

Courses of Instruction

Art

ART 500 - Special Topics in Art 2 or 4 hours. Topics and issues not covered in other courses are explored. Topics vary from one term to another.

ART 501 - Studio Elective 1-6 hours. Required for all MFA graduate students. The studio elective gives students an opportunity to work in media that they are unfamiliar with or that might be incorporated into their studio work. Students must work in a media and studio outside their primary discipline. Any exceptions must be made in consultation with the appropriate advisor. Enrollment is by permission of the studio faculty.

ART 508 - Alfred Summer Ceramics: Sculpture Workshop 4 hours. Open to students with prior experience in ceramic sculpture who wish to pursue individually directed projects in consultation with Alfred University faculty and visiting artists. Participants will work alongside the artists-in-residence in an open studio environment. Demonstrations, lectures, and technical support are provided by Alfred MFA students. Runs concurrently with ART 310 - Alfred Summer Ceramics. Lectures, demonstrations, and other activities are open to participants in both sessions. (Summer)

ART 510 - Alfred Summer Ceramics 4 hours. Open to students of all levels of expertise. The program, a four-week intensive summer session, offers a comprehensive ceramic experience ranging from ceramic art history, and glaze calculation, to an expansive experience working with clay fabrication techniques. Those who attend Alfred Summer School will be given personal studio space and an opportunity to deepen their understanding of clay and glaze by firing in gas, electric, wood, raku and soda kilns. Participants work alongside artists-in-residence in an open studio environment where students can pursue self-directed projects. Technical support provided by Alfred MFA students in kiln firing, moldmaking and casting; slide lectures and discussion by faculty and guest artists will regularly punctuate the studio experience. (Summer)

ART 522 - Advanced Sculpture/Dimensional Studies 1-8 hours. This is the primary component of individually directed/generated studio research during the first year of graduate studies in the program. The focus of the graduate student's critical inquiry is done in consultation with the specific division's faculty who are responsible for either the concentration in Sculpture or Glass Art.

ART 523 - Work and Analysis 4 hours. Functions as the primary forum for group dialogue among the MFA students in Electronic Integrated Arts. Regular group critiques of student work will occur during class time, allowing for the development of understanding of how work is produced, and the ability to contribute insight to others. Narrative, symbolic, personal, cultural and poetic implications will be addressed. In addition to dialogue relative to student's work, questions pertinent to contemporary art practice will be discussed weekly. This discussion will include debates on contemporary artists and current philosophical approaches to image making both critical and aesthetic. The goal is to provide the student with a strengthened sense of context from which to proceed as an artist.

ART 524 - Electronic Strategies (Non time based) 2 hours. Required of first year graduate students working in Electronic Integrated Arts. This course is designed to help create a context in which to ask questions about the nature of dynamic media relative to the making of contemporary printed images.

Students will work with moving and still images using combinations of digital processes, including: video capture, digital drawing, electronic still cameras, scanning and image processing. Participants will investigate the making of large format digital images as ways to understanding how ideas about print media are expanding. The course will focus on the impact of digital print media and how it functions to construct the visual languages of contemporary art making. Experimentation with applications that cross media will be extensively explored. These media may include: drawing, painting, photography, bookmaking, video, multimedia and Internet interfaces. The studio comprises a state of the art Macintosh lab with scanning, video editing and grabbing capabilities and Internet interfaces. Printing capabilities include, film recording, image setting, and a large variety of digital color printing devices including wide format digital printing.

ART 525 - Advanced Electronic Arts 1-8 hours. Required each semester for graduate students working in Electronic Integrated Arts. Each graduate student will register with Electronic Integrated Arts faculty on an independent study basis. This course is an opportunity for self-generated studio work. During the third and fourth semesters the primary emphasis of this course will be thesis preparation.

ART 526 - Electronic Strategies (Time based) 2 hours. Required of first year graduate students working in Electronic Integrated Arts. This course provides both a technical and theoretical foundation for the production of time-based works in the integrated video and sound studios. Experimentation with application that crosses media will be extensively explored. These media may include analog and digital video image processing, digital video editing, HD video, computer animation, web casting and electronic music in relationship to the visual arts. Through demonstrations, critiques and lab work students will gain a thorough understanding of the technical process as well as insights and expertise into the physical integration of traditional mediums with new technologies. Emphasis will be placed on the making of artwork through the use of electronic integrated media. The course will also include presentations, class discussions and readings designed to create a critical dialogue that connects theoretical, historical and contemporary perspectives through the practice of making art using electronic media. Areas of theoretical concern will include historical and contemporary perspectives on imaging and sound technologies.

ART 529 - Studio Practice 2 hours. This seminar is a forum for the graduate students in the Sculpture/Dimensional Studies program to engage in discussions and group critiques. Through a series of weekly meetings all of the students in both Glass Art and Sculpture come together to form a community of creative enquiry, to consider relevant contemporary art issues and support each other's art practice.

ART 538 - Large Format Digital Imaging 4 hours. Contemporary art making has been profoundly impacted by new digital technologies. This course focuses on how digital print media informs and evolves visual language for artistic expression. Providing each participant with a hands-on opportunity to explore large-format digital printing technologies, it is designed to help create a context in which to ask questions about the nature of dynamic media relative to the making of contemporary printed images. Looking for transitions, collapsing barriers, and sharing vocabulary, artists will consider multiples, sequencing, mark-making, notation, gesture, and narrative concerns within both digital media and traditional printmaking. Further experimentation across media will be investigated. These media may include: drawing, painting, photography, video, animation, multi-media and internet interfaces.

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Participants will be able to experiment with printing on a variety of handmade papers (up to 36"x 48") using eight color, permanent ink, large-format, ink jet technology. The course welcomes artists with beginning and advanced technological experience.

ART 550 - Independent Study 1-4 hours. Designed for graduate students to work with faculty outside of the School of Art and Design. Enrollment is by permission of the faculty and with approval of the respective Division Chair. A written Plan of Study is required.

ART 552 - Advanced Ceramics 1-8 hours. This is the primary component of the first year of ceramic art graduate studies. The focus is on individually directed studio research in consultation with the faculty. Studio work is evaluated at the midterm and final reviews by the entire faculty. Students work individually with a different faculty advisor each semester.

ART 555 - Raw Materials 2 hours. A general course in ceramic raw materials discussing the origin and properties of clay's fluxes and fillers used for various ceramic clay bodies. Laboratory exercises involving use and properties of materials and development of clay body compositions for pottery, vessels and sculpture.

ART 556 - Glaze Calculations 2 hours. The composition, properties and uses of materials in glazes. Calculation of glaze formulas and batches. Laboratory exercises in the development of color and texture.

ART 560 - Ceramic Graduate Seminar 2 hours. This seminar is required for first year, second semester graduate students in Ceramic Art. It is a faculty structured, student generated, and research discussion group course focusing on the history of contemporary ceramic art, mid 19th century to the present. It is intentionally founded on principles of artist studio practice rather than on academic art history methodologies.

ART 601 - Studio Advising Support 1-8 hours. Provides graduate students an opportunity to work with faculty outside of their division. Enrollment is by permission of the faculty, based on space/time availability and with approval of respective Division Chair.

ART 671 - Written Thesis Preparation for Electronic Integrated Arts 4 hours. The studio work is supported by a written thesis report that includes a detailed statement about the work, a technical documentation of materials and processes used, and 20 slides of the thesis work. This documentation is archived in the Scholes Library. Additionally, the course is structured as a seminar with all second year EIA MFA students participating.

ART 672 - Written Thesis Preparation 2 hours. The studio work is supported by a written thesis report that includes a detailed statement about the work, a technical documentation of materials and processes used, and 20 slides of the thesis work. This documentation is archived in the Scholes Library. Additionally, the course is structured as a seminar with all Ceramic Art and Sculpture/Dimensional Studies MFA students participating.

ART 680 - Thesis-Ceramic Art 1-8 hours. The ceramic art thesis is a body of work that is presented in a gallery exhibition at the end of the fourth semester of study. Students work with individual faculty studio advisors, with midterm and final reviews by the entire ceramic faculty.

The faculty will choose a work from the exhibition for the Glory Hole Collection of the Schein-Joseph International Museum of Ceramic Art at Alfred.

ART 681 - Thesis-Electronic Integrated Arts 1-8 hours. Required each semester for graduate students working in Electronic Integrated Arts. Each graduate student will register with one of the Division of Sculpture/Dimensional Studies and Electronic Arts faculty on an independent study basis. This course is an opportunity for self-generated studio work. During the third and fourth semesters the primary emphasis of this course will be thesis preparation.

ART 682 - Thesis-Sculpture/Dimensional Studies 1-8 hours. This course embodies the studio component of the written thesis. The focus is on the continuation of individually directed studio research in consultation with the faculty. A body of work is presented in a gallery exhibition at the end of the fourth semester of study.

Art History

ARTH 500 - Topics in Art History 2 or 4 hours. Topics vary from semester to semester.

ARTH 501 - African Art I 4 hours. A survey of the arts of sub-Saharan Africa with an emphasis on sculpture. The course focuses on the role art plays in African cultures and also introduces students to a wide range of art forms and styles.

ARTH 502 - African Art II 4 hours. Continuation of ARTH 501, a survey of the arts of sub-Saharan Africa.

ARTH 503 - Oceanic Art 4 hours. A survey of the arts of Melanesia, Micronesia, Polynesia, and Australia. The course surveys the arts of sculpture, ceramics, and personal adornment and examines their relationship to other aspects of oceanic society.

ARTH 511 - Pre-Columbian Art 4 hours. A survey course that acquaints students with major monuments and styles of Pre-Columbian American art, including: architecture, sculpture, ceramics, dress, and body adornment. Examined are several millennia of pre-contact art traditions in Meso America and South America from earliest art producing cultures to the Aztecs and Incas. The course looks at archaeological contexts and investigates possible meanings for art and written records dating from early periods that enhance our understanding of later cultures.

ARTH 521 - Topics in Greek and Roman Art and Architecture 4 hours. A study of art and architecture from ancient Greece and Rome. Among other issues, the course addresses changing attitudes of style, function, and patronage during this period and investigates the influence of social and religious belief. The study of Greek art emphasizes the development of stylistic periods. Roman art study focuses on individual historical periods of various emperors as reflected in the patronage.

ARTH 522 - Topics in Medieval Art, AD 300-1500 4 hours. This course explores the medieval image in art with an emphasis on manuscript illumination. Various media, including wall painting, mosaic, enamel work, stained glass, ivory, wood, and (non-architectural) stone sculpture are investigated.

The Early Christian, Byzantine, Early Medieval, Romanesque, and Gothic Eras are studied with regard to the work of art in its cultural and historical context, regional style, iconography, and patronage.

ARTH 523 - Medieval Architecture, AD 300-1500 4 hours. This course focuses on architecture and architectural sculpture. It traces the development of Imperial and Byzantine architecture of the Mediterranean region and then investigates early medieval, Romanesque and Gothic architecture. Topics discussed include the imperial tradition, the Pilgrimage Road, the monastic orders, birth of Gothic style under the patronage of Abbott Suger, and the development of High Gothic, both secular and ecclesiastical.

ARTH 525 - Northern Renaissance Art: Quagmires, Quandaries & Queries 4 hours. This course will look at some of the major points of debate within Northern Renaissance scholarship (Northern Europe, ca. 1400-1570), beginning with the fabulous "Tres Riches Heures de Duc de Berry" and ending with Brueghel's "Children's Games". Each week will focus on one or two works of art and problems relating to historical context, authorship, techniques of production and interpretation.

ARTH 531 - Italian Renaissance Art 4 hours. An in-depth study of the Renaissance Period and its theories. Artistic developments in Italy are emphasized.

ARTH 532 - Northern Renaissance Survey 4 hours.

ARTH 533 - Baroque Art 4 hours. This class will look at the art and architecture of 17th century Europe, from Bernini to Rembrandt, and look at the historical, political, and religious context of this dynamic era. Among the issues to be discussed will be Counter Reformation spirituality and its impact on religious painting, urban planning and the rise of the modern city, the staging of kingship, the art market, the representation of gender roles and the rise of the art print. Course will consist of lectures, discussions on assigned readings, exams and a short research paper.

ARTH 534 - Art of the 18th Century 4 hours. A thematic survey of 18th Century art, architecture, art institutions, and art theory of Europe from classical Baroque, Neo-Classicism, and early Romanticism with contextual emphasis on economic, social, cultural, intellectual, and political developments in France, Austria, Venice, England, and Spain.

ARTH 535 - Northern Baroque 4 hours. This course is a survey of the Southern and Northern Netherlands in the 17th Century that will look at the role of art in Netherlandish society and economy. We'll consider the methodological issues surrounding attribution and interpretation that confront art historians today. This course is writing intensive, with two short papers, a long research paper, and essay exams.

ARTH 540 - Ceramics from Arts and Crafts to Modernism, 1876-1929 4 hours. Beginning with the 1876 Philadelphia Centennial Exposition and ending with the 1929 International Exhibition of Ceramic Art, this course will survey tidal shifts in American ceramics, exploring the substance of styles. We will examine claywork in relation to patterns of consumption and emulation, artistic invention, and tradition. We will measure change by looking at expositions in galleries, world's fairs, and museum collections. Original archival research is an important component of the workload.

ARTH 542 - Primitivism: A Western Perspective 4 hours. This course surveys the concept of the "primitive" in Western art from the Enlightenment to the present. Students explore the shifting nature of primitivism, examine the relationship between art and colonial expansion, and critique the formal and thematic appropriation of non-Western artifacts by European and American artists.

ARTH 543 - Modern Art 4 hours. Encompassing the movements of Symbolism to Surrealism, this course covers the developments in modern art during the first half of the 20th Century. Students explore such themes as modernity, primitivism, and utopian theory as well as the stylistic developments and formal innovations of this period.

