

Economics—EC

- 923 Advanced Environmental and Resource Economics**
Fall. 3(3-0) Interdepartmental with Agricultural Economics; Forestry; Park, Recreation and Tourism Resources; Resource Development. Administered by Department of Agricultural Economics. RB: (AEC 829 and EC 812A)

Advanced economic theory of environmental management and policy. Treatment of externalities and market and non-market approaches to environmental improvement. Topics in conservation and sustainable economic growth. Applications to research and policy.

- 925 Advanced Natural Resource Economics**
Spring. 3(3-0) Interdepartmental with Agricultural Economics; Forestry; Resource Development; Park, Recreation and Tourism Resources. Administered by Department of Agricultural Economics. RB: (EC 812A and AEC 829 and FOR 866) SA: AEC 991H

Economic theory of managing nonrenewable and renewable resources, including optimal use, the incentives for use under decentralized markets, and public policy design. Analysis of the co-evolution of economic and ecological systems.

- 950 Research Seminar in Applied Economics**
Spring. 3(3-0) R: Open only to Ph.D. students in Economics.

Current research topics in applied economics.

- 951 Research Seminar in Economic Theory**
Spring. 3(3-0) R: Open only to Ph.D. students in Economics.

Current research topics in economic theory.

- 952 Research Seminar in Econometrics**
Spring. 3(3-0) R: Open only to Ph.D. students in Economics.

Current research topics in econometrics.

- 992 Advanced Topics in Economics**
Fall of odd years. 3(3-0) A student may earn a maximum of 9 credits in all enrollments for this course. RB: (EC 811A and EC 811B and EC 812A and EC 812B and EC 813A and EC 813B and EC 820A and EC 820B) R: Open only to Ph.D. students in Economics or approval of department.

Advanced work in a specialized topic in economics.

- 999 Doctoral Dissertation Research**
Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 99 credits in all enrollments for this course. R: Open only to Ph.D. students in Economics.

Doctoral dissertation research.

EDUCATION

ED

College of Education

- 870 Capstone Seminar**
Summer. 3(3-0) R: Open only to students in the Master of Arts in Education. Approval of college.

Reflection and synthesis of learning experiences in online masters program. Creation and exhibition of electronic portfolio on the Web. Participation in online discussion groups.

EDUCATIONAL ADMINISTRATION EAD

Department of Educational Administration College of Education

- 315 Student Leadership Training**
Fall, Spring. 3(2-2)

Student leadership role, skills, and technique, consistent with the principles and demands of a democratic multicultural society.

- 800 Organization Theory in Education**
Fall, Spring, Summer. 3(3-0)

Organizational theory and research applied to educational administration. Topics include comparative organization settings, external environments, organizational effectiveness, and ethics.

- 801 Leadership and Organizational Development**
Spring, Summer. 3(3-0)

Interaction of leadership with organizational culture and development within a variety of educational organizations.

- 802 Building a Learning Organization**
Spring. 3(3-0)

Disciplines and practices for crafting a learning organization. Examination of Eastern, Western, and Quantum models of organization dynamics. Emphasis on strategies and skills for increasing human capacity.

- 803 Planning, Budgeting, and Evaluation**
Spring. 3(3-0)

Planning, budgeting, and evaluation in educational organizations. Topics include needs assessment, funding sources, and processes for estimating costs and revenues.

- 804 Administration of Human Resources in Education**
Fall, Summer. 3(3-0)

Tasks of personnel management in schools, colleges, and other educational organizations, including recruitment, selection, orientation, development, compensation, and evaluations. Focus on attracting and retaining a quality workforce in education.

- 805 Administration in Higher Education**
Fall. 3(3-0)

Theories, systems, structures and processes of college and universities. Comparison of the organization, leadership, and governance of higher education institutions to other non-profit organizations.

- 806 Learning Leadership and Organizational Analysis I**
Fall. 3(3-0) R: Open only to graduate students in K-12 Educational Administration.

