

**COLLEGE OF ENGINEERING**

**COURSE AND CURRICULUM CHANGES**

~~to be considered~~ **Approved** at the College faculty meeting

Thursday, April 9, 2009

Fiedler Auditorium

3:30 p.m.

Undergraduate/Graduate  
Expedited and Non-Expedited items

Contact Person: Jim Goddard  
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**Units outside the college, which may be directly  
impacted by these changes are:  
Art and Statistics Department**

Please provide the sponsors of a proposed change with any information regarding fiscal or programmatic impact on your department, program or students.

## **EXPEDITED COURSE PROPOSALS**

### **Undergraduate (Course numbers 000-599)**

#### **Department of Architectural Engineering & Construction Science**

**From:** ARE 100. Architectural Engineering Orientation (1) I Introduction to Architectural Engineering; emphasis on relationship of architectural engineering to the building industry. One hour lecture a week.

**To:** ARE 100. Architectural Engineering Orientation (1) I Introduction to Architectural Engineering; emphasis on relationship of architectural engineering to the building design and construction industry. One hour lecture a week.

**Rationale:** Revised description to match the true course focus.

**Impact:** None

**Effective Date:** Fall 2009

**From:** ARE 536. Plumbing /Fire Protection Systems Design (3) I, II. Sewage disposal systems, building plumbing and fire protection systems, space relationships, equipment requirements as related to architectural design, structural systems, construction materials, and techniques. Three hours rec a week. PR: ~~PHYS 213 and~~ CNS 321.

**To:** ARE 536. Plumbing /Fire Protection Systems Design (3) I, II. Principles and practices of the design and layout of sewage disposal systems, building plumbing and fire protection systems, space relationships, equipment requirements as related to architectural design, structural systems, construction materials, and techniques. Three hours rec a week. PR: CNS 321.

**Rationale:** Minor revision of the course description and prerequisite. Since the requirement is to be in the Architectural Engineering Professional Program, the Physics prerequisite is moot.

**Impact:** None

**Effective Date:** Fall 2009

**From:** ARE 539. Architectural Engineering Management (3) I, II General business and management procedures ~~Drawings, specifications, and conceptual estimating. Contracts, bonds, liability, arbitration, and insurance. Project financing.~~ Three hours rec. a week. Pr.: ~~ME 560~~ Must be taken concurrent with ARE 690.

**To:** ARE 539. Architectural Engineering Management (3) I, II. General business, ~~and~~ management, and contractual procedures in professional practice. Personal and professional development. Three hours rec. a week. Pr.: IMSE 530. Must be taken concurrent with ARE 690.

**Rationale:** The revision of description more accurately describes the course content as currently taught. Prerequisite course number changed to match current offering of Engineering Economics.

**Impact:** None

**Effective Date:** Fall 2009

**From:** CNS 100. Construction Science and Management Orientation (1) I. Construction Science and Management; emphasis on relationship of architectural engineering to the building industry. One hour lecture a week.

**To:** CNS 100. Construction Science and Management Orientation (1) I. Construction Science and Management; emphasis on relationship of architectural engineering to the building design and construction industry. One hour lecture a week.

**Rationale:** Revised description to match the true course focus.

**Impact:** None

**Effective Date:** Fall 2009

**From:** CNS 524. Steel Construction (3) I, II. Principles of design, fabrication, and erection of structural steel in conformance with codes. ~~Two hours lec and three hours lab~~ a week. Pr.: CNS 522.

**To:** CNS 524. Steel Construction (3) I, II. Principles of design, fabrication, and erection of structural steel in conformance with codes. Three hours rec. a week. Pr.: CNS 522.

**Rationale:** Revised meeting format to match delivery.

**Impact:** None

**Effective Date:** Fall 2009

**From:** CNS 528. Concrete and Masonry Construction (3) I, II. Principles of design, fabrication, and erection of concrete and masonry structures. ~~Two hours lec and three hours lab~~ a week. Pr.: CNS 522.

**To:** CNS 528. Concrete and Masonry Construction (3) I, II. Principles of design, fabrication, and erection of concrete and masonry structures. Three hours rec. a week. Pr.: CNS 522.

**Rationale:** Revised meeting format to match delivery.

**Impact:** None

**Effective Date:** Fall 2009

**From:** CNS 534. Heating and Air Conditioning (3) I, II. Principles of designing, applying, installing, ~~and estimating~~ heating and air conditioning systems for buildings. Three hours rec. a week. Pr.: ~~PHYS 113 and~~ CNS 321.

**To:** CNS 534. Heating and Air Conditioning (3) I, II. Principles of designing, applying, and installing heating and air conditioning systems for buildings. Three hours rec. a week. Pr.: CNS 321.

**Rationale:** Revised description to match the true course focus.

**Impact:** None

**Effective Date:** Fall 2009

**From:** CNS 535. Electrical ~~Service and Installation~~ (3) I, II. Basic design and construction of building electrical, lighting, and distribution systems with emphasis on the National Electrical Code and installation. Three hours rec. a week. Pr.: ~~PHYS 114 and~~ CNS 321.

**To:** CNS 535. Electrical and Lighting (3) I, II. Basic design and construction of building electrical, lighting, and distribution systems with emphasis on the National Electrical Code and installation. Three hours rec. a week. Pr.: CNS 321.

