Korea; (P) Philippines; (S) Southeast Asia; (Z) Other. Pre: 201 or 202, or consent.

ASAN 493 Globalization in Asia (3) Globalization affects the economic, political, and cultural lives of people in Asia. Transformations by capitalism in agricultural and industrial sectors of contemporary societies. Perspective is historical and global; approach is interdisciplinary. Repeatable twice. Pre: 201 and 202, or consent.

ASAN 495 Encountering Tourism in Asian-Pacific Societies (3) A critical examination and current impact of tourism on contemporary Asian and Pacific Island societies. Topics include colonial antecedents, social impacts, cultural and environmental concerns, case studies (including Hawai'i). Pre: 201 or 202, or consent. (Cross-listed as PACS 495)

ASAN 496 Religions of Island Southeast Asia (3) A comparative, interdisciplinary examination of indigenous beliefs, Islam, Christianity, and Hinduism in island Southeast Asia, and how they have been adjusted because of economic and social change. Pre: 201 and 202, or consent.

ASAN 499 Directed Reading (V) Pre: consent.

ASAN 500 Master's Plan B/C Studies (1) Enrollment for degree completion. Pre: master's Plan B or C candidate and consent.

ASAN 501 Practicum in Asian Studies (V)

ASAN 600 Asian Studies Seminar: Scope and Methods (3) Scope of Asian studies as a field; contributions of major disciplines to study of Asia; resources and methods of research; preparation of research proposal. (C) China; (I) South Asia; (J) Japan; (K) Korea; (P) Philippines; (S) Southeast Asia. Pre: graduate standing.

ASAN 603 Japanese Studies Seminar (3)

ASAN 605 Contemporary Korean Studies Seminar (3) Critical examination and study of selected aspects of modern and contemporary Korea. Pre: HIST 328.

ASAN 608 Politics and Development: China (3) Political economy of market transformation in China; developmental context of human resource, cultural tradition, ideology, policy issues of agriculture industry transfer, decentralization, dualism, market reform in urbanization, social service, foreign investment, and Greater China. Pre: one of POLS 341, ASAN 484, POLS 484, ASAN 600, ASAN 635, or PLAN 635; or consent. (Cross-listed as POL 645C)

ASAN 611 Comparative Muslim Societies in Asia (3) This course will compare Muslim societies and cultures in Asia with each other and with the so-called "core" Middle Eastern Muslim societies. Pre: 600 or consent.

ASAN 618 Contemporary China: Development and Culture (3) Selected topics on contemporary China. Center for Chinese Studies has details of current offering. May be repeated with permission of instructor. Pre: 312 or 320C, or consent.

ASAN 620 Problems/Issues of Contemporary Asia (3) Analysis from multidisciplinary perspective: rural development, urbanization, international relations, ethnicity, religion, language, etc. Pre: 312 or consent.

ASAN 624 Culture and Colonialism (3) Analysis of theories and debates (cultural studies, feminist writings, post-colonial issues). Case studies of the transformation and creation of "traditional" cultures under colonialism. Pre: 310 or 312, or consent.

ASAN 625 Comparative Development in East and Southeast Asia (3) Comparative developmental analysis of Asia's leading economic powers. Considers Japanese political and economic developmental model; discusses problems for continued Asian growth; examines Korea, Taiwan, China, Indonesia, Thailand, Philippines and other Asian nations. Pre: 312, 600, or consent.

ASAN 626 Capitalism in Contemporary Asia

(3) Historically grounded theoretical examination of capitalism in 20th-century Asia; multidisciplinary approach to fundamental change in political and economic structures and institutions, prospects for the future. Pre: 600 or 625, or consent.

ASAN 627 Ethnic Nationalism in Asia (3)

Contemporary theories of ethnic and cultural nationalism from perspective of Asia. Issues of nation-state, power hierarchies, modernity, and identity in contemporary societies. Pre: 310 (or concurrent) or 312 (or concurrent), or consent.

ASAN 628 Southeast Asian Development: Costs and Benefits (3)

Interdisciplinary approach to broad economic, social, and political issues. Focus on benefits and costs of economic development and effects on local cultures. Exploration of dilemmas of modernization and comparison of societal responses to development. Repeatable. Pre: 312 or consent.

ASAN 635 Industrialization and Development Planning in Asia and Pacific (3)

Political economy of industrialization and development, state and society under industrialization and post-industrialization, evolution of development planning, and policy making in Asia under global economy. Pre: 600 or PLAN 630, or consent. (Cross-listed as PLAN 635)

ASAN 636 Culture and Urban Form in Asia (3)

Cultural and historical impact on urban form, contention of tradition and modernity in urban space, spatial expression of state and society, perception and utilization of urban design, evolution of urban form in selected Asian capitals. Pre: 312, PLAN 310, or PLAN 600. (Cross-listed as PLAN 636 and ARCH 687)

ASAN 651 East Asia Now (3)

Views East Asia as an interactive region. Examines common historical and cultural, economic, and political themes including various experiences with the West. Focus upon present state of the region. A-F only. Pre: 310, 312, or consent.

ASAN 652 Contemporary Japanese Studies Seminar (3)

Selected human and physical features that represent economic, social, and political life. Pre: consent. (Cross-listed as GEOG 652)

ASAN 671 The Splendor that was Southeast Asia (3)

Interdisciplinary examination of the classical civilizations of Southeast Asia, the 9th to 14th centuries. Includes Pagan, Sukhothai, Angkor, Dai Viet, Srivijaya, and Majapahit. Considers historical themes and patterns, issues in Southeast Asian studies. A-F only. Pre: 310, 312, or consent.

ASAN 672 Demographic History of Southeast Asia (3)

Southeast Asian population histories. Contrasts with East and South Asian population histories. Links among demography, subsistence activities and social institutions. Evolution of indigenous and colonial population records. Practical applications of historical demographic methodology. A-F only. Pre: graduate standing or consent. (Cross-listed as PPST 672)

ASAN 694 Topics in Buddhist Studies (3)

Seminar on selected topics in Buddhist studies. Pre: PHIL 360, PHIL 406, REL 475, or REL 490; or consent.

ASAN 699 Directed Research (V) Individual problems and research. Pre: consent.

ASAN 700 Thesis Research (V)**ASAN 705 Asian Research Materials and Methods (3)**

Bibliography, reference tools, and research methods in sources on Asia in Western and Asian languages. Discussion of published and archival repositories. (Cross-listed as HIST 705 and LIS 705)

ASAN 750 (Alpha) Research Seminar in Asian Studies (3)

(C) China; (I) South Asia; (J) Japan; (K) Korea; (P) Philippines; (S) Southeast Asia. Pre: 600 or consent.

Astronomy (ASTR)

College of Natural Sciences

ASTR 110 Survey of Astronomy (3) Introduction to the astronomical universe for nonscience students. Credit not given for both 110 and 240. **NS2**

ASTR 240 Foundations of Astronomy (3)

Introduction to the astronomical universe for science or engineering students. Satisfies requirements for non-introductory level credit. Pre: PHYS 151 or PHYS 170; or consent. Credit not given for both 110 and 240. **NS2**

ASTR 280 Evolution of the Universe (3)

The Big Bang, origin of the elements, formation and evolution of galaxies and stars. Pre: 110 or 140 or 240.

ASTR 281 Space Exploration (3)

Current topics in planetary exploration, space resources and colonization, extraterrestrial life. Pre: 110 or 140 or 240.

ASTR 399 Directed Study (V)

Individual reading in astronomy and astrophysics. Pre: a minimum cumulative GPA of 2.5 and two astronomy courses, or consent.

ASTR 500 Master's Plan B/C Studies (1)**ASTR 622 The Interstellar Medium (3)**

Astrophysics of diffuse matter, HII regions, molecular clouds, etc. Pre: consent. (Alt. years)

ASTR 623 Stellar Interiors and Evolution (3)

Structure and evolution; energy sources, radiative processes; relations to observables. Pre: consent. (Alt. years)

ASTR 626 Galaxies (3)

Observations and stellar dynamics of elliptical and spiral galaxies including our galaxy, globular clusters, and dark matter. Galaxy formation and evolution. Active galactic nuclei. Pre: consent. (Alt. years)

ASTR 627 Cosmology (3)

Geometry and evolution of the universe. Dark matter. Early universe. Formation of large-scale structure, galaxies, and clusters. Cosmological models. Pre: consent. (Alt. years)

ASTR 630 The Solar System (3)

Survey of observational data and physical concepts on planets and smaller bodies; formation of planetary systems; solar activity. Pre: consent. (Alt. years)

ASTR 631 Radiative Transfer Stellar Atmospheres (3)

Excitation, ionization, and radiative transfer in stellar atmospheres; model atmospheres, formation of line and continuum radiation. Pre: consent. (Alt. years)

ASTR 633 Astrophysical Techniques I (3)

Telescopes, positional astronomy, photon detection, error analysis, photometry, spectroscopy. Pre: consent.

For key to symbols and abbreviations, see the first page of this section.

ASTR 635 Fundamentals of Astrophysics (3)

Applications of fundamental physics to astrophysical situations. Elements of general relativity. Basics of hydrodynamics and shock waves. Radiative processes, high energy astrophysics. Modern dynamics. Pre: consent. (Alt. years)

ASTR 699 Directed Research (V) Pre: consent.

ASTR 700 Thesis Research (V)**ASTR 734 Astronomy Seminar I (V)**

Selected advanced topics in astronomy and astrophysics. Available for 1 to 3 credit hours by arrangement. Repeatable. Pre: consent.

ASTR 735 Astronomy Seminar II (V)

Selected advanced topics in astronomy and astrophysics. Available for 1 to 3 credit hours by arrangement. Repeatable. Pre: consent.

ASTR 736 Astronomy Seminar III (V)

Selected advanced topics in astronomy and astrophysics. Available for 1 to 3 credit hours by arrangement. Repeatable. Pre: consent.

ASTR 800 Dissertation Research (V)**BE**

See Biosystems Engineering

BEC

See Business Economics

Biochemistry (BIOC)

School of Medicine

Adequate preparation in chemistry (through physical chemistry), physics, and mathematics is required, and a background in biological sciences is desirable.

BIOC 241 Fundamentals of Biochemistry (3)

Biological chemistry stressing integration of concepts of general, inorganic, and biochemistry and application to life chemistry. Pre: beginning algebra and high school science. **NS2**

BIOC 341 Elements of Biochemistry (3)

Biochemical principles and concepts as applied to living systems, including sufficient organic chemistry to understand these principles. Pre: 241 or consent.

BIOC 441 Basic Biochemistry (4)

Function and composition of biological substances and their metabolic transformation in animals, plants, microorganisms. Pre: BIOL 275/275L, CHEM 272 and CHEM 273, or consent. (Cross-listed as BIOL 441)

BIOC 441L Basic Biochemistry Lab (1)

Experiments working with substances discussed in 441.

BIOC 471 Clinical Biochemistry (4)

Biochemical processes in human health and disease states. Repeatable one time. Pre: 441 or BIOL 405 or CMB 405. Spring only. (Cross-listed as MEDT 471)

BIOC 481 Introduction to Molecular Biology (3)

Biochemical basis of life presented in terms of the structure and function of the gene in the production of biological catalysts. Pre: 441 or consent.

BIOC 499 Directed Research and Reading (V) Independent research or selected reading of current literature in the area of biochemistry and biophysics. Pre: consent.

BIOC 500 Master's Plan B/C Studies (1) Enrollment for degree completion. Pre: master's Plan B or C candidate and consent.

BIOC 512 (Alpha) Unit II Electives in Biochemistry (1) Concurrent electives in biochemistry. (B) carbohydrate biochemistry (review and clinical correlation of important aspects of biochemistry and carbohydrate chemistry); (D) introduction to magnetic resonance imaging (how the generation and processing of the magnetic signal produces strikingly clear anatomical images); (E) topics in carcinogenesis (review of current understanding of cancer cause and prevention). Repeatable. Pre: BIOM 551.

BIOC 513 (Alpha) Unit III Electives in Biochemistry (1) Concurrent electives in biochemistry. (B) carbohydrate biochemistry (review and clinical correlation of important aspects of biochemistry and carbohydrate chemistry); (D) introduction to magnetic resonance imaging (how the generation and processing of the magnetic signal produces strikingly clear anatomical images); (E) topics in carcinogenesis (review of current understanding of cancer cause and prevention). Repeatable. Pre: BIOM 551.

BIOC 514 (Alpha) Unit IV Electives in Biochemistry (1) Concurrent electives in biochemistry. (B) carbohydrate biochemistry (review and clinical correlation of important aspects of biochemistry and carbohydrate chemistry); (C) basic biochemical aspects (as applied to clinical cases); (D) introduction to magnetic resonance imaging (how the generation and processing of the magnetic signal produces strikingly clear anatomical images); (E) topics in carcinogenesis (review of current understanding of cancer cause and prevention). Repeatable. Pre: BIOM 551.

BIOC 515 (Alpha) Unit V Electives in Biochemistry (1) Concurrent electives in biochemistry. (B) carbohydrate biochemistry (review and clinical correlation of important aspects of biochemistry and carbohydrate chemistry); (D) introduction to magnetic resonance imaging (how the generation and processing of the magnetic signal produces strikingly clear anatomical images); (E) topics in carcinogenesis (review of current understanding of cancer cause and prevention). Repeatable. Pre: BIOM 551.

BIOC 525 Unit V Block Elective (V) Required elective for medical students. The objectives will be determined by contract; however, one option is a review for NBME Part I. CR/NC only. Pre: BIOM 551.

BIOC 545 Topics in Biochemistry (V) Fourth-year elective in which medical students take an in-depth study of selected topics in biochemistry. Pre: fourth-year medical student or consent.

BIOC 601L Biochemistry-Biophysics Lab (2) Basic biochemical experimental techniques; enzyme kinetics; active-site identification; amino acid sequence determination; radioimmunoassay, *in vivo* studies of nucleic acids. Pre: 441 or consent.

BIOC 624 Protein Interactions (2) Thermodynamics of protein-ligand and protein-protein interactions; protein dynamics. Pre: 441 and CHEM 351, or consent.

BIOC 643 Bioenergetics and Carbohydrates (3) Current topics on mechanism of energy production and transformation. Advanced survey of structure and metabolism of carbohydrate biochemistry. Pre: 441 or consent.

BIOC 644 Metabolic Biochemistry (3) Organization and function of metabolic pathways of proteins, heme, nucleotides, and lipids. Pre: 441 or consent.

BIOC 671 Seminar (1) Weekly discussions and reports on various subjects; current advances in biochemistry and biophysics.

BIOC 699 Directed Research (V) Pre: consent.

BIOC 700 Thesis Research (V) Research for master's thesis. Pre: consent.

BIOC 705 Special Topics in Biochemistry (V) Advanced treatment of frontiers in biochemistry. Repeatable. Pre: consent.

BIOC 710 Enzyme Regulation (2) Control of biocatalytic activity at molecular, cellular, and organismal levels. Pre: consent. (Alt. years)

BIOC 730 Phage, Plasmids, and Recombinant DNA (2) Plasmid replication, transmission, and compatibility; gene cloning, gene transfer, and genetic engineering. Pre: consent. (Alt. years)

BIOC 800 Dissertation Research (V) Research for doctoral thesis. Pre: consent.

Biology (BIOL)

College of Natural Sciences

Courses for Non-Science Majors

BIOL 101 Biology and Society (3) Characteristics of science, historical development of scientific concepts, and interaction of society with science illustrated by topics from biological science. Credit not given for both 101 and 123. NS1

BIOL 101L Biology and Society Laboratory (1) (1 3-hr Lab) Lab experiments illustrating topics and methods in the biological sciences. Pre: 101 (or concurrent). NS1

BIOL 102 General Botany (3) Growth, functions, and evolution of plants; their relations to the environment and particularly to humans and human activities. (Cross-listed as BOT 101) NS1

BIOL 102L General Botany Laboratory (1) (1 3-hr Lab) Lab observations and experiments illustrating basic principles of plant biology. Pre: 102 (or concurrent). (Cross-listed as BOT 101L) NS1

BIOL 103 Principles of Zoology (3) Structure, development, physiology, reproduction, evolution, behavior, and ecology of animals. (Cross-listed as ZOOL 101) NS1

BIOL 103L Principles of Zoology Laboratory (1) (1 3-hr Lab) Laboratory to accompany 103. Pre: 103 (or concurrent). (Cross-listed as ZOOL 101L) NS1

BIOL 123 Introduction to Science: Hawaiian Environment (3) Characteristics of science and interaction with society illustrated by topics in geology, astronomy, oceanography, and biology of Hawaiian Islands. Credit not given for both 123 and 101. NS1

BIOL 123L Hawaiian Environment Science Lab (1) (1 3-hr Lab) Lab experiments illustrating topics and methods in science; examples from Hawaiian natural history. Pre: 123 (or concurrent). NS1

BIOL 124 Environment and Ecology (3) Biological and physical principles affecting human/environment interaction; impact of science, technology, value, and perceptions on global society and ecology; projections and options about human ecology. NS1

BIOL 124L Environment and Ecology Lab (1) (1 3-hr Lab) Lab experiments and projects illustrating topics in human ecology. Pre: 124 or concurrent. NS1

BIOL 201 The Biotechnology Age: Issues and Impacts (3) Introduction to the basic concepts, goals and practical impacts of biotechnology. Real-life case studies are used to explore socio-ethical, economic, and environmental issues raised by cloning, DNA testing, gene therapy and genetically engineered food, medicines, and vaccines using microbes, plants and animals. Pre: 101 or consent. (Cross-listed as PMP 201)

BIOL 310 Environmental Issues (3) Global environmental problems in historical perspective; physical, biological, sociocultural views. Pre: one of 101, 123, or GEOG 101; or consent.

BIOL 320 The Atoll (3) Atoll as ecosystem and as human environment. Formation, structure, distribution, biota. Pre: two semesters of introductory science or consent.

BIOL 350 Sex Differences in the Life Cycle (3) Human sex differences, their biological basis and significance; genetic, hormonal, and behavioral determinants of sexual differentiation; biology of gender, sexuality, parenting, menopause, and aging. Pre: one semester of biological science. (Cross-listed as WS 350) NS1

BIOL 360 Island Ecosystems (3) Characteristics of island biota; examples from Hawai'i and the Pacific. Impact of island and continental cultures; policy and ecosystem endangerment; contemporary legislation, policy, and management practices. Pre: one semester of biological science or consent.

BIOL 410 Human Role in Environmental Change (3) Human impacts through time on vegetation, animals, landforms, soils, climate, and atmosphere. Special reference to Asian/Pacific region. Implications of long-term environmental change for human habitability. Pre: one of 123, 124, or GEOG 101 and either 310 or GEOG 326; or consent. (Cross-listed as GEOG 410)

BIOL 430 Seminar in the Biology of Women (3) Embryological, anatomical, and physiological development of human female; hormonal, neural, and behavioral determinants of female sexual behavior; psychobiology of pregnancy, ovariectomy, and menopause. Pre: 172, 350 or WS 350, WS 377; or consent. (Cross-listed as WS 430)

BIOL 440 Psychoactive Drug Plants (3) Taxonomy, ecology, biochemistry, distribution, cultural history, and contemporary use of mind-altering drug plants; examples from primitive,

traditional, and modern societies. Pre: junior standing, one semester of biological science, and either ANTH 200 or GEOG 151; or consent.

Courses for Life Science Majors

BIOL 171 Introductory Biology (3) Introductory biology for all life science majors. Cell structure and chemistry; growth, reproduction, genetics, evolution, viruses, bacteria, and simple eukaryotes. Pre: CHEM 151 or 161 (or concurrent) or consent. Co-requisite: 171L. **NSI**

BIOL 171L Introductory Biology Lab (1) (1 3-hr Lab) Laboratory to accompany 171. Pre: CHEM 161L (or concurrent) or consent. Co-requisite: 171. **NSI**

BIOL 172 Introduction to Biology II (3) Continuation of 171. Anatomy, physiology, and systematics of plants and animals; behavior; ecosystems, populations, and communities. Pre: 171/171L. Co-requisite: 172L.

BIOL 172L Introduction to Biology II Lab (1) (1 3-hr Lab) Laboratory to accompany 172. Co-requisite: 172.

BIOL 265 Ecology and Evolutionary Biology (3) Principles of ecology and evolution for life science majors stressing integrated approach and recent advance. Pre: 171/171L and 172/172L; or consent. Co-requisite: 265L.

BIOL 265L Ecology and Evolutionary Biology Lab (1) (1 3-hr Lab) Laboratory to accompany 265. Recommended: ICS 101/101L. Co-requisite: 265.

BIOL 275 Cell and Molecular Biology (3) Integrated cell and molecular biology for life science majors. Modern advances in recombinant DNA technology. A-F only. Pre: 171/171L, 172/172L, and CHEM 272/272L; or consent. Co-requisite: 275L.

BIOL 275L Cell and Molecular Biology Lab (1) (1 4-hr Lab) Laboratory for Cell and Molecular Biology. A-F only. Pre: 171/171L, 172/172L, and CHEM 272/272L; or consent. Co-requisite: 275.

BIOL 299 Service Learning for Biology Majors (1) Directed participation on tutorials and related activities in public schools and approved community and UHM organizations. A-F only. Repeatable one time. Pre: 265/265L, 275/275L and consent.

BIOL 363 Biological Field Studies (3) Biological survey, collection, and analysis techniques will be reviewed and applied through field studies. Students will be introduced to the uniqueness of the Hawaiian environment and its diversity of life. Emphasis on diversity, evolution and ecology. Pre: 171/171L, 172/172L, and 265/265L or equivalent; or consent.

BIOL 375 Concepts of Genetics (3) Genetic concepts at advanced undergraduate level; genetic transmission, recombination, gene action, mutation, population and evolutionary genetics. Pre: 171/171L, 172/172L, and 275/275L; or consent. Co-requisite: 375L. Repeatable once.

BIOL 375L Concepts of Genetics Lab (1) (1 4-hr Lab) Experiments with a variety of organisms to illustrate principles discussed in BIOL 375. Pre: 171, 171L, 172, 172L, and 275, 275L; or consent. Co-requisite: 375.

BIOL 399 Directed Studies in Biology Teaching (1) Supervised laboratory internship in the preparation and demonstration of laboratory experiments in selected laboratory courses. Repeatable. Pre: consent.

BIOL 401 Molecular Biotechnology (3) General principles, applications, and recent advances of the rapidly growing science of biotechnology. Topics include impact of biotechnology on medicine, animal sciences, environment, agriculture, forensics, and economic and socio-ethical issues. Pre: BIOL 275 or consent. (Cross-listed as PMP 401)

BIOL 402 Principles of Biochemistry (4) Molecular basis of life from viruses to bacteria to higher plants and animals, studies of proteins and enzymes, carbohydrates, lipids, and nucleic acids. Pre: 275/275L, CHEM 272, and CHEM 273; or consent. (Cross-listed as ENBI 402)

BIOL 405 Biochemistry (4) Structure of biological molecules and molecular mechanisms of biological and physiological processes. Pre: 275 and 270L, and CHEM 272 and 273, or consent. (Cross-listed as CMB 405)

BIOL 406 Cellular Biology (3) Cell structure and function. Structure, chemistry, and functions of organelles and macromolecules. Pre: 275 and CHEM 273, or consent.

BIOL 406L Cellular Biology Laboratory (2) (2 3-hr Lab) A laboratory to accompany 406. Pre: 275L or consent. Co-requisite: 406.

BIOL 407 Molecular Biology (3) Relationship between structure and function at macromolecular level. Pre: 275 and CHEM 273; or consent.

BIOL 407L Molecular Biology Laboratory (2) (2 3-hr Lab) A laboratory to accompany 407. Pre: 275L or consent. Co-requisite: 407.

BIOL 409 Biology Seminar (1) Study and discussion of current or significant topics and problems in biology. Open to graduating seniors in biological sciences. A-F only. Pre: consent.

BIOL 425 Wildlife and Plant Conservation (3) Principles of conservation biology and wildlife management techniques, illustrated with animal, plant, and ecosystem examples. Examination of ethical, cultural, legal, political, and socio-economic issues impinging on conservation policy and practice. Group project and field trips. Pre: 171/171L, 172/172L, and 265/265L; or consent.

BIOL 441 Basic Biochemistry (4) Function and composition of biological substances and their metabolic transformation in animals, plants, microorganisms. Pre: 275/275L, CHEM 272, and CHEM 273; or consent. (Cross-listed as BIOC 441)

BIOL 499 Biological Problems (V) Directed reading and research. For seniors whose research interests are not served by MICR 499, ZOOL 499, or BOT 399. Limited to senior majors in biology (BA and BS) with a minimum cumulative GPA of 2.7 or a minimum GPA of 3.0 in biology courses.

Professional Development Courses for Science Teachers

BIOL 461 Ecology, Evolution and Conservation for High School Teachers (2) Principles of ecology, evolution and conservation for in-service teachers to learn about the integrated approach

and recent advances in these areas. Pre: 171/171L, 172/172L, in-service teachers; or consent.

BIOL 463 Biological Field Studies for Science Teachers (2) Biological survey, collection, and analysis techniques will be reviewed and applied through field studies. Participants will be introduced to the uniqueness of the Hawaiian environment and its diversity of life. Emphasis on diversity, evolution, and ecology. A-F only. Pre: 171/171L, 172/172L, in-service teachers; or consent.

BIOL 501 (Alpha) Biology Workshop for Science Teachers (V) Principles taught in a conceptual and/or hands-on manner either in a laboratory setting or in the field. (B) biotechnology; (C) ecology, evolution and conservation; (D) marine biology. A-F only. Repeatable. Pre: in-service teacher, 171/171L and 172/172L; or consent.

See other science professional development courses NSCI 501, 502, 503, 505, 619, and 620 under the Natural Sciences (NSCI) course listing in this section of the Catalog.

Biomedical Sciences (BIOM)

School of Medicine

BIOM 401 Scientific Basis of Medicine (2) Introduction to medical science stressing key historical figures and significant events to exemplify the development of scientific methods. Special emphasis on writing skills, health team concept, and culture and contributions of the Pacific. CR/NC only. Pre: admission to Imi Ho'ola Post-Baccalaureate Program.

BIOM 402 Scientific Basis of Medicine (2) Continuation of 401. CR/NC only. Pre: 401.

BIOM 403 Review of Premedical Biology (5) (2 Lec, 2 Tutorial, 1 3-hr Lab) Biological principles fundamental to further study in the health sciences with emphasis on structure and function of cells, tissues, and organs. CR/NC only. Pre: admission to Imi Ho'ola Post-Baccalaureate Program.

BIOM 404 Review of Premedical Biology (5) (2 Lec, 2 Tutorial, 1 3-hr Lab) Continuation of 403. CR/NC only. Pre: 403.

BIOM 405 Review of Premedical Chemistry (4) Review of selected topics in biochemistry. Designed to reinforce chemical foundations of medical biochemistry. CR/NC only. Pre: admission to Imi Ho'ola Post-Baccalaureate Program.

BIOM 406 Review of Premedical Chemistry (4) Continuation of 405. CR/NC only. Pre: 405.

BIOM 499 Directed Research and Reading (V) To provide elective courses for undergraduates in the biomedical sciences specialties.

BIOM 500 Master's Plan B/C Studies (1)

BIOM 512 (Alpha) Unit II Concurrent Electives (1) Elective courses for first-year medical students. (B) histopathology; (C) medical ethics; (D) introduction to student research. CR/NC only. Pre: 551 and consent.