Leadership of K-12 schools and associated community organizations. Theory and skills needed to discern organizational dynamics of schools and community. Professional ethics of K-12 school leadership. Skills and methods of disciplined reflection applied to issues of leadership practice. Methods of reflection and applications of multiple theories to cases of practice.

- 807 Learning Leadership and Organizational Analysis II**
Spring. 2(2-0) P:M: (EAD 806) R: Open only to graduate students in K-12 Educational Administration.

Data-based organizational analysis of K-12 schools and school-community relations. Leadership skills to define vision strategies. Case analysis and double-loop learning.

- 809 Interpersonal Dimensions of Leadership**
Spring, Summer. 1(1-0) P:M: (EAD 806 and EAD 807 and EAD 808) RB: (EAD 820 and EAD 821) R: Open only to graduate students in K-12 Educational Administration.

Assessment of different approaches to school leadership. School leader as reflective practitioner and effective communicator in school and community contexts.

- 810 Use of Technology in School Administration**
Fall. 3(3-0)

Learning and leading in the knowledge age with special focus on the role of technology in educational management, communication, and curriculum and instruction.

- 813 Education, Development and Social Change**
Spring of odd years. 3(3-0) Interdepartmental with Teacher Education.

Rise of modern systems of education in developed and developing countries. Education, the state, and national development. Colonial heritage, linkages, and globalization of educational development.

- 820 Internship in Educational Administration I**

Fall, Spring. 1 to 3 credits. A student may earn a maximum of 9 credits in all enrollments for this course. R: Open only to graduate students in K-12 Educational Administration.

Supervised internship in an educational institution focused on school leadership issues.

- 821 Internship in Educational Administration II**

Spring, Summer. 1 to 3 credits. R: Open only to graduate students in K-12 Educational Administration.

Supervised internship in an educational and/or community organization focused on school-community leadership issues.

- 845 Teaching, Learning, and School Restructuring**
Spring. 3(3-0)

Relationship between school-wide interventions and improvement in classroom teaching: school restructuring and reculturing, strategies for school improvement, approaches to teaching and learning.

- 850 Issues and Strategies in Multicultural Education**
Spring. 3(3-0)

Historical, pedagogical, and administrative considerations of multicultural education in K-16 educational settings.

- 852A Elementary and Middle School Administration**
Fall, Summer. 3(3-0)

Administration and supervision of elementary and middle schools. Alternative organizational arrangements, curricula, and practices. Problems and strategies for improving K-8 education.