**Rationale:** Revision of title in order to match the true course focus.

**Impact:** None

**Effective Date:** Fall 2009

**From:** CNS 536. Water Supply and Plumbing (3) I, II. Principles and practices of plumbing and fire protection systems ~~in~~ buildings including code requirements and estimating. Three hours rec a week. Pr.: ~~PHYS 113 and~~ CNS 321.

**To:** CNS 536. Water Supply and Plumbing (3) I, II. Principles and practices of the design and layout of plumbing, and fire protection, and individual waste treatment systems for buildings including code requirements and estimating. Three hours rec a week. Pr.: CNS 321.

**Rationale:** Minor revision of the course description and prerequisite. Since the requirement is to be in the Construction Science and Management Professional Program, the Physics prerequisite is moot.

**Impact:** None

**Effective Date:** Fall 2009

## Department of Computing and Information Sciences

**From:** CIS 544. Advanced Software Design and Development (3) II, S. Advanced concepts and practicum in object-oriented analysis, modeling, design, implementation, testing, and use of CASE tools; relationships among structural, static, and dynamic models; relationship among conceptual, system, and implementation models. Pr. CIS 501.

**To:** CIS 544. Advanced Software Design and Development (3) II, S. Advanced concepts and practicum in object-oriented analysis, modeling, design, implementation, testing, and use of CASE tools; relationships among structural, static, and dynamic models; relationship among conceptual, system, and implementation models. Not available for credit to students with credit in CIS 744. Pr. CIS 501.

**Rationale:** CIS 544 and 744 are similar courses targeted for undergraduate and graduate students, respectively. Because there is significant overlap in the two courses, it would be inappropriate to give credit for both.

**Impact:** None

**Effective Date:** Fall 2009

**From:** CIS 570. Introduction to Formal Language Theory (3) I. Formal languages, automata, regular expressions, grammars, introduction to computability theory. Reading and Writing informal mathematical proofs pertaining to these topics. Pr. Math 510 ~~and CIS 505.~~

**To:** CIS 570. Introduction to Formal Language Theory (3) I. Formal languages, automata, regular expressions, grammars, introduction to computability theory. Reading and Writing informal mathematical proofs pertaining to these topics. Pr. Math 510.

**Rationale:** Although some knowledge of programming languages, indeed of computer science, is helpful to students learning formal language theory, it's not necessary. What is necessary is mathematical maturity, of the kind one can get from MATH 510.

**Impact:** None

**Effective Date:** Fall 2009

## Department of Electrical & Computer Engineering

**From:** ECE 241. Introduction to Computer Engineering (3) I, II. ~~Simple coding schemes,~~ Boolean algebra fundamentals, elements of digital building blocks such as gates, flip flops, shift registers, memories, etc.; basic engineering aspects of computer architecture. Two hours lec. and ~~two~~ hours lab a week.

**To:** ECE 241. Introduction to Computer Engineering (3) I, II. Number systems, Boolean algebra fundamentals, gates, flip-flops, shift registers, memories, etc.; basic

engineering aspects of computer architecture; introduction to hardware description languages. Two hours lec and three hours lab a week.

**Rationale:** This is a change to the course description. There is also a change to the number of lecture and lab hours a week. Total hours are unchanged.

**Impact:** None.

**Effective Date:** Fall 2009

**From:** ECE 410 (or 510). Circuit Theory I (3) I, II. An introduction to linear circuit theory; analysis of linear circuits containing resistance, inductance, and capacitance. Mutual inductance and transformers. Three hours ~~rec.~~ a week. Pr.: MATH 222, PHYS 214, and ~~EECE~~~~EECE~~ 210.

**To:** ECE 410. Circuit Theory I (3) I, II. An introduction to linear circuit theory; analysis of linear circuits containing resistance, inductance, and capacitance. Mutual inductance and transformers. Three hours lec. a week. Pr.: MATH 222, PHYS 214, and ECE 210.

**Rationale:** This is a change to the course description. There is also a change from rec to lec designation. Total hours are unchanged. NOTE: The course number 410 is the current enrollment number, but is not yet reflected in the course catalog.

**Impact:** None.

**Effective Date:** Fall 2009

**From:** ECE 431. Microcontrollers (3) I, II. Architecture, assembly language programming, serial and parallel input/output, and applications. Two hours ~~rec.~~ and three hours lab a week. Pr.: ECE 241; and CIS 200 or CIS 209.

**To:** ECE 431. Microcontrollers (3) I, II. Architecture, assembly language programming, serial and parallel input/output, interface circuits, and applications. Two hours lec. and three hours lab a week. Pr.: ECE 241; and CIS 200 or CIS 209.

**Rationale:** There is a change from 2 hours recitation to 2 hours lecture. Total hours are unchanged. There is also a change in the course description.

**Impact:** None.

**Effective Date:** Fall 2009

**From:** ECE 441 (or 541). Design of Digital Systems (3) I, II. Design of combinational and sequential systems ~~and peripheral interfaces~~. Emphasis is placed on hardware

description languages, computer-aided design tools and simulations. Three hours ~~rec.~~ a week. Pr.: ~~EECE 431; EECE 510 or PHYS 214.~~

**To:** ECE 441. Design of Digital Systems (3) I, II. Design of combinational and sequential systems including asynchronous circuits; testing of digital systems. Emphasis is placed on hardware description languages, computer-aided design tools, and simulations. Three hours lec. a week. Pr.: ECE 210 and ECE 241.