ARTH 551 - Object/Objecthood 4 hours. An examination of the changing nature of sculpture in the twentieth century, ranging from formalist object to surrealist fetish and minimalist object to performance "residue." Artists include: Constantin Brancusi, Alberto Giacometti, Donald Judd and Yoko Ono. We will critique the shifting conditions and critical reception of the sculptural object through a series of theoretical texts.

ARTH 552 - Contemporary Projects in Art 4 hours. This interactive course will focus on and study the projects of selected contemporary artists. These projects will serve as platforms for investigating issues and problems related to various contemporary art forms and movements including, the embodiment of the viewer, play and reality, new technologies and consciousness, ironic modernism, and the critique of the post-medium condition.

ARTH 553 - Contemporary Art Theory 4 hours. This course surveys developments in Western Art from the late modernism of the post-war era to post-modernist interventions at the end of the 20th Century.

ARTH 554 - Recent Sculptural Practices 4 hours. A series of recent projects exploring contemporary issues in sculpture will be the focus of this class. We will be looking an international array of artists, including: Matthew Barney (United States), Robert Irwin (United States), Juan Munoz (Spain), Doris Salcedo (Colombia), Thomas Schutte (Germany), and Rachel Whiteread (Britain). The work of these artists will be examined in the context of larger post-war debates.

ARTH 561 - Viewing Sculpture: Figurative, Modernist, Minimalist, Performative 4 hours. A close examination of the nature of sculptural viewing over the past 200 years. Sculptural theory is considered alongside contemporary artistic practice, ranging from Antonio Canova's neoclassical figures to Janet Cardiff's audio walks. Primary sources will be used for class discussion, along with Potts' "The Sculptural Imagination". In addition to thinking critically about the phenomenon of viewing, we will investigate the changing attitudes toward sculpture and the broadening definitions of three-dimensional work in the modern period.

ARTH 562 - History of Photography 4 hours. A survey course covering the pre-history of photography up to Post Modernism. Required readings directly related to the slide lectures are placed on reserve at Scholes Library.

ARTH 563 - Ceramics and Cultural Identity: Global Traditions and Innovations 4 hours. A thematic approach to the history of ceramics that is global and cross-disciplinary, designed for students to re-conceive their inheritance and its varied strands of tradition, convention and invention. Topics include ritual objects, tableware and dining customs and the funereal.

Evidence will span an enormous range of cultures and era, from ancient to contemporary. The approach of material culture will reveal the complex cultural issues surround the ceramic medium.

ARTH 564 - Design and Culture 1600-1900: Tombstones to Telegraph Poles 4 hours. Trace chair, the coffee mug, and the printed page back in time to consider their significance in America between 1600 and 1900. Consulting primary documents, such as houses, furnishings, and photographs, and contemporary secondary readings, this course will examine the concepts, social meanings, styles, and craftsmanship of American material culture. Different theoretical models of interpretation will complement looking at stuff and learning about history. Our focus will be on local Southern Tier design, reconsidering the idea of style, diffusion, industry and the culture of the country.

ARTH 565 - Design and Culture, 1900-Present 4 hours. We will ponder design in the age of rapid obsolescence, and consider how typefaces, furniture, table settings, and facades reflect the changing values of our turbulent society. We will assess artifacts in terms of materials, craftsmanship, consumption, gender, authority, and cultural identity. Can a typeface engineer mass consumption? Can a chair articulate an existential crisis? Can a mug express emotional ambivalence? Theoretical and historical readings will be integral to this study of visual culture.

ARTH 570 - (Re)Considering the Ceramic Object 4 hours. This class will attempt to re-map twentieth-century ceramics and its critical place within the broader art system. Our discussions will be based on a range of texts and images, both within and beyond the field of ceramics. Particular emphasis will be placed on recent studio practices.

ARTH 571 - Contemporary Ceramic Art 4 hours. We will investigate developments in studio ceramic art over the past fifty years. Topics include: a commentary on Modernism and materiality, a critique of the postmodern interest in the decorative, and a review of current scholarship in the field. Contemporary Work will be examined in their historical contexts and cultural traditions.

ARTH 581 - American Folk Traditions: Vernacular Art/Architecture 4 hours. This course will explore the art of largely self-taught artists in the United States from the earliest colonial period to present day. A variety of media will be discussed including portraiture, tombstone carving, quilts, architecture and furniture design. We will also look at distinctive regional traditions, such as the decorative arts produced by the Shakers and Yard Art produced in the deep South today. Course will consist of lectures, discussions on assigned readings, exams and a research project on which students will present to the class.

ARTH 582 - Women in Art 4 hours. This course considers various gender issues in art history including the role of women artists in western and non-western cultures, feminist re-evaluation of art history, and the existence of a "feminine art." Students are assigned research papers or oral reports on topics generated by readings, lectures, and class discussions.

ARTH 584 - Strategies of Display: Museums, Fairs, and Flea Markets 4 hours. Theorizing artistic reception has an added urgency in our era when presentation is the product. Artists need to constantly re-think their own practice in relation to new technologies, new ideas and the resurgence of old ideas. This course will look at how artists have addressed modes and technologies of presentation and how theories of the space of art have played a role in defining culture and cultural institutions.

A critical appreciation of light, frames, and framing devices and other exhibition technologies will be surveyed in museums and malls, flea markets, and artist's homes.

ARTH 590 - Issues in Non-Western Art Seminar 4 hours. A round-table seminar based on extensive group discussions and in-depth individual research on non-Western art topics.

ARTH 592 - Contemporary Topics Seminar 4 hours. A round-table seminar based on extensive group discussions and in-depth individual research on significant contemporary events and developments in and around the art world.

ARTH 593 - Art in the Age of Digital Recursion 4 hours. A round-table seminar based on extensive group discussions and in-depth research on recent innovations in technology and how that technology has impacted art production and theory.

ARTH 594 - Pablo Picasso Seminar 4 hours. This course examines issues of representation and reception in the work of Pablo Picasso. Students will critically explore a broad range of Picasso's work, including painting and printmaking, sculpture, and ceramics. This artist, whose production spanned most of the 20th century, will serve as a case-study for discussions on the nature of modern theory and art criticism.

ARTH 660 - First Year Graduate Seminar 2-4 hours. Required for all first year MFA graduate students. This seminar brings together the students working in all three graduate programs to facilitate their participation in creating a framework for understanding the practice of art making in relation to the contemporary, global and cultural terrain.

Biology

Graduate students may take this 400-level courses for graduate credit:

BIOL 485 - Internship in Biology 1-16 hours. Off-campus research in consultation with faculty and project advisors. Open to junior, senior and graduate biology students.

Graduate Courses:

BIOL 550 - Independent Study 1-4 hours.

BIOL 580 - Research 2 or 4 hours. Open primarily to graduate students, others by permission.

Business Administration

Foundation Courses (undergraduate credit only)

ACCT 211 - Financial Accounting 3 hours. Introduces financial reports and the underlying concepts and processes. Financial reports are a major way in which a business enterprise communicates its activities and their results to owners, government authorities and the general public.

ACCT 212 - Managerial Accounting 3 hours. Internal accounting reports are used by management to assess results, plan further operations and make decisions as to capital projects, product lines, and pricing.

Illustrates the use of such interpretive techniques as cost-volume-profit analysis, variance analysis, cash forecasting, and rate of return to develop managerial decisions based on accounting data. Prerequisite: ACCT 211.

BUSI 113 - Business Statistics 3 hours. The elements of basic statistical theory and technique are introduced with an emphasis on applications to business situations. Computer-based software packages complement these objectives.

ECON 201 - Introduction to Economics and Markets 4 hours. Introduction to the principles of microeconomics and a survey of contemporary economic issues. Includes study of market systems and structures, government regulation of business, labor markets and income distribution, strategic behavior, and market failure. Prerequisite: sophomore standing. (E)

ECON 202 - Principles of Macroeconomics 3 hours. Study of the factors involved in the problems of unemployment, inflation, economic growth, and the role of fiscal and monetary policies. Includes coverage of the money and banking system and international trade. Prerequisite: ECON 201.

FIN 348 - Managerial Finance 3 hours. An introductory course explaining the tools and the new responsibilities modern financial managers deal with in a rapidly changing world environment characterized by uncertainty. The course identifies and examines the financing needs of the firm, its cost of capital, and assets and liabilities management using modern decision support systems for the application of new financial innovations, such as contingent claims and securitization of assets. Prerequisites: ACCT 211/212, ECON 201/202.

MATH 107 - Calculus Concepts for the Social Sciences 4 hours. The purpose of this course is to provide students with a firm foundation in the basic concepts of calculus. Considerable time will be spent on functions, and understanding functions as a relationship between two quantities: input and output. Examples from business and social sciences will emphasize real world applications and data-sets. Mathematical models will motivate the study of how functions change, with a heavy use of technology replacing traditional algebraic manipulations. Not open to students with credit in MATH 151. (III)

MIS 101 - Business Perspectives 3 hours. This course helps students develop a sense of business systems, methods and issues. It is designed to raise sensibilities about the business environment, ethics, and decision making. It also acknowledges the importance of fundamental computer concepts for business, covering spreadsheet, database, presentation software, as well as website design.

MIS 190 - Introduction to Management Information Systems 3 hours. This first course in information theory covers the subjects of computer hardware and software, the system development process, principles of data management and modern computer-based information systems. Emphasis is placed on business problem analysis and determining how automation can contribute to satisfying business needs. Development of computer-based business applications. Prerequisite: MIS 101 or equivalent.

MGMT 328 - Management and Organizational Behavior 3 hours. This course builds an understanding of individual and group behavior within organizations, the means of assessing such organizational behavior and specific techniques for managing behavior toward improved performance.

The goal for the course is for students to develop skills grounded in behavioral science that are essential for assuming a leadership position in organizational environments. Prerequisite: Junior standing.

MGMT 484 - Operations Management 3 hours. Introduces students to functions, problems, and techniques associated with management of production operations in manufacturing firms and service organizations. The problem oriented approach focuses on analytical techniques so students learn to recognize problems arising in operations management areas and to apply analytic techniques meaningfully. Topics include plant location, plant layout and design, inventory control, quality control, production planning and control (including PERT), production scheduling, queuing, mathematical programming, simulation, and forecasting. Prerequisites: BUSI 113, BUSI 261, ACCT 212, MGMT 328.

MKTG 221 - Marketing Principles and Management 3 hours. A survey of marketing concepts, principles, techniques and theories. Emphasizes the development and implementation of an effective marketing strategy, and control of the marketing function within the firm. The role of marketing in society and the efficient distribution of goods and services are addressed. Prerequisite: Sophomore standing.

Graduate Courses

MBA 610 - Leadership Dynamics 3 hours. The course focuses on the theory and practice of situational leadership. Course participants will learn about theories of motivation, organization design and performance management by examining factors that influence individual and group performance management. Teaching methods will include the use of the College's behavioral lab facilities, interactive software, diagnostic tests to evaluate each participant's leadership skills, experiential exercises and group discussions.

MBA 611 - Accounting Information Systems 3 hours. This course provides students with a solid understanding of conceptual, analytical and technical knowledge and skills in accounting information systems to prepare students for successful careers in accounting. The course examines the design, control and operation of accounting information systems in a computerized organizational environment with a strong business process orientation. Various principles, methodologies and applications in accounting and information systems are introduced through lectures, discussions, case studies, computer lab assignments/project using advanced data modeling and enterprise applications including SAP.

MBA 612 - Legal, Political, and Social Environment of Business 3 hours. This course emphasizes how optimal managerial decisions can be made in the current public policy environment. Government-business relations and government policies will be analyzed through readings and cases to evaluate how successful firms have adapted to their environment.

MBA 613 - International Marketing 3 hours. This course introduces and discusses the critical factors influencing marketing management in a global environment related to analytic/strategic decisions and personal skills. Analyzing environmental and cultural information in a foreign country and managing with a global mindset are critical factors to assure success. Current examples and case studies address the key issues that marketers must keep in mind to create effective marketing programs for foreign markets.

The relationships of international marketing to advertising, global competition, cultural and ethical concerns, theory vs. practice, emerging technologies, verbal and visual language and other relevant issues are also examined. The class is operated as a seminar requiring each class member's contribution in reading assigned material and active participation in class discussion including one group project.

MBA 614 - Corporate Finance 3 hours. This course deals with the financial manager's job to add value and maximize shareholders' wealth. Students develop their skills to learn and apply theories of finance related to capital budgeting techniques, capital structure working capital management, and international corporate finance through critical problem solving, cases, and a multiple period simulation of a hypothesized corporation. Students make major operating and financial decisions and sharpen their skills to integrate this course with other disciplines. This includes general decision-making for both short-term liquidity needs and long-term financing and investing projects to sustain the corporation growth and attain its overall objective of value creation to the stakeholders.

MBA 620 - Global Dimensions of Management 3 hours. This course develops the analytical capability and perspectives to manage a firm in a global economy. The course will explore the global strategies of multi-national firms by integrating the viewpoints of functional disciplines. It will cover the impact of cultural differences on marketing and management, of government policies on trade and investment, foreign exchange and international capital markets and how an effective manager adapts to these issues.

MBA 621 - Business Decision Making 3 hours. This course challenges students to integrate all of the discipline-specific skills developed in the MBA foundation courses within a dynamic decision-making context. The focus of the course is the process of problem framing/identification, analysis, and decision making in complex and uncertain environments. Working in a simulated environment, students develop critical judgments about the efficient and effective application of core knowledge by applying the tools of analysis appropriately, and then exacting useful insights and drawing managerially relevant recommendations from the analysis.

MBA 622 - Quality Management 3 hours. The focus of this course is the fundamental concept of quality management; the design and development of management systems which contribute to achieving customer-driven, continuous improvement. The course is interdisciplinary in nature, drawing principally from the fields of MIS, market research, management theory and statistical control. The course utilizes a mix of case studies, lectures, and HW assignments in developing an appreciation of the theory and practice of quality management including Six Sigma Management. Emphasis is on developing skills with specific techniques and systems central to quality management principles.