- 852B Secondary School Administration**
Fall, Summer. 3(3-0)
Administration and supervision of secondary schools. Alternative organizational arrangements, curricula, and practices. Problems and strategies for improving secondary schools.
- 853A Legal, Fiscal, and Policy Environment of Schools**
Fall, Summer. 3(3-0)
External determinants of school policy and practice. Nature of policy-making process. History of school finance. Effect of fiscal policy on education. Equity issues. Impact of constitutional, legislative, and administrative requirements.
- 853B Schools, Families, and Communities**
Fall. 3(3-0)
Comparative and historical analysis of education within the broader social context. Families, communities, and the private sector. Social problems, social policies, and school practice.
- 853C Instructional Supervision**
Spring, Summer. 3(3-0) RB: (EAD 800)
Supervision and evaluation of teaching and learning, and strategies for improvement of K-12 education.
- 854 Introduction to Inquiry for Educational Leaders**
Fall. 3(3-0) R: Open only to graduate students in K-12 Educational Administration.
Inquiry and applied research methods and skills to inform school-based decision making for school improvement. Constructing, analyzing, and interpreting student and school-level databases. Evaluating, assessing, and creating strategic instructional and organizational development plans.
- 855 Research in Educational Administration**
Fall, Spring, Summer. 3(3-0) P:M: (EAD 854)
Applications of research techniques to educational organizations. Developing research proposals, conducting research, and writing formal papers.
- 856 Applied Inquiry for Educational Leaders**
Spring, Summer. 2(2-0) P:M: (EAD 854) RB: (EAD 806 and EAD 807 and EAD 808 and EAD 820) R: Open only to graduate students in K-12 Educational Administration.
Research techniques and application to current educational organizations and their associated community issues. Design, implement, and evaluate school-level research projects.
- 858 Special Education Law**
Fall of even years. 3(3-0) Interdepartmental with Counseling, Educational Psychology and Special Education. Administered by Department of Counseling, Educational Psychology, and Special Education. R: Open only to seniors or graduate students.
Analysis of State and Federal regulations, guidelines and court decisions related to special education and examination of their impact.
- 860 Concept of a Learning Society**
Fall. 3(3-0)
Learning in the Knowledge Age with special focus on the role of technology as a partner in the learning process and in extending intelligence.
- 861 Adult Learning**
Fall. 3(3-0) SA: EAD 861A
Learning and change in the adult years. Motivation and barriers to participation. Cognitive, emotional, developmental, and socio-cultural processes involved in adult learning. Understanding differences among adults in approaches to learning.
- 863 Training and Professional Development**
Fall. 3(3-0) SA: EAD 862A
Design of training and professional development programs for postsecondary education contexts.
- 864 Adult Career Development**
Spring. 3(3-0) SA: EAD 862B
Psychological, social and institutional elements of careers. Cases and theories of career and adult development in the context of changing conditions of work and learning across the life-span.
- 865 Policy and Practice in Developmental Education**
Spring of odd years. 3(3-0)
Key policy questions and pedagogical issues in the practice of developmental education in postsecondary institutions. Providers of developmental education. Issues of assessment and placement. Literacy as skill versus social practice. Organizational and curricular approaches.
- 866 Teaching in Postsecondary Education**
Spring. 3(3-0) SA: EAD 861B
Philosophies and beliefs undergirding teaching strategies. Effective teaching strategies and formal learning environments. Assessment of teaching and of student learning.
- 867 Case Studies in Educational Leadership**
Summer. 3(3-0)
Case-based learning to examine contemporary K-16 leadership.
- 870 Foundations of Postsecondary Education**