**Rationale:** There are changes in the course description and prereqs to better reflect the current course content . There is a change from 3 hours of recitation to 3 hours of lecture. Total hours are unchanged. NOTE: The course number 441 is the current enrollment number, but is not yet reflected in the course catalog.

**Impact: None**

**Effective Date:** Fall 2009

**From:** ECE 502. Electronics Laboratory. (2) I, II. Design, simulation, construction and testing of electronic circuits. One hour lec. and three hours lab a week. Pr.: ~~EECE 511 and 525. Pr. or core.: EECE 526.~~

**To:** ECE 502. Electronics Laboratory. (2) I, II. Design, simulation, construction and testing of electronic circuits. One hour lec. and three hours lab a week. Pr.: ECE 511 and 526.

**Rationale:** This is a change only to the prerequisites.

**Impact: None**

**Effective Date:** Fall 2009

**From:** ECE 511. Circuit Theory II. (3) I, II. Analysis of electric circuits using differential equations, transform techniques, and linear algebra. Transmission lines and applications. Three hours ~~rec.~~ a week. Pr.: MATH 240, STAT 510 and ~~EECE 510.~~

**To:** ECE 511. Circuit Theory II. (3) I, II. Analysis of electric circuits using differential equations, transform techniques, and linear algebra. Transmission lines and applications. Three hours lec. a week. Pr.: MATH 240, STAT 510 and ECE 410.

**Rationale:** There is a change from 3 hours recitation to 3 hours lecture. Total hours are unchanged. The change from EECE510 to ECE410 is to update the catalog.

**Impact: None**

**Effective Date:** Fall 2009

**From:** ECE 512. Linear Systems (3) I, II. ~~An introduction to linear system fundamental concepts and analytical methods. Analytical concepts presented are signal~~

~~representation and~~ classification, convolution, Fourier analysis signal sampling, and discrete transforms. Three hours ~~rec.~~ a week. Pr.: ~~EECE~~ 511; CIS ~~208~~ or 209.

**To:** ECE 512. Linear Systems (3) I, II. Time- and frequency-domain analysis of signals and systems. Concepts include signal classification, convolution, Fourier series, Fourier transforms, filters, signal sampling, and discrete transforms. Three hours lec. a week. Pr.: ECE 511; CIS 209 or 308.

**Rationale:** There are changes in the course description. Courses for prerequisites are also changed to reflect current offerings. There is also a change from 3 recitation hours to 3 lecture hours. Total hours are unchanged.

**Impact: None**

**Effective Date:** Fall 2009

**From:** ECE 519. Electric Circuits and Control (4) I, II, S. Principles of direct-current circuits and machines, alternating-current circuits and machines, electronics, and application to instrumentation and control. Four hours ~~rec.~~ a week. Not open to ~~EECE~~ students. Pr.: PHYS 214.

**To:** ECE 519. Electric Circuits and Control (4) I, II, S. Principles of direct-current circuits and machines, alternating-current circuits and machines, electronics, and application to instrumentation and control. Four hours lec. a week. Not open to ECE students. Pr.: PHYS 214.

**Rationale:** This is only a change from 4 recitation hours to 4 lecture hours. Total hours are unchanged.

**Impact: None**

**Effective Date:** Fall 2009

**From:** ECE 525. Electronics I (3) I, II. Fundamentals of electronic components, devices, and circuits. Three hours ~~rec.~~ a week. Pr.: STAT 510; ~~EECE-510~~ or 519.

**To:** ECE 525. Electronics I (3) I, II. Fundamentals of electronic components (e.g., diodes, MOSFETs, BJTs, op amps) and electronic circuits. Three hours lec. a week. Pr.: STAT 510; ECE 410 or 519.

**Rationale:** There are changes in the course description to better describe the contents, and in the prereqs to reflect the ECE510 to 410 numbering change in the enrollment system. There is a change from 3 recitation hours to 3 lecture hours. Total hours are unchanged.

**Impact: None**

**Effective Date:** Fall 2009

**From:** ECE 526. Electronics II (3) I, II. Continuation of Electronics I. Three hours ~~rec.~~ a week. Pr.: ~~EECE~~ 511 and 525.

**To:** ECE 526. Electronics II (3) I, II. Continuation of Electronics I, with emphasis on performance measures, including frequency response. Additional topics include Miller's theorem, cascoding, and the application of negative feedback. Three hours lec. a week. Pr.: ECE 511 and 525.

**Rationale:** This is a change in the course description to better describe the content, and in the pre-requisite from EECE to ECE. There is also a change from 3 recitation hours to 3 lecture hours. Total hours are unchanged.

**Impact: None**

**Effective Date:** Fall 2009

**From:** ECE 530. Control Systems Design (3) I, II. Modeling, analysis, and design of control systems. Three hours ~~rec.~~ a week. Pr.: ~~EECE 512.~~

**To:** ECE 530. Control Systems Design (3) I, II. Modeling, analysis, and design of control systems. Topics include basic linear systems modeling and analysis; feedback control; time response and stability of dynamic systems; introduction to root locus and frequency response design. Three hours lec. a week. Pr.: MATH 240 and ECE 511.

**Rationale:** This is a change to the course description. There are changes in the prerequisites also to reflect course content requirements. There is a change from 3 recitation hours to 3 lecture hours. Total hours are unchanged.