BIOM 513 (Alpha) Unit III Concurrent Electives (1) Elective courses for first-year medical students. (B) medical ethics; (C) introduction to

student research. CR/NC only. Pre: 551 and consent.

BIOM 514 (Alpha) Unit IV Concurrent Electives (1) Elective courses for second-year medical students. (B) community medicine; (C) medical ethics; (D) introduction to student research. CR/NC only. Pre: 551 and consent.

BIOM 515 (Alpha) Unit V Concurrent Electives (V) Elective courses for second-year medical students. (B) community medicine; (C) medical ethics. CR/NC only. Pre: 551 and consent.

BIOM 525 Unit V Block Electives (V) Required electives for second-year medical students; objectives to be determined by contract. One option is a review for USMLE Step 1. CR/NC only. Pre: 551.

BIOM 531 Clerkship Assessment (1) Required comprehensive interdepartment multidisciplinary assessment program for third-year medical students. Pre: 555. Co-requisite: 566 and FPCH, MED, OBGN, PED, PSTY, SURG 531 or 532.

BIOM 545 (Alpha) Unit VII Interdisciplinary Electives (V) An elective for senior students to enhance skills in student-centered teaching, to review the sciences basic to the clinical problems, and to prepare students for their role as teachers during residency. CR/NC only. (B) medical education elective; (C) ambulatory primary care; (D) primary care continuity clinic; (E) primary care weekly seminar; (F) native Hawaiian health-care. Pre: FPCH, MED, OBGN, PED, PSTY, SURG 531 or 532.

BIOM 548 Senior Seminars (4) In-depth review of issues and subjects for fourth-year medical students to strengthen skills in art of medicine. Subjects include medical ethics, decision analysis, medical economics, and diagnostic imaging. CR/NC only.

BIOM 551 Unit I Health and Illness (11) Introductory series of problem-oriented small group tutorials for medical students stressing concepts of health and disease, supplemented by colloquia and resource sessions intended to broaden the perspectives of the Unit I health-care problems. Repeatable twice. CR/NC only. Co-requisite: 571, and 581B or 581C.

BIOM 552 Unit II Cardiovascular, Respiratory, and Renal Problems (10) Advanced series of problem-oriented small group tutorials for medical students focusing on cardiovascular, respiratory, and renal topics, supplemented by conferences, colloquia, labs, and resource sessions intended to broaden the perspectives of the Unit II health-care problems. Repeatable twice. CR/NC only. Pre: 551 or consent. Co-requisite: 572 and 582B or 582 C.

BIOM 553 Unit III Gastroenterology, Endocrinology, and Hematology Problems (10) Advanced series of problem-oriented small group tutorials for medical students focusing on gastroenterology, endocrinology, and hematology topics, supplemented by conferences, colloquia, labs, and resource sessions intended to broaden the perspectives of the Unit III health-care problems. Repeatable twice. CR/NC only. Pre: 551 or consent. Co-requisite: 573 and 583B or 583C.

BIOM 554 Unit IV Locomotor System, Nervous System, Behavioral Problems (11) Advanced series of problem-oriented small group tutorials for medical students focusing on locomotor

system, nervous system, and behavioral topics, supplemented by conferences, colloquia, labs, and resource sessions intended to broaden the perspectives of the Unit IV health-care problems. Repeatable twice. CR/NC only. Pre: 551 or consent. Co-requisite: 574.

BIOM 555 Unit V The Life Cycle (8) Advanced series of problem-oriented small group tutorials for medical students focusing on topics across the life cycle, supplemented by conferences and colloquia intended to broaden the perspectives of the Unit V health-care problems. Repeatable twice. CR/NC only. Pre: 551, 552, 553, and 554. Co-requisite: 575.

BIOM 561 Unit I Topics in Health and Illness (2) A series of lecture-discussions intended to broaden the perspective of the Unit I health-care problems. CR/NC only. Co-requisite: 551.

BIOM 566 Unit VI Topics in Health and Illness (2) A series of lecture-discussions intended to broaden the perspectives of the Unit VI experiences and health-care problems. Repeatable. CR/NC only. Pre: 551 and 555.

BIOM 571 Introduction to Clinical Skills and Clinical Anatomy (4) An integrated presentation of the clinical skills and anatomy necessary to perform the basic physical examination linked to the health-care problems in Unit I. CR/NC only. Co-requisite: 551.

BIOM 572 Unit II Clinical Skills (2) History taking and physical exam skills pertinent to the health-care problems in Unit II. CR/NC only. Pre: 571. Co-requisite: 552.

BIOM 573 Unit III Clinical Skills (2) History taking and physical exam skills pertinent to the health-care problems in Unit III. CR/NC only. Pre: 571. Co-requisite: 553.

BIOM 574 Unit IV Clinical Skills (3) History taking and physical exam skills pertinent to the health-care problems in Unit IV. CR/NC only. Pre: 551 and 571.

BIOM 575 Unit V Clinical Skills (3) History taking and physical exam skills pertinent to the health-care problems in Unit V. CR/NC only. Pre: 571. Co-requisite: 554.

BIOM 581 (Alpha) Unit I Primary Care and Community Medicine (2) Field experience placing student in community settings to work with health-care professionals as they provide services to patients. (B) primary care; (C) Ke Ola O Hawai'i. CR/NC only. Co-requisite: 551.

BIOM 582 (Alpha) Unit II Primary Care and Community Medicine (2) Field experience placing students in community settings to work with health-care professionals as they provide service to patients. (B) primary care; (C) Ke Ola O Hawai'i. CR/NC only. Pre: 551. Co-requisite: 552.

BIOM 583 (Alpha) Unit III Primary Care and Community Medicine (2) Field experience placing students in community settings to work with health-care professionals as they provide service to patients. (B) primary care; (C) Ke Ola O Hawai'i; (D) Ke Ola O Hawai'i hospice. CR/NC only. Pre: 551. Co-requisite: 553.

BIOM 593 Primary Care Preceptorship (3) Students will work with a primary care physician and develop an understanding of primary care practice as well as gain experience in clinical skills.

Repeatable one time. CR/NC only. Pre: 551, 571, 572, and 573; or consent. Spring only.

BIOM 594 Student Research Project (3) Students will identify a research project and conduct an in-depth study that will form the focus of a formal paper and a poster presentation. Course work will be integrated into Units 1 through 4. Repeatable one time. CR/NC only. Pre: 551, 552, and 553; or consent. Fall only.

BIOM 595 Evidence-Based Medicine (2) The critical appraisal track is designed to improve the student's ability to seek and evaluate new medical knowledge. CR/NC only. Pre: 551. Co-requisite: 555.

BIOM 599 Research in Basic Sciences (V) An elective for medical students to work on a basic science research project under the direction of a preceptor of the biomedical sciences graduate faculty.

BIOM 611 Seminar in Biomedical Sciences (1) Presentation and discussion of research topics in biomedical science. Repeatable six times. CR/NC only. Pre: graduate standing or consent. (Cross-listed as REPR 611)

BIOM 699 Directed Reading (V) Students may register on approval of department. CR/NC only. Repeatable.

BIOM 700 Thesis Research (V) Research for master's thesis. Repeatable. CR/NC only. Pre: consent.

BIOM 800 Dissertation Research (V) Research for doctoral dissertation. Repeatable. CR/NC only. Pre: consent.

Biophysics (BIOP)

School of Medicine

Adequate preparation in chemistry (through physical chemistry), physics, and mathematics is required, and a background in biological sciences is desirable.

BIOP 499 Directed Research and Reading (V) Independent research or selected reading of current literature. Emphasizes experimental approaches in biophysics. Pre: consent.

BIOP 500 Master's Plan B/C Studies (1) Enrollment for degree completion. Pre: master's Plan B or C candidate and consent.

BIOP 602L Biochemistry-Biophysics Lab (2) Basic biophysical techniques: spectroscopic methods for macromolecular characterization; ultracentrifugation; receptor methodology; *in vitro* studies of nucleic acids. Pre: BIOC 441 or consent.

BIOP 629 Bioenergetics and Membrane Function (2) Energy transducing membrane systems; relationships of structure to function. Pre: BIOC 441, CHEM 351, or consent.

BIOP 633 Nucleic Acids (2) Chemical, physical-chemical, and metabolic principles involved in the study of primary, secondary, and tertiary structures of nucleic acids. Principles of bacterial molecular genetics, restriction, and recombination; DNA-protein interaction studies. Pre: BIOC 441, CHEM 351, or consent.

BIOP 641 Structures and Interactions (3) Proteins, nucleic acids, and membranes are examined to understand the physical and chemical

bases of their structures, binding, kinetics, and interactions between biomolecular components. Pre: BIOC 441 and CHEM 351 (or concurrent); or consent.

BIOP 642 Biophysical Techniques (3) Survey of spectroscopies, light scattering, and direct visualization; study of the properties of biomolecules in solution. Pre: BIOC 441 and CHEM 351 (or concurrent); or consent. Spring only.

BIOP 699 Directed Research (V) Pre: consent.

BIOP 700 Thesis Research (V) Research for master's thesis. Pre: consent.

BIOP 705 Special Topics in Biophysics (V) Advanced treatment of frontiers in biophysics. Repeatable. Pre: consent.

BIOP 800 Dissertation Research (V) Research for doctoral thesis. Pre: consent.

Biosystems Engineering (BE)

College of Tropical Agriculture and Human Resources

BE 351 Energy Conversion and Power Units (3) Fundamentals of energy conversion for engineering and biological systems. Engineering design and performance analysis of electrical, mechanical, and hydraulic energy conversion and power transmission systems. Practical problems related to power unit selection and optimal performance. A-F only. Co-requisite: 351L. Pre: CHEM 171, MATH 241, and PHYS 170; or consent.

BE 351L Energy Conversion and Power Units Lab (1) (1 3-hr Lab) Laboratory experience in design and analysis of power devices and energy conversion systems. Field trips focused on field and industrial applications. A-F only. Co-requisite: 351.

BE 360 Mass and Energy Balances (3) Introduction of the principles of mass and energy conservation; development of systematic approaches to apply these principles in calculations for design and analysis of biochemical, chemical, and physical processes. Pre: CHEM 171, PHYS 170, and MATH 242.

BE 401 Microcomputer Use in Biosystems (3) (2 Lec, 1 3-hr Lab) Use of microcomputers for problem solving in technical writing; data acquisition, management, and analysis; expert system models. Pre: MATH 241.

BE 411 Food Engineering (3) (2 Lec, 1 3-hr Lab) Principles and application of thermodynamics, electricity, fluid mechanics, heat transfer, psychrometry, and material and energy balances to food processing and preservation. Pre: one year physics. (Cross-listed as FSHN 411)

BE 413 Transport Phenomena (3) Fundamental principles and applications relating to mass, momentum, and energy transfers in biosystems and other systems for engineers and scientists. Pre: CHEM 161, PHYS 170, and MATH 242; or consent.

BE 431 Biological Pollution Control (3) Environmental impact; waste/wastewater characteristics; biological treatment fundamentals and systems; utilization for feed, energy and fertilizer; land treatment and stabilization; physical and chemical treatment; nonpoint source control; management. Pre: CHEM 161.

BE 435 Irrigation Principles and Practices (3) Basic principles of irrigation science with applications to irrigation methods, furrow, sprinkler, and drip; water conveyance, distribution, measurement; soil-water relations and movements; water requirements of crops; and irrigation efficiency emphasis in the Hawaiian situation.

BE 436 Structures and Environments (3) Functional design of agricultural structures, including shadehouses and environmental control for production, treatment, and storage of plants and animals. Repeatable. Pre: consent.

BE 437 Biosystems Unit Operations (2) Pumps and fans; size reduction; cleaning and sorting; materials handling; processing of fruits, nuts, vegetables, animals, and other bio-products. Pre: PHYS 151.

BE 440 Bioremediation: Principles and Practices (3) (2 Lec, 1 3-hr Lab) Soil environment, fate and transport of contaminants; microbial ecology, metabolism, and energy production; biodegradation of selected compounds. In situ treatment, solid-phase bioremediation, slurry-phase bioremediation, and vapor-phase biological treatment. Open to nonmajors. Repeatable once. Pre: 360, CHEM 161, MATH 241 and 206, PHYS 170, or consent.

BE 460 Bioreactor Design and Analysis (3) Application of mass/energy balances and reaction kinetics for the design and analysis of bioreactors for microbial, plant, and animal cell cultures. Pre: CHEM 161, PHYS 170, and MATH 241; or consent.

BE 481 Senior Engineering Design I (3) (1 1-hr Lec, 2 3-hr Lab) First of a two-semester course sequence that provides a major design experience for senior students in biosystems engineering. Design process; project management; design methods; modeling and simulation; design optimization; engineering economics; engineering statistics, initiation of an open-ended design project. Pre: 351/351L, 360, or consent.

BE 482 Senior Engineering Design II (3) (1 1-hr Lec, 2 3-hr Lab) Continuation of 481. Properties of biological materials; risk and reliability; design ethics; guest lectures on engineering design by practicing engineers; extension and completion of the design project with submission of a final design report. Pre: 481 or consent.

BE 491 Biosystems Engineering Topics (V) Study and discussion of significant topics and problems. Offered by visiting faculty and/or for extension programs. Repeatable.

BE 492 Internship (4) Integration and application of academic knowledge and critical skills emphasizing professional development. Placement with an approved cooperating supervisor/employer. Pre: consent.

BE 499 Directed Research (V) Research in the area of biosystems engineering. Pre: consent.

BE 604 Aquaculture Systems (3) Study and review of fundamental principles and mechanisms critical to understanding and operating aquaculture systems. Engineering, business, and operating analyses. Pre: CE 320, CHEM 151, and MATH 241.

BE 606 Instrumentation and Measurement (3) Measurement concepts and operating principles applied to the selection and use of instruments important to scientists and engineers dealing with

biological systems, including automatic data acquisition and processing. Pre: CHEM 151, MATH 241, and ME 311; or consent.

BE 610 Advanced Food Processing Technology (3) Principles and applications of new methods of food preservation. Repeatable. Pre: FSHN 401 and FSHN 403, or equivalent; or consent. (Cross-listed as FSHN 610)

BE 622 Experimental Methods in Cause-Effect Modeling (3) Factorial designs and fractional factorial designs for screening variable and response optimization. Response surface methodology. Experimental designs appropriate to building and testing multi-variable behavior relationships. Sequential experimental designs.

BE 634 Biological Treatment (3) Fundamentals of applied microbiology and biochemical reactor engineering, quantitative description of microbial growth, operational theory and design basis of aerobic, anoxic and anaerobic treatment processes. Applications for water, wastewater, air, solid wastes, and soil. A-F only. Pre: consent. Fall only. (Cross-listed as CE 634)

BE 635 Irrigation System Design (3) Hydraulics of surface irrigation, volume balance analysis and irrigation efficiency, optimal length of run and irrigation scheduling; sprinkler irrigation system design, distribution, and uniformity; drip irrigation system design and related problems. Pre: 435 or consent.

BE 638 Biosystems Modeling (3) Introduction to system thinking, procedures for developing system models, characteristics of important agricultural system models, computer approach to evaluation and optimization of system models. Pre: MATH 242.

BE 648 Biosystems Simulation (3) Discrete and continuous simulation models and their application in design and management of engineering and biological systems.

BE 660 Bioseparation Processes (3) Design, analysis, and scale-up of separation process that incorporates unit operations such as filtration, cell distribution, and chromatography for the purification of biological products. Pre: CHEM 253 and MATH 241, or consent. Fall only.

BE 699 Directed Research (V)

BE 700 Thesis Research (V)

BE 750 Seminar (1) Use of computer and video technology in technical presentation, review of current biosystems engineering research. Pre: consent.

BLAW

See Business Law

Botanical Sciences (BTSC)

BTSC 500 Master's Plan B/C Studies (1)

BTSC 700 Thesis Research (V) Pre: candidacy for MS degree and approval of thesis proposal.

BTSC 800 Dissertation Research (V) Pre: candidacy for PhD and approval of dissertation proposal.

Botany (BOT)

College of Natural Sciences

BOT 101 General Botany (3) Growth, functions, and evolution of plants; their relations to the environment and particularly to humans and human activities. (Cross-listed as BIOL 102) **NSI**

BOT 101L General Botany Lab (1) (1 3-hr Lab) Lab observations and experiments illustrating basic principles of plant biology. Pre: 101 (or concurrent). (Cross-listed as BIOL 102L) **NSI**

BOT 103 Plants and Pollution (3) Sources, nature, distributions, impacts, and fate of pollutants; dangers to life; concepts of regulation, management, and correction.

BOT 105 Ethnobotany (3) (2 Lec, 1 Demonstration) Plants and their influence upon culture of Hawai'i and Pacific; uses of cultivated and wild plants. **SS**

BOT 135 Magical Mushrooms and Mystical Molds (3) Impact of fungi in nature and on humankind. Selected historical events in which fungi played a significant role, their activities as decomposers and pathogens, and their uses as sources for mind altering drugs in religious ceremonies and in food and beverage production in various societies.

BOT 160 Campus Plants (2) Nontechnical course emphasizing recognition of the many interesting tropical plants seen on campus; origin, status in Hawai'i, and cultural and economic uses of campus plants.

BOT 201 Plant Evolutionary Diversity (3) Significance of evolutionary trends in the plant world, including reproductive, morphological, and life history adaptations by algae, fungi, and vascular plants. Pre: 101 or college general biology. Co-requisite: 201L. **NSI**

BOT 201L Plant Evolutionary Diversity Lab (1) (1 3-hr Lab) Lab exercises in the morphology and systematics of land plants, fungi, and algae. Co-requisite: 201. **NSI**

BOT 311 Form and Function in Algae and Plants (3) Structural and functional adaptations of algae and plants, with an emphasis on their ecological significance in aquatic and terrestrial environments. Emphasis on bryophytes and pteridophytes. Marine macrophytes, gymnosperms and angiosperms will also be included. Both vegetative and reproductive structures considered. Pre: 201 and 201L, or consent.

BOT 350 Resource Management and Conservation in Hawai'i (3) Management of native Hawaiian organisms and terrestrial ecosystems with particular attention to strategies, planning, research, and management actions necessary to control alien influences and promote native species. Pre: college general biology.

BOT 351 Inside Tropical Ecosystems (3) Ecology of tropical ecosystems; biodiversity and its values; energy flow, successional stages and nutrient cycles; approaches to conservation and resource management. Emphasis on Hawaiian ecosystems via field trips to study local examples. Pre: 101, or BIOL 171 and BIOL 172; or consent.

BOT 351L Inside Tropical Ecosystems Lab (1) Introduction to ecological methods and common plant species of Hawaiian marine and terrestrial ecosystems. Pre: consent. Co-requisite: 351.

BOT 399 Botanical Problems (V) Individualized directed research. Intended for upper division botany majors. Repeatable six times. Pre: 101, BIOL 172, or consent.

BOT 410 Plant Anatomy (3) Structure of vascular plants; origin and differentiation of tissues; relation of structure to function. Pre: 201. Co-requisite: 410L. Recommended: 470.

BOT 410L Plant Anatomy Lab (1) (1 3-hr Lab) Lab study of plant structure. Co-requisite: 410.

BOT 412 Modern Methods in Microscopy (4) (3 Lec, 1 3-hr Lab) Preparation, examination, and photography of specimens with bright-field, dark-field, phase-contrast, polarizing, fluorescence, and transmission electron microscopy. Emphasis on modern methods employing resins. Introduction to histochemistry, quantitative analysis using morphometrics, and molecular applications. Pre: 201 or consent.

BOT 430 Mycology (2) Morphology, physiology, ecology of fungi; their identification. Pre: 201, BIOL 172, or consent.

BOT 430L Mycology Lab (2) Laboratory to accompany 430. Pre: 430 (or concurrent) or consent.

BOT 440 Advanced Ethnobotany (3) Advanced studies of plant uses in cultural contexts, focusing upon impacts of plant-culture interactions in development of cultures, cultivars, medicinals, ethnoecologies, ethics, and intellectual property. Pre: 105 and one of ANTH 200, BIOL 172, BIOL 201, BIOL 361; or consent.

BOT 442 Medical Ethnobotany (3) Survey and theory of plants used as medicines, cultural perspectives of herbal medicine, and the botanical/chemical basis of allopathic and naturopathic medicine. Pre: 105 or consent. Recommended: CHEM 272 or BIOC 341.

BOT 446 Hawaiian Ethnobotany (2) (1 Lec, 1 3-hr Lab) Methods and techniques of handling and identifying plant materials used by early Hawaiians for house and canoe construction, clothing, household and fishing items, medicine, and food preparation. Reading, laboratory, and fieldwork. Pre: 101 or 105, ANTH 200 or ANTH 210, and consent.

BOT 450 Natural History of Hawaiian Islands (3) (2 Lec, 1-hr Lab) Geography, geology, climatology, biotic environment of Pacific Basin and Hawaiian Islands; endemism and evolution in terrestrial and marine biota of islands. Pre: one semester of biological sciences at college level. (Cross-listed as ZOOL 450) **NSI**

BOT 453 Plant Ecology and Environmental Measurements (4) (2 Lec, 2 3-hr Lab) Influence of natural environments on plant behavior (autecology). A field-oriented course to complement 454. Field trips. Should precede 454. Pre: one of 101, BIOL 172, or ZOOL 101.

BOT 454 Vegetation Ecology (4) (2 Lec, 2 3-hr Lab) Analysis and synthesis of plant communities and ecosystems (synecology). Field trips to develop local examples. Integrated with 453. Pre: one of 101, BIOL 172, or ZOOL 101. Recommended: 453.

BOT 455 Analysis of Biological Data (3) Application of computers to analysis of biological data; preparation and storage, report production, database analysis procedures, univariate and

bivariate statistical analyses. Pre: BIOL 172 or consent.

BOT 456 Plant-Animal Interactions (3) Interdependence of plants and animals, emphasizing the influence of animals on plant fitness and evolution. Topics include pollination, fruit/seed dispersal, herbivory, and ant-plant mutualisms. Pre: 201/201L or BIOL 265/265L.

BOT 461 Systematics of Vascular Plants (4) "Hands-on" experience with Hawai'i's unique tropical flora; emphasis on recognition and identification of vascular plant families and the principles and methodologies that define them; evolution of biodiversity. Pre: 101 or college general biology.

BOT 462 Plant Evolution (3) Major events and principles; includes the blue-green algae and fungi. Pre: 201 or BIOL 172. (Alt. years)

BOT 470 Principles of Plant Physiology (3) Integration of form and function from cellular to whole plant levels in processes from seed germination through photosynthesis, growth, and morphogenesis, to flowering and senescence. Pre: CHEM 152 and BIOL 171; or consent. Co-requisite: 470L. (Cross-listed as HORT 470)

BOT 470L Principles of Plant Physiology Lab (1) (1 3-hr Lab) Principles of experimentation in plant physiology, includes individual investigations. Co-requisite: 470. (Cross-listed as HORT 470L)

BOT 480 Algal Diversity and Evolution (4) (3 Lec, 1 3-hr Lab) Principles of algal diversity, structure, and evolution. Identification of common Hawaiian algae. Pre: one of 101, BIOL 172, MICR 351, ZOOL 101, or consent.

BOT 482 Adaptations of Plants to Marine Environment (3) Morphological, physiological, cellular, and molecular examples of adaptation to marine environments by marine macroalgae, phytoplankton, and sea grasses. Pre: 480. (Alt. years)

BOT 482L Adaptations of Plants to Marine Environment Lab (1) (1 3-hr Lab) Laboratory exercises emphasizing current research tools and opportunities in algal/sea grass physiological ecology. Repeatable once. Pre: 482 (or concurrent); or consent.

BOT 607 Scientific Writing and Publication (2) (1 Lec, 1 3-hr Lab) Introduction to writing and illustrating scientific papers. Objectives are to gain familiarity with journal style and requirements and preparation of poster presentation. Repeatable once. Pre: graduate standing. (Alt. years)

BOT 610 Botanical Seminar (1) Study and discussion of significant topics and problems in botany. Repeatable three times.

BOT 612 Advanced Botanical Problems (V) Investigation of any botanical problem; reading and laboratory work. Repeatable nine times. Pre: consent.

BOT 617 Biological Electron Microscopy (3) (1 Lec, 2 3-hr Lab) Biological specimen preparation, operation, and ancillary techniques in electron microscopy, interpretation of electron micrographs. Pre: graduate standing in biological sciences and consent.

BOT 620 Perspectives in Modern Botany (2) Lectures by distinguished visiting professor on contemporary botanical topics in the lecturer's

area of expertise. No more than 6 credit hours may be counted toward the MS degree requirements. Repeatable five times.

BOT 632 Instrumentation for Research in Plant Science (1) (1 2-hr Lab) Discussion and demonstration of equipment and methods. Pre: consent.

BOT 640 Quantitative Ethnobotany (3) Modern ethnobotanical field research project design, execution, data analysis, and documentation methods. Intended for students preparing to conduct field research studies. Lecture/discussion, term paper. Pre: 105 and one of 201, 361, ANTH 200, or BIOL 172.

BOT 650 Ecology Seminar (2) Literature reviews of concepts and methods in physiological and vegetation ecology. Repeatable three times. Pre: graduate standing; consent for well-prepared undergraduates.

BOT 651 Invasion Biology (3) Theories, models, patterns, and predictive methods relating to the introduction, establishment, and spread of introduced organisms. Application of principles of invasion biology to conservation and natural resource management. Pre: one of 453, 456, 482, MICR 485, or ZOOL 439; and 462 or BIOL 375; or consent.

BOT 661 Hawaiian Vascular Plants (3) (2 Lec, 1 3-hr Lab) Identification, systematics, evolution, and biogeography of native plants. Field trips. Pre: 361 or consent.

BOT 662 Advanced Systematics (4) (2 Lec, 2 3-hr Lab) Combined lecture-lab oriented course in the application of molecular protocols used in systematics and population genetics studies; emphasis on data gathering, data analysis, and presentation of results. Pre: 675, or ENBI 402 (or concurrent), or BIOC 441 (or concurrent); or consent. (Spring only)

BOT 663 Plant Cytotaxonomy (2) (1 Lec, 1 3-hr Lab) Aspects of cytogenetics most relevant to vascular plant taxonomy. Emphasis on student participation and mastery of cytogenetic techniques. Pre: 361 or consent. (Alt. years)

BOT 669 Molecular Systematics and Evolution (3) Molecular approaches to evolution, phylogenetics, and systematics. Basic use of chloroplast DNA, mitochondrial DNA, nuclear DNA, and electrophoresis. Phylogenetic analysis using parsimony, distance, and comparative methods. Recommended: 201. Pre: BIOL 172 and BIOL 275, or ENBI 402, or BIOC 441; or consent.

BOT 674 Plant Growth and Development (3) Physiology of plant growth regulators, tropisms, circadian rhythms, translocation, photoperiodism, vernalization, germination and dormancy, and senescence. Pre: 470 and ENBI 402. (Cross-listed as HORT 674) (Alt. years)

BOT 676 Environmental Physiology Seminar (2) Environmental stress; pollution; salinity, geobotany, and other interactions between the environment and plant processes. Current literature emphasized at multidisciplinary and interdisciplinary levels. Pre: graduate status in a biological science, geosciences, etc.; consent for well-prepared undergraduates.