MBA 624 - Strategic Management 3 hours. The course is case-oriented and focuses on the analysis of complex business problems via the integration of the subject matter of all previous program courses. Linking the firm's internal and external environments from the total-enterprise perspective of the general manager, this course undertakes a systematic inquiry into the strategic management and administrative business policy issues pertaining to the organization's performance and effectiveness. The course consists of four major topics: Business Planning Simulation (BPS), Business Information Collection (BIC), Corporate Performance (CPM) and Stakeholder Relationship Management (SRM). Enterprise Resource Planning (ERP) software will be used to demonstrate the importance of an enterprise-wide data base in strategic decision making.

MBA 640 - American Economic History 3 hours. In order to understand business as it is conducted in the new millennium, it is necessary to understand how business was conducted in the past. The readings in this course will focus on the "Golden Age of Business" in the United States beginning from the aftermath of the Civil War until the Great Depression.

MBA 642 - Portfolio Management: Personal and Corporate Planning 3 hours. A course dealing with applications of financial theory to individuals and corporations. Topics include budgets, insurance, investments, taxation and wealth creation.

MBA 644 - Accounting Issues 3 hours. The primary objective of the course is to learn to make effective use of management accounting data within an organization. A secondary objective is to develop the analytical skills necessary to diagnose complex business problems in an accounting context. The world of management accounting is dynamic, and requires knowledge of the most recent advances in management accounting. The course will focus on strategic issues in managerial accounting that are helpful for organizations operating in today's uncertain environments. These issues include, but not limited to, Activity-Based Costing and Management (ABC/ABM), Kaizen (continuous improvement) Costing, Value chain analysis and inter-organizational control, Target costing, Balanced Scorecard, Transfer Pricing, and Strategic Performance Measurement.

MBA 646 - Enterprise Resource Planning 3 hours. The objective of the course is to develop awareness of the need for enterprise wide information systems. Students will learn this cutting edge technology in Information Systems, and how this system provides the foundation of a wide range of e-commerce-based business processes. Topics include, pros and cons of ERP system, evolution of ERP, systems requirements of ERP system, systems implementation, and Supply Chain Management. Students will have hands-on experience with SAP R/3 systems and accelerated SAP.

MBA 648 - Business Warehouse 3 hours. The goal of this course is to introduce the student to the use of business techniques to improve decision making. The course is structured to answer the following: 1. What are the technology and the architecture of data warehousing? 2. What is data mining? 3. What are the data mining techniques? SAP BW will be used to demonstrate extracting data from online transaction processing systems, dealing with poor data quality and structuring the data.

MBA 660 - Seminar in Business Issues 3 hours. A seminar that focuses on special topics in the field of management and business administration. Topics vary from one semester to another. May be repeated for credit.

Ceramic Engineering, Materials Science and Engineering, Glass Science, Biomedical Materials Engineering Science

Graduate students may take this 400-level course for graduate credit:

CEMS 458 - Materials for Electronic Packaging 3 hours. Electronic package systems for information processing include the function of electrical interconnection, cooling and physical support for the sets of semiconductor I.C. chips plus other components in electronic systems. Semiconductors, ceramics, polymers and metals are generally used in combinations in all packages; and, hence, it is necessary to understand their bulk properties as well as their interface structures and characteristics.

This course focuses on the design of materials and processing needs for packaging technology from chip to board using principles involved in key areas of materials science and engineering disciplines. Basic properties and processing methods used in the design and fabrication of semiconductor IC's, ceramic substrates, metal interconnections, and polymers are discussed. Prerequisites: CEMS 314, 344.

Graduate Courses:

CEMS 500 - Special Topics 2-4 hours. The course covers advanced topics which are not ordinarily covered in detail in the general curriculum, but are either current areas of faculty research or areas of current or future industrial interest.

CEMS 501 - Solid State Physics 3 hours. This course discusses the microscopic origins of the physical properties of solids. The focus is on the atomic lattice and associated mechanical, thermal and dielectric properties; energy band structure; the electronic properties of metals, semiconductors and insulators; magnetic properties; optical properties; superconductivity; and the dielectric, ferroelectric and piezoelectric properties of insulators.

CEMS 502 - Quantum Mechanics I 3 hours. Presents the fundamental theory of physical phenomena, of matter and energy and of their interaction. Emphasis is placed upon a thorough grounding in the concepts and techniques, which is then applied to diverse phenomena of importance to ceramics and to solid-state chemical physics.

CEMS 503 - Thermodynamics of Materials 3 hours. This course seeks to advance the students' understanding of classical and statistical thermodynamics as applied to materials systems as well as to expand students' ability to solve advanced thermodynamic problems. This course will cover classical and statistical thermodynamics as related to solution theory, phase equilibria, phase transformations, surface thermodynamics, and defects.

CEMS 504 - Kinetics and Non-equilibrium Processes in Material 3 hours. This course seeks to provide students with an advanced understanding of kinetics and non-equilibrium processes in materials. Topics will include the phenomenological and atomic theory of diffusion, kinetics of solid-state reactions, and diffusional and diffusionless phase transformations. Applications of the course materials to materials research problems will also be discussed.

CEMS 505 - Defects and Defect-related Processes 3 hours. This course discusses the nature and behavior of defects (including point, line and planar, etc.) in ceramics. The relationship of defect properties to such basic processes as mass transport diffusion and conductivity is considered. The discussion will largely be at an atomistic level and will cover non-stoichiometry, and the role of impurities in phenomena such as grain-growth and sintering.

CEMS 506 - Advanced Engineering Mathematics 3 hours. The classical partial differential equations of physics; the heat equation; the wave equation (vibrating strings and membranes); Laplace's equation. Includes orthogonal sets of functions, Fourier series, separation of variables, Sturm-Liouville problems boundary value problems and the Fourier integral.

CEMS 507 - Quantum Mechanics II 3 hours. Continuation of Quantum Mechanics I. Focuses on the applications of quantum mechanics postulates to real systems. Time independent perturbation theory is developed as are nonperturbative techniques such as variational theory.

These ideas are applied to real atoms, molecules, metals, etc. Time dependent perturbation is also constructed and applied to electrodynamics. Non relativistic quantum electrodynamics is then applied to realistic systems. Prerequisite: CEMS 502.

CEMS 510 - Advanced Ceramic Processing 3 hours. This course provides a review of all relevant issues concerning the processing and sintering of advanced ceramic materials - discussing powder preparation and characterization, colloidal and sol-gel techniques, powder consolidation and forming, sintering theory and practice, and microstructure evolution. The course shows the importance of each step, and the critical interconnections among the steps, in the overall fabrication of ceramics; focuses on the formation of ceramics by firing consolidated powders; reveals which ceramic manufacturing methods are easier to employ and why; covers the properties of colloidal suspension; elucidates the liquid-phase sintering and vitrification; describes the role of solid solution additives in the sintering of ceramics; considers the densification of amorphous materials that can crystallize during firing; and more.

CEMS 511 - Science of Whitewares 3 hours. The science and technology of whitewares (i.e. primarily stonewares and porcelains) covering mineralogy, raw material characterization, mixing, rheology and plasticity, forming processes, drying, firing, phase equilibria, thermal stress evolution, microstructural characterization, physical properties, and glazing. Special emphasis will be given to colloidal science and its application to clay materials, the impact of particle-particle interactions on suspension rheology, plasticity, and particle packing, and to the application of phase equilibria to the microstructural evolution in whiteware bodies.

CEMS 512 - Colloids and Interfaces 3 hours. This course will develop a fundamental understanding in several areas of colloidal and interfacial chemistry that are important in the modern processing of fine ceramics, adsorption from solution, wetting, dispersion and stability of suspensions, sedimentation, osmosis effects, rheology, light scattering, emulsions, and gels, and how those principles apply to modern ceramic processing.

CEMS 513 - Nano-Structured Materials 3 hours. This course provides a basic knowledge of nano-structured materials. The first section deals with fundamentals of the synthesis processes, e.g. gas phase reactions or precipitation reactions. In the second section the various applications and properties of nano-structured materials will be discussed. Examples are quantum dot (lasers), ductile ceramics, solar cells, memory devices, or magnetic refrigeration.

CEMS 519 - Ceramic Science for the Artist 2 hours. The science and technology of whitewares covering mineralogy, raw material characterization, mixing, suspension behavior and control, rheology and plasticity, forming processes, drying, firing, the use of phase diagrams, thermal stress and microstructural evolution, mechanical properties, and glazing. This course provides the artist with the practical basis necessary for analyzing problems commonly encountered in the production of whitewares.

CEMS 520 - Optical Glasses 3 hours. A detailed discussion of the primary glasses used in optical applications. Approximately one half of the course will focus on pure and doped vitreous silica. The remainder of the course will deal with glasses containing rare earth ions, infrared transmitting glasses, and traditional optical glasses.

The production, structure, and general properties of each type of glass will be discussed in detail. The optical application of each glass will be stressed throughout the course.

CEMS 521 - Behavior of Glass-forming Melts 3 hours. The behavior of glass-forming melts from the fluid range to transition to the glassy state is explored in depth. Starting with a review of the glass formation criteria and the structure, the phase transformation phenomena (liquid immiscibility, crystallization, the glass transition) are examined. Theories of liquid state and viscosity are developed. Glass transition arguments based upon free volume, thermodynamics and kinetics are discussed. Additionally, properties of melts such as fining and redox equilibria are briefly studied. Finally the development/relaxation of stresses, annealing and tempering of glass are dealt with. The course is designed to give the student a better understanding of the science why glass behaves the way it does. The mathematics content is moderate.

CEMS 522 - Thermal Behavior of Glasses and Melts 3 hours. This course presents a detailed discussion of the thermal behavior of glasses. Analytical techniques considered include DSC/DTA, dilatometry, TGA, EGA, hot stage microscopy/diffraction, viscosity, and thermal conductivity. The determination of T_g , effects of thermal history, fictive temperature, nucleation and crystallization rates, specific heat measurements, thermal expansion coefficients, viscosity, phase separation, first order phase transformations, thermal conductivity and diffusivity, decomposition of raw materials and other batch reactions, and thermal shock behavior will be discussed.

CEMS 523 - Structure of Glasses 3 hours. In the first half of the semester, this course involves an in depth look at the means by which the structure of glasses is described and the measurement techniques used to elucidate the structure. In the second half of the semester, the various models of glass structure are discussed and the students are required to research and champion a particular glass structural model in the form of an in-class debate.

CEMS 524 - Mass Transport in Glasses and Melts 3 hours. This course introduces the student to a wide variety of diffusion-controlled phenomena in solids and liquids. Solids covered include inorganic and organic glasses, glass-ceramic, ceramics, metals, and porous materials. Liquids covered include oxide and non-oxide glass forming melts, halides, and liquid metals. Both atomistic and mathematical approaches to diffusion processes will be emphasized. The course will include extensive discussion of measurement techniques and will deal with diffusion of both ionic and gaseous species. Diffusion under stress, thermal and electrical field gradients will be discussed in addition to diffusion under concentration of gradients.

CEMS 525 - Advanced Optical Behavior of Glasses 3 hours. The course will consider the optical behavior of glass. Topics covered will include the intrinsic band gap, effect of impurities on uv absorption, interionic charge transfer, electron and hole centers, wavelength dependent scattering, ligand field effects, dichroism, fluorescence, phosphorescence, glass lasers, metallic and semiconducting colloids, hydroxyl/hydride absorption, including optical dating of natural glasses, the multiphonon edge, isotope effects, intrinsic infrared absorption bands, interference effects, opalescent glasses, photosensitivity, photoconductivity, photochromism, photo/thermoluminescence, electrochromism, Faraday rotation, color filters, traditional optical glasses, and birefringence.

CEMS 526 - Surface Properties of Glass 3 hours. The theoretical background necessary for the understanding, prediction and modification of surface properties is provided. Non-crystalline materials are stressed. The course includes use of thermodynamic principles to predict the general chemical and mechanical behavior of glass under a wide variety of environments. Mathematical models provide quantitative descriptions of the performance of these materials in various applications. Individual topics include chemical durability, mechanical properties including environmental effects, friction, wear, grinding and polishing, and surface modification processes such as ion-exchange and de-alkalization processes.

CEMS 530 - Advanced Properties 3 hours. Physical and mathematic presentation of material properties and their relation to the symmetry of crystals, ceramics, glasses, and isotropic materials. Presentation of properties in both matrix and tensor forms. Properties include linear and non-linear equilibrium properties (e.g., permittivity, stiffness, permeability, piezoelectricity, electro-optic and magneto-optic) and transport properties (e.g., diffusivity, electrical conductivity). Inter-relationship of properties using Maxwell Relations and thermodynamics.

CEMS 531 - Advanced Solid State Chemistry 3 hours. This course will explore, in detail, the relationship between structure, stoichiometry, and properties of solid materials. The subject will be approached through a thorough discussion of symmetry (both point and space groups) and crystal chemistry.

CEMS 532 - Atomistic Computer Modeling of Materials 3 hours.

CEMS 533 - Statistical Experimental Design 3 hours. Following a review and extension of ANOVA and regression, experimental design is introduced as an extension of statistical methods. Various standard designs and their analysis are introduced and applied to research and quality control situations. Factorials, fractional factorials, response surface designs and mixture designs are covered. Statistical process control, control charts, and optimization are introduced. Computer methods will involve some standard packages such as SPSS, JMP, IMSL on the mainframe, or software packages on computers in the College micro-computer labs.

CEMS 534 - Polymer Characterization 3 hours. An introduction to the scientific principles of synthesis, processing, characterization, and testing of polymeric materials. Relationship of polymer properties and performance to the underlying structure and synthetic conditions is emphasized by application of appropriate scientific approaches. Hands-on experience with structure-property characterization of polymeric materials is included in the required laboratory.

CEMS 536 - Physical and Mechanical Metallurgy 3 hours. Structure/processing/property relationships for metals with an emphasis on mechanical properties. Mechanical testing techniques and the effect of test temperature and strain rate on properties. Failure analysis, corrosion, fracture, fatigue, and creep. Brief introduction to the physical metallurgy of aluminum, titanium, magnesium and stainless steel alloys. Laboratory experiments emphasizing mechanical testing, heat treatment, and microstructural development.