Fall. 3(3-0)
Historical, philosophical and social forces that shaped development of colleges and universities. Emphasis on higher education in the United States.
- 871 Collegiate Contexts for Teaching and Learning**
Spring. 3(3-0) SA: EAD 871B
Sociocultural contexts of teaching and learning in collegiate environments. Organizational strategies to improve learning contexts for diverse students.
- 872 Legal Issues in Higher Education**
Spring. 3(3-0)
Legal aspects of administrative practice in institutions of higher education. Governance, academic freedom, due process, and anti-discrimination.
- 873 The College Student Experience**
Fall. 3(3-0)
Research, theory, and literature related to student development in the college years.
- 874 Student Affairs in Collegiate Settings I**
Fall. 3(3-0) SA: EAD 874A
History, development, philosophy, organization and administration of college student personnel as a profession. Needed services, programs and skills.
- 875 Student Affairs in Collegiate Settings II**
Spring. 3(3-0) SA: EAD 874B
College students as members of groups. Peer and group influence. Impact of diversity on behavior. Professional staff development.
- 876 Budgeting and Finance in Higher Education**
Spring. 3(3-0) SA: EAD 971C
Fundamentals of higher education budgeting and finance including external sources of funding, internal resource allocation processes, social and economic principles and values regarding the distribution of resources among competing concerns.
- 877 Program Planning and Evaluation in Postsecondary Contexts**
Fall. 3(3-0) SA: EAD 871A
Planning and evaluating programs for learning in diverse educational contexts.
- 881 Workshops in Educational Administration**
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 9 credits in all enrollments for this course.
Laboratory experiences focused on common supervisory and administrative problems.
- 882 Seminars in Educational Administration**
Fall, Spring, Summer. 3(3-0) A student may earn a maximum of 9 credits in all enrollments for this course.
Seminars in various fields in K-12 educational administration and in higher, adult, and lifelong education.
- 890 Independent Study**
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 9 credits in all enrollments for this course. R: Approval of department.
Individual study in an area of K-12 administration or higher, adult, and lifelong education.
- 893 Professional Development Seminar in Student Affairs**
Fall, Spring, Summer. 1(1-0) A student may earn a maximum of 4 credits in all enrollments for this course. P:M: (EAD 874) R: Open only to students in the Master of Arts in Student Affairs Administration. Approval of department. SA: EAD 894A
Supervised work experience in student affairs.
- 894 Laboratory and Field Experiences**
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 9 credits in all enrollments for this course.
Supervised graduate practica, observations, internships, or externships in K-12 administration and in higher, adult, and lifelong education.
- 895 Research Ethics**
Summer. 1(1-0) Interdepartmental with Teacher Education; Counseling, Educational Psychology and Special Education; Kinesiology. R: Open only to graduate students in the Department of Counseling, Educational Psychology and Special Education or Department of Educational Administration or Department of Kinesiology or Department of Teacher Education. SA: PES 895
Identifying and resolving ethical problems in research, including issues related to collegial interactions; authorship, publication, and reviewing practices; data management; ownership of data and intellectual property; conflicts of interest; protection of human and animal subjects; and lab safety and compliance.
- 899 Master's Thesis Research**
Fall, Spring, Summer. 1 to 9 credits. A student may earn a maximum of 15 credits in all enrollments for this course.
Master's thesis research.
- 925 Policy and Practice in Education**
Fall of odd years. 3(3-0) SA: EAD 944
Multiple conceptions of the relationship between policy and practice in K-12 education.