BOT 680 Marine Macrophytes Seminar (2) Discussion of current literature in physiological ecology, cellular and molecular adaptations to

environmental factors by marine plants. Repeatable four times. Pre: 480.

BOT 690 Conservation Biology (3) Theories and concepts of ecology, evolution, and genetics for conservation of biological diversity. Topics will include restoration ecology, management planning, laws and policies, biological invasions. Pre: 453 or ZOOL 439, 462 or ZOOL 480. (Cross-listed as ZOOL 690)

BOT 699 Directed Research (V) Research preliminary to thesis or dissertation research. CR/NC only. Pre: consent of graduate committee.

BOT 750 Topics in Conservation Biology (V) Advanced topics in conservation and environmental biology. Repeatable three times. A–F only. Pre: consent. (Cross-listed as ZOOL 750)

BTSC

See Botanical Sciences

Burmese (BURM)

College of Languages, Linguistics and Literature

BURM 101 Elementary Burmese (4) Listening, speaking, reading, writing. Structural points introduced inductively. Meets one hour daily, Monday–Friday. Lab work. **HSL**

BURM 102 Elementary Burmese (4) Continuation of 101. **HSL**

BURM 112 Intensive Elementary Burmese (4) **HSL**

BURM 201 Intermediate Burmese (4) Continuation of 102. Conversation, reading, writing. Meets one hour daily, Monday–Friday. Lab work. Pre: 102. **HSL**

BURM 202 Intermediate Burmese (4) Continuation of 201. **HSL**

BURM 212 Intensive Intermediate Burmese (10) **HSL**

BURM 303 Accelerated Third-Level Burmese (6)

Business (BUS)

College of Business Administration

BUS 209 Written Communication in Business (3) An interactive writing class stressing persuasive writing in the context of memos, letters, and business reports. A–F only. Pre: ACC 201 and ENG 100. Students may not earn credit for both BUS 209 and ENG 209.

BUS 300 Business Issues (3) Designed to familiarize non-business students with basic business concepts and skills. Topics include business organization, management, marketing, accounting, and finance. Pre: sophomore standing and non-business major.

BUS 305 Introduction to Marketing (3) Introduction to the field of marketing designed for non-business students. Emphasis given to explaining marketing from the social, consumer, and managerial point of view. Pre: sophomore standing and non-business major.

BUS 310 Statistical Analysis for Business

Decisions (3) Problem recognition and formulation; stress on cross-disciplinary complex problem solving and communication; computer intensive. Coverage of descriptive statistics, probability and hypothesis testing with emphasis on quality, productivity, and regression analysis. Must be taken in first semester of BBA program. Pre: MATH 241 or equivalent.

BUS 311 Information Systems for Global Business Environment (3) Skills and strategies for using external information resources applied to local and global business issues; advanced skills in computer-based analytical techniques and information management; impact of information technology on business operations. Must be taken in first semester of BBA program. Pre: ICS 101 or equivalent, or consent.

BUS 312 Principles of Marketing (3) Concepts, problems, and opportunities in marketing within its competitive, political-legal, economic, social and global environments. Social responsibility and ethics. Marketing research. Consumer and business-to-business segmentation and positioning. Strategic marketing planning. Students may not earn credit for BUS 312 and TIM 304.

BUS 313 Economic and Financial Environment of Global Business (3) International trade, financial flows, and direct investment. Public and private institutions including government policies and capital markets. Emphasis on Asia Pacific issues, with attention to the cultural differences among countries. Must be taken in first year of BBA program.

BUS 314 Business Finance (3) Introduction to the theory and practice of financial management: analysis and decision making for asset management, capital budgeting, capital structure, and dividend policy. Prerequisite for all other finance courses. Pre: ACC 202 or consent.

BUS 315 Global Management and Organizational Behavior (3) Analysis of theories and concepts underlying domestic and global organizational management, including behavioral and personnel issues. Emphasis on leadership, team-work, cultural differences in the Asia Pacific region. Prerequisite to all other advanced management courses. Students may not receive credit for BUS 315 and TIM 303. Pre: PSY 100 or SOC 100.

BUS 345 Strategic Management (3) Applications of strategy to domestic and global business problems using an interdisciplinary approach. Emphasis on Asia Pacific business, assessment of risk, integration of all business core disciplines. Extensive writing expected. Pre: all core courses and graduating senior standing.

BUS 367 Business Study Abroad (3) Study abroad experience emphasizing international business issues. Course content varies depending on where the course is taught and by which professor. Course qualifies as an international business elective.

BUS 395 (Alpha) Internship (V) On-the-job experience in the business community. Term paper and meetings with faculty adviser required. (C) accounting; (D) MIS; (F) finance; (G) management; (I) international business; (K) marketing; (M) human resource management; (R) real estate. CR/NC only. Repeatable one time. Pre: consent and RE 300 for (R) only.

BUS 500 Master's Plan B/C Studies (1)

Enrollment required for degree completion. Pre: master's Plan B or C candidate and consent.

BUS 610 (Alpha) Analytical Tools for the MBA

(2) Integrative course providing foundation skills in business. (B) accounting tools for the MBA; (C) statistical tools for the MBA; (D) economic tools for the MBA. 610B, 610C, and 610D must be taken concurrently. A–F only.

BUS 613 (Alpha) Organization and External Environments of Asia-Pacific Business (3)

Integrative course covering, from an Asia-Pacific cross-cultural perspective, the organizational behavior in business settings along with the external and technological business environment. (B) organizational behavior; (C) external environment of Asia-Pacific business. 613B and 613C must be taken concurrently. A–F only. Pre: 610B, 610C, and 610D (or concurrent).

BUS 614 (Alpha) Managerial Finance and Accounting (3)

Integrative course covering managerial accounting tools and finance. (B) managerial accounting; (C) managerial finance. 614B and 614C must be taken concurrently. A–F only. Pre: 610B, 610C, and 610D (or concurrent).

BUS 615 (Alpha) Marketing Management and Information Technologies (3)

An integrative course covering marketing and the use of information technologies. (B) marketing management; (C) information technologies. 615B and 615C must be taken concurrently. A–F only. Pre: 610B, 610C, and 610D (or concurrent).

BUS 660 Business Policy and Strategy (3)

Integration of learning through analysis of comprehensive business problems, resolution of policy issues, and the study of competitive strategies in the international setting. Pre: all required MBA courses.

BUS 677 Field Study in Asia (6) Industry observations conducted entirely in Asian countries for three and a half weeks. Pre: consent.

BUS 695 Internship (3) On-the-job experience in the business community. Project paper and meetings with faculty adviser required. Pre: consent.

BUS 696 (Alpha) Field Studies in the Enterprise

(3) Comprehensive study of (B) audit of existing organizations. Problems and solutions, or feasibility, of personally experienced organizations, as opposed to text case studies. Pre: 660.

BUS 696C Entrepreneurship (3)**BUS 699 Directed Reading and Research (3)**

Outline (including methodology or sources, results expected, and means of measurement) must be prepared by student and approved by supervisor and chair of graduate programs before registration.

BUS 700 Thesis Research (V) Required for Plan A candidates only; 6 credit hours required, 1 of which must be taken during semester in which degree is awarded.

Business Economics (BEC)

College of Business Administration

BEC 389 Applied Business Economics:

Forecasting (3) Techniques of forecasting, such as exponential smoothing, regression, and Box-

Jenkins. Review of available computer software. Applications to economic analysis of industries and firms in national and international settings. Pre: BUS 310.

BEC 399 Directed Reading and Research (V)

Reading and research of a special area in major under direction of faculty member(s). Project must include statement of objectives, outline of activities planned, results expected, and how they are to be reported and evaluated. Must be approved in advance by the department chair and the faculty adviser.

BEC 461 International Business Economics (3)

Discussion of current international business and economic problems, international trade policies, business environments, monetary problems, protectionism against free trade, and nation/state economic policies and control, with applications in Asian/Pacific areas. Pre: BUS 313.

BEC 470 Dynamics of Asian Business: Selected

Topics (3) Status and role of Asian business; current technological, economic, and financial developments; impact on world economy. Pre: ECON 130 and ECON 131, or consent.

BEC 476 Industry Studies (3)

Analysis of particular industries to determine trends, shifting product mix, technological change. Study of individual industries on local, national, international levels. Impact of government regulation, deregulation. Pre: BUS 316 or consent.

BEC 477 Industry in Asia (6)

Analysis of selected key industries of Asian countries: business/economic trends, shifting product mix, technological changes, joint ventures, international competition, and productivity strategy, including contrasting management styles, worker/management relationships, and decision-making processes under different cultural settings. Industry observations conducted in Asian countries for three weeks during the summer. Pre: 6 credit hours of economics or business, PAMI participant, or consent.

BEC 495 Multinational Business in World

Economy (3) Economies of multinational enterprises. Interactions with social, cultural, and political environments. Pre: BUS 316 or consent.

BEC 501 Economics for Managers (3)

Economic principles for students entering graduate business programs. Covers essentials of micro-, macro-, international, and public sector economics. Students cannot get credit for this course and ECON 130–131, nor does it count toward a graduate degree.

BEC 624 Current Issues in World Business and

Economics (3) Study of modern issues and problems in business economics. Topics may vary from term to term. Pre: BUS 610 or consent.

BEC 625 Capital Markets and International

Finance (3) Supply and demand for capital in national and international markets. Nature of capital movements and role of capital in industrialization of regions and nations. Pre: BUS 610 or consent.

BEC 626 Economics of Entrepreneurship (3)

Examination of major theories of entrepreneurial supply. Characteristics and consequences of entrepreneurial behavior. Interdisciplinary approach with emphasis on case studies in Pacific/international areas. Pre: consent.

Business Law (BLAW)

College of Business Administration

BLAW 200 Legal Environment of Business (3)

Introduction to the legal environment of business operations with particular attention to business law and ethics and to principles of law relating to contracts, agency, partnerships, and corporations.

BLAW 311 Business Enterprise and Govern-

ment (3) Critical study of the legal environment of business administration including competition, monopolies, mergers, securities, taxation, and regulatory agencies. Pre: 200.

BLAW 360 International Business Law (3)

Overview of international and national law as it applies to international trade. Readings and case studies focus on the legal environment of selected areas in the Asia Pacific region and strategies for doing business overseas. Pre: 200.

BLAW 604 Social and Legal Aspects of

Management (3) Study of the legal environment of management with particular attention to the sources, principles, and form of the law; contracts, business organizational structures, agency, and partnership.

Cambodian (CAM)

College of Languages, Linguistics and Literature

CAM 101 Introduction to Modern Khmer (4)

Listening, speaking, reading, writing. Structural points introduced inductively. Meets five hours weekly; daily lab work. HSL

CAM 102 Introduction to Modern Khmer (4)

Continuation of 101. HSL

CAM 112 Intensive Elementary Khmer (10)

HSL

CAM 201 Intermediate Modern Khmer (4)

Continuation of 102. Conversation, reading, writing. Meets five hours weekly; daily lab work. Pre: 102. HSL

CAM 202 Intermediate Modern Khmer (4)

Continuation of 201. HSL

CAM 212 Intensive Intermediate Khmer (10)

HSL

CAM 303 Accelerated Third-Level Cambodian (6)**CE**

See Civil Engineering

Cell and Molecular Biology (CMB)

School of Medicine

CMB 351 Genetics, Evolution and Society (3)

Role of genetics in evolution, medicine, behavior, plant and animal breeding, and technology; its impact on today's society. NSI

CMB 405 Biochemistry (4) Structure of biological molecules and molecular mechanisms of biological and physiological processes. Pre: BIOL 275, BIOL 275L, CHEM 272, and CHEM 273; or consent. (Cross-listed as BIOL 405)

CMB 411 Human Genetics (3) Principles of human genetics. Designed for pre-medical or pre-dental students or others who require a course with emphasis on human genetics. Pre: BIOL 171 and BIOL 171L, or BIOL 172 and BIOL 172L; or consent.

CMB 499 Genetical Problems (V) Directed reading and research in genetics. Pre: 351 or 411.

CMB 500 Master's Plan B/C Studies (1) Enrollment for degree completion. Pre: master's Plan B or C candidate and consent.

CMB 515 Unit V Topics in Genetics (1) First-year elective course in which medical students may take an in-depth study of genetics. Pre: first-year medical student or consent.

CMB 601 Probability and Statistics in Genetics (3) Basic concepts of probability theory and statistical inferences in genetic applications. Pre: 411 or consent.

CMB 604 Evolutionary Genetics (2) Genetic changes involved in the processes of adaptation and in species formation. Pre: 411 or equivalent. Recommended: population and/or quantitative genetics.

CMB 606 Introduction to Neuroscience (4) An interdisciplinary overview of the central nervous system, drawn from current knowledge and research on vertebrate and invertebrate neurobiology. Pre: consent.

CMB 618 Cytogenetics (3) (2 Lec, 1 1-hr Lab) Correlation of genetic and cytological phenomena. Pre: 411.

CMB 621 Cell Molecular Biology I (4) Molecular approaches to cell structure and function emphasizing cells in multicellular plants and animals. Pre: graduate standing, BIOC 441 or ENBI 402, and BIOL 406; or consent. Recommended: CHEM 351.

CMB 622 Cell Molecular Biology II (4) Molecular approaches to cell structure and function emphasizing cells in multicellular plants and animals. Pre: one of 621, BIOC 441, or ENBI 402; and BIOL 406; or consent.

CMB 625 Advanced Topics in Genetics (2) Advanced treatment of frontiers in genetics. Pre: graduate standing in genetics or consent.

CMB 631 Research Rotations (3) Individualized research project in three laboratories of CMB faculty with a written report on each project. Faculty laboratories will be selected by consultation with student's graduate committee and individual faculty. Pre: 621 (or concurrent), 622 (or concurrent), or consent.

CMB 650 Population Genetics (3) Mathematical, observational, experimental results on effects of mutation, selection, and systems of mating on distribution of genes. Analysis of non-experimental populations. Pre: 601 or consent.

CMB 654 (Alpha) Genetics Seminar (1) Research and topical literature reports in genetics. May be repeated. (B) molecular genetics; (C) molecular biology of cancer; (D) human genetics; (E) cytogenetics; (F) evolutionary genetics; (G) molecular biology of the cell; (H) drosophila genetics; (I) population/statistical genetics; (J) developmental genetics; (K) insect molecular biology; (M) genetics and molecular biology of fungi. Pre: graduate standing in genetics or consent.

CMB 671 (Alpha) Techniques in Genetics (V) Laboratory training in procedures used in diagnosis of genetic diseases, cytogenetics, immunogenetics, and dermatoglyphics. Pre: graduate standing in genetics or consent.

CMB 672 Techniques in Genetics (3) Continuation of 671.

CMB 680 Molecular Genetics (3) Structure of proteins and nucleic acid to genetic fine structure, mutagenesis, transfer of genetic information, and control of development. Pre: 411 and BIOC 441 or equivalent; or consent.

CMB 699 Directed Research (V) Pre: graduate standing and consent.

CMB 700 Thesis Research (V) Research for master's thesis. Pre: acceptance of thesis topic.

CMB 701 Human Polymorphisms (3) (2 Lec, 1 1-hr Lab) Phenotypic, serum protein, isozymic, and other polymorphisms; pharmacogenetics, theory of polymorphisms; disease associations; evidence for and against selection; significance. Pre: 650 or consent.

CMB 702 Immunogenetics (3) (2 Lec, 1 1-hr Lab) Immunological and genetic analysis of antigenic variation; cellular and soluble antigenic systems; transplantation; genetic control of immune response. Pre: 680 or consent.

CMB 705 Special Topics in Neuroscience (V) Advanced topics in neuroscience, from basic neurobiology to clinical neurology and psychiatry. Emphasis on current investigations at the cellular or molecular level. Pre: consent.

CMB 712 Quantitative Methods in Human Family Genetic Analysis (3) (2 Lec, 1 1-hr Lab) Lecture and laboratory sessions covering probability models and statistical methods used in genetic analysis of human family data. Pre: a course in genetics and calculus, or consent.

CMB 750 Human Population Genetics (3) Comprehensive treatment of the genetics of human populations with emphasis on population structure. Pre: 650.

CMB 800 Dissertation Research (V) Pre: acceptance of dissertation topic.

Chamorro (CHAM)

College of Languages, Linguistics and Literature

CHAM 101 Elementary Chamorro (4) Introduction to Chamorro, emphasis on listening and speaking, language structure. Meets five hours weekly. Lab work. **HSL**

CHAM 102 Elementary Chamorro (4) Listening, speaking, reading, and writing skills; emphasis on oral and reading proficiency. Meets five hours weekly. Lab work. Pre: 101 or equivalent, or consent. **HSL**

CHAM 201 Intermediate Chamorro (4) Continuation of 102. Emphasis on comprehension and language production (speaking). Meets five hours weekly. Lab work. Pre: 102 or equivalent, or consent. **HSL**

CHAM 202 Intermediate Chamorro (4) Continuation of 201. Emphasis on comprehension and language production. Lab work. Pre: 201 or equivalent, or consent. **HSL**

Chemistry (CHEM)

College of Natural Sciences

Credit allowed for only one of CHEM 151, 161, 171, or 181A.

CHEM 151 Elementary Survey of Chemistry (3) Nonrigorous but adequate background in fundamentals. Preparation for technical training in life sciences. **NS2**

CHEM 151L Elementary Survey of Chemistry Lab (1) (1 3-hr Lab) Experiments introducing laboratory techniques and illustrating chemical principles. Pre: 151 (or concurrent). **NS2**

CHEM 152 Survey of Organic and Bioorganic Chemistry (3) Structure, nomenclature, properties, reactions of organic compounds emphasizing those of practical importance in related fields. Pre: 151, 162, or 171. (Cross-listed as ENBI 152) **NS2**

CHEM 152L Survey of Organic and Bioorganic Chemistry Lab (1) (1 3-hr Lab) Techniques of preparation, purification, identification of organic compounds. Pre: 151L, 162L, or 171L; and 152 (or concurrent). **NS2**

CHEM 161 General Chemistry I (3) Basic principles of chemistry. Introduction to electronic structure, chemical bonding, solutions, kinetics, equilibrium, phases, and energy changes in matter. Pre: two years high school algebra, high school chemistry, and placement exam. **NS2**

CHEM 161L General Chemistry Lab I (1) (1 3-hr Lab) Laboratory experiments introducing techniques and fundamental principles of chemistry. Pre: 161 (or concurrent). **NS2**

CHEM 162 General Chemistry II (3) Continuation of 161. Basic principles of chemistry. Introduction to electronic structure, chemical bonding, solutions, kinetics, equilibrium, phases, and energy changes in matter. Pre: 161. **NS2**

CHEM 162L General Chemistry Lab II (1) (1 3-hr Lab) Laboratory experiments introducing techniques and fundamental principles of chemistry. Pre: 161L and 162 (or concurrent). **NS2**

CHEM 171 Principles of Chemistry (4) Principles, theories, elementary analytical methods of chemistry. Intended for physical science majors and engineers. Pre: high school chemistry and MATH 215 or MATH 241 or MATH 251. **NS2**

CHEM 171L Principles of Chemistry Lab (1) (1 3-hr Lab) Laboratory experiments illustrating fundamental principles of chemistry. Pre: 171 (or concurrent). **NS2**

CHEM 181A Honors General Chemistry (4) Rigorous, in-depth introduction to chemical principles with emphasis on experimental and applied aspects of modern chemistry. Pre: high school chemistry and MATH 215 or MATH 241 or MATH 251. Fall only. **NS2**

CHEM 181L Honors General Chemistry Laboratory (1) Laboratory experiments illustrating chemical principles involving advanced techniques and modern instrumentation. Co-requisite: 181A. **NS2**

CHEM 253 Survey of Analytical Chemistry (4) (2 Lec, 2 3-hr Lab) Practical introduction to analytical techniques, lab manipulations, data

handling, choice and limitations of methods. Pre: 152L.

CHEM 272 Organic Chemistry I (3) Molecular structure, stereochemistry, spectroscopy, mechanisms, reactions, and synthesis of organic compounds. Pre: 162 or 171L.

CHEM 272L Organic Chemistry I Lab (2) (1 5-hr Lab) Techniques, synthesis and qualitative analysis, applications of spectroscopy. Pre: 162L or 171L, and 272 (or concurrent).

CHEM 273 Organic Chemistry II (3) Continuation of 272. Molecular structure, stereochemistry, spectroscopy, mechanisms, reactions, and synthesis of organic compounds. Pre: 272.

CHEM 273L Organic Chemistry II Lab (1) (1 4-hr Lab) Techniques, synthesis and qualitative analysis, applications of spectroscopy. Pre: 272L and 273 (or concurrent).

CHEM 274 Principles of Analytical Chemistry (3) Selected methods and principles, e.g., phase equilibria, ionic equilibria, electrode equilibria, separations, spectroscopy, automation, and process control. Pre: 272 and MATH 216 or MATH 242 or MATH 252.

CHEM 274L Principles of Analytical Chemistry Lab (2) (2 3-hr Lab) Phase separations, chromatography, titrimetry, spectrophotometry, etc. Pre: 274 (or concurrent).

CHEM 333 Instrumental Analysis (3) Methodology and instrumentation; UV/VIS spectrometry, emission and absorption spectrometry, HPLC, potentiometry, voltammetry, and coulometry. Pre: 274/274L and 351 (or concurrent).

CHEM 333L Instrumental Analysis Lab (2) (2 3-hr Lab) Principles and applications of instrumentation for electrochemical and spectrometric analysis. Pre: 333 (or concurrent).

CHEM 351 Physical Chemistry I (3) Principles and theories; physico-chemical procedures. Pre: 162L or 171L or 181L, MATH 243 or MATH 253, and PHYS 272 and PHYS 272L.

CHEM 352 Physical Chemistry II (3) Continuation of 351. Pre: 351.

CHEM 352L Physico-Chemical Measurements (2) (2 3-hr Lab) Modern laboratory techniques. Pre: 333L, 352 (or concurrent), and ICS 101 or equivalent.

CHEM 399 Directed Reading or Research (V) Pre: chemistry major, and minimum cumulative GPA of 2.7 or minimum GPA of 3.0 in chemistry. Repeatable.

CHEM 422 Intermediate Inorganic Chemistry (3) Classification, description, fundamental theory. Pre: 352 (or concurrent).

CHEM 423 Synthesis: Inorganic Compounds (2) (2 Lec, 2 3-hr Lab) Advanced lab techniques and descriptive chemistry of inorganic compounds. A–F only. Pre: 351 (or concurrent and 422 (or concurrent)). Co-requisite: 443.

CHEM 443 Synthesis: Organic Compounds (2) (2 Lec, 2 3-hr Lab) Advanced contemporary synthetic techniques. A–F only. Pre: 273/273L. Co-requisite: 423.

CHEM 445 (Alpha) Intermediate Organic Chemistry (3) (B) synthesis; (C) mechanisms; (D) natural products. Pre: 273.

CHEM 601 Theory of Chemical Bonding (3) Application of quantum mechanics and symmetry principles to descriptions of chemical bonding. Pre: 352.

CHEM 602 Chemical Applications of Spectroscopy (V) Introduction to magnetic resonance, infrared, UV, and visible spectroscopy, emphasizing applications to organic and inorganic chemistry. Three topics each semester—1 credit hour per topic. Repeatable in different topics. Pre: 601.

CHEM 621 Advanced Inorganic Synthesis (3) A survey of the periodic table examining the characteristics and reactivities of representative elements. A–F only. Pre: 423 or consent.

CHEM 622 Organometallic and Main Group Chemistry (3) Types and reactions of metal carbon bonds, catalysis, compounds and reactions of main group elements. Pre: 352 and 422.

CHEM 623 Coordination Chemistry (3) Survey of Lewis acids and bases, coordination numbers, geometries, stereochemistry, ligand field theory, formation constants, and bio-inorganic chemistry. Pre: 601 and 602 (or concurrent).

CHEM 631 Methods of Instrumental Analysis (V) Theory, instrumentation, applications. Three areas each semester—1 credit hour per area. Repeatable in different areas. Pre: 333.

CHEM 633 Molecular Spectroscopy (3) Experimental and theoretical principles underlying x-ray spectroscopy. Pre: 601.

CHEM 641 Organic Structure Determination (3) Interpretation of chemical and physical (primarily spectral) data in the identification of organic compounds. Pre: consent.

CHEM 642 Organic Synthesis (3) Modern synthetic methods with emphasis on the design and execution of multi-step sequences. Pre: 445 or consent.

CHEM 643 Physical Organic Chemistry (3) Theory of molecular structure, stereochemistry, and reaction mechanisms. Pre: 445 and 601, or consent.

CHEM 651 Chemical Thermodynamics and Statistical Mechanics (3) Includes statistical thermodynamics, with application to chemical systems. Pre: 352.

CHEM 653 Quantum Chemistry (3) Rigorous introduction to quantum mechanics, including operator formalism, matrix formation, group theory, and perturbation theory; introduction to the electronic structure of atoms and molecules. Pre: 352 and MATH 244 or MATH 253.

CHEM 658 Crystallography (3) Crystal symmetry. Elementary x-ray physics. Diffraction theory and its application to crystal and molecular structure determination. Pre: 352 and MATH 244 or MATH 253.

CHEM 691 (Alpha) Seminar (1) Current topics in (D) analytic-inorganic-physical; (E) organic. Repeatable. Pre: graduate standing.

CHEM 692 (Alpha) Seminar (1) Continuation of 691. Current topics in: (D) analytic-inorganic-physical; (E) organic. Repeatable. Pre: graduate standing.

CHEM 699 Directed Research (V) Repeatable. Pre: consent.

CHEM 700 Thesis Research (V) Pre: candidacy for MS degree and consent of thesis chair.

CHEM 721 Special Topics: Inorganic Chemistry (V) Theory and applications. Repeatable. Pre: consent.

CHEM 731 Special Topics: Analytical Chemistry (V) Theory and applications. Repeatable. Pre: consent.

CHEM 741 Special Topics: Organic Chemistry (V) Theory and applications. Repeatable. Pre: consent.

CHEM 751 Special Topics: Physical Chemistry (V) Theory and applications. Repeatable. Pre: consent.

CHEM 753 Advanced Quantum Chemistry (3) Continuation of 653. Application of quantum mechanics to atoms and molecules, solid surfaces, with emphasis on electronic structure and chemical bond formation. Pre: 653.

CHEM 800 Dissertation Research (V) Pre: candidacy for PhD degree and consent of dissertation chair.

Chinese (CHN)

College of Languages, Linguistics and Literature

All students taking language courses in this program for the first time must take a regularly scheduled placement test; those with no background must come to the Department of East Asian Languages and Literatures for a brief interview. A grade of C or better is required in the prerequisite courses for continuation.