**Impact: None**

**Effective Date:** Fall 2009

**From:** ECE 542. Local Area Networking (3) I, II. An introduction to data communication concepts used in the network, data link, and physical layers of the Open Systems Interconnection (OSI) model. Hardware and software aspects of data communications as well as modern Local Area Network (LAN) standards will be emphasized. Two hours ~~rec.~~ and three hours lab a week. Pr.: ~~EECE 241~~, high-level programming language.

**To:** ECE 542. Local Area Networking (3) I, II. An introduction to data communication concepts used in the network, data link, and physical layers of the Open Systems Interconnection (OSI) model. Hardware and software aspects of data communications as well as modern Local Area Network (LAN) standards will be emphasized. Two hours lec. and three hours lab a week. Pr.: ECE 241, high-level programming language.

**Rationale:** This is only a change in EECE to ECE course prefix in the prereqs and from 2 hours of recitation to 2 hours of lecture. Total hours are unchanged.

**Impact: None**

**Effective Date:** Fall 2009

**From:** ECE 557. Electromagnetic Theory I (3) I, II. Vector analysis, electrostatics, magnetostatics, Faraday's law, Maxwell's equations, and applications. Three hours ~~rec.~~ a week. Pr.: PHYS 214 and ~~EECE 510~~.

**To:** ECE 557. Electromagnetic Theory I (3) I, II. Vector analysis, electrostatics, magnetostatics, Faraday's law, Maxwell's equations, plane waves, and applications. Three hours lec. a week. Pr.: PHYS 214 and ECE 410.

**Rationale:** This is a change in the course description. There is also a change in the prerequisites to reflect the ECE510 to ECE410 course renumbering, and 3 recitation hours changed to 3 lecture hours. Total hours are unchanged.

**Impact: None**

**Effective Date:** Fall 2009

**From:** ECE 571. Introduction to Biomedical Engineering (4) I. ~~Introduction to quantitative analysis techniques as applied to the study of physiological systems and their associated biological signals.~~ One hour ~~rec.~~ a week. Pr.: ~~MATH 222~~.

**To:** ECE 571. Introduction to Biomedical Engineering (3) I. Overview of engineering applied to clinical medicine and the life sciences. Topics include sensors and instrumentation to acquire physiologic data, imaging techniques, biomechanics, health care information technology, assistive technology, telemedicine, home care, emergency services, battlefield medicine, and biomedical career opportunities. Three hour lec. a week. Pr.: MATH 221.

**Rationale:** This is a change in the course description and pre-requisite. Total hours are changed from 1 recitation hour to 3 lecture hours to reflect the expanded course topic coverage.

**Impact: None**

**Effective Date:** Fall 2009

**From:** ECE 581. Energy Conversion I (3) I, II. ~~Energy conversion principles and their application to electric energy converters operating in the static and the dynamic mode.~~ Three hours ~~rec.~~ a week. Pr.: ~~EECE 510~~ or 519.

**To:** ECE 581. Energy Conversion I (3) I, II. Three-phase systems, magnetic circuits, transformers, and DC and AC machines. Three hours lec. a week. Pr.: ECE 410 or 519.

**Rationale:** This is a change to the course description, and to the prerequisites to reflect the ECE510 to ECE410 number change. There is also a change from 3 recitation hours to 3 lecture hours. Total hours are unchanged.

**Impact: None**

**Effective Date:** Fall 2009

**From:** ECE 590. Seminar (1) I, II. ~~Preparation and oral presentation of a written technical report.~~ One hour rec. a week. Pr.: DEN 325 and ENGL 415.

**To:** ECE 590. Seminar (1) I, II. Review of oral and written communication skills, engineering ethics and career topics. One hour rec. a week. Pr.: DEN 325 and ENGL 415.

**Rationale:** This is only a change in the course description.

**Impact: None**

**Effective Date:** Fall 2009

**Drop:** ECE 533. Basic Real-Time Electronics (1) II. Introduction to number systems, Boolean algebra, logic gates, logic family characteristics, and programmable logic devices. Introduction to finite state machines, memories, analog-to-digital converters and basic electrical circuit elements. This course is not available to students with credit in EECE 241. Two hours rec. and three hours lab a week. Course meets in one contiguous block of five weeks. Pr.: PHYS 113 or 213.

**Rationale:** This course has not been offered in 10 years, and there are no plans to offer it again.

**Impact: None**

**Effective Date:** Fall 2009

**Drop:** ECE 535. Control Systems Laboratory (3) I, II. The design and testing of feedback control systems. Two hours rec. and three hours lab a week. Pr.: EECE 431 and EECE 502. Pr. or conc.: EECE 530.

**Rationale:** This course has not been offered in 10 years, and there are no plans to offer it again.

**Impact: None**

**Effective Date:** Fall 2009

**Drop:** ECE 589. Circuits and Machines Lab (2) I, II. Practical aspects of electrical circuits, transformers, and electrical motors and generators. One hour lec. and two hours lab a week. Not open to EECE students. Pr.: EECE 519.