Educational Administration—EAD

- 928 Proseminar in Educational Policy**
Fall. 3(3-0) Interdepartmental with Teacher Education.
Disciplinary perspectives on policy issues. Influence of research on policy process. Politics and educational practice as determinants of policy choice.
- 931 Qualitative Methods in Educational Research**
Fall, Spring, Summer. 4(4-0) Interdepartmental with Teacher Education; Counseling, Educational Psychology and Special Education. Administered by Department of Teacher Education. RB: (CEP 930)
Multiple traditions of qualitative research in education. Theory, research questions and design, data collection and analysis, and reporting. Ethical issues. Appraising qualitative research.
- 940 Organizational Analysis of Education**
Fall, Summer. 3(3-0) RB: (EAD 800)
Theoretical perspectives on schools and universities as organizations. Relationship of organization theory to administrative practices.
- 941 Administrative Behavior in Educational Organizations**
Spring. 3(3-0) RB: (EAD 800)
Concepts and models of leadership, management, and organization as they apply to the administration of educational institutions.
- 942 Economic Analysis in Educational Policy Making**
Spring of even years. 3(3-0) Interdepartmental with Teacher Education.
Economic effects of education. Economic analysis of policy issues in education. Alternative theoretical perspectives. Applications to the United States and other countries.
- 943 Politics of Education**
Fall of odd years. 3(3-0)
Education as a political enterprise. Interplay of federal relations, democratic principles, and contending sources of authority in shaping educational policy and practice.
- 950A Proseminar I in K-12 Educational Administration**
Fall. 1(1-0)
Disciplinary perspectives of K-12 educational leadership and management. Influence of research on leadership practice.
- 950B Proseminar II in K-12 Educational Administration**
Spring. 1(1-0) P:M: (EAD 950A)
Synthesis and analysis of disciplinary perspectives of K-12 educational leadership and management. Influence of research on leadership practice.
- 951A Educational Finance**
Spring. 3(3-0)
Political and economic contexts of educational finance. Role of government and policy criteria. Acquisition and distribution of public resources. Emerging issues in elementary and secondary education. Comparative and international analyses.
- 951B Planning Change in K-12 Education**
Fall. 3(3-0)
Behavioral change processes in educational institutions. Concepts and methods that have been tested by laboratory and field experiences.
- 951C Educational Law**
Spring, Summer. 3(3-0)
Legal aspects of school administration. Governance, compulsory attendance, student discipline, due process, search, free speech rights of students and teachers, church and state, and discrimination law.
- 952A Externship in Educational Administration**
Fall, Spring. 3(3-0) Fall: Given only at various off-campus sites. Spring: Given only at various off-campus sites. A student may earn a maximum of 21 credits in all enrollments for this course.
Current administrative problems and solution strategies in education.
- 953 Organizational Change in Postsecondary Education**
Spring of even years. 3(3-0) R: Open only to doctoral students in the Higher, Adult, and Lifelong Education major.
Theories of organizational change as they apply to postsecondary organizations. Strategies for facilitating organizational change in universities and colleges.
- 955B Field Research Methods in Educational Administration**
Spring. 3(3-0)
Methods used in conducting field studies in educational organizations, with emphasis on interviews, observation, and participant observation.
- 960 Proseminar in Postsecondary Education**
Fall. 3(3-0) R: Open only to doctoral students in the Higher, Adult, and Lifelong Education major.
Questions, trends, issues and resources in higher, adult, and lifelong education. Development of skills in problem identification, literature analysis, and scholarly writing.
- 963 Leadership in Postsecondary Education**
Spring. 3(3-0)
Leadership as a complex social phenomenon in higher, adult, and lifelong educational settings. Interdisciplinary theories of leadership as applied to postsecondary education.
- 965 Diversity and Equity in Postsecondary Education**
Fall. 3(3-0)
Promise, challenge, and management of diversity and equity in higher education. Analysis of data and policy. Management responses and strategies.
- 966 Students in Postsecondary Education**
Spring. 3(3-0) R: Open only to doctoral students in the Higher, Adult, and Lifelong Education major.
Research and theoretical foundations concerning traditional and non-traditional college students. Literature from diverse fields such as higher education, adult learning, and multicultural education. Psychosocial and cognitive development of college students, learning and development across the lifespan, experiences of diverse populations, impact of collegiate environments and structures on students.
- 967 Policy Development and Analysis in Postsecondary Education**
Fall. 3(3-0) R: Open only to doctoral students in the Higher, Adult, and Lifelong Education major.
Higher education policy issues, policy-related research and development approaches.
- 968 Teaching, Learning, and Curriculum in Postsecondary Education**
Spring. 3(3-0) R: Open only to doctoral students in the Higher, Adult, and Lifelong Education major.
Theories and current issues about teaching, learning, and curriculum in postsecondary education. Topics include learning contexts, learners, teachers, the learning process, curriculum.
- 969 Pedagogical Issues in Postsecondary Education**
Fall. 3(3-0) R: Open only to doctoral students in the Higher, Adult, and Lifelong Education major.
Theories of learning for teaching adults in postsecondary contexts. Transformative pedagogy, socio-cultural dimensions of teaching and learning, teacher formation and development, learning within technologically mediated environments. Authentic approaches to assessing teaching and learning.
- 970 Organization and Administration in Postsecondary Education**
Fall. 3(3-0) R: Open only to doctoral students in the Higher, Adult, and Lifelong Education major. SA: EAD 970A
Principles and patterns of organization and governance characteristic of colleges and universities. Administrative, trustee, faculty, and student roles.
- 971 Planning, Evaluation, and Decision Making in Postsecondary Education**
Spring of odd years. 3(3-0) R: Open only to doctoral students in the Higher, Adult, and Lifelong Education major. SA: EAD 971B
Concepts, theories and models of planning, evaluation, and decision making in the leadership and management of postsecondary institutions. Application to and usefulness for addressing complex problems facing institutions of postsecondary education.
- 990 Independent Study**
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 15 credits in all enrollments for this course.
Advanced individual study in an area of K-12 administration or higher, adult, and lifelong education.
- 991A Special Topics in K-12 Administration**
Fall, Spring, Summer. 3(3-0) A student may earn a maximum of 9 credits in all enrollments for this course.
Special topics in K-12 administration.
- 991B Special Topics in Higher, Adult, and Lifelong Education**
Fall, Spring, Summer. 3(3-0) A student may earn a maximum of 15 credits in all enrollments for this course.
Special topics in the field of higher, adult and lifelong education.
- 994 Laboratory and Field Experience in Educational Administration**
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Open only to doctoral students.
Supervised advanced graduate practica, observations, internships, or externships in K-12 administration and in higher, adult, and lifelong education.