CHN 101 Elementary Mandarin (4) Listening, speaking, reading, writing, grammar. Meets one hour daily, Monday–Friday, plus daily lab work. Pre: placement test. **HSL**

CHN 102 Elementary Mandarin (4) Continuation of 101. Pre: 101 or consent. **HSL**

CHN 103 Accelerated Elementary Mandarin (8) Content of 101 and 102 covered in one semester. Meets two hours daily, Monday–Friday, plus daily lab work. Pre: placement test. **HSL**

CHN 131 Beginning Cantonese (4) Introduction to standard dialect of Canton, emphasis on conversational skills. Meets one hour daily, Monday–Friday, plus daily lab work. Pre: consent. **HSL**

CHN 132 Beginning Cantonese (4) Continuation of 131. Pre: 131 or consent. **HSL**

CHN 201 Intermediate Mandarin (4) Continuation of 101 and 102. Meets one hour daily, Monday–Friday, plus daily lab work. Pre: 102, or 103, or consent. **HSL**

CHN 202 Intermediate Mandarin (4) Continuation of 201. Pre: 201 or consent. **HSL**

CHN 204 Accelerated Intermediate Mandarin (8) Content of 201 and 202 covered in one semester. Meets two hours daily, Monday–Friday, plus daily lab work. Pre: 102, or 103, or consent. **HSL**

CHN 231 Intermediate Cantonese (3) Continuation of 131 and 132; meets three hours a week, plus lab work. Pre: 132 or consent. **HSL**

CHN 232 Intermediate Cantonese (3)

Continuation of 231. Pre: 231 or consent. HSL

CHN 301 Third-Level Mandarin (4)

Vocabulary building and extended mastery of sentence structures of modern Chinese through reading and related conversation. Meets one hour daily, Monday–Friday, plus lab work. Pre: 202, or 204, or consent.

CHN 302 Third-Level Mandarin (4)

Continuation of 301. Pre: 301 or consent.

CHN 303 Accelerated Third-Level Mandarin (8)

Content of 301 and 302 covered in one semester. Meets two hours daily, Monday–Friday, plus daily lab work. Pre: 202, or 204, or consent.

CHN 311 Mandarin Conversation (3)

Systematic practice on everyday topics of conversation. Lab work. Pre: 202, or 204, or consent.

CHN 312 Mandarin Conversation (3)

Continuation of 311. Pre: 202, or 204, or consent.

CHN 313 Mandarin for Cantonese Speakers (3)

For Cantonese speakers only. Competence in spoken Mandarin through comparison of Cantonese and Mandarin (pronunciation, romanization, vocabulary, idioms, and syntax). Translation from Cantonese to Mandarin. CR/NC only. Pre: placement test.

CHN 314 Mandarin for Cantonese Speakers (3)

Continuation of 313. Pre: placement test.

CHN 315 Spoken Taiwanese (3)

The purpose of this course is to offer the student the basic knowledge (listening, speaking, romanization and grammar) of spoken Taiwanese and to train the student to handle some familiar everyday topics. A-F only. Pre: 202 or consent. Fall only.

CHN 316 Spoken Taiwanese (3)

Continuation of 315. A-F only. Pre: 315 or consent. Spring only.

CHN 319 Chinese Dialect Studies (V)

Advanced Cantonese or other Chinese dialects. Repeatable one time. CR/NC for native Chinese speakers. Pre: consent.

CHN 399 Directed Third-Level Reading (V)

For those who need special assistance, e.g., in reading texts in their area of specialization or at a pace more rapid than those of standard courses. CR/NC only. Repeatable. Pre: consent.

CHN 401 Fourth-Level Mandarin (4)

Extensive reading in academic topics. Meets one hour daily, Monday–Friday, plus lab work. Pre: 302 or consent.

CHN 402 Fourth-Level Mandarin (4)

Continuation of 401. Pre: 401 or consent.

CHN 404 Accelerated Fourth-Level Mandarin (8)

Content of 401 and 402 covered in one semester. Meets two hours daily, Monday–Friday, plus lab work. Pre: 302, or 303, or consent.

CHN 411 Advanced Mandarin Conversation (3)

Systematic practice on academic topics of conversation. Lab work. Pre: 302 or consent.

CHN 412 Advanced Mandarin Conversation (3)

Continuation of 411. Pre: 411 or consent.

CHN 413 Advanced Mandarin for Cantonese Speakers (3)

Systematic practice for spontaneity, accuracy, and depth in conversation. CR/NC only. Pre: 313 and 314, or consent.

CHN 414 Advanced Mandarin for Cantonese Speakers (3)

Continuation of 413. Pre: 413 or consent.

CHN 421 (Alpha) Chinese Translation (3)

Training in techniques; theory of translation. (B) Chinese–English; (C) English–Chinese. Pre: 402 or consent.

CHN 431 Readings in Taiwanese (3)

This year-long course is designed for those who have the spoken ability of Taiwanese and a good knowledge of Chinese characters to learn and practice reading Taiwanese. A-F only. Pre: 316 or consent. Fall only.

CHN 432 Readings in Taiwanese (3)

Continuation of 431. A-F only. Pre: 431 or consent. Spring only.

CHN 451 Structure of Chinese (3)

Introduction to phonology and morphology of Mandarin Chinese; some discussion of usage and linguistic geography. Pre: 202, or 204, or consent.

CHN 452 Structure of Chinese (3)

Introduction to syntax and semantics of Mandarin Chinese; some discussion of usage and linguistic geography. Pre: 202, or 204, or consent.

CHN 453 Study of Chinese Characters (3)

Origin, structure, and evolution. Pre: 402, 461, or consent. (Alt. years)

CHN 454 Study of Chinese Characters (3)

Continuation of 453. Pre: 453 or consent.

(Alt. years)

CHN 461 Introduction to Classical Chinese (3)

Analysis of basic structural patterns through selected readings in various texts. Pre: 302 or consent.

CHN 462 Introduction to Classical Chinese (3)

Continuation of 461. Pre: 461 or consent.

CHN 470 Language and Culture of China (3)

Extensive exposure—chiefly through tape recordings, classroom conversation, and outside readings—to history, culture, and institutions. Pre: 401 or consent.

CHN 485 Selected Readings in Chinese (3)

Readings in modern Chinese in various disciplines. Pre: 402 or consent.

CHN 486 Selected Readings in Chinese (3)

Continuation of 485. Pre: 485 or consent.

CHN 499 Directed Fourth-Level Reading (V)

For those who need special assistance, e.g., in reading texts in area of specialization or at a pace more rapid than those of standard courses. CR/NC only. Repeatable. Primarily for graduate students from other departments. Pre: consent.

CHN 610 (Alpha) Chinese Poetry (3)

Critical study of major traditional Chinese poetic forms. (B) ancient (to 5th century); Pre: 462, 483, or consent (C) medieval (5th–10th century); Pre: 610B or consent (D) late imperial (10th–19th century); Pre: 610C or consent.

CHN 611 (Alpha) Readings in Contemporary Chinese (3)

Representative works of writers from the People's Republic of China, Taiwan, and Hong Kong. (B) short stories; (C) poetry and drama; (D) novels and essays. Pre: one of 461, 462, 481, 482, 483, 484, 485, 486, or 610; or consent.

CHN 612 Traditional Chinese Fiction (3)

Formal and thematic analysis of short stories, historical romances, and novels. Repeatable once with consent. Pre: 402 or consent.

CHN 613 (Alpha) Traditional Chinese Drama (3)

Major plays. (B) Yuan period (1271–1368); (C) Ming and Ching periods (1368–1911). Pre: 402 or consent.

CHN 631 (Alpha) History of Chinese Language (3)

(B) phonology; (C) syntax. Pre: 451, LING 421, or consent for (B); 452 or consent for (C).

CHN 633 Chinese Dialects (3)

Synchronic description of a Chinese dialect other than Cantonese and Mandarin; contrastive and comparative studies with Mandarin. Repeatable once with consent. Pre: 451 and 452, or consent.

CHN 634 Chinese Syntax and Semantics (3)

Verbal categories, aspects, focus devices, resultative and directional compounds, coverbial constructions. Interaction between syntax and semantics. Pre: 452 or consent.

CHN 641 Contrastive Analysis of Mandarin and English (3)

Pre: 451.

CHN 642 Contrastive Analysis of Mandarin and English (3)

Pre: 452.

CHN 643 Methods in Teaching Chinese as Second Language (3)

Problems in language learning and teaching. Practice in preparing and presenting lessons with materials based on comparative linguistic analysis. Materials, teaching aids, test construction. Pre: 451 and 452, or consent.

CHN 650 (Alpha) Topics in Chinese Language (3)

(B) teaching and testing; specific problems in teaching Chinese including characters and cultural elements; proficiency and communicative ability. Pre: 451 and 452, or consent.

CHN 661 Advanced Classical Chinese (3)

Pre: 461, 462, and consent.

CHN 662 Advanced Classical Chinese (3)

Pre: 661 and consent.

CHN 699 Directed Research (V)

CR/NC only. Pre: consent.

CHN 750 (Alpha) Research Seminar in Chinese Language (3)

(B) teaching methods; Pre: 643 (C) structure; Pre: 452 (D) classical grammar; Pre: 452 (E) sociolinguistics; Pre: 451.

CHN 753 (Alpha) Research Seminar in Chinese Literature (3)

Study of authors, a genre, a period, or a problem. (M) modern; (T) traditional. Pre: 611 or consent for (M); 612, 613, or consent for (T).

CIS

See Communication and Information Sciences

Civil Engineering (CE)

College of Engineering

Preference in registration is given to declared engineering majors. Please consult the current Schedule of Classes for confirmed offerings each semester.

CE 123 Computer-Aided Design and Drafting

(1) Introductory course in engineering drawing employing the computer. Topics include theory of projections, multiview representations, sectional views, auxiliary views, and dimensioning. Restricted to majors.

CE 211 Surveying I (2) Basic principles of plane surveying, including reference planes and surfaces, use of instruments for distance and angular measurements, traverse adjustment, heights, measurement theory, computer applications, and topographic surveying. Repeatable one time. A–F only. Pre: computer programming, MATH 243 or 252, and civil engineering major; or consent.

CE 211L Surveying I Lab (1) Distance, angle, and height measurements. Traverse design, measurements and computations. Repeatable. Pre: 211 (or concurrent).

CE 270 Applied Mechanics I (3) Forces, resultants, and equilibrium; analysis of trusses, frames, and machines; centroids, moments of inertia; friction. Repeatable one time. A–F only. Pre: grade of C or better in PHYS 170, and MATH 243 or MATH 252 (or concurrent); or consent.

CE 271 Applied Mechanics II (3) Dynamics of particles and rigid bodies; force, acceleration, impulse-momentum, work-energy. Repeatable one time. A–F only. Pre: grade of C or better in 270, and MATH 244 or MATH 253 (or concurrent); or consent.

CE 305 Applied Probability and Statistics (3) Description of sample data; correlation and regression; probability and statistical distributions; estimations of population parameters; fittings distributions to histograms; hypothesis testing. Repeatable one time. A–F only. Pre: MATH 244 or MATH 253; or consent.

CE 320 Fluid Mechanics Fundamentals (4) (3 Lec, 1 2-hr Lab) Compressible and incompressible fluid properties; fluid statics; kinematics, energy and momentum considerations in steady flows; application of steady flow concepts to various fluid processes. A–F only. Pre: PHYS 310 and a grade of C or better in CE 271.

CE 330 Environmental Engineering (3) Parameters and indices of environmental quality; transport and fate of contaminants in the environment; water and air pollution control; solid waste management. A–F only. Pre: 305 and 320.

CE 355 Geotechnical Engineering I (4) Introduction to geotechnical engineering: soil characterization, index properties, seepage and flow in soil, stresses in soils, compressibility, consolidation, shear strength. Repeatable one time. A–F only. Pre: 320, 370, or consent.

CE 361 Fundamentals of Transportation (3) Transportation modes: land, air, water, pipelines. Tourist, urban transportation. Geometric design, human factors, vehicular flow models, capacity analysis. Overview: traffic impact, air quality, parking studies. A–F only. Pre: a grade of C or better in 271.

CE 370 Mechanics of Materials I (3) Elastic stress-strain relation and behavior of members under flexural, torsional, and axial loading. Repeatable one time. A–F only. Pre: 271 and MATH 244 or MATH 253; or consent.

CE 370L Mechanics of Materials Lab (1) Tension, compression, and torsion of bars, and bending of beams. Repeatable. Pre: 370 (or concurrent).

CE 375 Construction Materials (3) (2 Lec, 1 2-hr Lab) Introduction to the crystalline and molecular structure of materials. Properties of metals, concrete, concrete admixtures, asphalt, wood, and other materials commonly used in construction. A–F only. Pre: 305 and 370.

CE 381 Structural Analysis (3) Analysis of statically determinate plane and space trusses and frames; deflections; introduction to matrix methods; computer applications. Pre: 370.

CE 405 Engineering Economics (3) Economic analysis in engineering and management decision-making, interest, depreciation, income tax, cost classification, break-even analysis, economic comparisons of alternatives, benefit-cost analysis. Pre: ECON 120 or 130, and senior standing; or consent.

CE 412 Surveying II (3) (2 Lec, 1 3-hr Lab) Advanced course in surveying; project design and specifications; measurements, errors, and adjustments; land surveying; state plane coordinate systems; modern instrumentation. Pre: 211 or consent.

CE 417 Computer Methods in Engineering Systems (3) Numerical solutions of engineering problems using digital computers. Regression analysis; numerical differentiation and integration; solutions of algebraic, transcendental, and differential equations; and analysis of large structural systems. Pre: computer programming and senior standing.

CE 421 Engineering Hydraulics (3) Analytical and computer solutions of engineering hydraulics problems. Hydraulics of closed conduits and open channels, well hydraulics, introduction to coastal hydraulics. Pre: 320.

CE 422 Environmental Fluid Mechanics (3) Introduction to basic concepts of pollutant transport phenomenon through theoretical modeling, lab and field experiments and observations. Specific topics include mass balance, jets and plumes, mixing and transport in rivers, reservoirs, groundwater and estuaries; non point source pollution. Repeatable. A–F only. Pre: 320, and MATH 244 or MATH 253 or equivalent; or consent. (Alt. years)

CE 424 Applied Hydrology (3) Introduction to occurrence, distribution, circulation of surface and groundwater through precipitation, streamflow, evaporation, transpiration, infiltration. Engineering applications. A–F only. Pre: 305 and 320 or consent.

CE 426 Hydraulic Design (4) (3 Lec, 1 2-hr Lab) Basic hydraulic structures design; feasibility studies; computer-aided optimal design for water surface profiles, pipe network, and urban storm-water drainage systems; optimal design of multipurpose reservoir systems. Pre: 421 and 424 (or concurrent).

CE 431 Water and Wastewater Engineering (3) Hydrologic fundamentals of water demand and supply; water and wastewater distribution;

collection systems; quality characterization; analytical methods for water quality management. Pre: 320 and 330.

CE 432 Water and Wastewater Treatment Design (3) Physical operations; chemical and biological processes; design flow and process loading rates; treatment plant design. Pre: 431.

CE 433L Water Quality Laboratory (3) Analysis and characterization of typical water and wastewater samples for organic and inorganic constituents such as alkalinity, hardness, solids, biochemical oxygen demand, nitrogen and phosphorous species, coliform bacteria, and trace organic chemicals. Relevance of these measurements to water and wastewater regulations and engineering design. A–F grading only. Repeatable. Pre: 330 and either CHEM 171 and 171L or CHEM 161, 161L and 162, and senior standing.

CE 441 Air Pollution Control Design (3) Operational theory, design basis, and capital and operating costs of air pollution control devices for stationary sources of particulates, gases, and vapors. Overview of sources and effects of air pollution and current regulations. Introduction to atmospheric dispersion modeling. A–F grading only. Repeatable. Pre: 320, 330, and senior standing.

CE 450 Soils and Foundation Engineering (3) Analysis and design of soil retaining systems, shallow and deep foundations. Repeatable one time. A–F only. Pre: 355 or consent.

CE 451 Soil and Site Improvement (3) Methods of improving engineering properties of soils and sites through use of mechanical stabilization, soil admixtures, pre-consolidation, deep densification, and earth reinforcement. Repeatable one time. A–F only. Pre: 355 or consent.

CE 455 Geotechnical Engineering II (3) Continuation of 355 introducing geotechnical engineering topics including: field exploration, lateral earth pressures, bearing capacity theory, slope stability theory, use of geosynthetics, earthquake effects and ground modification. Repeatable one time. A–F only. Pre: 355 or consent.

CE 462 Traffic Engineering (3) Design/analysis of signalized, unsignalized intersections, urban networks. Traffic impact studies; analysis steps and applications. Design/redesign options. Parking studies: demand, alternative designs (lot layouts). Pre: 361 or consent.

CE 464 Urban and Regional Transportation Planning (3) Application of travel demand forecasting models to transportation planning. Evaluation and decision-making, microcomputer applications. Term projects. Pre: 361 or consent.

CE 465 Traffic Network Simulation (3) Introduction to computer simulation; Monte Carlo techniques; application of traffic simulation packages. Term project required. Pre: 361 or consent.

CE 466 Traffic Operations and Safety (3) Traffic operations and control, in conformance with the manual of uniform traffic control devices. Safety appurtenances and accident analysis. Pre: 361.

CE 469 Photogrammetric Engineering (3) (2 Lec, 1 1-hr Lab) Fundamentals of metric photogrammetry, vertical and oblique photographs, flight planning, stereoscopy and parallax,

For key to symbols and abbreviations, see the first page of this section.

mosaics, orthophotography, photo interpretation, remote sensing. Pre: consent. (Alt. years)

CE 471 Construction Methods (3) Methods of construction, primarily buildings. Construction types: light and heavy wood; steel; plain, reinforced, and prestressed concrete; masonry. Foundations; associated details of frames, walls, roofs, floors, openings, finishes. Disasters, failures, and their causes. Industrialization of the building process. Pre: 375.

CE 472 Construction Management (3) Introductory treatment of the management of construction. Construction supervision, contract documents, estimating and bidding, organization, planning and scheduling, administration, business methods, safety, and labor. Pre: 375 or consent.

CE 473 Construction Equipment and Methods (3) Methods and equipment used on horizontal/heavy engineering projects. Available equipment, their production, and how they are used to excavate, move, process, and place the earth. Pre: senior standing or consent.

CE 474 Construction Estimating and Bidding (3) Estimating science; techniques of estimating quantities and pricing of work for construction contracting; classification of costs, analysis of plans and specifications for estimating; computerized estimating; cash flow, bidding strategy, preparation and submission. A-F grading only. Pre: 375 or consent.

CE 476 Construction Planning and Scheduling (3) To teach the theory and the practice of planning, scheduling, and reporting a construction project through the use of bar chart and CPM. The course format to include lectures, text, outside speakers, site visits, discussions, case study, and computers. Pre: 375 or consent.

CE 482 Indeterminate Structures (3) Analysis of statically indeterminate beams, frames, trusses, arches, and space structures by classical and matrix methods; computer applications. Pre: 381.

CE 483 Field Experience (1)

CE 485 Reinforced Concrete Design (3) Behavior and design of reinforced concrete beams, columns, one-way slabs, and footings. Pre: 381 or consent.

CE 486 Structural Steel Design (3) Basic properties of steel; behavior and design of steel beams, columns, and connections; introduction to rigid frames. Pre: 381. (Alt. years)

CE 488 Forensic Engineering (3) Introduction to failure analysis, engineering safety and reliability, and professional liability. Topics covered include professional licensing, liability insurance, arbitration, and litigation. Junior standing. Pre: 375 or ME 331, and ME 371.

CE 489 Reinforced Masonry Design (3) Analysis of reinforced masonry structural systems. Design of reinforced masonry curtain, bearing, and shear walls, columns, and beams. Advantage of masonry design compared with other structural materials. Pre: 485 (or concurrent). (Alt. years)

CE 490 Senior Design Project (4) Design problem involving several areas of civil engineering and requiring a team approach for a solution. Pre: completion of degree requirements in the semester of registration.

CE 491 (Alpha) Special Topics in Civil Engineering (3) Course will reflect special interests of visiting and/or permanent faculty. Pre: junior or senior standing, and consent.

CE 492 (Alpha) Special Topics in Civil Engineering (3) Course will reflect special interests of visiting and/or permanent faculty. Pre: junior or senior standing, and consent.

CE 499 Special Problems (V) Individual investigation in civil engineering topics as approved by instructor. Pre: senior standing, and minimum cumulative GPA of 2.7 or minimum GPA of 3.0 in engineering.

CE 500 Master's Plan B/C Studies (1)

CE 602 Construction Scheduling and Claims (3) Precedence networks, CPM, float, updating, resource leveling, least cost scheduling, scheduling case studies, computerized scheduling, exclusion reports, sorting, term project; contract law, types of claims, proving claims, delay claims, impact of changes, Eichleay Formula, acceleration, overtime, stacking, crowding, efficiency losses, contract interpretation, Leonard Study, Kuiper model, labor escalation, claims case studies, term paper. A-F only. Pre: graduate standing in civil engineering and consent.

CE 604 Cost Engineering and Quality Control (3) Study and applications of cost/schedule control systems criteria, earned value analysis, probabilistic cost estimating, construction risk management, construction quality control, and operations research in construction. Pre: 472 and 474; or consent.

CE 606 Analysis of Construction Operations (3) A study for design of construction processes. Topics include line of balance, queueing, delay models, and process simulation with CYCLONE. Pre: 472 or consent. (Alt. years)

CE 610 Construction Productivity Improvement (3) Design of productivity and safety improvement programs in a construction company. Time-lapse techniques, crew balancing, work sampling, data gathering and analysis, worker fatigue, quality circles, motivation and project leadership, construction automation. Pre: 472 and one other senior-level construction course, or consent.

CE 611 Precise Engineering Surveys (3) Horizontal and vertical geodetic control networks; precise 3D positioning; special applications. Pre: 211 and 411, or consent. (Alt. years)

CE 612 Ocean Mapping (3) Positioning and depth measurement methods; instrumentation, data acquisition and analysis in the marine environment. Pre: 611 or consent. (Alt. years)

CE 614 Negotiation and Alternative Dispute Resolution (V) Lawyers negotiate settlements in almost all their cases. This class presents a "hands-on," skill-building approach to the newest ideas, as well as centuries-old techniques, about the skill lawyers will use most often in their private practice - negotiation. The class also examines the rapidly developing field of alternative dispute resolution (ADR), including mediation, facilitation, arbitration, and court-annexed ADR. (Cross-listed as LAW 508)

CE 622 Fluid Mechanics (3) Theory of fluid dynamics in differential form, covering equation of motion, vortex generation, flow in rotating

frame, potential theory, laminar flow, and introduction to turbulence. Pre: 320 or equivalent.

CE 623 Groundwater Modeling (3) Introduction to the finite-difference method; steady-state and transient groundwater flow in saturated and unsaturated media; applications to groundwater recharge and aquifer evaluation. A-F only. Pre: 627 or consent. Fall only. (Cross-listed as GG 655)

CE 624 Transport Modeling (3) Introduction to the finite-element method; transport of mass and heat in groundwater flow systems; applications to groundwater contamination. A-F only. Pre: 623 and 627; or consent. Spring only. (Cross-listed as GG 656) (Alt. years)

CE 626 Surface Water Hydrology (3) Quantitative studies of water cycle and relationships among principal hydrologic elements: precipitation, runoff, infiltration, and evapotranspiration, with emphasis on engineering and management of surface waters. Pre: consent. (Alt. years)

CE 627 Groundwater Hydrology (3) Groundwater occurrence, movement, quality, and resource evaluation, development, and management. Emphasis on saltwater encroachment, well evaluation, aquifer protection, recharge with wastewater, and Hawai'i type hydrology. Pre: 424 or consent.

CE 630 Water Resources Systems Planning and Management (3) Planning and management of multiobjective water resources systems to achieve a sustainable development. Using EIA/EIS for project alternatives evaluation to attend optimal balance in economic development and environmental quality enhancement. Repeatable one time. A-F only. Pre: students with a B.S. degree or senior standing of civil engineering, or consent.

CE 634 Biological Treatment (3) Fundamentals of applied microbiology and biochemical reactor engineering, quantitative description of microbial growth, operational theory and design basis of aerobic, anoxic and anaerobic treatment processes. Applications for water, wastewater, air, solid wastes, and soil. A-F only. Pre: consent. Fall only. (Cross-listed as BE 634)

CE 635 Environmental Chemistry (3) Basic concepts of chemistry as related to the environment, with more emphasis on water. Topics include chemical kinetics, equilibrium, acid-base, precipitation and dissolution redox reactions, sorption, organic chemicals in the environment. Pre: consent. (Cross-listed as PH 689)

CE 636 Water Quality Biology (3) Fundamental microbiology involved in environmental engineering processes and research with special emphasis on mixed culture systems, biochemistry, and microbiological aspects of water supply protection and wastewater treatment. Pre: consent. (Cross-listed as PH 690)

CE 637 Sanitary Engineering Laboratory (3) (2 Lec, 1 3-hr Lab) Laboratory studies of chemical, physical, and biological treatment of water and wastewater for development of design criteria and system operation. Pre: 635 or consent.

CE 641 Marine Disposal of Wastewaters (3) Types of wastes, their treatment and disposal; water quality standards; oceanographic variables and related data collection; diffusion and dispersion of effluent; ocean outfall design;

ecological problems with pollutants; engineering problems with outfalls. Pre: consent. (Alt. years)

CE 644 Water Quality Modeling (3) Mathematical formulation of pollutant transport and mixing in the water environment. Kinetics formulation and parameter identification, model calibration and verification. Design projects. Pre: 422 and 431, or consent.

CE 650 Seepage, Drainage, and Dewatering (3) Theory of seepage, field and laboratory methods of measurement; graphical and numerical methods; design of drainage structures; construction dewatering. A-F only. Repeatable one time. Pre: 355 and 455, or consent. (Alt. years)

CE 651 Deep Foundations (3) Analysis and design of deep foundations; driven piles and drilled shafts. A-F only. Repeatable one time. Pre: 355 and 455, or consent. (Alt. years)

CE 652 Experimental Soil Mechanics (3) Advanced laboratory testing and application of analyses using test data for solution of a hypothetical geotechnical project. Repeatable one time. A-F only. Pre: 355 and 455, or consent. (Alt. years)

CE 653 Advanced Soil Mechanics (3) Soil continuum mechanics principles; elastic, plastic and cam clay soil behavior; critical state and strength; interpretation of laboratory test results. Repeatable one time. A-F only. Pre: 355 and 455, or consent. (Alt. years)

CE 654 Geotech Seismic Engineering (3) Soil and site response to dynamic loading, earthquake ground motions; stress waves and soil shear moduli; soil liquefaction theory, evaluation, analyses, and preventative design. Repeatable one time. A-F only. Pre: 355 and 455, or consent. (Alt. years)

CE 655 Slope and Earth Structures (3) Classification of landslides and triggering mechanisms; field investigation procedures; limit equilibrium slope stability methods; numerical techniques; seepage and dynamic considerations; cast studies. Repeatable one time. A-F only. Pre: 355 and 455, or consent. (Alt. years)

CE 656 Marine Geotechnics (3) Principles of geotechnical engineering applied to marine environments; marine geology; surveying and sampling methods; seabed sediment types, properties, and behavior; scour, erosion, and sediment transport; coastal and offshore foundations; seafloor stability; dredging and waste disposal. Repeatable two times. A-F only. Pre: 355 and 455, or consent. (Alt. years)

CE 657 Designing with Geosynthetics (3) An overview of geotechnical uses of geosynthetics, including product descriptions, applications, design methods, and case studies. Repeatable one time. A-F only. Pre: 355 and 455, or consent. (Alt. years)

CE 658 Earth Pressures (3) Estimation of lateral earth pressures; analysis and design of retaining walls and excavation support systems. Repeatable one time. A-F only. Pre: 355 and 455, or consent. (Alt. years)

CE 660 Transportation Evaluation and Logistics (3) Evaluation of transportation alternatives. Efficiency and effectiveness analysis. Logistics, network problems, exact and heuristic solution algorithms. Computer applications on evaluations and logistics. Pre: 361 and either 462 or 464; or consent.