CEMS 538 - Surfaces and Interfaces 3 hours. This course focuses on the underlying concepts for surface chemistry and the application of these concepts to everyday practice. Topics covered in this course include; molecular interactions at the interface, interaction forces, fluid interfaces, amphiphilic and polymer systems, crystalline solid surfaces, thin films, surface modification and surface analysis techniques.

CEMS 541 - Advanced Crystallography 3 hours. This course is intended to give the student a thorough grounding in the theory and application of modern diffraction and scattering methods. Kinematical and dynamical scattering theory will be covered, followed by single-crystal and advanced powder diffraction methods. Modern structure solution techniques, instrumentation and automation will be addressed. Further discussion of other scattering techniques will bring the student near the state-of-the-art in materials characterization using x-ray, neutron and electron scattering.

CEMS 542 - Advanced Optical Microscopy 3 hours. This course provides an advanced treatment of the use of optical microscopes in characterization of glasses and ceramics. Underlying principles of the interactions between light and materials are presented, and techniques of optical microscopy, which exploit these principles, are examined and practiced. Optical microscopes will be discussed by examining the function, adjustments, and design of individual components and by describing illumination techniques in detail. In the laboratory, students will use a variety of microscopes and illumination techniques, including brightfield, darkfield, differential interference contrast, other interference techniques, phase contrast, and polarized-light. Photomicrography using film and digital image-storage systems will be covered, as will image processing and image analysis-using computers. Students will do prepared laboratory experiments (including measuring index of refraction, specimen preparation, optical strain measurements, and characterization of microstructures) and individual projects. There are two lectures and one lab each week.

CEMS 543 - Analytical Transmission Electron Microscopy 3 hours. A hands-on laboratory course, the class is oriented toward instructing students in the practical use and operation of the analytical electron microscope, to ultimately be applied to his/her thesis work.

CEMS 544 - Structure and Characterization of Glasses 3 hours. This course provides a general review of techniques for the characterization of glasses and glass-ceramics. Characterization is taken to include atomic and molecular composition and distribution (intrinsic and extrinsic species), morphology, phase (vitreous and crystalline) identity and concentration, thermal history, and properties which are commonly used to establish reproducibility of glass compositions. Techniques considered will include microscopy, x-ray analysis, spectroscopy, qualitative and quantitative chemical analysis, thermal analysis, surface analysis and profiling, and property measurements. Discussions include the principles behind each measurement, the equipment used, and the possible sources of error. Both qualitative and quantitative analysis are included wherever applicable.

CEMS 545 - Characterization in Materials Science and Engineering 3 hours. The course will provide the student with detailed knowledge of the interactions of electromagnetic radiation with matter. Particle probes used in materials characterization will also be considered. A theoretical approach to understanding the mechanisms of interaction will provide the foundation for understanding any of the plethora of materials characterization techniques, including capabilities and limitations.

CEMS 546 - Surface and Porosity Characterization 3 hours. Students should get familiar with various surface and porosity characterization techniques, e.g. ESCA, SIMS, Auger, DRIFT, temperature programmed desorption (TPD), electrophoresis, adsorption techniques, Hg-porosimetry, NMR, and permeability studies. The course will give a brief introduction to each of those techniques.

Adsorption as well as several pore characterization methods will be discussed in more detail. The course should provide students with an overview of the general field as well as a more in depth discussion about some specific techniques. Several lab sections will provide a sufficient practical supplement to the theoretical concepts given in the lectures.

CEMS 550 - Independent Study 1-4 hours.

CEMS 551 - Fracture Fatigue, and Creep of Materials 3 hours. This course will cover the effects of microstructure on the fracture, fatigue, fatigue crack propagation, and creep behavior of engineering materials including metals, ceramics, polymers, and composites with a special emphasis on pure metals, single-phase alloys, multi-phase alloys and dispersion-strengthened materials. Fracture resistance, fracture toughness and methods to improve fracture behavior will be discussed in detail and various analytical techniques in the failure analysis of structural components will be presented. Topics discussed will include static and dynamic brittle and ductile failures, crack initiation, fatigue life prediction, damage tolerance approach to component design, and microstructural and structural synthesis for optimum behavior. In addition to fatigue and fracture, this course will provide the student with the basic material behavior concepts which control high-temperature material properties. A comprehensive study of relationships between microstructure and high-temperature creep deformation will be presented to the student. The properties and applications of high-temperature materials will be discussed, especially of those materials used in the aerospace industry such as titanium and nickel-based alloys.

CEMS 552 - Composite Design and Fabrication 3 hours. This course will introduce the influence of materials, design and processing on composite properties. Discussions will include details on state-of-the-art fabrication technology and performance of continuous fiber reinforced composites. Reviews of the open literature will be presented concisely in order to understand and to identify approaches toward addressing composite materials limitations.

CEMS 553 - Mechanical Properties of Glasses and Ceramics 3 hours. Fundamental concepts concerning mechanical behavior are introduced and discussed with respect to their application to glasses and ceramics. Emphasis is placed on strength and fracture mechanics, and how processing and temperature affect mechanical properties. Testing procedures, including non-destructive evaluation techniques, and problems associated with them are treated in detail. Part of the semester is devoted to a discussion of recent developments in the area of mechanical properties.

CEMS 555 - Principles and Technology of Photonic Devices 3 hours.

CEMS 556 - Properties/Applications of Ferroelectrics 3 hours. The course starts with a basic discussion of polarization in a dielectric, reviews electrostatic boundary conditions and then develops the concept of domains with the occurrence of spontaneous polarization. Domain re-orientation is shown to develop anisotropic properties and frequency effects in the dielectric constant. The structural transitions are modeled with thermodynamic theory and soft mode concepts. The second part of the course is concerned with the effect of the symmetry of spontaneous polarization on the structure and properties. The properties are expanded into devices and the use of ferroelectric material as piezoelectrics, pyroelectrics, electro-optics, and dielectrics.

CEMS 563 - Advanced Cell Biology 4 hours. This course focuses on integrative and specialized cellular activities. Integrative cell functions include: cell-to-cell signaling, mechanical and structural properties, motility, and differentiation via specific interactions between cells. Specialized cellular activities include: molecular immunology, neuron structure and function, and the cellular bases of cancer. Four lectures with one reserved for discussion of current research publications.

CEMS 564 - Biochemistry: Proteins and Metabolism 4 hours. Properties, biosynthetic pathways, and metabolism of carbohydrates, lipids, and nitrogenous compounds with related units on physical biochemistry, protein structure, bioenergetics and enzyme kinetics. Laboratories reinforce theoretical concepts and provide hands-on experience with modern biochemistry techniques and instrumentation. Three lectures and one three-hour laboratory.

CEMS 565 - Biochemistry: Nucleic Acids 4 hours. This course surveys the molecular biology of the gene. Discussions of the latest paradigms for nucleic acid structure and function are presented. Topics include: regulation of DNA replication and transcription, post-transcriptional modification of RNA, chromatin structure, recombinant DNA techniques, functional genomics, and the latest genetic engineering methods. Four lectures with one reserved for discussion of current research publications.

CEMS 567 - Electrochemistry and Bioelectrochemistry 3 hours. Theory and applications of electrochemical principles to the interphase region unique to biological materials. Topics include a basic review of ionics and electrodics followed by a detailed discussion of electrochemical phenomena that result from the structure and function of biological surfaces from macromolecules to intact cells. Detailed models are developed for the cell surface, the extracellular matrix and other regions capable of electrochemical phenomena. Special attention is paid to electrochemical phenomena that may result from the interaction of biological and non-biological materials (biomaterials).

CEMS 568 - Biomedical Materials 3 hours. This course introduces the fundamental concepts and theories behind the choice of material for biological applications. Metals, polymers, ceramics and composites are covered. It brings together biology and materials science to get a better understanding of fundamental interactions that control the applicability of materials. Case studies of present material applications are used to illustrate the principles taught.

CEMS 569 - Advanced Biomedical Materials Engineering 3 hours. Advanced concepts in biomaterials with an emphasis on the current literature. Objectives for the course include: understand the testing, requirements and issues related to medical devices; review current and historic materials used in these medical devices; review current FDA guidelines for medical devices; be able to make logical recommendations for research concerning new materials for medical devices.

CEMS 680 - Graduate Thesis 2-15 hours.

CEMS 685 - Graduate Internship 1-4 hours. Off-site internships with industrial, government or academic research laboratories are required for a minimum of 2 months. Funding will be provided by either the collaborating institution or the School. Examples of current contacts include Affymetrix, Arrow International, Cambridge Scientific, Food and Drug Administration, Orthovita, Owens Corning Fiberglass, U.S. Biomaterials, U.S. Surgical, Wilson Greatbatch, and Zimmer.

We also have strong ties with international universities and companies; for example, we currently have internships available at the University of Modena in Italy.

Chemistry

Graduate students may take these 400-level courses for graduate credit:

CHEM 400 - Advanced Chemistry Topics 1-4 hours. Special topics not covered by regular course work. One or more special topic courses will be offered most years. Students in consultation with a faculty member may design their own special topics courses. All special topics courses must have the written approval of the Division Chair and should in general meet the criteria of the American Chemical Society's requirements for an advanced course. Prerequisite: CHEM 346, although this can be waived at the discretion of the Division Chair.

CHEM 423 - Instrumental Analysis 3 hours. The theory and practice of modern instrumentation techniques and methods used in chemistry are presented. An in-depth look at spectroscopic, separation, and electrochemical methods and their associated instrumentation follow an introduction to instrumentation; interpretation of results is also covered. Required for chemistry majors. Prerequisites: CHEM 321 and CHEM 346 or equivalent.

CHEM 457 - Advanced Organic Chemistry 2 hours. Organic reaction mechanisms and stereochemistry. Other topics may be included, depending upon the interests of those enrolled. Prerequisite: CHEM 316 (Alternate years)

Graduate Courses:

CHEM 515 - Organic Chemistry I 4 hours. An introduction to the chemistry of carbon compounds, including the preparation of typical compounds and a study of their properties, reactions, and uses.

CHEM 516 - Organic Chemistry II 4 hours.

CHEM 520 - Chemical Principles 3 hours. A guided reading and problem solving course designed to develop a thorough understanding of the basic chemical principles essential for secondary school chemistry courses. It covers stoichiometry reaction types, atomic theory, bonding models, molecular shape, thermodynamics, kinetics, equilibrium, liquids and solids, solutions, and electrochemistry. This course is normally taken in conjunction with a teaching assistant position for CHEM 105/106. Prerequisite: Graduate students in education with emphasis in chemistry. (Sufficient demand)

CHEM 550 - Independent Study 1-4 hours. Hours to be arranged.

Counseling

COUN 600 - Special Topics in Counseling 1-3 hours.

COUN 601 - Foundations of Cultural Diversity 1 hour. As frontline practitioners in schools, human service agencies, and higher education settings, mental health providers are faced with a proliferation of cultural issues on a daily basis. It is essential that mental health providers develop an appreciation for cultural diversity and an understanding of how cultural diversity issues interact with service provision. This course is intended as an introduction to cultural diversity issues and their impact on the major areas of practice within schools, agencies, and higher education.

Upon completion of this course, students will have acquired knowledge regarding cultural issues that provide a foundation for exploring these issues in subsequent specialization courses. (Cross-listed as PSYC 601)

COUN 602 - The Profession of Counseling 3 hours. This course helps the student begin establishing professional identity as a counselor. Areas explored include professional roles, settings, functions, goals and objectives, organizations, history, ethics, and credentialing. Comparisons will be made between counseling in textbooks and in the "real world."

COUN 603 - Issues in Mental Health Counseling 3 hours. This course focuses on contemporary issues facing counselors in a variety of counseling agencies. Topics include counseling clients with eating disorders, depression, survivors of incest, date rape, alcohol problems. ACOA, etc. Students also become familiar with diagnostic and statistical manual of mental disorders; consultation issues and managing office politics. Prerequisite: COUN 602 and 636.

COUN 604 - Issues in School Counseling 3 hours. This course focuses on current guidance and counseling issues that are important to beginning school counselors. Examples of such issues include the CSE and IEP planning, course scheduling, working with BOCES, and managing time constraints. Prerequisite: COUN 602 and 636.

COUN 605 - Career Development and Life Planning 3 hours. Students learn how career development theories, occupational and educational information, vocational tests, sociological and economic factors, and family dynamics all relate in helping their clients to make career and life style career decisions. Students also spend time practicing skills directly related to career counseling. Prerequisite: COUN 602 and 636. Lab fee required.

COUN 606 - Human Development: The Lifespan 3 hours. This course acquaints the student with the interplay of psychodynamics, behavioral, sociocultural, cognitive and interpersonal theories of development. These factors are examined as they combine to explain personality and cognitive functioning across the life span. The student will learn to relate development theory and research to professional practice in educational and clinical settings.

COUN 607 - Issues in College Student Development 3 hours. This course will introduce students to issues and principles of practice in the college student personnel field. Topics may include developmental tasks of college students, counseling and the college student, and practices in a cross-section of areas in student affairs, including admissions, financial aid, student activities, residence life, and career development. Prerequisites: COUN 602 and 636.

COUN 615 - Psychopathology and Differential Diagnosis 3 hours. This weekly course is designed to familiarize the students with the DSM-IV-TR axial system, and with etiology and general treatment issues for various psychological disorders. The students will learn differential criteria for diagnosis, multicultural factors, systemic issues, legal and ethical concerns, intake and information gathering skills, and basic psychopharmacological information pertinent to mental health diagnosis and treatment. The course will be focused on disorders that present with frequency to mental health counselors, including: mood disorders, anxiety disorders, substance use disorders, and impulse control disorders.

COUN 616 - Mental Health, Exceptionality, and Disability 3 hours. This course covers the range of physical, cognitive, communication, and social/emotional exceptionalities in human development from childhood to early adulthood. One focus will be on understanding mental health and psychopathology from the perspectives of risk and resilience. A second focus is on understanding the commonalities, not just the differences, between children and youth with disabilities and their non-disabled peers.