**Rationale:** This course has not been offered in 10 years, and there are no plans to offer it again.

**Impact:** None

**Effective Date:** Fall 2009

### **EXPEDITED COURSE PROPOSALS**

#### **Graduate (Course numbers 600-999)**

#### **Department of Architectural Engineering & Construction Science**

**From:** ARE 710. Building Energy Analysis (2) I. Study of building energy consumption and current modeling techniques to analyze overall energy usage including: economic evaluation and energy efficient system selection for new construction. Two hours rec. a week. Pr.: ARE 533, 540 ~~or instructor permission.~~

**To:** ARE 710. Building Energy Analysis (2) I, on sufficient demand. Study of building energy consumption and current modeling techniques to analyze overall energy usage including: economic evaluation and energy efficient system selection for new construction. Two hours rec. a week. Pr.: ARE 533, and 540.

**Rationale:** Revised offering to on sufficient demand due to inconsistent enrollment numbers. Removed instructor permission to be consistent with other course listings.

**Impact:** None

**Effective Date:** Fall 2009

**From:** ARE 731. Advanced Lighting Design (3) II. ~~Lighting modeling and analysis used in lighting design practice, and computer-assisted lighting analysis.~~ Two hours recitation and two hours lab a week. Pr.: ARE 532 and 533.

**To:** ARE 731. Advanced Lighting Design (3) II. Design and application of lighting systems for commercial buildings, using current industry practices and computer-assisted analysis. Two hours recitation and two hours lab a week. Pr.: ARE 532 and 533.

**Rationale:** Revised description matches the true course focus.

**Impact:** None

**Effective Date:** Fall 2009

**From:** ARE 734. Advanced Mechanical Systems Design (3) II. Design and ~~specifications of selected thermal and mechanical systems for structures. The course uses all the~~

~~modern techniques of thermal/ mechanical system design for buildings.~~ Two hours rec. and ~~three~~ hours lab a week. Pr.: ARE 540.

**To:** ARE 734. Advanced Mechanical Systems Design (3) I, II Design and application of selected mechanical systems for commercial buildings, expanding on the material and topics presented in ARE 534 and ARE 540. Two hours rec. and two hours lab a week. Pr.: ARE 540

**Rationale:** Revised description to match the true course focus and course offering.

**Impact:** None

**Effective Date: Fall 2009**

**From:** ARE 735. Electrical Systems Design (3) I. Design and application of ~~various~~ electrical distribution system ~~components.~~ The course uses the National Electrical Code in conjunction with all ~~the modern techniques of electrical systems design for buildings.~~ Two hours recitation and ~~three~~ hours lab a week. Pr.: ARE 533.

**To:** ARE 735. Electrical systems Design (3) I, II. Design and application of electrical distribution systems for commercial buildings. The course uses the National Electrical Code in conjunction with current industry practices. Two hours rec. and two hours lab a week. Pr.: ARE 533.

**Rationale:** Revised description matches the true course focus.

**Impact:** None

**Effective Date: Fall 2009**

**From:** ARE 740. Environmental Control Systems for Buildings (3) II. Electric, electronic, and pneumatic control systems to optimize energy usage and environmental comfort in buildings. ~~Three~~ hours rec. a week. Pr.: ARE ~~640~~ and ECE 519.

**To:** ARE 740. Environmental Control Systems for Buildings (3) II. Introduction to pneumatic, electric, electronic, and direct digital control systems to optimize energy usage and environmental comfort in buildings, including preparation of control diagrams and control sequences. Two hours rec. a week and two hours lab a week. Pr.: ARE 540 and ECE 519.

**Rationale:** Revised description to match the true course focus, course offering and change in prerequisite course number.

**Impact:** None

**Effective Date: Fall 2009**

**From:** CNS 738. Mechanical and Electrical Estimating (2) II. ~~Techniques~~ of mechanical and electrical building systems estimating. Procedure for evaluating relative costs of

different systems. ~~Development of computer-aided finite and conceptual estimating techniques. Two three-hour~~ labs a week. Pr.: ARE 534 or CNS 534, ARE 536 or CNS 536, and Pr. or conc.: ARE 533 or CNS 535.

**To:** CNS 738. Mechanical and Electrical Estimating (2) I, II. Principles and practices of mechanical and electrical building systems estimating. Procedure for evaluating relative costs of different plumbing, HVAC, and electrical/lighting systems. Six hours lab a week. Pr.: ARE 534 or CNS 534, ARE 536 or CNS 536, and Pr. or conc.: ARE 533 or CNS 535.

**Rationale:** Minor revision of the course description.

**Impact:** None

**Effective Date:** Fall 2009

### **Department of Computing and Information Sciences**

**From:** CIS 744. Advanced Software Analysis and Design (3) II, S. Advanced concepts and practicum in object-oriented analysis, modeling, design, implementation, testing, and use of CASE tools; relationships among structural, static, and dynamic models; relationship among conceptual, system, and implementation models. Pr. CIS 540.

**To:** CIS 744. Advanced Software Analysis and Design (3) II, S. Advanced concepts and practicum in object-oriented analysis, modeling, design, implementation, testing, and use of CASE tools; relationships among structural, static, and dynamic models; relationship among conceptual, system, and implementation models. Not available for credit to students with credit in CIS 544. Pr. CIS 540.

**Rationale:** CIS 544 and 744 are similar courses targeted for undergraduate and graduate students, respectively. Because there is significant overlap in the two courses, it would be inappropriate to give credit for both.