CE 661 Intelligent Transportation Systems (3) Definition, technologies and their attributes. Analysis and implementation based on FHWA's User Services. Automated incident detection algorithms. Machine vision applications to traffic engineering. Repeatable. Pre: 462 or 464.

CE 662 Highway Capacity Analysis (3) Application of manual and computer-based techniques to the estimation of capacity and level of service. Recent research findings in capacity analysis are reviewed. Pre: 361 and 462, or consent.

CE 664 Advanced Transportation Modeling and Statistics (3) Demand modeling, discrete choice and activity-based modeling. Demand forecasting by simulation. Transportation surveys and sampling methods. Application of cluster, factor, regression, logistic and ARIMA analyses to transportation. A-F only. Pre: 305 and 464, or consent.

CE 671 Continuum Mechanics (3) Cartesian tensors in mechanics; coordinate transformations; analysis of stress and strain; principal values, invariants, equilibrium and compatibility equations; constitutive relations; field equations. Problems in elasticity. Pre: 370 or ME 371, or consent. (Cross-listed as ME 671)

CE 672 Project Management Systems (3) Project Integration and PMIS; organizational power; conflict, strategic, and life-cycle management in construction management; matrix structure compared to projectized structure; project success; team building; change and culture in construction organizations; competitive bidding. Pre: consent.

CE 675 Theory of Vibrations (3) Principal modes and natural frequencies of discrete and continuous elastic systems. Approximate methods. Forced motions, damping effects, wave propagation. Pre: consent.

CE 676 Structural Dynamics (3) Free and forced vibrations of structures with single and multi-degrees of freedom, analysis and design of structures to dynamic loads. Pre: 675. (Alt. years)

CE 680 Advanced Mechanics of Materials (3) Advanced topics in structural mechanics including three-dimensional stress and strain, torsion of non-circular sections, curved beams, fracture mechanics, beams on elastic foundation, and plates. Pre: 485 and 486; or consent.

CE 681 Theory of Modern Structural Analysis (3) Fundamentals of modern structural analysis theory, with emphasis on frame structures. Virtual work. Member stiffness/flexibility. Matrix formulation of stiffness and flexibility methods. Computer modeling issues. Pre: 381 or consent.

CE 682 Numerical Methods in Engineering (3) Numerical methods commonly used to solve civil engineering problems: linear and nonlinear equations, numerical integration, integration of ODEs, eigensolvers. Emphasis on implementation. Pre: programming background and graduate standing.

CE 683 Advanced Reinforced Concrete Design (3) Slender columns; biaxial bending; combined shear and torsion. Building lateral load resisting frame analysis and design—shearwalls, rigid frames. Floor system analysis and design—flat slabs, joist systems. Computer applications. Repeatable. Pre: 485.

CE 684 Nonlinear Structural Analysis (3) Computational methods and concepts in nonlinear structural analysis. Geometric and material nonlinearities. Solution strategies. Program development. Nonlinear structural behavior. Pre: 681 and 682, or consent.

CE 685 Advanced Structural Steel Design (3) Load and resistance factored design (LRFD); steel building modeling and analysis; moment-resisting frames; bracing systems; beam-columns; moment connections; composite construction; and plate girders. Repeatable. Pre: 482 (or concurrent) or 486, or consent.

CE 686 Finite Elements in Structures (3) Finite element method in structural engineering. Extension of structural theory. Virtual work. One-, two-, and three-dimensional elements; axisymmetric elements; plate bending. Application to linear problems. Pre: 671 (or concurrent) and 681, or consent.

CE 687 Prestressed Concrete (3) Behavior of prestressed concrete members, including prestress losses. Analysis and design of prestressed beams, slabs, and composite sections. Anchorage zone design; continuous systems. Pre: 485.

CE 688 Concrete Technology (3) Mixture proportioning with and without pozzolanic materials, aggregate testing, concrete testing, effects of admixtures, admixture side effects, nondestructive testing, and durability issues. Repeatable. A-F only. Pre: 375 and 485; or consent.

CE 690 GIS in Civil Engineering (3) Fundamental principles and components of vector-based GIS applications including spatial models, topological overlays, planar coordinate systems and projections, non-spatial (attribute) data models, and spatial analysis; hands-on exercises; individual term project required. A-F only. Pre: consent.

CE 691 Seminar in Civil Engineering I (1) Structures/transportation; water resources/environmental. Discussions and reports on literature, research developments and activities. Required of all graduate students. Repeatable two times. A-F only. Pre: consent.

CE 696 Selected Topics in Civil Engineering (3) Highly specialized topics in structures, soils, hydraulics, sanitary, water resources, applied mechanics, transportation. Repeatable. Pre: consent.

CE 699 Directed Readings or Research (V) Pre: consent.

CE 700 Thesis Research (V) Research for master's thesis.

CE 800 Dissertation Research (V) Research for doctoral dissertation. Pre: candidacy for PhD in civil engineering.

Communication (COM)

College of Social Sciences

COM 201 Introduction to Communication (3) An overview of communication emphasizing the interpersonal, intercultural, organizational and international communication, management, multimedia, mass media, and telecommunication perspectives.

COM 320 Organizational Communication (3) Communication in formal organizational contexts; research and theory of communication within organizations; role of communication in organizational effectiveness. Pre: 201 or consent.

COM 330 Telecommunication Concepts and Technologies (3) Basic electronics and concepts of telecommunication; orientation to telecom technologies including television, radio, cable, video disc, and telecom/computer convergence. Pre: 201 or consent.

COM 331 Fundamentals of Visual Media (3) Orientation to techniques of production. Emphasis on history, language, and theory of the creative process and application to video productions and multimedia. Pre: 201 or consent.

COM 335 Mass Communication (3) Introduction to mass communication theory. Emphasis placed on theoretical approaches to societal effects of media, human communication, and research traditions in mass communication. Pre: 201 or consent.

COM 337 Introduction to Multimedia (3) Combined lecture-lab course providing an orientation to, and examination of, procedures and techniques of multimedia. Emphasis on new media literacy, human-computer interaction, and basic design of electronic multimedia. Pre: 201 or consent.

COM 340 Intercultural Communication (3) Problems and opportunities of communication in a variety of intercultural contexts. Focus on theory, research, and managing intercultural effectiveness. Pre: 201 or consent.

COM 341 International Communication (3) Problems and opportunities of communication in a variety of international contexts. Focus on commerce, diplomacy, and mass communication. Pre: 201 or consent.

COM 350 Communication in Interpersonal Relationships (3) Theory and practice of interpersonal communication from a social science perspective. Pre: 201 or consent.

COM 401 Introduction to Communication Research Methods (3) Exploration of quantitative and qualitative research methods commonly used in communication studies. Practical experience will be offered. Pre: 201 or consent.

COM 420 Communication in Multicultural Organizations (3) Cultural diversity in multicultural and multinational organizations is examined regarding communication-related aspects of working life. Pre: 320 and 340, or consent.

COM 423 Applied Organizational Communication (3) Principles of organizational communication applied in organizational assessment, intervention, training, and development. Pre: 201 and junior standing, or consent.

COM 431 Video Production Lab I (3) Production of studio and remote video programming including news/information, instructional/educational, and dramatic formats. Lighting, sound, blocking, and equipment competency. Pre: 331 or consent.

COM 432 Telecommunication Services (3) Understanding human information needs as they relate to telecommunication services developed from new technologies. Pre: 330 or consent.

COM 433 Video Scriptwriting (3) Application of communication theory to creating and revising commercial and dramatic script material for video production. Pre: 331 or consent.

COM 434 Video Production Lab II (3) Creating, scripting, and producing complex programs. Media aesthetics and professional production, preparation, and execution are emphasized. Pre: 331 and 431, or consent.

COM 436 Media Effects (3) Social, political, economic, and cultural effects of broadcast media are examined to understand their impact on human behavior. Pre: 201 and junior standing, or consent.

COM 437 Interactive Multimedia Design and Development (3) The design, development, and evaluation of interactive computer-based multimedia communication. The course emphasizes authoring and production of such multimedia elements as full-motion images, audio, graphics, etc. Pre: 337 or consent.

COM 438 International Telecommunication (3) Development of international telecommunication with emphasis on political theory, social purposes, legal regulation, and competition among nations. Pre: 330 or consent.

COM 440 Intercultural Training and Intervention (3) This course describes programs designed to prepare, support, and train individuals, groups, and communities for effective intercultural interaction at home and abroad. Pre: 340 or consent.

COM 441 Communication Policy and Planning (3) Alternative models in policy and planning that bring about or inhibit social, economic, and technical development in communication systems and their environments. Pre: 201 and junior standing, or consent.

COM 442 Communication in the Pacific Hemisphere (3) Comparative communication processes, development communication, technology, knowledge and skill transfer, and regional communication issues in the Pacific hemisphere. Pre: 201 and junior standing, or consent.

COM 444 Communication and Gender (3) Theories, myths, and the missing links in gendered communication. Application of established and emerging theories of gender and communication to interpersonal, organizational, intercultural, and mass communication. Pre: 201 and junior standing, or consent.

COM 451 Communication and Law (3) Role of communication in the legal process; impact of law on communication processes. Pre: 201 and junior standing, or consent.

COM 452 Building Communication Theory (3) Major theories of communication in terms of requirements for a theory, theory development, associated research, and application. Pre: 201 and junior standing, or consent.

COM 453 Ethnography of Communication (3) The interactional basis of communication in normal everyday living. Students analyze face-to-face and mediated communication using ethnographic methods. Pre: 201 and junior standing, or consent.

COM 454 Communication Campaigns (3) Communication strategies and research methods that lead to effective campaign programs. Focus

on political, marketing, and public communication campaigns. Pre: 201 and junior standing, or consent.

COM 459 Special Topics (3) Topics of interest to faculty and students; taught by regular and visiting faculty. Repeatable on different topics to 6 credit hours. Pre: 201 and junior standing, or consent.

COM 480 Communication Seminar (3) Application of theoretic and methodological criteria to researchable questions. Topics will vary. Pre: 201 and senior standing, or consent.

COM 490 Senior Thesis Project (3) Completion of the thesis project appropriate to the selected area of concentration within the context of a seminar. Pre: 201 and senior standing, or consent.

COM 495 Communication Internship (V) Analysis of communication processes under faculty supervision through participation in the operations of an organization. Repeatable up to 3 credit hours. Pre: 201 and junior standing, or consent.

COM 499 Special Problems (V) Independent study of selected topics under faculty supervision. Repeatable up to 3 credit hours. Pre: 201 and junior standing, or consent.

COM 500 Master's Plan B/C Studies (1)

COM 611 Communication Theories (3) Systematic study of major theories of communication and current status of communication research.

COM 612 Communication Research Methods (3) Introduction to the major steps in the research process. Emphasis on the methodological approaches to making choices among alternatives at each step of a research cycle.

COM 623 Organizational Communication (3) Communication theory/research applied to formal organizations; assessments of strengths and weaknesses of organizational communications systems. Pre: 611 (or concurrent) or consent.

COM 624 Organizational Communication Training (3) Designing and implementing training systems in organizations; conducting training programs; evaluating training program effectiveness. Pre: 612 (or concurrent) or consent.

COM 633 Telecommunication Architectures (3) Telecommunication structures, processes, and networks as an area of research and study in the social sciences. Pre: 611 (or concurrent) or consent.

COM 634 Telecommunication Services (3) Systematic study from a social science perspective of current and emerging teleservices. Attention to user needs and impact, and to teleservice design. Pre: 612 (or concurrent) or consent.

COM 643 Intercultural Communication (3) Problems and opportunities of intercultural communication from theory and research, consulting and training, and policy and program perspectives. Pre: 611 (or concurrent) or consent.

COM 644 International Communication (3) Principles and practices of international communication from the perspectives of relevant theories, focusing on problems in an information age. Pre: 612 (or concurrent) or consent.

COM 645 Mass Communications (3) An introduction to major mass media theories, research trends and literature. A-F only. Pre: 611 (or concurrent) or consent.

COM 650 Communication Policy (3) Examination of the formation and implementation of communication policy in world, national, and local arenas. Key concepts; role in development. Pre: 611 (or concurrent) or consent.

COM 660 Communication Planning (3) Processes and methods of planning appropriate to the communication sector, including cultural, information, and media industries and organizations. Pre: 611 (or concurrent) or consent.

COM 691 Communication Topics (3) Coverage in depth of some area of theory and research. Repeatable. Pre: 611 and 612, or consent.

COM 692 General Research Seminar (3) Application of theoretic and methodological criteria to a researchable question. Pre: 611 and 612, or consent.

COM 695 Communication Practicum (V) Supervised work experience, study of an organization, and career planning. Required of Plan B students in the main communication program. Repeatable. CR/NC only. Pre: 611 and 612, or consent.

COM 699 Directed Reading and Research (V) Individual reading and/or research. Pre: consent.

COM 700 Thesis Research (V)

Communication and Information Sciences (CIS)

CIS 699 Directed Reading and/or Research (V)

CIS 701 Communication/Information Theories of Society (3) A critical review of major theoretical and empirical traditions in communication and information sciences. Focus on European, American, Third World, and applied research. Pre: consent.

CIS 702 Communication/Information Technologies (3) Technological concepts underlying data communications; information processing and computers; communication channels and networks, information storage and retrieval, and computer hardware and software. Pre: consent.

CIS 703 Communication/Information Research Methods (3) Current research methodologies in decision sciences, computer science, library science, and communication. Emphasis on methodologies suitable for interdisciplinary analysis. Pre: consent.

CIS 720 Interdisciplinary Seminar in Communication and Information Science (1) Exploration of relationships between disciplines in social sciences, science and technology, and humanities. Faculty and student presentations. Pre: consent.

CIS 799 Directed Reading and/or Research (V) Individualized program of directed reading and/or research outside the scope of regularly titled courses. Pre: consent. Plan must include goals and rationale.

CIS 800 Dissertation Research (V)

Counseling and Guidance (EDCG)

College of Education

EDEP 429 is a prerequisite for the graduate program in counseling and guidance and is to be completed before advancement to candidacy.

EDCG 402 Guidance and Classroom Management (3) Guidance principles applied to classroom management for teachers. Pre: consent.

EDCG 470 Ethnic Groups and Education in Hawai'i (3) Identity and learning within and among Hawai'i ethnic groups; study of prejudice and inter-ethnic hostilities as these impact education and teaching. Pre: consent. (Cross-listed as EDEF 470)

EDCG 500 Master's Plan B/C Studies (1) Enrollment for degree completion. Pre: master's Plan B or C candidate and consent.

EDCG 581 (Alpha) Educational Workshop in Guidance (1) For counselors, counseling and guidance teachers, and other personnel to develop new approaches, attitudes, and ideas pertaining to the role and function of counseling and guidance in school, community, and state. (B) elementary school; (C) middle school; (D) high school; (E) college; (F) rehabilitation; (G) career; (H) evaluation and assessment; (I) personal development; (J) research methods; (K) guidance technique for classroom teachers; (M) counseling and social issues; (N) counselor as consultant; (O) program development; (P) geriatric; (Q) adult development. Repeatable with different content. CR/NC only.

EDCG 582 (Alpha) Educational Workshop in Guidance (2) For counselors, counseling and guidance teachers, and other personnel to develop new approaches, attitudes, and ideas pertaining to the role and function of counseling and guidance in school, community, and state. (B) elementary school; (C) middle school; (D) high school; (E) college; (F) rehabilitation; (G) career; (H) evaluation and assessment; (I) personal development; (J) research methods; (K) guidance technique for classroom teacher; (M) counseling and social issues; (N) counselor as consultant; (O) program development; (P) geriatric; (Q) adult development. Repeatable with different content. CR/NC only.

EDCG 583 (Alpha) Educational Workshop in Guidance (3) For counselors, counseling and guidance teachers and other personnel to develop new approaches, attitudes, and ideas pertaining to the role and function of counseling and guidance in school, community, and state. (B) elementary school; (C) middle school; (D) high school; (E) college; (F) rehabilitation; (G) career; (H) evaluation and assessment; (I) personal development; (J) research methods; (K) guidance technique for classroom teacher; (M) counseling and social issues; (N) counselor as consultant; (O) program development; (P) geriatric; (Q) adult development. Repeatable with different content. CR/NC only.

EDCG 603 Introduction to Practicum (3) Pre-practicum training for supervised experiences in school, community, and human service organizations. Focus on the counseling relationship. Includes a specialty observation-participation field experience. Pre: consent.

EDCG 604 Career Development and Vocational Counseling (3) Theory and practice in career development and vocational counseling with individuals and groups; utilization of educational, vocational, and social resources in career counseling. Pre: consent.

EDCG 605 Human Growth and Development—Life Span (3) Life span perspective on psychological, social, and physical development. Major theories and related research on human development; applications in policy planning and service delivery in counseling. Pre: consent.

EDCG 607 Planning and Design of Counseling Research (3) Integration and synthesis of counseling research principles in field settings; construction and formulation of research proposals. Pre: consent and classified counseling and guidance major.

EDCG 608 Counseling: Group Theory and Practice (3) Theories and techniques of group counseling and guidance as preparation for practicum and internship. Application in school, college, rehabilitation, and community settings. Pre: 603, 610, and consent.

EDCG 609 Tests and Inventories in Guidance (3) Tests and inventories for the assessment of aptitudes, achievement, and interests. Applications to educational, instructional, and career guidance. Pre: consent.

EDCG 610 Counseling: Theory and Practice (3) Theory and techniques of counseling and guidance as preparation for practicum and internship. Application in school, college, rehabilitation, and community settings. Pre: consent.

EDCG 611 Problems of School Adjustment (3) Principles of behavior affecting interpersonal relationships in school with emphasis on application to actual situations. Pre: consent.

EDCG 613 Counseling in the Schools (3) History, philosophy, and organization of school counseling programs. Counselor role and functions, legal and ethical issues, contemporary issues, current methodology and resources. (Meets EdD common core elective.) Pre: consent.

EDCG 614 Theory and Assessment of Intelligence (3) Theory and supervised experience in individual intelligence testing, psychological report writing; psychometric and social issues in intelligence testing. Pre: 609 and consent.

EDCG 615 Theory and Assessment of Personality (3) Personality testing; practice in administration and use of personality assessment; examination of psychometric and social issues. Pre: 609 and consent.

EDCG 620 Cross-Cultural Counseling (3) Significance of cultural factors in counseling relationships, delivery of counseling services in multicultural settings with attention to Hawai'i. Emphasis on process of cultural learning and implications for counselor roles and functions. Pre: consent.

EDCG 630 Introduction to Community Services (3) Philosophy, organization, and function of community service agencies, programs, and institutions as related to professional work in counseling and guidance. Pre: consent.

EDCG 646 American College Student (3) Psychosocial characteristics of American college students and college environment, from viewpoint

of student personnel work. Pre: consent. (Cross-listed as EDEA 646)

EDCG 650 Substance Abuse Counseling (3)

Major theories on substance abuse behaviors, etiology, developmental aspects, socio-environmental issues, and prognosis. Theory and techniques in counseling, assessment, rehabilitation, prevention, and intervention. Pre: consent.

EDCG 654 Child Abuse: Counseling Practice and Theory (3)

Historical aspects and contemporary sociocultural, and political attitudes and practices. Treatment and prevention theories and techniques in context of developmental psychology. Pre: consent.

EDCG 660 Marriage, Family, and Child Counseling (3)

Theory/practice of marriage, family, and child counseling, including major model in clinical practice; supervised counseling project by each student. Liability insurance required. Pre: 603, 608, 610, and consent.

EDCG 670 Consultation: Theory and Practice (3)

Consultation in educational, business, health, community, and human services agencies. Pre: 603, 608, 610, and consent.

EDCG 680 Principles and Practice of Rehabilitation Counseling (3)

Principles, practices of rehabilitation counseling; review of history and influence of legislation on vocational rehabilitation; current issues, developments, with emphasis on local situation. Pre: consent.

EDCG 681 Psychosocial Aspects of Disability (3)

Major theoretical and conceptual approaches to the understanding of adjustment to disability. Psychological and societal factors will be considered as they apply to the adult disabled in general, as well as to individuals with specific disabilities. Pre: 680 and consent.

EDCG 682 Medical Aspects of Disability (3)

Systematic presentation of medical aspects of most prevalent handicapping conditions. Analysis of rehabilitation process in selected cases. Pre: consent.

EDCG 688 Theory and Techniques of Job Placement (3)

Theory, process, and techniques of job readiness, job development, and job placement. Pre: 604 and consent.

EDCG 689 Vocational Evaluation and Assessment in Rehabilitation (3)

Theory, process, and techniques of vocational evaluation and assessment. Assessment methods and processes as they relate to vocational choice and adjustment of special groups. Pre: 609 and consent.

EDCG 699 Directed Reading and/or Research (V)

Individual reading and/or research. Pre: written consent of instructor and department chair.

EDCG 700 Thesis Research (V)

Research for master's thesis. Pre: master's Plan A candidate and consent.

EDCG 701 (Alpha) Seminar in Counseling (3)

In-depth study of professional concerns in specialty area. (B) school counseling; (C) college counseling; (D) rehabilitation counseling; (E) community service counseling. Pre: 703, classified counseling and guidance major, and consent.

EDCG 703 (Alpha) Practicum (3)

Supervised experience (150 clock hours per semester) in counseling and guidance activities, which includes a weekly class meeting: (B) elementary; (C) middle

school; (D) high school; (E) college; (F) rehabilitation counseling; (G) community service. Repeatable. Pre: 603, classified counseling and guidance major, and consent.

EDCG 704 Contemporary Issues in Counseling (3)

Current issues and problems. (Meets EdD common required elective.) Repeatable. Pre: consent.

EDCG 733 (Alpha) Internship (6)

Supervised post-practicum experience (300 clock hours per semester) in counseling and guidance activities: (B) elementary; (C) middle school; (D) high school; (E) college; (F) rehabilitation; (G) community service. Repeatable. Pre: 703, classified counseling and guidance major, and consent.

Dance (DNCE)

College of Arts and Humanities

DNCE 121 Beginning Ballet Technique (3)

Introduction to classical ballet technique. Repeatable three times. **AHLI**

DNCE 122 Continuing Ballet Technique (3)

Continuation of beginning classical ballet technique. Repeatable. Pre: 121 or consent. **AHLI**

DNCE 131 Beginning Modern Dance Technique (3)

Introduction to modern dance technique. Repeatable. **AHLI**

DNCE 132 Continuing Modern Technique (3)

Continuation of beginning modern dance technique. Repeatable. Pre: 131 or consent. **AHLI**

DNCE 141 Beginning Jazz Technique (3)

Introduction to beginning jazz technique.

DNCE 142 Continuing Jazz Technique (3)

Continuation of beginning jazz technique. Repeatable. Pre: 141 or consent.

DNCE 150 Introduction to Dance (3)

Survey the development of major dance styles and their relationship to contemporary choreography. **AHLI**

DNCE 151 Music Theory for Dancers (3)

Elements of music and relationship to dance; emphasis on rhythmic analysis. (Alt. years)

DNCE 152 Music Theory for Dancers (3)

Elements of music and relationship to dance; emphasis on form and literature. Pre: 151 or consent. (Alt. years)

DNCE 186 (Alpha) Individual Dance Instruction (1)

Instruction at introductory level. Representative works. (B) Japanese; (C) Korean; (D) Philippine; (E) Okinawan; (F) Indian. Pre: audition or consent.

DNCE 221 Low Intermediate Ballet Technique (3)

Low intermediate ballet technique. Repeatable. Pre: 122 or consent.

DNCE 222 Low Intermediate Ballet Technique (3)

Low intermediate ballet technique. Repeatable. Pre: 221 or consent.

DNCE 231 Low Intermediate Modern Technique (3)

Low intermediate modern dance technique. Repeatable. Pre: 131 or consent.

DNCE 232 Low Intermediate Modern Technique (3)

Low intermediate modern dance technique. Repeatable. Pre: 231 or consent.

DNCE 250 Dance Production (3) Survey of historical, theoretical, and practical aspects; work in scenery, lighting, costume, makeup, and theater management.

DNCE 255 Dance in World Cultures (3)

Multimedia overview of world dance forms, with emphasis on Asia and the Pacific, and related concepts. Pre: sophomore standing or consent. **AHLI**

DNCE 260 Movement Fundamentals (1)

Organized somatic systems as a framework for understanding movement and dance techniques. Required for majors. Repeatable twice.

DNCE 286 (Alpha) Individual Dance Instruction (1)

Instruction at the second level. Representative works. (B) Japanese; (C) Korean; (D) Philippine; (E) Okinawan; (F) Indian. Pre: promotion from 186 or equivalent by audition.

DNCE 301 Asian Dance I (V)

Performance and techniques at the introductory level. Pre: upper division standing or consent. **AHLI**

DNCE 302 Chinese Dance I (1)

Performance and techniques at the introductory level. Pre: upper division standing or consent. **AHLI**

DNCE 303 Japanese Dance I (1)

Performance and techniques at the introductory level. Pre: upper division standing or consent. **AHLI**

DNCE 304 Javanese Dance I (1)

Performance and techniques at the introductory level. Pre: upper division standing or consent. **AHLI**

DNCE 305 Korean Dance I (1)

Performance and techniques at the introductory level. Pre: upper division standing or consent. **AHLI**

DNCE 306 Okinawan Dance I (1)

Performance and techniques at the introductory level. Pre: upper division standing or consent. **AHLI**

DNCE 307 Philippine Dance I (1)

Performance and techniques at the introductory level. Pre: upper division standing or consent. **AHLI**

DNCE 311 Oceanic Dance I (1)

Performance and techniques at the introductory level. Pre: upper division standing or consent. **AHLI**

DNCE 321 Intermediate Ballet Technique (3)

Intermediate ballet technique. Repeatable. Pre: 222 or consent.

DNCE 331 Intermediate Modern Technique (3)

Intermediate modern dance technique. Repeatable. Pre: 232 or consent.

DNCE 334 Taiji (T'ai Chi) for Actors I (3)

Basic Taijiquan (T'ai Chi Ch'uan) movement training. Pre: THEA 221 and THEA 222, or consent. (Cross-listed as THEA 334)

DNCE 360 Dance Kinesiology (3)

Practical information for dance students on diet and nutrition, anatomy, training and conditioning, and injury prevention. Pre: 260 or consent.

DNCE 361 Elementary Labanotation (3)

Elementary theory of Labanotation with practical application in scoring and reconstructing dances. Pre: 151 or MUS 180, or consent. (Alt. years)

DNCE 362 Intermediate Labanotation (3)

Intermediate theory of Labanotation with practical application in scoring and reconstructing dances. Pre: 361 or consent. (Alt. years)

DNCE 370 Dance Improvisation (3)

Improvisation in dance as creative experience, as source of new movement ideas, and as means of developing

spontaneity in performance. Repeatable. Pre: 222, 232, or consent.

DNCE 371 Dance Composition I (3) Elementary techniques and theories for creating and crafting concert dances. Pre: 370 and 231, or consent.

DNCE 372 Dance Composition II (3) Intermediate techniques and theories for creating and crafting concert dances. Pre: 371 or consent.