- 995 Research Practicum in Educational Administration**
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 3 credits in all enrollments for this course. R: Open only to doctoral students in the College of Education. Approval of department.
Supervised research practicum. Design, execution, analysis, presentation, critique, and revision of research projects.
- 999 Doctoral Dissertation Research**
Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 100 credits in all enrollments for this course. R: Open only to doctoral students in the Department of Educational Administration.
Doctoral dissertation research.

ELECTRICAL AND COMPUTER ENGINEERING

Department of Electrical and Computer Engineering College of Engineering

- 201 Circuits and Systems I**
Fall, Spring, Summer. 3(3-0) P:M: (CSE 131 or concurrently or CSE 231 or concurrently) and (MTH 234 or concurrently or MTH 254H or concurrently or LBS 119 or concurrently) SA: ECE 200
Resistive circuits. Loop and modal analysis. Network theorems, dependent sources. Capacitor and inductor circuits. Transient analysis. Introduction to computer-aided design.
- 202 Circuits and Systems II**
Fall, Spring, Summer. 3(3-0) P:M: (ECE 201) and (MTH 235 or concurrently or LBS 119 or concurrently or MTH 255H or concurrently) SA: ECE 360
Sinusoidal steady-state response. Laplace transforms. S-Domain circuit analysis. Frequency response. Fourier series. Mutual inductance. Power in sinusoidal steady state.
- 230 Digital Logic Fundamentals**
Fall, Spring, Summer. 3(3-0) P:M: (CSE 131 or CSE 231) SA: ECE 330
Binary information. Switching algebra, combinational logic, minimization. Programmable logic devices. Sequential system fundamentals and state machines. Arithmetic operations and circuits. Memory elements and systems. Design tools. Design problems.
- 280 Electrical Engineering Analysis**
Fall, Spring. 3(3-0) P:M: (MTH 234) and (ECE 201 or concurrently)
Application of linear algebra, complex numbers, vectors, probability, and random processes to elementary problems in electrical and computer engineering. Application to signals, systems, noise, electromagnetics, and reliability. Modeling using standard software packages.
- 291 Circuits and Systems**
Fall, Spring. 2(2-0) P:M: (MTH 235 or concurrently or LBS 119 or concurrently or MTH 255H or concurrently) R: Approval of department. SA: ECE 360
Sinusoidal steady-state response. Laplace transforms. S-Domain circuits analysis. Fourier series.
- 302 Electronic Circuits**
Fall, Spring. 3(3-0) P:M: (ECE 202) R: Open only to students in the Department of Electrical and Computer Engineering or Department of Computer Science and Engineering. SA: EE 302
Volt-ampere characteristics of diodes and transistors. Modeling using SPICE software. Differential, multistage, and integrated circuit amplifiers. High frequency effects.
- 303 Electronics Laboratory**
Fall, Spring. 1(0-3) P:M: (ECE 202) and (ECE 302 or concurrently) R: Open only to students in the Department of Electrical and Computer Engineering or Department of Computer Science and Engineering. SA: EE 303
Electronic test equipment and measurement fundamentals.
- 305 Electromagnetic Fields and Waves I**
Fall, Spring, Summer. 4(4-0) P:M: (MTH 235 or concurrently or LBS 119 or concurrently or MTH 255H or concurrently) and (PHY 184 or PHY 184B or PHY 234B) R: Open only to students in the Department of Electrical and Computer Engineering. SA: EE 305
Transient and time-harmonic transmission lines. Smith charts. Two-port networks. Maxwell's equations. Force, energy, and power. Plane electromagnetic waves. Guided waves.
- 313 Control Systems**
Fall, Spring. 3(3-0) P:M: (ECE 202 or ECE 345) R: Open only to juniors or seniors or graduate students in the Department of Electrical and Computer Engineering and Department of Computer Science and Engineering. SA: EE 413, ECE 413