**Impact:** None

**Effective Date:** Fall 2009

**From:** CIS 751. Computer and Information Security (3) I. A comprehensive coverage of computer and information security. Basic cryptography, access control, authentication, authorization, network security, software security, and social aspects of security. The lectures discuss when and where things can go wrong and how design flaws in a system can be exploited to compromise security. Common attack techniques are introduced, and students have the opportunity to work on course projects that cover both the defense and offense aspects in cyber space. Pr.: CIS 450 or 520.

**To:** CIS 751. Computer and Information Security (3) I. A comprehensive coverage of computer and information security. Basic cryptography, access control,

authentication, authorization, network security, software security, and social aspects of security. The lectures discuss when and where things can go wrong and how design flaws in a system can be exploited to compromise security. Common attack techniques are introduced, and students have the opportunity to work on course projects that cover both the defense and offense aspects in cyber space. Not available for credit to students with credit in CIS 551. Pr.: CIS 450 or 520.

**Rationale:** CIS 551 and 751 are similar courses targeted for undergraduate and graduate students, respectively. Because there is significant overlap in the two courses, it would be inappropriate to give credit for both.

**Impact:** None

**Effective Date:** Fall 2009

### **Electrical & Computer Engineering**

**From:** ECE 624. Power Electronics (3) I. Theory and application of semiconductor devices to the control and conversion of electric power, control of DC and AC machines, design of electronic power circuits such as controlled rectifiers, converters and inverters, ~~using diodes, diacs, thyristors, triacs, and power transistors.~~ Three hours ~~rec.~~ a week. Pr.: ~~EECE~~ 581, 511, and 525.

**To:** ECE 624. Power Electronics (3) I. Theory and application of semiconductor devices to the control and conversion of electric power, control of DC and AC machines, and design of electronic power circuits such as controlled rectifiers, converters and inverters. Three hours lec. a week. Pr.: ECE 581, 511, and 525.

**Rationale:** This is a change to course description. There is also a change from 3 recitation hours to 3 lecture hours. Total hours are unchanged.

**Impact:** None

**Effective Date:** Fall 2009

**From:** ECE 628. Electronic Instrumentation (3) I, II. Applications of electronics in the design of analog and digital systems for the measurement of physical variables and in the transduction of these variables into a useful form for both recording and control. Two hours ~~rec.~~ and three hours lab a week. Pr.: ~~EECE~~ 502 and 526.

**To:** ECE 628. Electronic Instrumentation (3) I, II. Applications of electronics in the design of analog and digital systems for the measurement of physical variables and in the transduction of these variables into a useful form for both recording and control. Two hours lec. and three hours lab a week. Pr.: ECE 502 and 526.

**Rationale:** Hours are changed from 2 recitation and 3 lab hours a week to 2 lecture and 3 lab hours a week. Total hours are unchanged.

**Impact:** None

**Effective Date: Fall 2009**

**From:** ECE 631. Microcomputer Systems Design (3) II. Design and engineering application of ~~16~~ and 32-bit microcomputers to instrumentation and control. Investigate the relationship of the C language and assembly language. Timing and other interfacing problems will be covered. Two hours ~~rec.~~ and three hours lab a week. Pr.: CIS 308 or 209; EECE 431/525 or ~~ME 535~~.

**To:** ECE 631. Microcomputer Systems Design (3) II. Design and engineering application of 32-bit microcomputers to instrumentation and control. Investigate the relationship of the C language and assembly language. Timing and other interfacing problems will be covered. Two hours lec. and three hours lab a week. Pr.: CIS 308 or 209 or ME 400; ECE 431; ECE 525 or 519.

**Rationale:** Description is modified to reflect current processors used in course. Prerequisites are also changed to better match course content. Credit hours are changed from 2 recitation and 3 lab to 2 lecture and 3 lab hours per week. Total hours are unchanged.

**Impact:** None

**Effective Date: Fall 2009**

**From:** ECE 633. Real-Time Embedded Systems (1) I. Interconnection of peripherals, such as CAN networks, DA/AD converters, and timers. Implementation of device drivers on top of micro-kernels. Build a simple real time distributed embedded system. Two hours ~~rec.~~ and three hours lab a week. Course meets in one contiguous block of five weeks. Pr.: CIS 621 and 622.

**To:** ECE 633. Real-Time Embedded Systems (1) I. Interconnection of peripherals, such as CAN networks, DA/AD converters, and timers. Implementation of device drivers on top of micro-kernels. Build a simple real time distributed embedded system. Two hours lec. and three hours lab a week. Course meets in one contiguous block of five weeks. Pr.: CIS 621 and 622.

**Rationale:** Credit hours are changed from 2 recitation and 3 lab to 2 lecture and 3 lab per week. Total hours are unchanged.

**Impact:** None

**Effective Date: Fall 2009**

**From:** ECE 636. Introduction to Computer Graphics (3) I, II. An introduction to the hardware and software aspects of graphics generation. Programming assignments will provide practical experience in implementing and using standard graphics primitives and user interfaces. Three hours ~~rec.~~ a week. Pr.: CIS 308 or 209; CIS 300; and MATH 222 or 551.

**To:** ECE 636. Introduction to Computer Graphics (3) I, II. An introduction to the software, hardware, and algorithmic aspects of graphics generation. Programming

assignments will provide experience in implementing interactive interfaces via application-level graphics libraries. Three hours lec. a week. Pr.: CIS 308 or 209; CIS 300; and MATH 222 or 551.