COUN 617 - Exceptionality: College Students with Disabilities 3 hours. This course will focus on effective service provision for college students with disabilities. Topics will include the Americans with Disabilities Act, identification of and intervention with various disabilities, development of systems of support, and faculty consultation. Prerequisites: COUN 602, 606, and 636.

COUN 618 - Leadership and Change in Higher Education Administration 3 hours. This seminar is designed to provide opportunities to explore and generate greater understanding of the culture of organization and administration in higher education, especially in terms of leadership and change. This course will introduce and define the nature of change and transformation in higher education; investigate various models for change as well as practical change strategies; and review and refine theories regarding transformation in higher education. Prerequisites: COUN 602, 606, 636.

COUN 619 - Program Development and Grantsmanship 3 hours. This course will introduce students to fundamentals of program development and grantsmanship in the counseling field. Emphasis will be on techniques of successful proposal writing, funding opportunities at the local/state/federal level, grant administration, and building programs through collaborative teams of faculty, students, and school and agency personnel.

COUN 620 - Special Topics in Schooling I 1-3 hours.

COUN 625 - Special Topics in Schooling II 1-3 hours.

COUN 626 - Assessment in Counseling 3 hours. This course teaches students how to effectively evaluate the usefulness of tests and inventories and how to integrate testing into the counseling process. Such measurement issues as reliability, validity, and standard error of measurement are covered. Students also become familiar with the most frequently used personality, educational, clinical, intelligence and special population instruments, as well as testing ethics. Time is spent practicing test interpretation with other students. Lab fee required.

COUN 630 - Special Topics in Counseling Assessment I 1-3 hours.

COUN 635 - Special Topics in Counseling Assessment II 1-3 hours.

COUN 636 - Principles of Counseling 3 hours. This course focuses on teaching students the process and theories of counseling. Students also spend time practicing skills directly related to the helping process.

COUN 637 - Introduction to Group Dynamics 1 hour. (See PSYC 637)

COUN 638 - Advanced Counseling Theory and Practice 3 hours. This course emphasizes the integration, by the student, of counseling theory and counseling practice. The aim is an expansion of both knowledge and skill.

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Counseling theories will be studied in light of their applicability to skill development. Prerequisite: COUN 636.

COUN 639 - Group Counseling 3 hours. This course emphasizes the understandings and skills necessary to plan, organize, lead, and evaluate counseling groups. Attention is given to recent research and current issues related to groups in the helping professions. Students need access to counseling groups at the time of the course. Prerequisite: COUN 637.

COUN 640 - Special Topics in Counseling Intervention I 1-3 hours.

COUN 641 - Counseling Special Populations 3 hours. This weekly course will address formulation and application of research-based effective interventions with particular presenting concerns that often present challenges to the mental health counselor. Some of these presenting concerns include: bereavement, bipolar disorder, schizophrenia spectrum disorders, eating disorders, sex offenders, personality disorders, and substance abuse. Students will have the opportunity to discuss difficult cases they are currently seeing and develop individualized treatment plans with appropriate outcome benchmarks based on best practices guidelines.

COUN 642 - Multi-Cultural Counseling 3 hours. An exploration of the considerations and issues involved in counseling persons from different cultural, religious, racial-ethnic, and gender/gender oriented groups. There is a focus on heightening an awareness and appreciation of difference. Prerequisite: COUN/PSYC 601.

COUN 645 - Special Topics in Counseling Intervention II 1-3 hours.

COUN 648 - Advanced Seminar in Consultation 3 hours.

COUN 650 - Independent Study 1-3 hours.

COUN 655 - Special Topics in Counseling Intervention III 1-3 hours.

COUN 656 - Counseling Pre-Practicum 1 hour. This course will acclimate students to the environment in which the counseling experience occurs through a series of site visits (minimum of 5) to schools, mental health agencies, and/or colleges/universities. Interview summaries, detailed analyses, and other relevant counseling experiences are a part of the course. Continued orientation to the role of the professional counselor and ethical concerns will also be discussed. Students will practice the basics in terms of active listening skills and the use of appropriate counseling techniques through role-plays and other activities.

COUN 657 - Practicum in Counseling I 2 hours. The student is required to spend a minimum of 100 clock hours at a selected school, agency or college/university, working under supervision with clients/students. During that time, the student is expected to increase his or her competence in the areas of basic interviewing, assessment, and counseling skills. Furthermore, the student will be made more aware of the ethical, legal, and professional issues inherent in the counseling process. The student is provided practical, on-the-job, supervised and evaluated field experiences that provide the foundation for internship experiences. A weekly seminar class accompanies the fieldwork experience, which will focus on discussion of the theory and practice of supervision vis-a-vis the practicum. Prerequisite: COUN 656.

COUN 658 - Practicum in Counseling II 3 hours. This is a continuation of COUN 657, with the exception that the student is required to spend a minimum of 200 clock hours at a selected school, agency or college/university, working under supervision with clients/students. Students continue to develop conceptual and professional skills related to their practice at a field site. Again, a weekly seminar class accompanies the fieldwork experience. Prerequisite: COUN 657.

COUN 660 - Special Practicum I 1-3 hours.

COUN 661 - Advanced Practicum in College Student Development I 3 hours. The student is required to spend a minimum of 200 clock hours at a selected college/university working under supervision with students and fellow student affairs professionals. During that time, the student is expected to increase his or her competence in the areas of basic interviewing, assessment, counseling skills, and student affairs administration. Furthermore, the student will be made more aware of the ethical, legal and professional issues inherent in the counseling process. A weekly seminar class accompanies the fieldwork experience, which will focus on discussion of the theory and practice of supervision vis-a-vis the practicum.

COUN 662 - Advanced Practicum in College Student Development II 3 hours. This is a second 200 hour practicum experience for students in the College Student Development track. Students will work in a setting different from their placement in COUN 661. Again, a weekly seminar class accompanies the fieldwork experience, which will focus on discussion of the theory and practice of supervision vis-a-vis the practicum.

COUN 665 - Special Practicum II 1-3 hours.

COUN 667 - Internship in Mental Health Counseling 9 hours. The student experiences the actual counseling practice by performing a wide range of counselor functions and activities in a field-training site. The site may be a social service agency, mental health clinic, veterans counseling service, or any other approved counseling setting. Site supervision is provided by a certified or licensed field supervisor. The student is expected to spend four full days each week at the site (400 clock hours), in addition to participating in a regular seminar on campus. Prerequisite: Satisfactory completion of qualifying examination.

COUN 668 - Internship in School Counseling 12 hours. The student experiences the actual practice of a school counselor by performing in a wide range of counselor functions and activities in a public school. Site supervision is provided by a certified school counselor. The student is expected to spend five full days each week at the school (525 clock hours), in addition to participating in a regular seminar on campus. Permission of the instructor is required Prerequisite: Satisfactory completion of qualifying examination.

COUN 671 - Research and Statistics 3 hours. The course introduces the analysis of research design and basic statistics and gives the student the background necessary to read and judge professional evaluation research as well as the ability to design and implement basic program evaluation.

COUN 675 - Special Topics in Research and Statistics 1-3 hours.

COUN 685 - Special Advanced Seminar I 3 hours.

COUN 690 - Special Advanced Seminar II 3 hours.

COUN 695 - Topics in Counseling/Internship Seminar 3 hours. This seminar accompanies the full-time internship, and will examine professional issues encountered in the internship setting, and provide group supervision during the internship experience. Intensive study of theories, research, and practice will be based on applied issues that arise for the professional counselor. Prerequisite: COUN 667 or COUN 668.

COUN 696 - Topics in College Student Development Practicum/Seminar 3 hours. This seminar accompanies the culminating practicum and will examine professional issues encountered in the practicum setting, and provided group supervision. Intensive studies of theories, research, and practice will be based on applied issues that arise for the professional counselor. Co-requisite: COUN 662.

Education

Graduate students may take these 400-level courses for graduate credit:

EDUC 460 - Seminar in Teaching and Professional Development 3 hours. Taken concurrently with EDUC 462, this course addresses general issues of professional development of educators. Topics will include, but are not limited to, advanced uses of technology in the classroom, classroom management, teaching learning process, and issues of professionalism.

EDUC 471 - Methods of Teaching Literacy 6 hours. A study of the current trends and innovative methods in teaching literacy in the elementary school. The areas of word identification, comprehension, and process writing for all students, including those with special needs, will be covered. Prerequisite: Admission into the Early Childhood/Childhood Education Program.

EDUC 472 - Competency Skills in Teaching Literacy 3 hours. This course gives students an opportunity to demonstrate achieved competency skills for teaching literacy at the Early Childhood/Childhood level. Attention will be given to the current New York State Learning Standards and how to incorporate these standards into the curriculum. Prerequisite: EDUC 471 and admission into Student Teaching in Early Childhood/Childhood Education.

EDUC 473 - Assessment in the Early Childhood/Childhood Classroom 3 hours. This course examines assessment procedures, strategies, and techniques used and constructed for early childhood/childhood classroom teaching and learning purposes. Traditional and nontraditional means of assessment will be explored and an emphasis is placed on the alignment of assessment, instruction and content.

EDUC 489 - Current Teaching Methods: Adolescent Subjects 3 hours. Discussion of goals, methods, and materials used to successfully teach middle/adolescence and special subjects. Classroom observation required. Prerequisite: Permission of instructor.

Graduate Courses:

EDUC 500 - Special Topics in Education 3 hours.

EDUC 503 - Competency in the Teaching of Literacy 3 hours. Study of theories of literacy development and strategies appropriate to teaching literacy in the early childhood and childhood classroom. Topics covered include strategies for teaching emergent literacy, word identification, phonics, phonemic awareness, meaning, comprehension, instructional materials, and identifying instructional needs.

EDUC 504 - Diagnostic and Remedial Techniques in Literacy 3 hours. Provides students with in-depth knowledge of procedures for assessing specific literacy problems, and strategies for the correction of reading difficulties of students within a broad range of disabilities. At the conclusion of this course, teachers should be able to administer and interpret several diagnostic instruments and communicate these results to parents and be able to design literacy programs at all areas of literacy at the early childhood and childhood levels. Pre- or co-requisite: EDUC 503. Field component required.

EDUC 505 - Literacy in the Content Areas 3 hours. The emphasis is on the application of literacy to subject area learning. It takes a balanced approach, providing a realistic and practical treatment of literacy as related to text review. Literacy strategies in content areas and study techniques are examined.

EDUC 506 - Literacy Practicum 6 hours. This course assists teachers in the diagnosis and remediation of reading problems in a clinical setting. Each teacher, working with several children, designs and implements a remediation program based on task analysis. Enrollment limited. Prerequisites: EDUC 503, 504, 505. (Offered only in Summer)

EDUC 507 - Literacy Seminar and Field Experience 6 hours. Emphasis is placed on the selection of literacy materials, grouping practices and literacy strategies for small and large groups in a public school setting. This experience coordinates the literacy curriculum with various school personnel and stresses the development of parental programs at the early childhood and childhood levels.

EDUC 508 - Advanced Literacy Practicum 6 hours. This program is designed for reading teachers and supervisors who have attended the basic reading clinic but who desire additional training in diagnosis, remediation, program planning, and supervision. In the advanced clinic, with the assistance of the professor, the reading teacher plans and implements a remedial program for children who have serious reading disabilities. Prerequisite: EDUC 506. (Offered only in Summer)

EDUC 513 - Literature for Children 3 hours. A practical approach to the study and selection of children's books. The riches of classical and contemporary writings are overviewed for classroom use. Various approaches to working with children and books are introduced as well as how literature can be integrated into the early childhood curriculum.

EDUC 528 - Human Development: The Lifespan 3 hours. This course acquaints the student with the interplay of psychodynamics, behavioral, sociocultural, cognitive and interpersonal theories of development. These factors are examined as they combine to explain personality and cognitive functioning across the life span. The student will learn to relate development theory and research to professional practice in educational and clinical settings.

EDUC 541 - Current Issues in Education 3 hours. This course explores various educational philosophies, as well as contemporary issues. It is helpful to early childhood and childhood as well as middle and adolescent school teachers. Project SAVE Workshop included.

EDUC 542 - The Teaching-Learning Process 3 hours. This course is an investigation of relationships between the teaching process and the principles of learning.

The emphasis is on having the students expand their repertoire of instructional strategies and thus increase their own teaching effectiveness within the learning environment.

EDUC 543 - School Safety I 3 hours.

EDUC 544 - School Safety II 3 hours.

EDUC 550 - Independent Study 1-4 hours.

EDUC 571 - Teaching Numeracy 3 hours. This course will introduce the core numeracy topics as the ways and means in which quantitative information is communicated. Teachers must be able to bring quantitative reasoning and analysis into their disciplines in an effective organized manner. This course will concentrate on successful integration of these techniques and relevant technology in the various subject areas, emphasizing the importance of solid mathematical skills across the disciplines as well as an arsenal of aids in helping students to incorporate these skills.

EDUC 572 - Teaching with Data: Functions and Statistics 3 hours. This course builds upon EDUC 571 and focuses on handling data. Society is awash with data found in tables and charts in newspapers, magazines, television, and especially through the internet. Handling data in the classroom will be demonstrated through modeling with functions and other basic statistical techniques. Examples from across the curriculum will make this course relevant for teachers of all disciplines and grade levels. Excel will be used as the principle technological tool.

EDUC 573 - Assessment and Learning Theories in Numeracy 3 hours. This course will focus on identification of individual student problems and difficulties with quantitative reasoning and communication; and on successful remediation strategies. These main objectives will broaden the teacher's perspectives about the philosophical and theoretical foundations of assessment and allow them to develop and implement alternative assessment methods related to student learning. A variety of learning theories will be explored on the current state of research in numeracy education, including gender and social influences on mathematical participation.