Analysis and design of control systems using transfer functions and state variable methods.
- 320 Energy Conversion and Power Electronics**
Fall, Spring. 3(3-0) P:M: (ECE 302 and ECE 303 and ECE 305) SA: EE 320
Power and energy. Magnetics and transformers. Elementary and induction machines. Power semiconductor devices. Controlled rectifiers and inverters. Power supplies and motor drives.
- 331 Microprocessors and Digital Systems**
Fall, Spring. 4(3-3) P:M: (CSE 231 and ECE 230) R: Open only to juniors or seniors or graduate students in the Department of Electrical and Computer Engineering. SA: EE 331
Microcomputers. Microprocessor architecture. Addressing modes. Assembly language programming. Parallel and serial input and output. Interfacing. Interrupts. Peripheral device controllers. Applications, design.
- 345 Electronic Instrumentation and Systems**
Fall, Spring, Summer. 3(2-3) P:M: (MTH 235 or MTH 255H or LBS 119) and (PHY 184 or PHY 184B or PHY 234B) and completion of Tier I writing requirement. R: Open only to students in the College of Engineering with the exception of students in the Department of Electrical and Computer Engineering. SA: EE 345
Electrical and electronic components, circuits and instruments. Circuit laws and applications, frequency response, operational amplifiers, semi-conductor devices, digital logic, counting circuits.
- 366 Introduction to Signal Processing**
Spring, Summer. 3(3-0) P:M: (ECE 202) R: Open only to students in the Department of Electrical and Computer Engineering. SA: ECE 360
Continuous- and discrete-time signal analysis fundamental to modern signal processing and communications technologies. Fourier and spectral analysis of signals. Elementary modulation techniques. Filtering and channel models. The z-transform. Introduction to random processes and noise in discrete time. Application examples.
- 402 Applications of Analog Integrated Circuits**
Spring. 4(3-3) P:M: (ECE 302 and ECE 303) R: Open only to juniors or seniors or graduate students in the Department of Electrical and Computer Engineering. SA: EE 484, ECE 484
Circuit design using analog integrated circuits. SPICE macromodeling. Operational amplifiers, comparators, timers, regulators, multipliers and converters. Design project with hardware and software verification.
- 405 Electromagnetic Fields and Waves II**
Fall. 4(3-3) P:M: (ECE 305) R: Open only to juniors or seniors or graduate students in the Electrical Engineering major and to juniors or seniors in the Computer Engineering major. SA: ECE 435
Microwave networks. Scattering parameters. Solutions to Coulomb's law, Gauss' Law and the wave equation. Planar transmission lines. Antennas. Waveguides and cavities. Measurement of the properties of antennas and microwave networks.
- 407 Electromagnetic Compatibility**
Spring. 4(3-3) P:M: (ECE 202 and ECE 305 and ECE 366) R: Open only to juniors or seniors or graduate students in the Electrical Engineering major and juniors or seniors in the Computer Engineering major.
Electromagnetics for electrical systems. Signals and spectra. Regulations. Radiated and conducted emissions. Conducted and radiated immunity. Mitigation techniques.
- 410 VLSI Design**
Fall, Spring. 4(3-3) P:M: (ECE 302 and ECE 303 and ECE 230) R: Open only to juniors or seniors or graduate students in the Department of Electrical and Computer Engineering or Department of Computer Science and Engineering. SA: EE 410
Digital integrated circuit design fundamentals. Design specifications: functionality, performance, reliability, manufacturability, testability, cost. Standards, silicon compilers, foundries. Design layout rules, rule checking. Circuit extraction, simulation, verification. Team-based design.