**Rationale:** This is a change in the course description. Credit hours are changed from 3 recitation hours to 3 lecture hours. Total hours are unchanged.

**Impact:** None

**Effective Date: Fall 2009**

**From:** ECE 641. Advanced Digital Design using Logic Synthesis (3) II. Applications of hardware description languages (HDLs) for the design of complex digital systems. Topics include designing and simulating using HDLs, logic synthesis into FPGAs and ASICs, optimization techniques, timing issues, hardware verification, and design for testability. Two hours ~~rec.~~ and three hours lab a week. Pr.: ~~EECE 541~~.

**To:** ECE 641. Advanced Digital Design using Logic Synthesis (3) II. Applications of hardware description languages (HDLs) for the design of complex digital systems. Topics include designing and simulating using HDLs, logic synthesis into FPGAs and ASICs, optimization techniques, timing issues, hardware verification, and design for testability. Two hours lec. and three hours lab a week. Pr.: ECE 441.

**Rationale:** Prerequisites are changed to reflect ECE541 to ECE441 renumbering. Credit hours have been changed from 2 recitation and 3 lab hours to 2 lecture and 3 lab hours. Total hours are unchanged.

**Impact:** None

**Effective Date: Fall 2009**

**From:** ECE 643. Computer Engineering Design Lab (3) I, II. The design and construction of small computer system using simple programmable devices. The design and construction of computer interfacing systems for PCs based on simple microcontroller chips. ~~Implementations of interrupt device drivers will also be covered.~~ One hours ~~rec.~~ and ~~six~~ hour lab a week. Pr. CIS 308 or 209; and ~~EECE 541~~. Pr. or conc.: ~~EECE 649~~.

**To:** ECE 643. Computer Engineering Design Lab (3) I, II. The design and construction of a small computer system using simple programmable devices. The design and construction of computer interfacing systems for PCs based on USB devices and simple microcontroller chips. Two hours lec. and three hours lab a week. Pr. CIS 308 or 209; and ECE 441. Pr. or conc.: ECE 649.

**Rationale:** This is a change in course description. Prerequisites are changed to reflect new names. Credit hours are changed from 1 hour recitation and 6 hour lab to 2 hour recitation and 3 hours lab per week to reflect the current course structure. Total hours are unchanged.

**Impact:** None

**Effective Date: Fall 2009**

**From:** ECE 645. Digital Electronics (3) I, II. Design of high-performance digital electronics and systems. Topics include design metrics, device modeling, transmission-line models for wiring, signaling conventions, transmitter and receiver circuits, noise analysis and management, power distribution, timing and synchronization techniques. Three hours ~~rec.~~ a week. Pr.: ~~EECE~~ 511, 525, and 544.

**To:** ECE 645. Digital Electronics (3) I, II. Design of high-performance digital electronics and systems. Topics include design metrics, device modeling, transmission-line models for wiring, signaling conventions, transmitter and receiver circuits, noise analysis and management, power distribution, timing and synchronization techniques. Three hours lec. a week. Pr.: ECE 511, 525, and 441.

**Rationale:** Prerequisites have been changed to reflect new course names. Credit hours have been changed from 3 recitation to 3 lecture hours per week. Total hours are unchanged.

**Impact:** None

**Effective Date: Fall 2009**

**From:** ECE 647. Digital Filtering (3) I. Difference equation characterization of digital filters, transient and steady-state analysis of digital filters using the Z-transform, spectral analysis of digital signals, design and implementation of digital filters. Three hours ~~rec.~~ a week. Pr.: ~~EECE~~ 512.

**To:** ECE 647. Digital Filtering (3) I. Difference equation characterization of digital filters, transient and steady-state analysis of digital filters using the Z-transform, spectral analysis of digital signals, design and implementation of digital filters. Three hours lec. a week. Pr.: ECE 512.

**Rationale:** This is only a change from 3 recitation hours to 3 lecture hours per week. Total hours are unchanged.

**Impact:** None

**Effective Date: Fall 2009**

**From:** ECE 648. Multimedia Compression (3) I. Introduction to multimedia creation and representation. Design of multimedia systems, which incorporate audio, image, and video. Topics will include the analysis and design of multimedia compression, streaming, delivery, security and authoring. Emphasis will be placed on current multimedia standards and applications. Three hours ~~rec.~~ a week. Pr.: ~~EECE~~ 512 or MATH 551; CIS 308 or 209.

**To:** ECE 648. Multimedia Compression (3) I. Introduction to multimedia creation and representation. Design of multimedia systems, which incorporate audio, image, and video. Topics will include the analysis and design of multimedia compression,

streaming, delivery, security and authoring. Emphasis will be placed on current multimedia standards and applications. Three hours lec. a week. Pr.: ECE 512 or MATH 551; CIS 308 or 209.

**Rationale:** This is only a change from 3 recitation hours to 3 lecture hours per week. Total hours are unchanged.

**Impact:** None

**Effective Date: Fall 2009**

**From:** ECE 649. Computer Design I (3) I, II. Concepts of computer design. Information representation, instruction sets, and addressing modes. Arithmetic and logic unit design for fixed and floating point operations. Hardwired and microprogrammed control design. Concepts of pipelining, CISC and RISC architecture. Memory system design including virtual memory, caches, and interleaved memories. I/O design methods, interrupt mechanisms, DMA and system integration. Three hours ~~rec.~~ a week. Pr.: ~~EECE 541~~.