EDUC 574 - Doing Science: Materials in Society 3 hours. In this course students learn and apply key mathematical concepts as necessary and fundamental parts of science, life, and the course itself; through the use of materials science, a historic strength of Alfred University, as the science exemplar and basis. The bulk of the quantification content lies in the laboratory portion where various mathematical calculations and techniques are introduced and applied to quantify and understand the measured results and experiments. Mathematics in the form of ratios, exponential notation, fractions, percent, and unit conversions/use are also essential to the lectures. These mathematical components of the course strengthen the course goals: 1) To increase student understanding and awareness of science in their lives. 2) To provide a positive science experience to reduce pre-existing aversions. 3) To understand the systematic and logical progression that under girds all science. 4) To develop an appreciation that science should be understandable to everyone and that it must be quantitative and repeatable to be science.

EDUC 590 - Teaching Writing in Public Schools 3 hours. Teaching writing in the grades and high school can be an absorbing, even exciting, experience. You will hone your own skills while learning some new techniques in this course.

EDUC 592 - Developing Literacy Comprehension in Children 3 hours. This course focuses on how to teach children to comprehend and retain what they have read. It involves study of both the micro processes and macro processes of reading. We will examine current best practices in the field, and discuss their application in classrooms today.

EDUC 593 - Use of Technology in the Inclusive Classroom 3 hours. This course provides teachers with the skills and techniques to integrate new teaching and learning strategies, technologies, and assessment procedures into the classroom curriculum. This course will focus on using technology to foster higher level learning outcomes for students with and without disabilities to meet the New York State Learning Standards.

EDUC 598 - Student Behavior and Learning 3 hours. In the context of Character Education, this course will examine general principles from learning theory, group dynamics, behavior management and instruction, and extract concrete strategies for effective classroom management and productive learning environments.

EDUC 635 - Research in Higher Education: A Seminar 3 hours.

EDUC 680 - Thesis 3 or 6 hours.

EDUC 695 - Master's Research 3 hours. Designed to be a culminating project for those who have completed the majority of coursework in the program. May be designed with special research or practical orientation.

Special Education

SPED 545 - Learning Disabilities 3 hours. This course reviews current research on educational programs for children with a full range of disabilities. Major issues, theories, and their practical applications, and assistive technologies are discussed. Students will learn assessment procedures for evaluating differences and making placement and programming decisions for students with disabilities.

SPED 556 - Teaching Students with Special Needs in Inclusive Classrooms 3 hours. This course provides both theoretical background and strategies of teaching which fosters inclusive learning communities in K-12 classrooms. Techniques for developing curriculum content and teaching strategies which meet the educational needs of all learners will be reviewed. This course focuses on the application of curriculum and teaching techniques of students with disabilities in school environments.

SPED 558 - Managing the Classroom 3 hours. This course provides both theoretical background and application techniques for developing sensitive and effective classroom management. Behavior management and other methods used to create positive teaching learning settings for students are emphasized. The course focuses on the application of techniques in school environments.

Electrical Engineering

ELEC 500 - Topics in Electrical Engineering 2-4 hours. Special topics in electrical engineering which vary from year to year.

ELEC 510 - Computer Architecture 3 hours. This course introduces the fundamentals of the modern processor design through qualitative and quantitative analysis. Both hardware and software design aspects are discussed. The main topics include economics of scaling, pipelining, memory segmentation and performance, instruction set design, and performance optimization. The course includes a design project, implemented in VHDL, that utilizes the topics discussed in class.

ELEC 520 - Communication Systems Engineering 3 hours. Theories of communications, types of communication systems, modulation principles, multiplexing techniques and data transmission are among the topics covered.

ELEC 522 - Control Systems 3 hours. Linear feedback control system modeling, analysis, and controller design. Design of state variable systems: controllability and observability, and pole placement using state feedback. Robust control systems: system sensitivity, analysis of robustness, and system with uncertain parameters.

ELEC 524 - Digital Control Systems 3 hours. Discrete time systems and the z-transform, sampling and stability analysis techniques, digital controller design, microcomputer implementation of digital systems, quantization and roundoff noise analysis. Pole assignment design and state estimation, controllability and observability, and linear quadratic optimal control.

ELEC 531 - Wind Energy 3 hours. The main objective of this course is to gain familiarity with wind energy. The course addresses three distinct areas: power and energy, generating power from wind, and the economics and markets of wind energy. Topics of discussion include the nature and physics of power and energy, different sources of energy, power in the wind, wind turbines, components and operation of typical wind systems, demand and resources, and energy conversion.

ELEC 542 - Applied Electromagnetism 3 hours. Complex vectors, Maxwell's equations, uniform plane waves, reflection and transmission of waves, waveguides and resonators, transmission lines, antennas, special topics in waves, electrostatic fields, electric force and energy, special techniques to solve electromagnetic equations, direct currents, magnetostatic fields, magnetic circuits, electroquasistatic fields, magnetoquasistatic fields, examples of applications.

ELEC 544 - Optical Fiber Communication Systems 3 hours. Basic optical fiber communication components including optical fibers, optical transmitters, and optical receivers; basic concept of analog and digital signals, channel multiplexing, and modulation; geometrical-optics description, wave propagation, dispersion, and fiber loss; system design and performance.

ELEC 545 - Advanced Photonics Experiments 3 hours. Thin film coating theories and practices, examples including RF sputtering and plasma deposition, optical filters, optical fiber communication experiments, optical amplifiers experiments, ring laser experiments, thin film wave guide experiments.

ELEC 546 - Optoelectronics 3 hours. Review of the nature of light, the wave equation, polarization, interference, superposition, diffraction. Optical Fibers: Structures, Waveguiding, and Fabrication. Signal loss in optical waveguides: Absorption, scattering, and bending losses. Material and waveguide dispersion. Inter- and intra-modal dispersion. Review of the band nature of solids. Light sources, light emitting diodes, laser diodes. Photodetectors. Principles of photodiodes, noise in detectors.

Photoreceivers, signal transmission and recovery. Digital transmission systems, power budgets, coherent optical communication systems.

ELEC 547 - Optical Fiber Communication Systems 3 hours. Optical fiber communication systems involving three basic components such as optical fibers, optical transmitters, and optical receivers; electromagnetic modes in cylindrical optical fibers, basic concept of analog and digital signals, channel multiplexing, and modulation; geometrical-optics description, wave propagation, dispersion, and fiber loss; system design and performance.

ELEC 550 - Independent Study 1-4 hours.

ELEC 562 - Superconducting Electronics 3 hours. Metals, alloys and ceramics in the superconducting state; London, Ginzburg-Landau and BCS theories; High TC superconductor theories such as Anderson's RVB model, types I and II, and high TC superconductors. Applications in power generation and transmission, computers, magnetic field control systems, Josephson junctions, SQUID.

ELEC 563 - Plasma Engineering 3 hours. Single particle motions, plasma as fluids wave in plasmas, diffusion and resistivity, equilibrium and stability, kinetic theory, nonlinear effects, induction circuits, power supplies, auxiliary equipment, design, applications.

ELEC 566 - Advanced Topics in Fuzzy Logic 3 hours. The main objective of the course is to introduce approximate reasoning and its applications in solution of engineering problems. The general rules of logic and implication, computational aspects of fuzzy inference, and the mathematics of process are discussed. Various methods of defuzzifications and their applications in control schemes are discussed in detail. The course includes a control project with a fuzzy logic based decision structure. Strong calculus background, programming skills, and some knowledge of controls are presumed.

ELEC 568 - Advanced Topics in Genetic Algorithms 3 hours. Genetic Algorithms, GA, is a collection of search and optimization techniques that function according to the evolutionary processes. Simple GA, classifier systems, GA with variable population size, and GA in machine learning context are introduced. Also, selected applications in optimization techniques and prediction methods are discussed. This course is a project-oriented course.

ELEC 569 - Expert Systems 3 hours. Expert Systems is a project-based course that explores the application of artificial intelligence concepts in real life engineering problems. The course is primarily intended for students who have completed at least one of ELEC 466, ELEC 566, ELEC 474, or ELEC 574. Topics of discussion and techniques to explore include rule-based systems, modern control schemes, knowledge growth, and machine learning.

ELEC 572 - Image Processing 3 hours. Digital image processing, partial coherence, transform, signal processing, modulators and detectors, image plane impulse functions, Fourier transform, equalization, edge detection, convolution, restoration, projection-slice, tomography, compression, examples such as MRI images.

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ELEC 574 - Electric Machinery 3 hours. Engineering electromagnetic theories, in particular magnetic theory and circuits, three phase circuits, electro-mechanics, electric energy to mechanical energy conversion, applications of phasors, transformers, motors, generators, power electronics devices and controls.

ELEC 576 - Advanced Electrical Energy Systems 3 hours. Advanced systems for electrical energy, fuel cell power systems, solar cell power systems, and wind-electricity power systems. Principles of fuel cells, various types of fuel cells, energy conversion mechanism.

ELEC 578 - Electric Power Systems 3 hours. History of power in electric utilities and industry, present and future trends. Introduction to computer programming/modeling techniques currently used in power system engineering. Phasors, complex power, matrix operations, three-phase power, symmetrical components, power transformers, power transmission lines, powerflows, faults, power system controls and transients. Field trips to industry, time permitting.

ELEC 579 - Power Systems Protection 3 hours. Lightning and switching surge phenomena and protection. Protective relay types and characteristics. Protection schemes. Backup protection schemes. Special relay types.

ELEC 584 - Analog VLSI Design 3 hours. Introduction to the analog component of integrated circuit design. Transistor circuits, current sources and mirrors, differential operational amplifiers, comparators. Switched capacitor techniques. Analog-to-digital/digital-to-analog conversion, analog signal processing.

ELEC 586 - VLSI Design 3 hours. Design of VLSI circuits concentrating on CMOS technologies. Logic design, fabrication principles, CAD layout and introduction to VLSI systems architecture. Structured design emphasis will be with the concept of hierarchy. Design methodology will focus on design of VLSI subsystems using advanced hierarchical design tools including Verilog HDL. This will be in the form of class homework and short projects.

ELEC 587 - Laser Theory and Application 3 hours. Maxwell Equations, wave mechanics, atom-field interaction, stimulated emission and dipole oscillators. Semi-classical Laser theory, multi-mode operation, gas laser theory, ring laser, Zeeman laser. Applications of YAG and Excimer lasers.

ELEC 588 - Applied Complex Variables 3 hours. Complex numbers, algebra, functions and integration. Taylor and Laurent series, theory of residues, conformal mapping and the Schwarz-Christoffel transformation. Applications to fluid dynamics, electrostatics, and electrical machines. Impulse functions. Applications to Fourier transforms and the inversion of the Laplace transform. Some linear algebra and matrix theory introduced as needed for an understanding of dynamic systems.

ELEC 680 - Graduate Thesis 2-15 hours.

ELEC 685 - Graduate Internship 1-4 hours.

ELEC 699 - Master's Project 3 hours.

Engineering

ENGR 660 - Research Seminar 1 hour. Students choose thesis areas and prepare literature surveys as part of the course. Required of all new graduate students.

ENGR 690 - Graduate Seminar 0 hours. Weekly lectures and discussions with visiting lecturers, faculty members, and graduate students. Required of all graduate students throughout their residence.

English

ENGL 500 - Special Topics in Writing 1-4 hours. A series of writing courses, each being a study of a subject not covered in other courses.

ENGL 501 - Literature for the Secondary School 3 hours. Literature for high school student and the methods of analysis which can be used to approach it. Writers such as Shakespeare, Dickens, Hawthorne, Frost, Fitzgerald, Hemingway, Steinbeck, Golding, and Salinger. Students evaluated on papers, exams, and classroom performance.

ENGL 520 - Topics in Literature 3 hours. Topics in literature suitable for the secondary school, and methods of analysis which can be used to approach them. Such topics as Twain/Crane, the Twenties in American Literature, and Biography in American Minority Groups offered. Evaluation based upon papers and classroom performance.

ENGL 550 - Independent Study 1-4 hours.

English as a Second Language

Graduate students may take these 400-level courses for graduate credit:

ESL 401 - Speaking and Listening 2 hours. This course will help non-native English speakers improve their speaking and listening skills. Students will work on pronunciation, oral presentation, and extracting meaning from conversations and other kinds of extended discourse.

ESL 402 - Writing Academic English 2 hours. This course will help non-native English speakers improve their writing skills. Students will work on a variety of academic writing projects related to their disciplines. Grammar and usage problems specific to academic writing will be addressed in relation to specific projects.

Geology

GEOL 524 - Clay Mineralogy 2-3 hours. Theoretical and applied aspects of the nature of clay minerals are addressed through lectures, discussions, readings, and original research. Topics include the structure and chemistry of clay minerals; their origin, paragenesis, classification, and identification; the weathering and alteration of minerals; properties and morphologies; and techniques used in clay mineral analysis. Knowledge of a programming language is desirable.

Mechanical Engineering

MECH 500 - Topics in Mechanical Engineering 2-4 hours. The course covers advanced topics which are not ordinarily covered in detail in the general curriculum, but are either current areas of faculty research or areas of current or future industrial interest.

MECH 514 - Continuum Mechanics 3 hours. Vectors and tensors, analysis of stress and deformation. Velocity fields and compatibility conditions, constitutive equations, mechanical properties of fluids and solids. Derivation of field equations and boundary conditions for fluids and solids.

MECH 516 - Mechanical Vibrations 3 hours. Harmonic oscillator; response of damped linear systems; multi-degree of freedom systems; introduction to vibration of continuous systems.

MECH 517 - Introduction to Finite Element Analysis 3 hours. Use of the finite element method to solve problems in the areas of stress analysis, heat conduction, and fluid flow. Weighted residual and variational approaches, shape functions, numerical integration, and the patch test.

MECH 518 - Advanced Finite Element Analysis 3 hours. This is an advanced course for finite element analysis. The goal is to train students with a more solid foundation and effective skill for numerical simulation to solve engineering problems. Contents include: numerical algorithms such as the Newton-Raphson method and simulation of material and geometric nonlinearity. Special topics may include FE modeling at small scales, micromechanics, plasticity, viscoplasticity and wear.