DNCE 386 (Alpha) Individual Dance Instruction (1) Instruction at the third level. Representative works. (B) Japanese; (C) Korean; (D) Philippine; (E) Okinawan; (F) Indian. Pre: promotion from 286 or equivalent by audition.

DNCE 401 Asian Dance II (V) Performance and techniques at intermediate level. Repeatable. Pre: 301 or consent. **AHL1**

DNCE 402 Chinese Dance II (1) Performance and techniques at intermediate level. Repeatable. Pre: 302 or consent. **AHL1**

DNCE 403 Japanese Dance II (1) Performance and techniques at intermediate level. Repeatable. Pre: 303 or consent. **AHL1**

DNCE 404 Javanese Dance II (1) Performance and techniques at intermediate level. Repeatable. Pre: 304 or consent. **AHL1**

DNCE 405 Korean Dance II (1) Performance and techniques at intermediate level. Repeatable. Pre: 305 or consent. **AHL1**

DNCE 406 Okinawan Dance II (1) Performance and techniques at intermediate level. Repeatable. Pre: 306 or consent. **AHL1**

DNCE 407 Philippine Dance II (1) Performance and techniques at intermediate level. Repeatable. Pre: 307 or consent. **AHL1**

DNCE 411 Oceanic Dance II (1) Performance and techniques at intermediate level. Repeatable. Pre: 311 or consent. **AHL1**

DNCE 421 Advanced Ballet Technique (3) Advanced ballet technique. Repeatable. Pre: 321 or consent.

DNCE 423 Ballet Pointe Technique (1) Advanced level pointe technique. Repeatable. Co-requisite: 421.

DNCE 431 Advanced Modern Technique (3) Advanced modern dance technique. Repeatable. Pre: 331 or consent.

DNCE 433 Movement Workshop (V) Special workshops in movements relating to specific departmental theatrical productions beyond the scope of movement taught in 437 and 438. Repeatable. Pre: 435, THEA 435, or consent. (Cross-listed as THEA 433) (Alt. years)

DNCE 434 Taiji (T'ai Chi) for Actors II (3) Intermediate-level Taijiquan (T'ai Chi Ch'uan) movement training. Pre: 334 or 373, or consent. (Cross-listed as THEA 434)

DNCE 435 Movement for Actors (3) Training actors to discover experientially the sources of movement; to teach skills for analyzing movement for its mechanical, anatomical, spatial, and dynamic content; and then to apply these skills in a role. Pre: 231 or THEA 222. (Cross-listed as THEA 435)

DNCE 436 Advanced Movement for Actors (3) Detailed development of material presented in 435. Focus on Bartenieff fundamentals and

movement analysis as it applies to the physical interpretation of theatrical roles. Pre: 435 or THEA 435, or consent. (Cross-listed as THEA 436) (Alt. years)

DNCE 437 Period Movement Styles, 1450–1650 (3) Movement styles and social deportment of European societies in the Renaissance and early Baroque periods. Pre: DNCE 435, THEA 435, one semester of a 100-level dance technique class, or consent. (Cross-listed as THEA 437) (Alt. years)

DNCE 438 Period Movement Styles, 1650–1800 (3) Movement styles and social deportment of the Baroque and pre-Romantic periods in Europe and the American colonies. Pre: 435, THEA 435, one semester of a 100-level dance technique class, or consent. (Cross-listed as THEA 438) (Alt. years)

DNCE 439 Musical Theater Dance Forms (3) Theatrical dance forms used in 20th-century musical theater. Pre: one of 221, 231, or THEA 421; or consent. (Cross-listed as THEA 439) (Alt. years)

DNCE 452 Dance History I: Ritual to Theater (3) Development of Western theatrical dance from Ancient Greece through 19th-century ballet. Pre: upper division standing or consent.

DNCE 453 Dance History II: 20th Century to the Present (3) Development of modern dance, contemporary ballet, and dance forms of musical theater and film. Pre: upper division standing or consent.

DNCE 458 Field Experiences in Dance (V) Field experiences in relevant contexts under professional and faculty supervision. Repeatable once. CR/NC only. Pre: upper division standing and consent.

DNCE 459 Topics in Dance (V) Readings, research, and/or field and movement experiences. Repeatable if topic changes. Pre: upper division standing and consent.

DNCE 470 Dance Performance (1) Performance in various dance styles and settings. By audition only. Repeatable. Pre: 221, 231, or consent.

DNCE 471 Improvisation II (1) Advanced-level dance improvisation. Repeatable. Pre: 370 or consent.

DNCE 480 Dance Repertory (V) Preparation of standard and new works for performance. Repeatable. Pre: consent.

DNCE 486 (Alpha) Individual Dance Instruction (1) Instruction at the fourth level. Representative works. (B) Japanese; (C) Korean; (D) Philippine; (E) Okinawan; (F) Indian. Repeatable. Pre: promotion from 386 or equivalent by audition.

DNCE 490 Creative Dance (3) Dance activities for young people. Appropriate for teachers, group workers, recreation majors, and others working with children. Also adults with special needs. Supervised field activities. Pre: upper division standing or consent.

DNCE 495 Senior Project (1) Individual choreographic project; student choreographs, performs, and oversees all technical aspects of a creative project; tutorial. Pre: 372, senior standing, and consent.

DNCE 499 Directed Work (V) Individual projects, tutorial. Pre: consent.

DNCE 500 Master's Plan B/C Studies (1) Enrollment for degree completion. Pre: master's Plan B or C candidate and consent.

DNCE 618 Digital Multimedia Tools for Performance Research (3) Dance, Theatre, Music Majors only. A-F only. Repeatable one time. Pre: consent. (Cross-listed as THEA 618)

DNCE 651 Seminar in Dance Research (3) Research materials and methods; preparation for thesis and scholarly research reporting. Required for graduate concentrations in dance. (Alt. years)

DNCE 652 Seminar: Dance Theory and Criticism (3) Major theories of dance and dance criticism; emphasis on Western ideas. Pre: 452 and 453, or consent.

DNCE 653 Dance Ethnology Seminar (3) Exemplary studies and field research. (Alt. years)

DNCE 654 Regional Dances of Asia (3) Dance content and historico-social context of principal dance traditions. Repeatable. (Alt. years)

DNCE 655 Regional Dances of Oceania (3) Dance content and historico-social context of principal dance traditions. Repeatable. (Alt. years)

DNCE 659 Advanced Topics in Dance (V) Readings, research, and/or field movement experiences. Repeatable if topic changes. Pre: graduate standing or consent.

DNCE 660 Laban Movement Analysis (3) Study and application of Laban Movement Analysis as a framework for enhancing analytical and artistic abilities. Pre: 260 (or concurrent) and 360 (or concurrent); or consent.

DNCE 661 Advanced Problems in Movement Analysis (3) Advanced skills in movement analysis and interpretation of movement scores. Emphasis on Labanotation. Repeatable. Pre: 362. (Alt. years)

DNCE 671 Advanced Choreography (3) Advanced analytic and creative study. Pre: 372 or consent. (Alt. years)

DNCE 672 Dance Performance (V) Graduate performance in various dance styles and settings. By audition only. Repeatable. Pre: consent.

DNCE 679 Directed Choreography (1) Concert choreography for selected performance settings under the direction of a faculty adviser. Repeatable. Pre: 372 (or concurrent) or 671 (or concurrent); or consent.

DNCE 691 Seminar in Teaching Dance/Theater (3) Pedagogy and classroom experience in teaching technique and theory. (Cross-listed as THEA 691) (Alt. years)

DNCE 692 Seminar: Theater and Dance for Children (3) Theories and methods applied in theatrical experiences with and for children: creative movement/drama, puppetry, and theater/dance. Pre: one of 490, THEA 470, THEA 474, or THEA 476. (Cross-listed as THEA 779)

DNCE 693 Internship: Youth Theater/Dance (V) Supervised leadership experiences in dance/theater program with children. Students spend nine hours per week in supervised setting and three hours in weekly class meeting. Pre: 490, THEA 470, or THEA 476; or consent. (Cross-listed as THEA 693)

DNCE 695 Dance Colloquium (1) Forum for presentation and discussion of current intellectual and artistic activities in the dance field. Repeatable three times. Pre: consent.

DNCE 699 Directed Reading and Research (V) Individual projects: tutorial. Pre: consent.

DNCE 700 Thesis Research (V)

DNCE 790 Issues in Youth Theater (3) Examination of current issues, problems, and future directions in curriculum theory and design as it applies to theater and dance education. Pre: one of 490, THEA 470, or THEA 474; or consent. (Cross-listed as THEA 778)

Dental Hygiene (DH)

School of Nursing and Dental Hygiene

Dental hygiene courses must be taken in sequence and are open only to those admitted to the program by the Department of Dental Hygiene.

DH 231 Oral Anatomy and Tooth Morphology (2) The study of the structure and functions of the head and neck with emphasis on structures in or related to the oral cavity; of tooth morphology. Repeatable once. A–F only. Pre: BIOC 241, PHYL 103, PHYL 103L, or equivalent. Co-requisite: 231L.

DH 231L Oral Anatomy and Tooth Morphology Lab (2) (2 3-hr Lab) Application of DH 231 didactic concepts to laboratory activities and practices. Repeatable once. A–F only. Pre: BIOC 241 and PHYL 103, PHYL 103L, or equivalent. Co-requisite: 231.

DH 238 Basic Dental Hygiene I (2) Relationship to dentistry, problems, trends, issues; role and functions of dental hygienists in prevention and control of chronic oral diseases; preliminary dental hygiene clinical and support procedures including vital signs; team concepts in dentistry. Repeatable once. A–F only. Co-requisite: 238L and 239L.

DH 238L Basic Dental Hygiene I Lab (1) Application of preliminary dental hygiene clinical and support procedures including instrumentation, vital signs, and team concepts in dentistry. Repeatable once. A–F only. Co-requisite: 238 and 239L.

DH 239L Basic Dental Hygiene I Lab (1) Application of preliminary dental hygiene clinical and support procedures including instrumentation, vital signs, and team concepts in dentistry. Repeatable one time. A–F only. Co-requisite: 238/238L.

DH 240 Basic Dental Hygiene II (2) Basic dental hygiene theory and skills including competencies in health history taking, examination, patient care plan, oral prophylaxis, application of caries preventive agents, plaque control and support procedures. A–F only. Pre: 239 and 239L. Co-requisite: 240L, 241L, and 242L.

DH 240L Basic Dental Hygiene Lab/Clinic (1) (1 4-hr Lab/Clinic) Laboratory and clinical experiences in basic dental hygiene skills and competencies including history taking, examination, patient care plan, oral prophylaxis, application of caries preventive agents, and clinic

procedures. A–F only. Pre: 239 and 239L. Co-requisite: 240, 241L, and 242L.

DH 241L Basic Dental Hygiene Lab/Clinic (1) (1 6-hr Lab/Clinic) Laboratory and clinical experiences in basic dental hygiene skills and competencies including history taking, examination, patient care plan, oral prophylaxis, application of caries preventive agents, and clinic support procedures. A–F only. Pre: 239 and 239L. Co-requisite: 240, 240L, and 242L.

DH 242L Basic Dental Hygiene Lab/Clinic (1) (1 4-hr Lab/Clinic) Laboratory and clinical experiences in basic dental hygiene skills and competencies including history taking, examination, patient care plan, oral prophylaxis, application of caries preventive agents, and clinic support procedures. A–F only. Pre: 239 and 239L. Co-requisite: 240, 240L, 241L.

DH 250 General and Oral Histology and Embryology (2) Cells and tissues and their embryologic origin, with particular reference to teeth and their supporting structures. Pre: 231 (or concurrent). Fall only.

DH 251 General and Oral Histology and Embryology (1) Continuation of 250. Pre: 250. Spring only.

DH 281 Dental Radiography (2) Basic principles of radiation and fundamental information to understand and safely use radiation in dental radiography. A–F only. Repeatable. Pre: 231. Co-requisite: 281L.

DH 281L Dental Radiography Lab/Clinic (1) (1 3-hr Lab/Clinic) Preparation and evaluation of radiographic survey of patients with varying dentition; methods, and indications of safety considerations in clinical application of roentgen rays. A–F only. Repeatable. Pre: 231. Co-requisite: 281.

DH 361 Health Education and Promotion (2) Provides an overview of the concepts and application of health education and health promotion theories and principles as applies to individuals, groups and the larger public. Pre: open to non-nursing majors with consent. (Cross-listed as NURS 361) Fall only.

DH 366 General and Oral Pathology (2) Nature and causes of disease, progress and termination or associated alterations of tissue, diseases affecting teeth and structures of oral cavity. Pre: 250 and 251 (or concurrent). Spring only.

DH 367 General and Oral Pathology (1) Continuation of 366. Pre: 366. Fall only.

DH 369 Dental Materials (1) Science of dental materials and its application to dentistry and dental hygiene. Repeatable one time. A–F only. Pre: 231. Co-requisite: 369L.

DH 369L Dental Materials Lab/Clinic (1) Laboratory and clinical application of concepts in the science of dental materials. Repeatable one time. A–F only. Pre: 231. Co-requisite: 369.

DH 370 Expanded Functions in Dental Hygiene (2) Basic concepts of expanded functions in dental hygiene. A–F only. Repeatable. Pre: 369. Co-requisite: 370L.

DH 370L Expanded Functions Lab/Clinic (1) (2 1.5-hr Lab/Clinic) Application of basic concepts of expanded functions in dental hygiene. A–F only. Repeatable. Pre: 369. Co-requisite: 370.

DH 375 Clinical Dental Hygiene I (2)

Development of dental hygiene concepts and skills; emergency procedures; team approach to dentistry, planning, implementing and evaluating total oral hygiene care of patients; review and critical analysis of current dental periodicals and research. Repeatable one time. A–F only. Pre: 240/240L, 241L, 242L, 281/281L, and 389. Co-requisite: 375L, 376L, 377L, and 378L.

DH 375L Clinical Dental Hygiene I Clinic (1) Clinical instruction and application of dental hygiene concepts and skills; emergency procedures; team approach to dentistry; planning, implementing, and evaluating total oral hygiene care of patients; review and critical analysis of current dental periodicals and research. Repeatable one time. A–F only. Pre: 240/240L, 241L, 242L, 281/281L, and 389. Co-requisite: 375, 376L, 377L, and 378L.

DH 376L Clinical Dental Hygiene I Clinic (1) Clinical instruction and application of dental hygiene concepts and skills; emergency procedures; team approach to dentistry; planning, implementing, and evaluating total oral hygiene care of patients; review and critical analysis of current dental periodicals and research. Repeatable once. A–F only. Pre: 240/240L, 241L, 242L, 281/281L, and 389. Co-requisite: 375/375L, 377L, and 378L.

DH 377L Clinical Dental Hygiene I Clinic (1) Clinical instruction and application of dental hygiene concepts and skills; emergency procedures; team approach to dentistry; planning, implementing, and evaluating total oral hygiene care of patients; review and critical analysis of current dental periodicals and research. Repeatable one time. A–F only. Pre: 240/240L, 241L, 242L, 281/281L, and 389. Co-requisite: 375, 375L, 376L, and 378L.

DH 378L Clinical Dental Hygiene I Clinic (1) Clinical instruction and application of dental hygiene concepts and skills; emergency procedures; team approach to dentistry; planning, implementing, and evaluating total oral hygiene care of patients; review and critical analysis of current dental periodicals and research. Repeatable once. A–F only. Pre: 240/240L, 241L, 242L, 281/281L, and 389. Co-requisite: 375/375L, 376L, and 377L.

DH 380 Clinical Dental Hygiene II (2) Continuation of 379. Pre: 379. Spring only.

DH 380L Clinical Dental Hygiene II Clinic (1) (1 6-hr Clinic) Continuation of 379. Clinical application of dental hygiene concepts and skills; emergency procedures; team approach to dentistry; planning, implementing and evaluating total oral hygiene care to patients. A–F only. Pre: 379. Co-requisite: 380, 381L, 382L, and 383L.

DH 381L Clinical Dental Hygiene II Clinic (1) (1 6-hr Clinic) Continuation of 379. Clinical application of dental hygiene concepts and skills; emergency procedures; team approach to dentistry; planning, implementing, and evaluating total oral hygiene care to patients. A–F only. Pre: 379. Co-requisite: 380, 380L, 382L, and 383L.

DH 382L Clinical Dental Hygiene II Clinic (1) (1 4-hr Clinic) Continuation of 379. Clinical application of dental hygiene concepts and skills; emergency procedures; team approach to dentistry; planning, implementing, and evaluating total oral hygiene care to patients. A–F only. Pre: 379. Co-requisite: 380, 380L, 381L, and 383L.

DH 389 Pain Control and Local Anesthesia in Dentistry (2) Basic concepts of pain control and local anesthesia in dentistry with appropriate emphasis on psychological preparation, pharmacological preparation, and safe and effective administration of anesthesia in the practice of dental hygiene. Pre: 231, 239, and 250. Co-requisite: 240, 251, and 366. Spring only.

DH 390 Periodontology I (2) Normal periodontium, etiology, pathogenesis, clinical manifestations and epidemiology of periodontal diseases, and mode of periodontal therapy. Repeatable one time. A-F only. Pre: 240, 251, and 366. Fall only.

DH 391 Periodontology II (2) Continuation of DH 390. Normal Periodontium, etiology, pathogenesis, clinical manifestations and epidemiology of periodontal diseases, and mode of periodontal therapy. Repeatable one time. A-F only. Pre: 390. Spring only.

DH 473 Community Health (3) Introduction and application of the principles of health education and dental public health into practice in schools, community agencies, and private dental offices (inclusive of problem assessment, planning, implementation and evaluation processes); epidemiology and biostatistics. A-F only. Pre: 361. Fall only.

DH 475 Advanced Clinical Dental Hygiene II (2) An in-depth knowledge and clinical application of expanded function in periodontics with emphasis on principles, techniques, procedures in pain-anxiety control, soft tissue curettage, host factors, and modification of behavior. Repeatable one time. A-F only. Pre: 380/380L, 381L, 382L, 383L, and 391. Co-requisite: 475L, 476L, 477L, and 478L.

DH 475L Advanced Dental Hygiene I Clinic A (1) Application of knowledge of expanded functions in periodontics with emphasis on principles, techniques, procedures in pain-anxiety control, soft tissue curettage, host factors, and modification of behavior. Repeatable one time. A-F only. Pre: 380/380L, 381L, 382L, 383L, and 391. Co-requisite: 475, 476L, 477L, and 478L. Fall only.

DH 476L Advanced Dental Hygiene I Clinic B (1) Application of knowledge of expanded functions in periodontics with emphasis on principles, techniques, procedures in pain-anxiety control, soft tissue curettage, host factors, and modification of behavior. Repeatable one time. A-F only. Pre: 380/380L, 381L, 382L, 383L, and 391. Co-requisite: 475, 475L, 477L, and 478L. Fall only.

DH 477L Advanced Dental Hygiene I Clinic C (1) Application of knowledge of expanded functions in periodontics with emphasis on principles, techniques, procedures in pain-anxiety control, soft tissue curettage, host factors, and modification of behavior. Repeatable one time. A-F only. Pre: 380/380L, 381L, 382L, 383L, and 391. Co-requisite: 475, 475L, 476L, and 478L. Fall only.

DH 478L Advanced Dental Hygiene I Clinic D (1) Application of knowledge of expanded functions in periodontics with emphasis on principles, techniques, procedures in pain-anxiety control, soft tissue curettage, host factors, and modification of behavior. Repeatable one time. A-F only. Pre: 380/380L, 381L, 382L, 383L, and

391. Co-requisite: 475, 475L, 476L, and 477L. Fall only.

DH 480 Advanced Clinical Dental Hygiene II (2) In-depth knowledge development of expanded functions in periodontics with emphasis on principles, techniques, procedures in pain-anxiety control, soft tissue curettage, host factors, and modifications in behavior. Repeatable one time. A-F only. Pre: 475, 475L, 476L, 477L, and 478L. Co-requisite: 480L, 481L, 482L, 483L. Spring only.

DH 480L Advanced Clinical Dental Hygiene II Clinic (1) (1 4-hr Clinic) Application of knowledge of expanded functions in periodontics with emphasis on principles, techniques, procedures in pain-anxiety control, soft tissue curettage, host factors, and modification of behavior. Repeatable one time. A-F only. Pre: 475, 475L, 476L, 477L, and 478L. Co-requisite: 480, 481L, 482L, 483L. Spring only.

DH 481L Advanced Clinical Dental Hygiene II Clinic (1) (1 4-hr Clinic) Application of knowledge of expanded functions in periodontics with emphasis on principles, techniques, procedures in pain-anxiety control, soft tissue curettage, host factors, and modification of behavior. Repeatable one time. A-F only. Pre: 475, 475L, 476L, 477L, and 478L. Co-requisite: 480, 480L, 482L, 483L. Spring only.

DH 482L Advanced Clinical Dental Hygiene II Clinic (1) (1 4-hr Clinic) Application of knowledge of expanded functions in periodontics with emphasis on principles, techniques, procedures in pain-anxiety control, soft tissue curettage, host factors, and modification of behavior. Repeatable one time. A-F only. Pre: 475, 475L, 476L, 477L, and 478L. Co-requisite: 480, 480L, 481L, 483L. Spring only.

DH 483L Advanced Clinical Dental Hygiene II Clinic (1) (1 4-hr Clinic) Application of knowledge of expanded functions in periodontics with emphasis on principles, techniques, procedures in pain-anxiety control, soft tissue curettage, host factors, and modification of behavior. Repeatable one time. A-F only. Pre: 475, 475L, 476L, 477L, and 478L. Co-requisite: 480, 480L, 481L, 482L. Spring only.

DH 499 Directed Reading, Field Work, or Research (V) Individualized program of directed reading, field work, or research for major under supervision in related areas of dentistry and dental hygiene. Pre: consent.

DS

See Information Technology Management

Dutch (DUTC)

College of Languages, Linguistics and Literature

Students choosing Dutch for the language requirement should realize it may not be offered if demand is limited.

DUTC 101 Elementary Dutch (4) Conversation, lab drill, grammar, reading. **HSL**

DUTC 102 Elementary Dutch (4) Continuation of 101. **HSL**

DUTC 107 Dutch for Reading Purposes (V) Reading of scholarly and technical Dutch. Does not fulfill the language core requirement.

DUTC 201 Intermediate Dutch (3) Reading, conversation, and composition. Rapid reading skills, listening to lectures in Dutch. Pre: 102. **HSL**

DUTC 202 Intermediate Dutch (3) Continuation of 201. **HSL**

East Asian Languages and Literatures (EALL)

College of Languages, Linguistics and Literature

All students taking language courses in this department for the first time must take a regularly scheduled placement test in the appropriate language; those with no background must come to the department office for a brief interview. A grade of C or better is required in the prerequisite courses for continuation.

EALL 271 Japanese Literature in Translation—Traditional (3) Survey of all major forms from the earliest era to mid-19th century. **AHL3**

EALL 272 Japanese Literature in Translation—Modern (3) Survey from mid-19th century to present; emphasis on fiction. **AHL3**

EALL 273 Survey of Japanese Literature—KIC (3) Survey of traditional and modern Japanese literature in translation, covering all major genres. Only offered at Konan University in Japan. Not open to students with 271 or 272.

EALL 281 Korean Literature in Translation—Traditional (3) Survey of Korean literature from earliest times with emphasis on development and cultural context; all readings in English translation. Students write essays about the readings. **AHL3**

EALL 282 Korean Literature in Translation—Modern (3) Survey of 20th-century Korean literature with emphasis on development and cultural context; all readings in English translation. Students write essays about the readings. **AHL3**

EALL 325 (Alpha) Japanese Film: Art and History (3) Study and analysis of Japanese film; its history and relationship to cultural, social, philosophical, and aesthetic contexts. (B) 1900-1960; (C) 1960-present; (D) special topics. Pre: upper division standing or consent. (Cross-listed as ASAN 325)

EALL 360 Literary Traditions of East Asia (3) Selected works of Chinese, Japanese, and Korean literature in English; relationships and parallels. Pre: one of ENG 250–257 or consent.

EALL 361 Chinese Literature: Ancient (3) Survey of all major genres from antiquity until the ninth century. Pre: one of ENG 250–257 or consent. **AHL3**

EALL 362 Chinese Literature: Pre-modern (3) Survey of all major genres from the ninth into the 20th-century. Pre: one of Eng 250–257 or consent. **AHL3**

EALL 363 (Alpha) 20th-Century Chinese Literature and Culture (3) Survey of 20th-century Chinese literature in translation. Includes a variety of genres from the People's Republic of

China, Taiwan, and Hong Kong: (B) 1919–1949; (C) 1949–present. Pre: 361, 362, or one of Eng 250–257; or consent. **AHL3**

EALL 364 20th-Century Literature by Chinese Women (3) A survey and critical examination of contemporary Chinese women writers from China, Taiwan, and Hong Kong. This course traces a genealogy of women's writing from the early 1920s up until now through novels, poetry, drama, and film. Pre: one of 271, 361, ENG 250, or WS 151. (Cross-listed as WS 346) **AHL3**

EALL 365 (Alpha) Traditional Chinese Fiction in Translation (3) Survey of pre-modern Chinese fiction in translation: (B) short story; (C) novel. A-F only. Pre: 361 or 362 or one of ENG 250–257; or consent.

EALL 371 (Alpha) Traditional Japanese Literature (3) Reading and analysis of English translations of selected important works in the classical tradition. No knowledge of Japanese required: (B) prose fiction and literary miscellany; (C) drama and poetry.

EALL 372 (Alpha) Modern Japanese Literature (3) Reading and analysis of English translations of selected important works in modern Japanese literature. No knowledge of Japanese required: (B) fiction; (C) poetry, drama, and criticism.

EALL 472 East-West Encounter Literature (3) Critical examination of selected literary works depicting East-West encounters from the mid-19th to the mid-20th centuries. Pre: two courses from 271, 272, ENG 250, or ENG 255; or consent of department chair/program director.

EALL 491 Senior Colloquium in East Asian Literature (3) Comparative perspectives; some works studied in the original. Pre: third-level East Asian language.

EALL 492 (Alpha) Study of East Asian Languages (V) Less commonly taught languages of East Asia: (B) Manchu; (C) Mongolian. Recommended: previous experience in history, linguistics, or languages. Pre: consent.

EALL 500 Master's Plan B/C Studies (1)

EALL 590 Intensive Japanese for Reading Knowledge (4) Open to graduate students only. CR/NC only. Pre: consent.

EALL 591 Intensive Japanese for Reading Knowledge (4) Open to graduate students only. CR/NC only. Pre: 590 or consent.

EALL 601 Method of Teaching East Asian Languages (3) Identification and analysis of problems in language learning, teaching, testing. Development of teaching strategies for East Asian languages. Pre: CHN 451, JPN 451, or KOR 451.

EALL 603 (Alpha) Bibliographical and Research Methods (3) Traditional and modern references and other library materials basic to research in all areas of East Asian studies: (C) Chinese; (J) Japanese; (K) Korean. Pre: CHN 402 for (C); JPN 407 (alpha) for (J); KOR 402 for (K).

EALL 699 Directed Research (V) CR/NC only. Pre: consent.

EALL 700 Thesis Research (V)

EALL 735 Seminar in Comparative East Asian Literature (3) Comparison of authors, modes, topics, and genres in poetry and prose; theoretical and practical criticism. Pre: consent.