MECH 520 - Statistical and Thermal Physics 3 hours. This course deals with the various aspects of macroscopic thermodynamics and describes these statistically in terms of microstates of systems.

MECH 524 - Advanced Fluid Mechanics 3 hours. Advanced topics in Fluid mechanics: compressible flows, boundary layers, potential flow, and turbomachinery.

MECH 526 - Advanced Heat Transfer 3 hours. An advanced treatment of free and forced convection. The boundary layer equations, laminar and turbulent transfer in channels and over external surfaces. Applications to heat exchange devices and processes.

MECH 527 - Unsteady Fluid Dynamics 3 hours. The course will cover the one dimensional, unsteady flow of gases using the method of characteristics, small wave theory in the frequency domain and numerical methods. The necessary quasi-steady boundary conditions will be discussed. Finally, other applications of the basic theory of isothermal flow and two-dimensional, supersonic flow will be covered.

MECH 532 - Combustion Engineering 3 hours. Combustion processes, combustion thermodynamics, and reaction kinetics. Flame ignition and stability limits. Detonation and deflagration waves. Gas phase reactions and solid particle fuel combustion (coal and wastes). Applications to furnaces, incinerators, gasifiers, gas turbines, and engines.

MECH 533 - Engineering Aspects of Rocket Engine Design 3 hours. This course deals with the physics and engineering aspects of rocket engines. In this course, the students will: 1) Learn about the principle of rocket propulsion devices. 2) Gain the ability to understand and analyze high-temperature flow phenomena for thrust generation, including combustion, ignition stability, flow acceleration nozzle design, etc. 3) Learn about experimental testing techniques, including static thrust measurements, measurements of flow properties, safety review procedures, etc. 4) Participate in the design, fabrication, and testing of a small hybrid rocket engine. Unlike solid-fuel or liquid-fuel rockets, the hybrid engine technology uses a solid fuel (such as Plexiglas or plastics) and a gaseous oxidizer (such as oxygen). Because of the solid nature of its fuel and oxidizer systems, hybrid rockets are operationally very safe and reliable.

MECH 534 - Heating, Ventilation, and Air Conditioning 3 hours. Applied engineering thermodynamics; psychometrics; humidification and dehumidification processes; air cooling processes, heating processes; heat vapor transmission, fluid flow and pressure losses; air conveying and distribution.

MECH 535 - Thermal Systems 3 hours. Principles of thermodynamics, fluid mechanics, and heat transfer are applied to the analysis, design, and computer simulation of thermal systems. Types of systems include power plants, heating and air conditioning, heat exchangers, and piping systems.

MECH 536 - Computational Fluid Dynamics 3 hours. This course presents the basics of field computational fluid mechanics and heat transfer. Numerical solutions of many fluid mechanics and heat transfer problems with no closed form solutions will be presented. Attention is given to the idea of the subject, and recent developments, as well as practical computer application in problem assignments.

MECH 537 - Viscous Flows 3 hours. This course covers several aspects of viscous flow mechanics: Navier-Stokes equations; exact solutions of viscous flows; boundary layer theory; properties of laminar and turbulent boundary layers; thermal boundary layers; boundary layer control, Stokes flow; jets and wakes; and numerical methods for solutions of two-dimensional viscous flows.

MECH 542 - Advanced Mechanics of Solids 3 hours. Analysis of stress and strain, failure criteria, energy methods, curved beams, beams on elastic foundations, plates, thick-walled cylinders, stress concentration, and fatigue.

MECH 548 - Introduction to Composite Materials 3 hours. An introduction to composite materials with an emphasis on their selection, analysis, and use in modern engineering applications. Advantages and limitations of composite materials, basic concepts and characteristics. Stiffness and strength theories for uniaxial and multidirectional composite materials, with a macro mechanical emphasis.

MECH 550 - Independent Study 1-4 hours.

MECH 552 - Introduction to Fatigue and Fracture Mechanics 3 hours. An introduction to linear elastic fracture mechanics, calculation of stress intensity factors. Concepts of fracture, fracture toughness, fracture resistance, fatigue crack nucleation, crack growth, high and low cycle fatigue, temperature effects, predictive equations.

MECH 553 - Advanced Materials Behavior and Underlying Mechanisms 3 hours. This course is to develop tools for students to analyze deformation and failure of engineering materials from multiscale points of view. By developing knowledge of micromechanics, meso-mechanics and macro-mechanics students will have a foundation to develop more understanding and useful skill for analysis of elasticity, inelasticity, fracture and fatigue of engineering materials. This class is a step towards updating our curriculum to match the current trends of developing multiscale analysis for deformation and failure of engineering materials and for materials design and improving materials behavior.

MECH 554 - Multiscale Analysis for Deformation and Failure 3 hours. By developing knowledge and computational skills of molecular dynamics and micromechanics students will have a foundation to develop comprehensive understanding and analysis of multiscale phenomena for deformation and failure. This course prepares students for some cutting-edge technology which includes designing advanced and bioengineering materials.

MECH 564 - Advanced Mechanical Design 3 hours. Design of mechanical engineering systems with topics including interaction of materials, processing and design; analysis, prediction and prevention of principle modes of mechanical failures. Emphasis placed on analytical, experimental and judgmental techniques to develop the ability to work on unstructured systems.

MECH 566 - Manufacturing 3 hours. This course covers the more significant developments in manufacturing. The subjects include automation, lean manufacturing, six sigma, and rapid manufacturing techniques such as stereo lithography and selective laser sintering. There are a minimum of two plant tours that highlight modern manufacturing methods. Students will also complete one or more projects using machining and welding equipment in the Student Engineering Project Laboratory.

MECH 586 - Modeling and Simulation of Dynamic Systems 3 hours. Mathematical modeling of physical systems and simulation of linear system responses. System response to varied inputs are studied using classical techniques. Laplace transforms and modeling and simulation software.

MECH 680 - Graduate Thesis 2-15 hours.

MECH 685 - Graduate Internship 1-4 hours.

MECH 699 - Master's Project 3 hours.

School Psychology

PSYC 600 - Special Topics in School Psychology 1-3 hours.

PSYC 601 - Foundations of Cultural Diversity 1 hour. (See COUN 601)

PSYC 602 - Seminar in Cultural Diversity 2 hours. This course is an advanced seminar on cultural diversity issues and their impact on the major areas of psychology practice and research. Students will explore these issues in depth and pursue literature research on diversity issues related to their area of specialization.

PSYC 603 - Foundations of School Psychology 3 hours. The theoretical, scientific and practical underpinnings of professional school psychology are covered, with material drawn from both psychology and education. Topics include cognitive, social, emotional, and cultural bases of behavior; educational theory and instructional psychology, particularly related to basic school subjects (reading, mathematics, and written language); and school psychology as a professional specialty, including history and systems, role and function, models of practice, and current issues with particular attention to practice in a rural setting.

PSYC 604 - Human Development: The Life Span 3 hours. This course acquaints the student with the interplay of psychodynamics, behavioral, sociocultural, cognitive and interpersonal theories of development as they combine to explain personality and cognitive functioning across the life span. The student will learn to relate development theory and research to professional practice in educational and clinical settings.

PSYC 605 - Special Topics in the Behavioral Sciences 1-3 hours.

PSYC 606 - Advanced Developmental Psychology 3 hours. An in-depth study of the basic scientific area of human developmental psychology. Considers development across the life span through classical theory and more recent formulations with a focus on empirical research findings. Included are biological, cognitive, social, emotional and cultural factors which influence normal development.

PSYC 607 - Learning and Cognition 3 hours. A study of the basic processes underlying learning, memory and higher cognitive functions such as conceptualization, problem solving and language. Emphasis on the relevance of recent research and theoretical developments in cognitive psychology to school learning. Topics include attention, memory, information processing, problem solving, reasoning, creativity, and experimental paradigms for the study of cognition and learning.

PSYC 608 - Social Psychology and Behavior 3 hours. This course provides a comprehensive background of the predominant models of human personality as formulated by such theorists as Adler, Freud, Jung, Kelly, and Skinner, as well as focus on current research in personality. Such topics as individual differences in traits, cognitive styles, and forms of emotional relatedness are explored and the current controversies regarding the consistency of personality and the question of genetics versus environmental factors in the evolution of human behavior are examined. The interface between pure personality theory/research and its application to social realities and clinical settings is emphasized.

PSYC 609 - Physical Bases of Behavior 3 hours. An overview of basic neuroanatomy and neurophysiology is presented to provide a foundation for understanding the biological bases of human cognitive functioning. Neurologically based problems encountered in the schools are discussed.

PSYC 610 - Special Topics in Cultural Diversity 1-3 hours.

PSYC 611 - History and Systems of Psychology 3 hours. This course presents a comprehensive orientation to the science and practice of psychology. Progressing from ancient foundations to the current state of the discipline, the course is designed to illustrate both the continuity and incremental development of psychology as a science and profession.

The course content is organized around three major themes: (1) the historical development of the discipline of psychology as a science and profession; (2) the systems, or “schools of thought” that form the foundation of psychology both historically and currently; and (3) the interweaving influence, as well as tensions, between the science and practice of psychology. The goal is for students to further develop their identities as psychologists through an understanding and appreciation of the broad landscape upon which their discipline is constructed.

PSYC 615 - Special Topics in Cultural Diversity II 1-3 hours.

PSYC 616 - Human Development: Exceptionality 3 hours. This course covers the range of physical, cognitive, communication, and social/emotional exceptionalities in human development from childhood to early adulthood. One focus will be on the commonalities, not just the differences, between children and youth with disabilities and their non-disabled peers. A second focus is on understanding the different contexts of disability.

PSYC 617 - Managing the Classroom 3 hours. The course provides both theoretical background and application techniques for developing sensitive and effective classroom management. Behavior management and other methods used to create positive teaching-learning settings for students with special education needs are emphasized. The course focuses on the application of techniques in school environments.

PSYC 618 - Affective Development in the Classroom 3 hours. This course examines current research, theory, and application of effective development in children and youth and affective education in the classroom and focuses on strategies for creating healthy teaching-learning environments in all schools for all students.

PSYC 619 - Psychoeducational Interventions 3 hours. This course focuses on interventions that are appropriate for use with a wide range of psychoeducational problems that children present in the schools. Remedial strategies for reading, spelling, math, written expression and language difficulties are reviewed. Case studies are utilized as a method of exploring the interventions. Desired behaviors are specified, interventions planned and their effectiveness evaluated systematically.

PSYC 620 - Special Topics in Schooling I 1-3 hours.

PSYC 625 - Special Topics in Schooling II 1-3 hours.

PSYC 626 - Psychological and Educational Measurements 2 hours. Basic theory of psychological and educational measurements and the elementary statistics of test score analysis including reliability, validity, item analysis, and scales of measurement. Evaluation and selection of standardized tests is emphasized as well as the theory bases of measurement of individual differences. Observational procedures will also be discussed and implemented.

PSYC 627 - Norm-Referenced Testing I 2 hours. This course focuses on the administration, scoring and interpretation of individually administered norm-referenced instruments. Attention is focused on those instruments related to the assessment of cognitive abilities and learning behaviors of school-aged children. The major purpose is to develop the student's repertoire and mastery with these measures and to increase the students' capacity for evaluation of individual behavior and report writing. Co-requisite: PSYC 626. Lab fee required.

PSYC 628 - Academic Functioning 3 hours. Examines the reading, mathematical and language arts processes and methods of assessing these. A variety of educational assessment techniques are reviewed including norm-referenced tests, curriculum-based approaches, and informal probes, and systems of direct observation. The use of these techniques to assist in the identification of educational difficulties is examined. Approaches to interventions for educational difficulties are surveyed highlighting the link between assessment and remediation. Lab fee required.

PSYC 629 - Social-Emotional Assessment 3 hours. This course provides information and training about a variety of instruments and techniques available to assess the psychological status and functioning of persons and systems, with a particular emphasis on children, adolescents, and families. Modern thematic storytelling tests and objective behavior rating scales are highlighted. The course also covers traditional projective approaches, as well as more recently developed techniques involving social skills and family assessment. Important theoretical and measurement issues are discussed as well as ethical concerns. Students are required to practice administration, scoring, and interpretation of many of the techniques discussed. Prerequisite: PSYC 626. Lab fee required.

PSYC 630 - Special Topics in Assessment I 1-3 hours.

PSYC 632 - Norm-Referenced Testing II 2 hours. Norm-Referenced Tests II is a continuation of training in the processes of assessment of children's cognitive, achievement, and language development. A variety of norm-referenced instruments will be reviewed, including broad-based comprehensive measures and diagnostic measures, as well as approaches for children from different cultural and linguistic backgrounds. Important theoretical issues in intelligence and research-based practices regarding academic development and assessment will be discussed. While students will be required to practice the administration and scoring of assessment instruments, the main focus of this course will be to develop higher-level interpretive skills and ability to communicate findings effectively in a written format. Prerequisite: PSYC 627.

PSYC 635 - Special Topics in Assessment II 1-3 hours.

PSYC 636 - Foundations of Interpersonal Effectiveness 3 hours. This course focuses on the training and practice of personal skills, which are the prerequisites to the functioning as a professional psychologist. Included is the study of theories and research from which those skills are derived. The course includes lectures, behavioral rehearsal and group activities, and involves critical self-examination and peer review. Students must demonstrate adequate levels of interpersonal skills according to the instructor's evaluation, in order to successfully complete the course. Such success is a prerequisite for admission to the Intervention sequence in the School Psychology Program.

PSYC 637 - Introduction to Group Dynamics 1 hour. The focus is on developing an understanding of the group process and its evolution, including basic group concepts and their applications. Students are involved in the process as they experience and then conceptualize group processes. An integral part of the experience is the student's engagement in self-examination. (Cross-listed as COUN 637)

PSYC 638 - Psychotherapy and Behavior Change 3 hours. This course covers a broad range of psychological interventions, with particular emphasis on their applications with children and families.