EALL 750 Seminar in Comparison of East Asian Languages (3) Comparison of lexicon, phonology, morphology, syntax, semantics, etc., of two or more East Asian languages, contact influence on them. Pre: CHN 451, CHN 452, or JPN 451; or consent.

EALL 800 Dissertation Research (1)

Economics (ECON)

College of Social Sciences

Sophomore standing or consent is prerequisite to all 300-level courses except as noted. No more than 6 credit hours total for 120, 130, 131, and 230.

ECON 120 Introduction to Economics (3) A one-semester survey of the principles of microeconomics and macroeconomics to enable students in all disciplines to understand current economic events. This course cannot be used in lieu of 130 or 131 for students who wish to major or minor in economics or enter the College of Business Administration. **SS**

ECON 130 Principles of Economics (3) How individuals make decisions that affect their income and wealth; how firms make decisions that affect profits and production. Relationship to demand, supply, and prices of goods and natural resources. **SS**

ECON 131 Principles of Economics (3) Economic forces that determine a country's income, employment, and prices. Roles of consumers, businesses, banks, and governments. **SS**

ECON 131A Principles of Economics (3) Economic forces that determine a country's income, employment, and price. Roles of consumers, businesses, banks, and governments.

ECON 230 Principles of Economics for Business (3) Nature of economics; market economic forces; demand, supply, and price; market adjustment; theories of household and firm behavior; competition and monopoly; national income and price level; fiscal and monetary policy; gains from trade. Pre: MATH 241 or QM 250. **SS**

ECON 300 Intermediate Economics: Macroeconomic Analysis (3) Forces that determine national income, employment, and price levels. Impact of fiscal and monetary policy on the economy. Pre: 130 and 131.

ECON 301 Intermediate Economics: Price Theory (3) The theory of consumer behavior and theory of the firm. Impact of industrial structure on profits, prices, and allocation of resources. Pre: 130 and 131.

ECON 310 Economic Development for Nonmajors (3) Introduction to issues in economic development and development planning. Case studies of Asian underdeveloped countries. Pre: 130 and 131. **SS**

ECON 311 The Hawaiian Economy (3) History of development of Hawaiian economy; current economic problems. Pre: 130 and 131.

ECON 321 Introduction to Statistics (3) Basic elements; descriptive statistics, probability, inference, distributions, hypothesis testing, regression, and correlation analysis.

ECON 340 Money and Banking (3) Nature and role of money; national and international monetary standards; development and role of commercial banking, financial intermediaries, and central banking. Pre: 130 and 131.

ECON 358 Environmental Economics (3) Economic analysis of environmental problems and issues, including water and air pollution, toxic substances, renewable and nonrenewable resources, and alternative control methods. Pre: 120 or 130.

ECON 360 International Economic Relations: Nonmajors (3) Survey of theoretical, historical, and institutional aspects of international trade and finance. Gains from trade, balance of payments, capital movements, and international monetary system. Pre: 130 and 131. **SS**

ECON 399 Directed Reading (V) Pre: senior majors with a minimum cumulative GPA of 2.7 or a minimum GPA of 3.0 in economics, and recommendation of department chair.

ECON 405 Comparative Economic Systems (3) Structure, institutions, operation, performance, growth of private enterprise of socialist, communist, and mixed economies; U.S., former Soviet republics, underdeveloped economies. Pre: 130 and 131.

ECON 410 Economic Development (3) Characteristics of underdeveloped economies, theories of economic growth, strategies of economic development, and investment criteria. Pre: 300 and 301, or consent.

ECON 412 Economic Development of the United States (3) U.S. economy from colonial times: slavery, transportation, education, industrial concentration, regional and urban growth. Pre: 300 and 301.

ECON 415 Asian Economic Development (3) History and economic development. Resources, population, and income, saving, investment, and consumption patterns. Role of government and private enterprise. Pre: 130 and 131.

ECON 416 The Chinese Economy (3) The Chinese economy during the imperial and republican periods, under Mao, and into the present reform era, with a brief comparison to Taiwan and Hong Kong. Pre: 130 and 131.

ECON 417 The Japanese Economy (3) Analysis of growth from Meiji period to present. Problems of population change, capital formation, income distribution, and industrial structure. Pre: 130 and 131.

ECON 418 Pacific Island Economies (3) Historical and current economic development of the Pacific islands (excluding Hawai'i). Analysis of selected economic issues such as tourism, population growth, etc. Pre: 130 and 131.

ECON 420 Mathematical Economics (3) Mathematical techniques applied to theories of the consumer, the firm, markets. Linear programming, input-output analysis. Pre: 300, 301, and calculus.

ECON 424 Introduction to Theory of Statistics (3) Descriptive statistics, probability theory, probability distributions, sampling, hypothesis testing, parameter estimations, bivariate regression, correlation analysis. Pre: calculus.

ECON 425 Introduction to Econometrics (3)

Regression analysis, analysis of variance, hypothesis testing, problems in estimation of single equation models, simultaneous equation models, problems and methods of estimation. Pre: 321 and AREC 210 or MATH 241; or consent.

ECON 429 Computer Programming for

Economic Research (3) Introduction to use of computers for economics and agricultural analysis. Employment of BASIC, electronic spreadsheets, software packages for statistics, regression and linear programming. Pre: 130 or AREC 220, and 321 or AREC 310. (Cross-listed as AREC 429)

ECON 430 Economics of Human Resources (3)

Economic analysis of labor market. Investment in human capital, education, health, migration, etc. Pre: 301.

ECON 432 Economics of Population (3)

Determinants and consequences of growth and structure of human populations. Relationships between economic factors and fertility, population growth and economic growth. Pre: 301 (or concurrent). (Cross-listed as PPST 432)

ECON 434 Health Economics (3)

Private and public demand for health, health insurance, and medical care; efficient production and utilization of services; models of hospital and physician behavior; optimal public policy. Pre: 301 or consent.

ECON 440 Monetary Theory and Policy (3)

Critical analysis of quantity theory, national income theory, tools of central banking, and debt management. Pre: 300 and 340.

ECON 450 Public Finance (3)

Governmental expenditures, revenues, and debt. Fiscal policy, budgeting, and tax administration. Pre: 300 and 301.

ECON 452 State and Local Finance (3)

Fiscal institutions, operations, and policy questions within state and local governments in U.S. grant programs and other links with central government. Pre: 301.

ECON 454 Economics and Cooperation (3)

Economics is portrayed as the science of cooperation, thus highlighting the role of government as facilitator. The cooperative perspective is applied to such current issues as business management in Asia, global security, and international relations. Pre: 301.

ECON 458 Project Evaluation and Resource

Management (3) Principles of project evaluation and policy analysis. Shadow pricing, economic cost of taxes and tariffs; public policy for exhaustible, renewable, and environmental resources. Pre: 301. (Cross-listed as AREC 458)

ECON 460 International Trade and Welfare (3)

Theory of international specialization and exchange; general equilibrium, tariffs, quotas, common markets. Pre: 301.

ECON 461 International Monetary Economics

(3) Theory of balance of payments, income, price level, and exchange rate determination; international capital movements, reserves, and current monetary problems. Pre: 300.

ECON 466 Growth and Crisis in the Global

Economy (3) Sources of economic growth and technological change; growth experiences of selected countries since the industrial revolution; global economic cooperation; global business cycles and crises. Pre: 120 or 131; or consent.

ECON 470 Industrial Organizations and Public

Control of Business (3) Interrelations of firms within industries in the United States. Determinants of firm and industry size, pricing policies, profits, and growth. Effects of antitrust laws and regulatory laws. Pre: 301.

ECON 476 Law and Economics (3)

Legal issues of property rights, contracts, torts, and crime. Efficiency of U.S. legal process. Economics of law enforcement, juries, prosecutors; evolution of legal rules. Pre: 301.

ECON 480 Transportation and Public Utilities

(3) Objectives, problems, and effects of government regulation of these industries. Pre: 301.

ECON 491 Marine Resource Economics (3)

Major problems and economic issues facing countries in Asia and the Pacific in effectively developing and managing marine resources. Pre: 120, 130, or consent. (Cross-listed as AREC 456)

ECON 495 Land and Housing Economics (3)

Microeconomics explains urban land and housing phenomena, and analyzes selected land and housing issues relevant to Honolulu. Pre: 301 and 321. (Cross-listed as PLAN 495)

ECON 496 Topics in Contemporary Economic

Problems (3) Economic analysis of current events. Topics announced each semester, e.g., environmental pollution, crime control, racial discrimination, traffic congestion. Pre: consent.

ECON 499 Directed Reading/Research (V)

Directed readings and research for majors.

ECON 500 Master's Plan B/C Studies (1)**ECON 604 Microeconomics and Policy**

Analysis (3) Theory of the consumer, firm, and market. Role of governments and analysis of public policy. Applications to both industrialized and developing countries. Pre: 301 and one of AREC 210, MATH 203, or MATH 241; or consent.

ECON 605 Macroeconomics and Policy

Analysis (3) Theories of income determination, prices, employment, and economic growth with emphasis on policy. Implications of interregional/international trade and financial linkages are explored. Pre: 300 and one of AREC 210, MATH 203, or MATH 241; or consent.

ECON 606 Microeconomic Theory I (3)

Theory of the firm: production, costs, duality; theory of the market: competition, monopoly, oligopoly, monopolistic competition; theory of the consumer: preferences, expenditures, duality; expected utility theory. Pre: 627 and 628, or consent.

ECON 607 Macroeconomic Theory I (3)

Neoclassical theory of real and monetary equilibrium, economics of J. M. Keynes, standard IS/LM models and aggregate demand/supply analysis in the closed and open economy, theory of rational expectations. Pre: 627 and 628, or consent.

ECON 608 Microeconomic Theory II (3)

General equilibrium analysis: production, consumption, and Walrasian equilibria; Pareto efficiency, fundamental theorems of welfare economics; externalities; public goods; game theory; information theory. Pre: 606 or consent.

ECON 609 Macroeconomic Theory II (3)

Models of economic growth and fluctuations; stochastic and dynamic macroeconomic models;

econometric testing of rational expectations models; theory of public debt; current topics in macroeconomic theory. Pre: 607 or consent.

ECON 610 Economic Development (3)

Nature and causes of economic growth and structural change. Roles of macroeconomic policy and foreign trade. Pre: 606 and 607, or consent.

ECON 611 Economic Development Policy (3)

Analysis of policies for the promotion of industrial and agricultural development. Project evaluation, industrial regulation, public administration, investment and capital market policies, land-use policies, trade policies, pricing, and stabilization. Pre: 604 or 606; or consent.

ECON 614 Economic Development of Japan

(3) Analysis of growth from Meiji period to present. Problems of population change, capital formation, income distribution, industrial structure. Pre: 610 or consent.

ECON 616 Economic Development of China

and Korea (3) Growth, structural change, development patterns, and problems of China, Taiwan, and Korea. Pre: 610 or consent.

ECON 618 Economic Development of

Southeast Asia (3) Analysis of growth, structural change, development patterns, agricultural and industrial development, foreign investment, foreign trade, economic integration in the region. Pre: 610 or consent.

ECON 620 Microeconomic Theory III (3)

Game theory and strategic behavior. Economics of information and incentives principal-agent theory. Economic design. Applications include: theory of contracts; incentive compatible mechanism for provision of public goods; auction theory. A-F only. Pre: 606 and 608; or consent.

ECON 627 Mathematics for Economics (3)

Sets, functions, limits, convexity, continuity; constrained and unconstrained optimization; difference and differential equations; matrix algebra; simultaneous equations; comparative statics; Kuhn-Tucker theory; game theory; mathematical programming. Pre: one semester of calculus.

ECON 628 Quantitative Method (3)

Probability; density and distribution functions; expectation, variance, and co-variance; central limit theorem; maximum likelihood methods; statistical estimation, testing, and inference; bivariate regression. Pre: one of 321, AREC 310 or MATH 241; or consent. (Cross-listed as AREC 626)

ECON 629 Econometrics (3)

Specification, statistical estimation, inference and forecasting of econometric models. Includes advanced topics for single-equation models, pooled models, qualitative dependent variables, simultaneous systems, distributed lags, and time series. Pre: 628 or consent. (Cross-listed as AREC 634)

ECON 637 Resource Economics (3)

Analysis of problems of development and management of natural resources with emphasis on resources in agriculture and role in economic development. Pre: 606, AREC 432, or consent. (Cross-listed as AREC 637)

ECON 638 Environmental Resource Economics

(3) Principles of policy design and evaluation for environmental resources management, forestry and watershed conservation, and sustainable economic development. Pre: 604 or 606; or consent.

ECON 640 Monetary Economics I (3) Advanced topics in money demand and supply at micro- and macro-levels; theory and empirical evidence; transmission mechanisms; dynamics of adjustments to money market disequilibria. Pre: 607 or consent.

ECON 641 Monetary Economics II (3) Advanced topics in monetary policy for closed and open economies; inflation; financial development; money and financial markets in economic development; dynamic stabilization models for financially repressed developing countries. Pre: 640 or consent.

ECON 650 Theory of Public Finance—Expenditures (3) Analysis of amount and composition of public spending. Techniques for analyzing and selecting government expenditures; PPBS, cost-benefit, fiscal Federalism. Pre: 450.

ECON 651 Theory of Public Finance—Revenue (3) Principles of taxation and frameworks for tax policy analysis: incidence and excess burden, taxation and individual behavior, taxation and corporate behavior, optimal taxation. Pre: 606 or consent.

ECON 660 International Trade and Welfare (3) Advanced theory of international trade and welfare; international specialization and exchange, general equilibrium, tariffs, quotas, common markets; welfare implications. Pre: 460 or consent.

ECON 662 International Monetary Economics (3) Advanced international monetary and macroeconomic theory: balance of payments, output, price and exchange rate determination, international aspects of growth and economic fluctuations, alternative exchange rate regimes, international capital flows. Pre: 605 or 607; or consent.

ECON 663 Trade Policy (3) Theory of international trade and welfare; tariffs; quotas; strategic trade policy; preferential trade areas; international trade agreements; foreign direct investment and multinationals. Pre: 604 or 606.

ECON 670 Labor Economics I (3) Supply of and demand for labor; implications for labor markets and unemployment level. Pre: 606 or consent.

ECON 671 Labor Economics II (3) Economics of human resources; human capital theory, allocation of time, poverty, and discrimination. Pre: 606 or consent.

ECON 672 Economics of Population (3) Economic determinants and consequences of population change. Pre: consent.

ECON 674 Health Economics and Policy (3) Economic analysis of health-care policy; efficient design of health-care financing schemes; private and public demand for health, health insurance, and medical care; provider behavior. Pre: 604 (or concurrent) or 606 (or concurrent), or consent.

ECON 680 Industrial Organization I (3) Structure, performance, and conduct of business firms; determinants of firm and industry size, firm pricing policies, profits, and growth. Pre: 606.

ECON 681 Industrial Organization II (3) Law of property, tort, contracts, crime; effects of antitrust laws and regulations. Pre: 680 or consent.

ECON 686 Strategic Behavior and Experimental Economics (3) Experimental economics: methodology. Experimental game theory. Market experiments. Applications include: topics in industrial organization, provision of public goods, asset markets, auctions. Repeatable one time. Pre: 606 and 608; or consent.

ECON 694 Economics of Marine Resources (3) Economics of fisheries and other uses of seas; resource management and development policies; institutional and legal aspects of ocean use. Pre: consent.

ECON 699 Directed Research (V) Pre: consent of department chair.

ECON 700 Thesis Research (V) Research for master's thesis.

ECON 724 Seminar in Advanced Economics and Quantitative Methods (3) Open only to graduate students writing empirically oriented dissertations or proposals. Methods of empirical research. Repeatable. CR/NC only. Pre: 629 or AREC 634 and completion of all comprehensive examinations. (Cross-listed as AREC 701Q)

ECON 730 Research Seminar (3) Selected issues emphasizing research techniques. Required for students who have passed the two theory qualifying exams and have not passed the comprehensive exam. CR/NC only. Pre: consent.

ECON 731 MA Cooperative Research Seminar (3) Applied research methodology for economics MA students. Student groups choose a topic in consultation with instructor and design conceptual strategies, data collection approaches, and analysis techniques. A–F only. Pre: 604 and 605, or consent.

ECON 732 MA Capstone Research (3) Student applies theoretical and quantitative techniques, critical thinking, and communicative skills to prepare a written and oral presentation of original research on a topic of his or her choice. A–F only. Pre: 420, 425, 604 (or concurrent), and 605 (or concurrent); or consent.

ECON 780 Seminar: Selected Topics in Economic Analysis (3) Topics not covered in other courses. Pre: 606, 607, or consent.

ECON 800 Dissertation Research (V) Research for doctoral dissertation.

EDCG

See Counseling and Guidance

EDEA

See Educational Administration

EDEP

See Educational Psychology

Education (EDUC)

College of Education

EDUC 401 Introduction to Teaching (3) Knowledge base for professional education; elementary and/or secondary school organization; curriculum, and instruction; individual and

program goals. A–F only. Pre: admission to PBCSE program or consent.

EDUC 402 Teaching Practicum (V) Observation, analysis, participation and teaching in elementary, middle and/or high schools. Repeatable once. CR/NC only. Pre: 401 (or concurrent) or consent. Co-requisite: 403 and 404; or consent.

EDUC 403 Seminar in Educational Inquiry (3) Study and discussion of general school-related topics and issues, e.g., dimensions of elementary and/or secondary schooling, school governance, curriculum design and development, the student learner, classroom management. Repeatable once. A–F only. Pre: 401 or consent. Co-requisite: 402 and 404; or consent.

EDUC 404 (Alpha) Teaching in the Subject Field (3) Purposes, procedures, curricula, evaluation in secondary school subject field: (B) art; (C) business and marketing; (D) language arts; (E) physical education; (F) industrial arts/agriculture; (G) mathematics; (H) science; (I) social studies; (J) foreign languages; (K) music; (M) home economics; (N) interdisciplinary. A–F only. Pre: 401 or consent. Co-requisite: 402 and 403.

EDUC 405 (Alpha) Teaching Residency (V) Full-time student teaching experience in school. (C) elementary; (D) secondary; (E) community colleges; (S) elementary/secondary regular education (for dual certification majors only). Repeatable. CR/NC only. Pre: 401, 402, 403 and 404; or consent. Co-requisite: 406.

EDUC 406 Seminar in Teaching Residency (3) Analysis and resolution of issues in teaching residency; teaching strategies and techniques; curriculum planning; professional growth and development. CR/NC only. Pre: 401, 402, 403, and 404; or consent. Co-requisite: 405.

EDUC 500 Master's Plan B/C Studies (1) Enrollment for degree completion. CR/NC only. Pre: master's Plan B or C candidate and consent.

EDUC 601 Professional Studies Seminar I (6) Development of theoretical and practical knowledge base and skills for understanding, analyzing, and responding to teaching issues and problems. Co-requisite: 602.

EDUC 602 Field Experience and Seminar I (3) Supervised field study of a school. Co-requisite: 601.

EDUC 603 Professional Studies Seminar II (6) Development of pedagogical skills in planning and implementing instruction for target subject area/grade level. Pre: 601 and 602. Co-requisite: 604.

EDUC 604 Field Experience and Seminar II (3) Team collaboration on responding to identified school need; supervised experience in mini-teaching. Pre: 601 and 602. Co-requisite: 603.

EDUC 610 Pre-internship Practicum (9) Supervised experience in instructional planning and practice teaching. Pre: 603 and 604. Co-requisite: 611.

EDUC 611 Practicum Seminar (3) Planning and methods seminar in conjunction with practice teaching. Pre: 603 and 604. Co-requisite: 610.

EDUC 612 Teaching Internship (9) Full-time supervised teaching experience. Pre: 610 and 611. Co-requisite: 613.

EDUC 613 Internship Seminar (3) Collaborative problem solving of issues and concerns encountered in current teaching experiences. Pre: 610 and 611. Co-requisite: 612.

EDUC 740 Field Project (V) Practicum experience in area of specialization. Variable credit: minimum of 3 credit hours, maximum of 6 credit hours. Repeatable. Pre: consent.

EDUC 799 Internship in College Teaching (V) Introduction to college-level teaching; doctoral students serve as apprentices to professors; responsibilities include supervised teaching, planning and evaluation. Repeatable. CR/NC only. Pre: admission to EdD candidacy and consent.

EDUC 800 Dissertation Research (V) Research for doctoral dissertation.

Educational Administration (EDEA)

College of Education

EDEA 360 Dynamics of Student Leadership (3) Theoretical approaches and an experimental orientation toward leadership in student organizations via classroom activities and practicum experiences with student organizations.

EDEA 460 Emergent Paradigms of Leadership (3) Exploration and application of advanced leadership concepts including emergent theories, issues, trends and empowering leadership. Supervised practicum experience in promoting leadership and organizational development required. Pre: 360 or equivalent; and consent.

EDEA 480 Organization and Administration of Schools (3) Principles and practices of school administration in relation to the function of the teacher. Special emphasis placed on Hawai'i's state organization of public education and its laws and regulations.

EDEA 499 Directed Reading (V) Planned individualized study, reading, research, teaching, and/or projects under direct supervision of instructor. A-F only. Repeatable one time. Pre: consent.

EDEA 500 Master's Plan B/C Studies (1) Enrollment for degree completion. Pre: master's Plan B or C candidate and consent.

EDEA 581 (Alpha) Practicum in Educational Administration (1) In-service training for teachers and administrators in specific problem areas in the field of educational administration. Repeatable. CR/NC only. Pre: teaching experience and consent.

EDEA 582 (Alpha) Practicum in Educational Administration (2) Continuation of 581. Repeatable. CR/NC only. Pre: teaching experience and consent.

EDEA 601 Introduction to Education Administration (3) Develops view of administrative process and organization elements in context of system of personal, social, and physical variables. Emphasis on role and functions of school administrator.

EDEA 602 Research in Education Administration (3) Develops basic concepts of research on educational administration: methodology, status of particular topics, communication, and application of findings to problems of school

administration. (Meets PhD common core inquiry methods requirement.)

EDEA 604 Qualitative Research Methods in Educational Organizations (3) Introduction to methods of qualitative research in educational administration. (Meets PhD common core requirement.)

EDEA 605 Collective Negotiation in Education (3) Principles and practices of collective negotiations as they apply to public and private education. Special emphasis placed on negotiation practices under Hawai'i's public employee collective bargaining act.

EDEA 608 Survey Research Design and Analysis (3) Survey study designs, survey sampling, questionnaire construction, interviewing, pre-tests, pilot studies, logic of measurement and association, table construction, and elaboration models. Pre: consent. (Cross-listed as SOC 608)

EDEA 610 School-Community Relations (3) Application of principles, techniques, policies, organization of school-community information program.

EDEA 620 Education Finance (3) Educational revenues, apportionments, budgetary procedures, costs, business management, economics of education, measures of productivity.

EDEA 623 Administration in KLS (3) Current problems, trends, and strategies in the administration of physical education, recreation, sport and fitness programs in school and non-school settings. Pre: KLS 423 or consent. (Cross-listed as KLS 623)

EDEA 629 Educational Statistics (3) Statistical inference including applications of parametric and nonparametric methods to educational problems. Pre: EDEP 429 or consent. (Cross-listed as EDEP 629)

EDEA 630 Education Law (3) Status and functions of educational institutions and personnel relative to their legal rights and responsibilities. Includes interpretation of important court decisions, statutes, equity measures.

EDEA 640 Systems Approach—Program Planning (3) Basic concepts and techniques in systems approach to educational management. Emphasizes preparation of program plans required at various organizational levels.

EDEA 642 Information Systems in Education (3) Integration of information systems and computer technology in educational planning, policy analysis, decision-making, and program assessment. Pre: ETEC 442 and consent.

EDEA 645 Principles of School Management (3) Relates identified management functions to operational problems of school administrators at various organizational levels. Principles and issues of management in relationship to school administration.

EDEA 646 American College Student (3) Study of psycho-social characteristics of the American college student and college environment, from viewpoint of student personnel work. (Cross-listed as EDCG 646)

EDEA 650 Human Factors in Organization (3) Analysis of the nature of organizations, human nature and needs, and their relationship to leadership, staffing, and staff development.

Implications of group structure and human conflict, communications, and supervision and evaluation considered.

EDEA 652 Conflict Management in Education (3) Human factors in administration. Skills in the management of conflict in organizations; theories and practical application techniques. Pre: 601, 650, or consent.

EDEA 655 Intercultural Interactions (3) Theory-based frameworks and training methods of intercultural interaction and their applications to educational administration situations.

EDEA 657 Introduction to Higher Education (3) Salient historic, social, and organizational aspects of higher education; history, philosophy, purposes, governance, administration, structures, financing, faculty and student selection, curricula, legal and social issues. (Cross-listed as EDEF 657)

EDEA 660 Management/Leadership in Higher Education (3) Trends, research, and problems in college and university management. Pre: 657 or consent.

EDEA 661 Student Affairs Administration in Higher Education (3) Philosophy, history, organization, and administration of student personnel services at college and university levels, including admissions, housing, student activities, financial aids, placement, counseling, health services. Pre: 657 or consent.

EDEA 662 Curriculum in Higher Education (3) Traditional and contemporary curriculum issues. Development of performance competencies in curriculum design and evaluation using systems and design theory as central paradigms. Pre: 657 or consent.

EDEA 663 Community College Leadership (3) Development and changing missions of community colleges; in-depth study of emerging leadership issues: planning, financial management, decision-making, governance, and student personnel. Pre: 657, 660, or consent.

EDEA 670 School Supervision (3) Principles of supervision, development of supervisory programs.

EDEA 675 Introduction to Educational Policy Studies (3) Examines theories and models of educational policy and policy making and the contribution of policy analysis to the policy-making and change processes. A-F only. Pre: consent. (Cross-listed as EDEF 675)

EDEA 676 The Politics of Education (3) Examination of the ways in which education can be viewed as political, arising from its connection to the larger political system including local, state, and federal governments. A-F only. Pre: 675, EDEF 675, or consent. (Cross-listed as EDEF 676)

EDEA 677 The Educational System (3) Examination of structure and dynamics of the educational system. Particular focus on how educational policy interacts with principles that explain educational system behavior. A-F only. Pre: 675 or EDEF 675; or consent. (Cross-listed as EDEF 677)

EDEA 699 Directed Reading and/or Research (V) Individual reading and/or research. Pre: consent of instructor and department chair.

EDEA 700 Thesis Research (V) Research master's thesis.

For key to symbols and abbreviations, see the first page of this section.

EDEA 704 Advanced Qualitative Research (3) Study in trends, research, and problems. Pre: 604, TECS 632, or comparable; or consent.

EDEA 720 Administrative Internship (V) Supervised intern experience in school and university administration. Emphasizes the development of leadership skills through program and project management. A–F only. Pre: approval of cooperating agencies and department.

EDEA 745 Creative Learning Strategies for Adults (3) Analysis of psychology of adult learner; forces that affect learning in dynamics of individual, group, and organizational behavior; concept of lifelong learning vis-a-vis development of creative strategies that assist maturing, self-directed persons to develop their potentialities. (Cross-listed as EDEP 745 and NURS 745)

EDEA 775 Seminar on the Principalship (3) Series of planned seminar experiences on problems and issues confronting school principals, such as contract administration, program planning and budgeting systems (PPBS), teacher evaluation. Topic to be announced. Repeatable.