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Theory and research in counseling and psychotherapy are covered with emphasis on behavior therapy, cognitive behavior therapy, and behavior modification.

Prerequisite: PSYC 636.

PSYC 639 - Exceptionality in Learning and Behavior 3 hours. This course presents the varieties of exceptionality in human learning and behavior. Various psychologically and educationally handicapping conditions are discussed. Classification systems, diagnosis, symptomology, prevalence, incidence, course and treatment are covered with an emphasis on empirical research findings. Professional, societal, and cultural issues in exceptionality provide an important focus for discussion.

PSYC 640 - Special Topics in Intervention I 1-3 hours.

PSYC 641 - Introduction to Family Therapy 3 hours. This seminar is a multi-purpose course designed to supplement student experiences in the clinic practicum and to provide a practical introduction to family therapy. . Specifically, students will be trained in concepts and techniques of structural-strategic family therapy through videotaped demonstrations and simulations. Students will also have the opportunity to discuss actual clinic cases as a means of applying family therapy concepts. At the completion of the course, participants should have developed foundation skills for using family therapy interventions. Prerequisites: PSYC/COUN 636 and PSYC 637, or permission of the instructor.

PSYC 642 - Clinical Seminar: Advanced Topics in School Psychology 3 hours. This clinical seminar is a multi-purpose course designed to supplement student experiences in the advanced clinic practicum. The primary purpose of the seminar this semester is to provide students with the opportunity to discuss cases with students and supervisors from other practicum sections. These types of discussions are useful for broadening conceptual perspectives and generating a variety of intervention ideas. A second purpose of the course is to provide students with additional training in areas that are related to direct service provision and integration of such techniques into foundation counseling and assessment approaches.

PSYC 643 - Techniques of Family Therapy 3 hours. This course focuses on the development of skills for utilizing strategic and structural family therapy approaches in school settings. Course material will be taught using didactic presentations, experimental activities, and video examples. Prerequisite: PSYC 638 or COUN 638.

PSYC 644 - Techniques of Play Therapy 3 hours. This course is designed to introduce participants to practical techniques and models of play therapy. Topics covered include play media, designing the therapy room, and such play therapy models as non-directive, relationship, and developmental-contextual therapies, and theraplay. Students are encouraged to engage child clients in play therapy, and receive regular supervision of their cases throughout the latter part of the course. Prerequisite: PSYC/COUN 636.

PSYC 645 - Advanced Topics in Play Therapy 3 hours.

PSYC 646 - Consultation and Prevention 3 hours. This course covers the concepts and practice of consultation in educational and human service settings. Emphases are on mental health and behavioral consultation including child-centered, teacher-centered and system centered techniques. This course has a practicum component. Prerequisite: PSYC 638 or COUN 638.

PSYC 647 - Prevention and Intervention 3 hours. This course provides a concentrated focus on direct and indirect approaches to interacting with students, teachers, curriculum, and families to reduce the incidence and minimize the impact of behavioral and academic problems. Instruction may include organizational psychology, school structure and culture, family systems, cultural diversity, family partnerships, and early intervention programs.

PSYC 648 - Advanced Seminar in Consultation and Intervention 3 hours. This course provides advanced instruction in consultation techniques, intervention skills, and collaborative processes. Topics include, but are not limited to: organizational consultation, instructional consultation, behavioral consultation, and the application of consultation models in school settings. Prerequisite: PSYC 646.

PSYC 649 - Behavioral School Psychology 3 hours. This course presents a behavioral approach to the delivery of psychological services. The primary objective of the course is to provide an understanding of the principles of applied behavior analysis and their application in classrooms and other settings. This course focuses on both the conceptual elements of learning theory and effective behavioral intervention.

PSYC 650 - Independent Study 1-3 hours.

PSYC 651 - Academic Interventions 2 hours. This course introduces students to a broad array of academic interventions. During this course students will learn the sequence of development of basic academic skills and how to target academic interventions for students with specific academic needs. There will be special emphasis on reading, writing, and written language interventions. Students will demonstrate their knowledge of the academic intervention process through applied intervention project.

PSYC 655 - Special Topics in Interventions II 1-3 hours.

PSYC 656 - Field Experience in School Psychology I 1 hour. Each student is placed in a school district one day each week to develop observation skills, gain exposure to the school as a system, begin to interact and practice testing skills with school-aged children and to become oriented to working in the schools as a school psychologist. On-site field supervisors, as well as program faculty, provide ongoing supervision for this experience. A campus-based seminar provides opportunities for in-depth exploration of issues relating to school functioning.

PSYC 657 - Field Experience in School Psychology II 1 hour. This practicum provides a continuation of skill development within the school setting. Students increase their placements to 1.5 days per week in a school district where they practice testing skills and gain experience utilizing observational techniques and providing targeted interventions. In addition, students also participate in provision of special education services where they gain experience working directly with children with disabilities in an academic setting. On-site field supervisors, as well as program faculty, provide ongoing supervision for this practicum. The practicum seminar covers topics such as multidisciplinary teams, the parent-school relationship, and the impacts of educational disabilities on school functioning.

PSYC 658 - Clinic Practicum I 3 hours. This is a practical course where students apply previous learning and gain experience in assessment and intervention with children and families and school consultation. Team collaboration, peer review and case conferences are essential elements of this course.

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Students work with actual clients at the Child and Family Services Center under supervision of professional psychologists. Supervision is provided through the use of audiotaping, videotaping and observation through one-way mirrors. Topical seminars are also included throughout the semester. Prerequisites: PSYC 629 and 638.

PSYC 659 - Clinic Practicum II 3 hours. A continuation of Clinic Practicum I where students will be performing the same activities at a higher level of autonomy and independence. Prerequisite: PSYC 658.

PSYC 660 - Special Practicum I 1-3 hours.

PSYC 661 - Advanced Practicum I 1-3 hours. This practicum provides additional supervised experiences in assessment and intervention at a site arranged by the student and his/her advisor.

PSYC 662 - Advanced Practicum II 1-3 hours. A continuation of PSYC 661, usually in the immediately following semester.

PSYC 663 - Advanced Consultation and Intervention Practicum 3 hours. This course provides an advanced practicum experience in consultation techniques, intervention skills, and collaborative processes. Each student will be placed in a school district for a minimum of one day per week to collaboratively develop and implement intervention plans and/or collaborative teams to address academic or behavioral problems. Program faculty as well as on-site supervisors supervise this experience. Prerequisite: PSYC 646.

PSYC 664 - Practicum in Academic Interventions. 1 hour. Each student will be placed in a school district one half day per week. Students will gain experience developing, implementing, and monitoring academic interventions in consultation with classroom teachers and other school support personnel. In addition, students will be involved in case conferences, peer review, and faculty supervision of their academic intervention and consultation activities. Co-requisite: PSYC 651.

PSYC 665 - Special Practicum II 1-3 hours.

PSYC 667 - Internship in School Psychology I 3-9 hours. The internship is the culminating experience of the School Psychology Program. It provides intensive, supervised experience in the roles and functions of a school psychologist and also a broad exposure to the educational and community environment of the internship site. Supervision is provided by one or more on-site certified school psychologists and by the University supervisor. Prerequisites: Comprehensive examinations and satisfactory progress in the program.

PSYC 668 - Internship in School Psychology II 3-9 hours. A continuation of the intensive field-based internship in school psychology, as described in PSYC 667. Prerequisite: PSYC 667.

PSYC 669 - Pre-doctoral Internship I 9 hours. The internship is the culminating experience of the doctoral program in school psychology. It provides intensive, supervised experience in the roles and functions of an applied psychologist working in schools and clinical settings. The internship also provides broad exposure to the educational and community environment of the internship site.

Supervision is provided by an on-site licensed psychologist, as well as other appropriately certified school psychologists or credentialed mental health professionals, and by the University supervisor. Prerequisites: Comprehensive examinations and satisfactory progress in the program.

PSYC 670 - Pre-doctoral Internship II 9 hours. A continuation of the intensive field-based doctoral internship in school psychology, as described in PSYC 669. Prerequisite: PSYC 669.

PSYC 671 - Statistical Analysis and Research Design I 3 hours. This course emphasizes: (a) the identification and formulation of research problems; (b) the utilization of research design strategies; and (c) an understanding of appropriate statistics such as one and two way analysis of variance, correlation and regression techniques and their applications.

PSYC 672 - Statistical Analysis and Research Design II 3 hours. Using examples relevant to professional psychology, this course covers advanced issues in research design and analysis. Factorial and non-factorial designs, and single-subject designs are discussed. The statistical tests to be covered include ANOVA, including planned comparisons, and ANCOVA. The course emphasizes the appropriate selection and interpretation of designs and analysis for testing specific hypothesis or for conducting program evaluations. Prerequisite: PSYC 671.

PSYC 673 - Statistical Analysis and Research Design III 3 hours. Using examples relevant to professional psychology, this course covers advanced issues in correlational research design and multivariate analysis. Multiple regression analysis, factor analysis, along with other multivariate statistics are covered. The course emphasizes the appropriate selection and interpretation of designs and analyses for testing specific hypotheses. Prerequisite: PSYC 672.

PSYC 674 - Research in School Psychology 3 hours. This course is specifically focused on the design and evaluation of studies relevant to school psychology. A broad literature is contained within this focus, including that from educational psychology, special education, counseling psychology, clinical psychology, and school psychology itself. Students are expected to apply knowledge and skills learned from previous coursework in this sequence in order to develop their own research plan. Prerequisite: PSYC 672.

PSYC 675 - Special Topics in Research and Statistics I 1-3 hours.

PSYC 680 - Special Topics in Research and Statistics II 1-3 hours.

PSYC 681 - Program Evaluation 3 hours. This course introduces students to the theories of program evaluation and various program evaluation models. Students review and critique a number of program evaluations. The implications that theory and program evaluation standards have on local, state and federal evaluations are presented. This course is taught in a seminar format.

PSYC 682 - Service Delivery in the Rural Context 3 hours. The practice of applied professional psychology in a rural area has its own unique characteristics in terms of social, cultural and economic factors. In addition, the stresses and strains on the practitioner are identifiably specific considerations. This course covers these issues in an effort to prepare students for specialized in rural environment.

PSYC 683 - Advanced Seminar: Social Cognition 3 hours. This seminar focuses on the development of children's understanding of the thoughts, intentions, and feelings of others and how this relates to their understanding of those processes within themselves.

PSYC 684 - Advanced Seminar: Health Psychology 3 hours. This course concentrates on the contribution of psychology to the understanding and treatment of physical problems. Particular emphasis is placed on the treatment of disorders such as hypertension, eating disorders, and chronic headaches in children and adolescents. Students will become familiar with the clinical research applying behavior techniques to the treatment of a number of specific medical disorders, and will be able to discuss the relative merits of various approaches to these disorders.

PSYC 685 - Special Advanced Seminar I 3 hours.

PSYC 686 - Advanced Seminar: Theories of Intelligence and School Learning 3 hours. This course examines the research regarding theories of intelligence as well as variables that affect school learning. Spearman, Thorndike and the more traditional models are reviewed as well as the psychometric viewpoint and information processing theories. Discussions focus on the relationship to the practice professional psychology and the development of applied research projects.

PSYC 687 - Advanced Seminar: Early Childhood Services 3 hours. This course covers issues and topics specifically related to the expanded role of the school psychologist in the assessment and intervention with infants and toddlers. In a combination didactic and seminar format, students are exposed to current theory and research regarding the delivery of services to these children and their families, and are required to think critically about the various topics and issues emerging from this new focus. A practicum experience in an early childhood setting provides opportunities to practice assessment and intervention skills and a context for application of current research.

PSYC 690 - Special Advanced Seminar II 3 hours.

PSYC 691 - Organizational Change and School Reform 3 hours. This is an advanced seminar for school professionals interested in organizational change and reform in school settings. Organizational consultation will be considered as a framework for delivering school-based services designed to prevent various learning and adjustment problems often seen as societal issues, such as drug abuse, violence, risky behaviors, and dropping out of school. The course is based on a constructionist perspective where students are actively involved in developing school-based projects involving principals of organizational change to improve instruction, student supports, or service delivery.

PSYC 692 - Supervision and Administration of Psychological Services 3 hours. This course prepares psychologists to function in supervisory and administrative capacities in delivering human services in schools and other child and family-oriented settings. Students become familiar with important issues in these areas and understand organizations from systems perspective. The essential elements and models of effective supervision are also examined.

PSYC 695 - Professional Practice Seminar 3 hours. This course examines the professional, legal and ethical practice of school psychology through lecture, discussion and readings. Focuses on the school psychologist as a systems level facilitator/change agent.

Topics include special education regulations, the organization and structure of schools, effective facilitation within the system, ethical guidelines, identification and reporting of child abuse, and related issues. Prerequisite: PSYC 603.

PSYC 696 - Integrative Seminar in Professional Psychology 3 hours.

PSYC 699 - Dissertation 1-12 hours.

Sociology

Graduate students may take these 400-level courses for graduate credit:

SOCI 420 - Social Theory: A Survey 4 hours. An examination of contemporary theoretical schools, e.g. symbolic interactionism, structural functionalism, exchange and conflict, and ethnomethodology. Special attention devoted to the precursors and contemporary representatives of the respective schools. Prerequisite: SOCI 110 or ANTH 110 or permission of instructor.

SOCI 431 - Research Design and Strategies 4 hours. The major research designs and techniques used in collecting social science data. The class selects, designs, and executes a research project and prepares a joint presentation and defense of its findings. Prerequisites: SOCI 110 or ANTH 110, and senior standing or permission of instructor.

Graduate Courses

SOCI 500 - Advanced Topics in Social Science 2 hours. An open course, varying in content from year to year, which allows for concentration on such specialized areas as Political Sociology, Demography, Criminology, Social Change, Stratification, and the like. Prerequisite: Graduate standing or permission of the instructor.

SOCI 550 - Independent Study 1-4 hours.