EDEA 780 (Alpha) Seminar (3) Study in trends, research, and problems. (B) policy formulation; (C) organizational change; (D) evaluation and research management (meets PhD common required advanced methodology course); (E) program management/PPBS; (F) curriculum administration; (G) school governance; (H) college student affairs administration; (I) higher education administration; (J) administrative theories; (K) administrative problems and issues; (M) facilities planning and management. Pre (for 780H): 646, 657, and 660. Pre (for all others): consent.

Educational Foundations (EDEF)

College of Education

Current TB clearance is a requisite for all students taking courses requiring practicum experiences.

EDEF 201 Introduction to Teaching as a Career (2) An experience-based introduction to careers in education. CR/NC only. (Cross-listed as EDEP 201)

EDEF 310 Education in American Society (3) Interrelated historical, philosophical, and socio-cultural contexts of education with an emphasis on contemporary problems and applications. Students enrolled in colleges other than the College of Education are asked to confer with the College of Education director of student services before enrolling in 310. A–F only. Pre: TECS 317 or TECS 402 (or concurrently with TECS 402 only).

EDEF 360 Introduction to Multicultural Education (3) Concepts and methods to develop sensitivity and awareness of cultural influences on behavior as these relate to the schooling process. Field experience is an integral part of the course. (Cross-listed as TECS 360)

EDEF 399 Directed Reading (V) Individual reading or research. Pre: senior majors with a minimum cumulative GPA of 2.7 or a minimum GPA of 3.0 in education, and consent of instructor and department chair.

EDEF 408 Community and Culture (3) Theoretical and practical approaches to understanding the constitution of community life. A

focus on the social construction of normative values, social dynamics of organizations, and school-community relations.

EDEF 445 Educational Sociology (3) Introduction to sociological frameworks of analysis of the institutional, cultural and social dynamics of schooling, classroom management, school reform, social group and individual role behavior.

EDEF 453 Gender Issues in Education (3) Examination of current and historical issues in education and how they are impacted upon by gender, with particular reference to gender as it intersects with ethnicity and class, locally and globally. Pre: WS 151 or junior standing, or consent. (Cross-listed as TECS 453 and WS 453)

EDEF 469 Field Studies in Educational Foundations (V) Field-based analyses of educational problems and issues. Repeatable with different content. Pre: consent.

EDEF 470 Ethnic Groups and Education in Hawai'i (3) Identity and learning within and among Hawai'i ethnic groups; study of prejudice and inter-ethnic hostilities as these impact education and teaching. (Cross-listed as EDCG 470)

EDEF 480 Anthropological Applications (3) Education as cultural and cross-cultural learning; universal aspects of the process. Ethnographic study. Applied anthropological theory and practice for educators. (Cross-listed as ANTH 480D)

EDEF 500 Master's Plan B/C Studies (1) Enrollment for degree completion. Pre: master's Plan B or C candidate and consent.

EDEF 581 (Alpha) Practicum in Problems: School and Community (1) For in-service school personnel to develop new approaches concerning how the school might relate more effectively to problems of a socio-political, ideological, moral, and/or multicultural nature. Repeatable with different content. CR/NC only. Pre: teaching experience or consent.

EDEF 582 (Alpha) Practicum in Problems: School and Community (2) For in-service school personnel to develop new approaches concerning how the school might relate more effectively to problems of a socio-political, ideological, moral, and/or multicultural nature. Repeatable with different content. CR/NC only. Pre: teaching experience or consent.

EDEF 583 (Alpha) Practicum in Problems: School and Community (3) For in-service school personnel to develop new approaches concerning how the school might relate more effectively to problems of a socio-political, ideological, moral, and/or multicultural nature. Repeatable with different content. CR/NC only. Pre: teaching experience or consent.

EDEF 610 Foundations of Educational Theory (3) An in-depth review of social, philosophical, and historical views underlying various theories of education and their applications in teaching and learning.

EDEF 630 Cultural Diversity and Education (3) Examines issues, theories, perspectives and practices in multicultural education and promotes awareness, encourages knowledgeable reflection and develops skills necessary for multicultural practitioners. A–F only. (Cross-listed as TECS 630)

EDEF 650 Education in the Classical Tradition (3) Classical European, Chinese, Indic, and Islamic traditions in the history of education; emphasis on ways in which they shift, interact, and collide from the early modern period to the present.

EDEF 651 Education and the American Experience (3) History of educational thought and practice from European colonialism to revolutionary nationalism to the present.

EDEF 652 History of Education in Hawai'i (3) From pre-contact, ancient Hawai'i to the present. Social and intellectual influences on the development of national, local, and indigenous educational institutions; emphasis on multicultural as well as monocultural directions in Hawai'i's schools.

EDEF 657 Introduction to Higher Education (3) Salient historic, social, and organizational aspects of higher education; history, philosophy, purposes, governance, administration, structures, financing, faculty and student selection, curricula, legal and social issues. (Cross-listed as EDEA 657)

EDEF 660 Philosophy of Education (3) Readings of the original texts of major philosophers impacting American education. Considerations about the conditions of knowing and their extension in everyday practices in education.

EDEF 669 Introduction to Comparative/International Education (3) Introduction to basic methods of comparative studies, focusing on schooling, but also treating broader educational issues.

EDEF 671 Topics in Comparative Education (3) Educational institutions, structures, processes, policies, and problems viewed within the context of political, social, and cultural milieus. Geographic region or theme focus. Repeatable with different content. Pre: consent.

EDEF 675 Introduction to Educational Policy Studies (3) Examines theories and models of educational policy and policy making and the contribution of policy analysis to the policy-making and change processes. A–F only. Pre: consent. (Cross-listed as EDEA 675)

EDEF 676 The Politics of Education (3) Examination of the ways in which education can be viewed as political, arising from its connection to the larger political system including local, state, and federal governments. A–F only. Pre: 675, EDEA 675, or consent. (Cross-listed as EDEA 676)

EDEF 677 The Educational System (3) Examination of the structure and dynamics of educational system. Particular focus on how educational policy interacts with principles that explain educational system behavior. A–F only. Pre: 675 or EDEA 675; or consent. (Cross-listed as EDEA 677)

EDEF 678 Interdisciplinary Perspectives in Educational Inquiry (3) Examination of theoretical and methodological issues underlying applications of quantitative and qualitative techniques in educational research. Preparation for writing the MEd or PhD thesis proposals.

EDEF 683 Social and Cultural Contexts of Education (3) Focuses on the interplay of class, race, gender and ethnicity in school and community settings. Social praxis, educational reform and policy are considered.

EDEF 684 Education and World Order (3)

Global futurism focuses on major problems such as war prevention, ecological planning, and world poverty as a basis for developing transnational education. Pre: 310, 683, or consent.

EDEF 685 International Development

Education (3) Introduction to international development education in Asian and Pacific nations. Students explore links between education and development. Emphasis is on cross-cultural perception of development.

EDEF 686 Environmental Education (3) Focus on environmental problems, such as pollution, resource depletion, and overpopulation, to develop programs of relevant education. Uses action projects in schools and community.

EDEF 699 Directed Reading and/or Research

(V) Individual reading and/or research. Pre: consent of department chair.

EDEF 700 Thesis Research (V) Research for master's thesis.

EDEF 725 Education and Social Change (3)

Study of classical and contemporary theories of social change as these relate to school, the profession of teaching, planning of change, and social stability. Pre: consent.

EDEF 751 Recent History of American

Education (3) Contemporary American education in recent historical perspective; focuses on the educational changes brought about by WW II, the Cold War, civil rights and other social movements. Pre: consent.

EDEF 761 History of American Higher

Education (3) Genesis and evolution of college and university from colonial America to present. Pre: consent.

EDEF 762 Seminar on the Social and Cultural Contexts of Education (3) Examination of social, political, and cultural issues affecting educational policy with special emphasis on methods of inquiry and theoretical constructs. Pre: consent.

EDEF 764 Advanced Seminar in Philosophy of Education (3) Advanced studies in philosophical inquiry. Examination of philosophically based methods of analysis and interpretation and their influence in educational research and practice. Pre: consent.

EDEF 766 (Alpha) Seminar in History of Education (3) Aspects of the history of education. Application of historiography to educational problems and policy. Repeatable with different content. Pre: one of 650, 651, 652, or 761; or consent.

EDEF 771 Seminar in Comparative/International Education (3) Advanced reading, research and writing in selected topics dealing with comparative and international education, including such themes as policy studies, minority education and educational reform. Pre: consent.

Educational Psychology (EDEP)

College of Education

EDEP 311 is a prerequisite to graduate study in educational psychology. Current TB clearance is a prerequisite for all students taking courses requiring practicum experiences.

EDEP 201 Introduction to Teaching as a Career (2) An experience-based introduction to teaching as a career. CR/NC only. (Cross-listed as EDEF 201)

EDEP 303 Experiential Introduction to Humanistic Education (3) Participation in exercises designed to enable potential teachers to become more aware of themselves, especially as related to interaction in school settings. CR/NC only.

EDEP 311 Psychological Foundations (3) Principles of learning and individual differences; relationships of these factors to classroom experience.

EDEP 327 Self-Regulated Learning (3) Theory and use of self-regulated learning strategies in academic contexts. Pre: 311, PSY 100, or consent.

EDEP 399 Directed Reading (V) Individual reading or research. Pre: consent.

EDEP 408 Fundamentals of Research in Education (3) Introduction to the methodology of systematic study of problems in education: principles of research design, data processing, technical writing, and evaluation of research proposals and reports.

EDEP 411 Seminar in Contemporary Perspectives in Educational Psychology (3) In-depth analysis of contemporary issues in education from the theoretical and methodological perspectives of the faculty in educational psychology. Repeatable once. Pre: 303, 311, or consent.

EDEP 416 Student Assessment (3) Development and analysis of assessment procedures in educational settings.

EDEP 429 Introductory Statistics (3) Use of descriptive statistics in analyzing test scores; application of linear correlation and regression; introduction to an understanding of inferential statistics.

EDEP 432 Human Motivation and Education (3) Application of motivation theory and research to understanding and increasing human motivation for education.

EDEP 500 Master's Plan B/C Studies (1) Enrollment for degree completion. Pre: master's Plan B or C candidate and consent.

EDEP 509 Cooperative Learning (2) Introduction to theories underlying cooperative learning and experience with various cooperative learning methods from both student's and teacher's perspectives. CR/NC only.

EDEP 510 Topics in Cooperative Learning (2) Educators who have studied and are implementing cooperative learning are provided opportunities to jointly reflect on their experiences in the context of relevant theory. Pre: 509 or consent.

EDEP 601 Introduction to Quantitative Methods (3) Introduction to quantitative methods in behavioral sciences. Review of elementary statistical methods. Introduction to general linear model as principle of data analysis.

(Meets EdD common inquiry methods requirement or elective.) Pre: 429 or consent. (Cross-listed as PSY 610 and SW 651)

EDEP 602 Computer Analysis of Data (3) The analysis and interpretation of behavioral science data using common statistical software packages. Pre: 429 or consent. (Cross-listed as SW 652)

EDEP 603 Design and Analysis of Psychological Experiments (3) Analysis of variance and other modes of assessing results of experiments. Relation of analysis to design. Pre: 601 or consent. (Cross-listed as PSY 611 and SW 653)

EDEP 604 Multiple Regression in Behavioral Research (3) Advanced application of general linear model to complex problems of data analysis. Relation of analysis of variance and co-variance to regression analysis. Non-linearity and treatment of missing data. Pre: 601 and 602, or consent. (Cross-listed as PSY 612 and SW 654)

EDEP 605 Factor Analysis (3) Theory and method of factor analysis and related methods of multivariate analysis. Pre: 604 or consent. (Cross-listed as PSY 613 and SW 655)

EDEP 606 Multivariate Methods (3) Multivariate forms of multiple linear regression, analysis of variance and co-variance. Multiple discriminant analysis, canonical correlation, and principal-components analysis. Pre: 603 and 604, or consent. (Cross-listed as PSY 614 and SW 656)

EDEP 607 Nonparametric Methods for Behavioral Science (3) Conditions for valid applications of nonparametric statistical techniques in education and behavioral sciences; theoretical and methodological perspectives. Pre: 601 or consent. (Cross-listed as PSY 615 and SW 657)

EDEP 608 Introduction to Educational Research (3) Fundamental design and evaluation procedures in educational research. Determining needs, defining objectives, research design, instrumentation, data collection, and evaluation. (Meets EdD common inquiry methods requirement or elective.) Pre: 416 and 408, or consent.

EDEP 611 Inquiry Approach to Educational Psychology (3) Foundations of educational psychology through the vehicle of an exploratory study. Inquiry approach stresses learning theory, measurement techniques, and research skills in education.

EDEP 612 Statistical Power in Behavioral Research (3) Theory and techniques of power analysis for significance testing of means, proportions, correlations or variances, estimation of effect size, and necessary sample size. Pre: 601 or consent.

EDEP 616 Measurement and Evaluation (3) Theory of measurement and evaluation; analysis of tests and scales emphasizing statistical and psychological analysis of experimental and standardized tests and scales. Pre: 416 or consent. (Cross-listed as PSY 616 and SW 658)

EDEP 626 Scaling: Measurement of Attitude and Perception (3) Theory and methods of major unidimensional and multidimensional scaling techniques. Examples from education, sociology, and psychology. Pre: 416 or 429. (Cross-listed as PSY 617)

EDEP 629 Educational Statistics (3) Statistical inference including applications of parametric and nonparametric methods to educational problems. Pre: 429 or consent. (Cross-listed as EDEA 629)

EDEP 661 Development and Learning (3) Analysis and critique of (Piagetian) developmental stage theory and traditional behavioristic and cognitive learning theories; introduction to current models of learning and development. Pre: consent.

EDEP 662 Social Context of Learning (3) Research methods and theories relating social mediation and learning group structures to intellectual growth. Pre: 661 or consent.

EDEP 663 Models of Cognitive Learning (3) Cognitive models of knowledge acquisition, organization, and utilization; theory and research relating learning and cognition to interactive instructional models. Pre: 661 or consent.

EDEP 664 Instructional Psychology (3) Application of learning theory and cognitive skills training in instructional settings. Pre: 661 or consent.

EDEP 665 Social Cognition and Competence (3) Systematic analysis of social reasoning abilities conjunctive with or prerequisite to effective social interaction in educational settings. Pre: 661 or consent.

EDEP 699 Directed Reading and/or Research (V) Individual reading and/or research. Pre: consent.

EDEP 700 Thesis Research (V) Research for master's thesis.

EDEP 708 Educational Research Methods (3) Research techniques and thesis development. Pre: 429 and consent.

EDEP 711 Practicum in Educational Psychology (V) Supervised practicum in teaching or program evaluation as each is reflected by professional activities of the members of the faculty. Pre: consent of supervisory professor.

EDEP 745 Creative Learning Strategies for Adults (3) Analysis of psychology of adult learner; forces that affect learning in dynamics of individual, group, and organizational behavior; concept of lifelong learning vis-à-vis development of creative strategies that assist maturing, self-directed persons to develop their potentialities. (Cross-listed as EDEA 745 and NURS 745)

EDEP 768 (Alpha) Seminar in Educational Psychology (3) Current issues and problems in the context of education: (B) general; (C) learning; (D) measurement; (E) statistics; (F) psycho-social development; (G) educational evaluation; (H) research methodology. Pre: consent.

EDEP 800 Dissertation Research (V) Research for doctoral dissertation.

Educational Technology (ETEC)

College of Education

ETEC 414 Educational Media Technology (3) Introduction to theories, application of principles, acquisition of practical skills of educational media relevant to teaching/learning situation, in classroom as well as non-school settings. Includes "mainstreaming" components for assisting mildly handicapped learners. Pre: upper division standing.

ETEC 415 Technology for Teachers (3) Introduction to the application of educational technology in teaching and learning using strategies in design, selection, development, integration, and evaluation. Interactive delivery via distance education technologies. A–F only. Pre: basic teaching certification.

ETEC 430 Video Technology (3) Use of video techniques for purposes of instruction, documentation, and training. Planning, production, simple editing procedures, and utilization in educational context.

ETEC 442 Computers in Education (3) Overview of basic components of computer systems and their application to instruction and administration. Various operating systems will be explored.

ETEC 448 Links to Lifelong Learning (3) Focused exploration of the Internet and its application to effective classroom teaching/learning, including finding, evaluating, using, creating information; design, construction, and posting of Web page. Integration with copyright law, ergonomics, national and Hawai'i standards. Repeatable one time. Pre: 442 or consent.

ETEC 454 Technology Resources (3) Virtual and hands-on analysis of technology resources and utilization in K–12 schools. Repeatable one time. Pre: 442 or consent.

ETEC 499 Directed Activity (V) Individual work, supervised by instructor. May consist of reading, research, and/or projects. Pre: consent.

ETEC 500 Master's Plan B/C Studies (1) Enrollment for degree completion. Pre: master's Plan B candidate and consent.

ETEC 511 Professional Development Education Technology I (3) Specialized topics reflecting interests and needs of faculty in current issues of technology integration. Combined lecture, lab and discussion course. Repeatable one time. Pre: consent.

ETEC 512 Professional Development Education Technology II (3) Specialized topics reflecting interests and needs of faculty in current issues of technology integration. Combined lecture, lab and discussion course. Repeatable one time. Pre: consent.

ETEC 513 Professional Development Education Technology III (3) Specialized topics reflecting interests and needs of faculty in current issues of technology integration. Combined lecture, lab and discussion course. Repeatable one time. Pre: consent.

ETEC 514 Professional Development Education Technology IV (3) Specialized topics reflecting interests and needs of faculty in current issues of technology integration. Combined lecture, lab and discussion course. Repeatable one time. Pre: consent.

ETEC 600 Theory and Practice in Educational Technology (3) The profession of educational technology and the role of instructional designers. Theoretical and philosophical foundations underlying practice that include instructional systems theory, needs assessment, change theory, and relevant learning models. Practical applications of these theories to solve instructional problems in real-life settings. A–F only. Pre: ETEC majors or consent.

ETEC 601 ET Research Review (3) Review of research in educational media/technology applicable to each student's own topic. Seminar-like discussions and oral reports. Written-format presentation of findings as part of a project proposal. A–F only. Pre: ETEC major or consent.

ETEC 602 Teaching/Training Technologies (3) Innovative technological advances for use in teaching and training, and their evaluation in terms of instructional goals. A–F only. Pre: ETEC major or consent.

ETEC 603 Instructional Design and Development (3) Basic concepts and techniques of instructional design and development, for application to solving instructional problems in real-life situations. A–F only.

ETEC 605 Conducting ET Research (3) Application of methodological and statistical concepts to students' own research projects. Formative and summative evaluation, measurements, descriptive and inferential statistics. A–F only. Pre: ETEC major or consent.

ETEC 620 Visual Design (3) Theory and practice involved in planning and producing instructional graphic material for desktop publishing and computer-based presentation. A–F only. Pre: 603 or consent.

ETEC 630 Video/TV Design (3) Development and utilization of television programs for the purpose of improving the teaching-learning process. A–F only. Pre: consent.

ETEC 644 Programming Concepts/Structures (3) Concepts and structures of microcomputer instruction; laboratory experience. Pre: 442 or consent.

ETEC 645 Design Web-based Instruction (3) The design and development of instruction for Web and internet delivery. Integration of HTML, Java, and current Web authoring software will be employed to create instructional Web sites. Repeatable once. A–F only. Pre: 620 or consent.

ETEC 647 Hypermedia Design (3) The utilization and application of computer interactive systems including the use of advanced authoring tools, combining unique advantages of video, motion, imagery, and sound with current instructional processes in student-centered learning. Repeatable once. A–F only. Pre: 620 or consent.

ETEC 648 (Alpha) Computer Authoring (3) Conceptualization of instructional design and its application to the development of particular types of software, utilization or environment: (B) assisted instruction (CAI); (C) managed instruction; (D) virtual reality; (E) animation. Repeatable once. A–F only. Pre: 442 and 603, or consent.

ETEC 649 Development of Online Courseware (3) Planning, design, and development of online instruction for educational and training settings. Implementation of online course elements such as student interaction, course management, testing, and content delivery using an authoring environment such as Web Course Tools or equivalent. Repeatable once. A–F only. Pre: 620 or consent.

ETEC 650 Instructional Technology Services Management (3) Applying theory of management in instructional technology support services and delivery systems. Pre: 601, 605, and ETEC major.

ETEC 661 Distance Education Technology (3) Technical and instructional considerations for developing, delivering, managing, and evaluating distance education including voice, video, and data transmission techniques. Interactive delivery over Hawai'i Interactive Television System. Repeatable once. Pre: consent.

ETEC 662 Computer Networks in Education (3) Design, installation, and management of computer networks for administrative and instructional uses, with particular focus on local area network issues. Pre: consent.

ETEC 663 Planning for Technology and Resources (3) Planning, needs assessment, and change theory applied to the development and evaluation of long-range plans and the communication of a vision for technology in education. Pre: consent.

ETEC 664 Technology and Instructional Applications (3) Evaluating products; planning for professional development; designing for and applying in-service training in: instructional design, teacher presentations, direction of student productions, and facilitating computer-managed instruction. Pre: consent.

ETEC 670 Media and Technological Product Evaluation (3) Evaluation process, sources and instruments applicable to systematic appraisal of technology systems, hardware, software, and other instructional resources. Repeatable twice. A–F only. Pre: consent.

ETEC 679 Education and Communication Technologies (3) Role and impact of communication technologies in contemporary educational institutions. Application and adaptation of such technologies to instructional (i.e., teaching as well as learning) activities and ramifications of these technologies on administrative structure of schools. A–F only.

ETEC 680 Professional Ethics and Media (3) Examining and conveying an ethical vision of the role and impact of communication technologies in contemporary education and training situations; communicating that vision by designing technology-based displays using newer technologies. A–F only. Pre: consent.

ETEC 686 Information Literacy and Learning Resources (3) Emphasis on a process approach to information literacy and integration of information literacy instruction with components of elementary and secondary curricula. Covers evaluation and use of print and nonprint/electronic resources in various content areas. (Cross-listed as LIS 686)

ETEC 687 Instructional Development Practicum (3) Practicum in instructional development and design in academic, agency, and private industry settings, under close supervision, plus regular class meetings in seminar format. Pre: 603, 605, and consent.

ETEC 688 Educational Technology Practicum (3) Practicum in educational technology applications in academic or non-academic settings, under close supervision, plus regular class meetings. Pre: 603, 605, and consent.

ETEC 690 Seminar and Internship in Technology Leadership (3) Supervised activity in application of technology to teaching/training experiences. Repeatable. Pre: consent.

ETEC 699 Directed Reading and/or Research (V) Individual reading and/or research. Repeatable for 3 credit hours maximum each time. Pre: consent of department chair.

ETEC 700 Thesis Research (V) Research for master's thesis.

ETEC 750 (Alpha) Seminar in Educational Technology Issues (3) Study and discussion of significant topics and problems. (B) instructional development (Pre: 603 and consent); (C) telecommunications (Pre: consent); (D) the future (Pre: consent).

LEEA

See European Languages

Electrical Engineering (EE)

College of Engineering

Preference in registration is given to declared engineering majors. Please consult the current Schedule of Courses for confirmed offerings each semester.

EE 101 Electrical Engineering Skills (3) Electrical engineering subjects in a skill acquisition context at the freshman level. Learning, creative problem solving, brainstorming, technical information assimilation, and presentation skills development. Repeatable.

EE 150 Introduction to Computer Programming Methods (3) Introductory course on computer programming methods; emphasis on planning, writing, debugging of programs, together with basic applications. Pre: MATH 140 or equivalent.

EE 160 Programming for Engineers (4) (3 Lec, 1 3-hr Lab) Introductory course on computer programming and modern computing environments with an emphasis on algorithm and program design, implementation, and debugging. Includes a hands-on laboratory to develop and practice programming skills. Restricted to engineering freshmen and sophomores. A–F only. Pre: Math 140 or equivalent or consent.

EE 196 Freshmen Project (V) Freshman level individual or team project under EE faculty direction and guidance. This project provides early student entry into EE hands-on project activity providing practical skills, EE subject exposure and experience. Second semester freshman standing required. Repeatable. Pre: 101 and consent.

EE 201 Electrical Engineering Skills for Transfer Students (3) This course develops key electrical engineering communications and creative problem-solving skills through peer interactive techniques. This course parallels EE 101 but at a more advanced topic level. Creative problem solving, brainstorming, technical information assimilation, presentations and learning skills development using peer interactive methodologies. Student presentations are required. Repeatable. Pre: sophomore standing or consent.

EE 211 Basic Circuit Analysis I (4) (3 Lec, 1 3-hr Lab) Linear passive circuits, time domain analysis, transient and steady-state responses, phasors, impedance and admittance; power and energy, frequency responses, resonance. Pre:

MATH 243 (or concurrent) and PHYS 272 (or concurrent), or consent.

EE 213 Basic Circuit Analysis II (4) (3 Lec, 1 3-hr Lab) Introduction to Laplace operator, Laplace transform in circuit analysis, frequency selective circuits, use of linear amplifiers, introduction to active filters, three-phase circuits, Fourier series and transform. Pre: 211 and MATH 244 (or concurrent); or consent.

EE 260 Introduction to Digital Design (4) (3 Lec, 1 3-hr Lab) Introduction to the design of digital systems with an emphasis on design methods and the implementation and use of fundamental digital components. Pre: 150 or 160; or consent.

EE 296 Sophomore Project (V) Sophomore level individual or team project under EE faculty direction and guidance. The project provides early student entry into EE hands-on activity providing practical skills, EE subject exposure and experience. Repeatable. Pre: 101, sophomore standing, and consent.

Registration in upper division courses will be contingent upon earning a grade of C or better in prerequisite courses.

EE 315 Signal and Systems Analysis (3) Discrete Fourier transform, Fourier series, Fourier transform, Laplace transform. Fast Fourier transform, analysis of linear systems. Pre: 213 and MATH 244, or consent.

EE 323 Microelectronic Circuits I (3) Semiconductor structures, operating principles and characteristics of diodes and amplifying devices. Their application as circuit elements in building basic digital, analog, and integrated circuit subsystems. Pre: 213 and 324.

EE 323L Microelectronic Circuits I Lab (1) (1 3-hr Lab) Experiments on linear and logic properties of diodes and transistor networks. Pre: 213. Co-requisite: 323.

EE 324 Physical Electronics (3) Atomic physics, lattices, introductory quantum mechanics, photons, scattering, carrier statistics, donors, acceptors, charge transport in semiconductors including ambipolar transport. The junction diode, the Schottky diode. Pre: PHYS 274 or consent.

EE 326 Microelectronic Circuits II (3) Principles and design of linear electronic circuits including differential, operational, feedback, and tuned amplifiers; integrated circuits, current mirrors, signal generators, filters, and stability. Pre: 323.

EE 326L Microelectronic Circuits II Lab (1) (1 3-hr Lab) Laboratory for 326, experiments on linear and analog electronics. Pre: 323L. Co-requisite: 326.

EE 327 Theory and Design of IC Devices I (3) Characteristics and physics of bipolar and MOS electronic devices used in integrated circuits. Pre: 324.

EE 328 Physical Electronics Lab Techniques (3) Technology principles and methods for the design and fabrication of integrated circuit devices. Pre: 327.