**To:** ECE 649. Computer Design I (3) I, II. Concepts of computer design. Information representation, instruction sets, and addressing modes. Arithmetic and logic unit design for fixed and floating point operations. Hardwired and microprogrammed control design. Concepts of pipelining, CISC and RISC architecture. Memory system design including virtual memory, caches, and interleaved memories. I/O design methods, interrupt mechanisms, DMA and system integration. Three hours lec. a week. Pr.: ECE 441.

**Rationale:** Prerequisite has been changed to reflect new course name/number. Credit hours are changed from 3 recitation hours to 3 lecture hours per week. Total hours are unchanged.

**Impact:** None

**Effective Date: Fall 2009**

**From:** ECE 661. Communications Systems II (3) II. ~~Analysis and design of digital communications systems. Topics include signal spaces, the derivation of optimum receivers for the white noise channel, modeling of bandpass systems, determination of the power spectrum of a random digital signal, multiple access methods, fading channels, error correction codes, and simulation of practical digital transmission systems.~~ Three hours ~~rec.~~ a week. Pr.: ~~EECE 660~~.

**To:** ECE 661. Communications Systems II (3) II. Error-correction code design and analysis with emphasis on block and convolutional coding and decoding; Trellis-coded modulation. Modeling of bandlimited systems and pulse-shape design, optimal receiver design for bandlimited systems, linear and nonlinear equalization. Multiple-access techniques, orthogonal frequency-division multiplexing and receiver design for CDMA schemes. Simulation of practical digital transmission systems. Three hours lec. a week. Pr.: ECE 660.

**Rationale:** This is a change to the course description to reflect current course content. Credit hours are changed from 3 recitation to 3 lecture hours per week. Total hours are unchanged.

**Impact:** None

**Effective Date:** Fall 2009

**From:** ECE 662. Design of Communication Circuits (3) II. The design of communication circuits and systems operating from baseband to UHF frequencies. Topics include tuned-RF amplifiers, ~~PR~~ oscillators, ~~frequency~~ mixers, LC and ceramic bandpass filters, and demodulator ~~circuits~~. Projects involve the design and performance testing of a complete radio receiver using ~~surface mount discrettes and IC components~~. Two hours ~~rec.~~ and three hours lab a week (~~one hour scheduled lab and two hours by appointment~~). Pr.: ~~EECE~~ 526 and 502.

**To:** ECE 662. Design of Communication Circuits (3) II. The design of communication circuits and systems operating from baseband to UHF frequencies. Topics include tuned-RF amplifiers, oscillators, mixers, LC and ceramic bandpass filters, and demodulators. Projects involve the design, construction, and performance testing of a complete radio receiver. Two hours lec. and three hours lab a week. Pr.: ECE 526 and 502.

**Rationale:** This is an update to the course description to match current content. Credit hours are changed from 2 recitation and 3 lab hours to 2 lecture and 3 lab hours. Total hours are unchanged.

**Impact:** None

**Effective Date:** Fall 2009

**Drop:** ECE 603. Advanced Electrical Engineering Laboratory (2) I, II. On sufficient demand. A project-oriented laboratory in which a small group of students works with a faculty member in a special area of interest. Projects usually involve design, measurement methods, or experimental work. May be repeated once. Pr.: EECE 502.

**Rationale:** This course has not been offered in 10 years, and there are no plans to offer it again.

**Impact:** None

**Effective Date:** Fall 2009

**Drop:** ECE 644. Parallel Computing Fundamentals (3) I. Parallel processing models, multistage interconnection networks, parallel algorithms for applications such as sorting, dense matrix manipulation, fast Fourier transforms and graph theory, distributed computing, quantum computing. Three hours rec. a week. Pr.: CIS 300, CIS 450, or EECE 541.

**Rationale:** This course has not been offered in 10 years, and there are no plans to offer it again.

**Impact: None**

**Effective Date:** Fall 2009

**Drop:** ECE 659. Wave Guides, Antennas, and Propagation (3) on sufficient demand. Applications of Maxwell's equations to boundary value problems, guided transmission, cavities, radiation, and propagation. Three hours rec. a week. Pr.: EECE 557.

**Rationale:** This course has not been offered in 10 years, and there are no plans to offer it again.

**Impact: None**

**Effective Date:** Fall 2009

**Drop:** ECE 663. Digital Error Control Coding (3) II, in odd years. An introduction to the subject of error-correcting and error-detecting codes, both block and convolutional. Emphasis is placed on practical means of encoding and decoding the most commonly used codes such as Hamming, BCH, and Reed-Solomon codes. Three hours rec. a week. Pr.: EECE 241, STAT 510, and CIS 308 or 209

**Rationale:** This course has not been offered in 10 years, and there are no plans to offer it again.

**Impact: None**

**Effective Date:** Fall 2009

## **NON-EXPEDITED COURSE PROPOSALS**

### **Undergraduate (Courses number 000-599)**

#### **Computer Science & Information Systems**

**Add:** CIS 553. Intro Applied Cryptography. (3) II. Introduction to the fundamentals of cryptography, including mathematical background, classical ciphers, public key encryption, block and stream ciphers, cryptographic hash functions, digital signatures, common attacks, and basic security protocols. Not available for credit to students with credit in CIS 753. Three hours rec. a week. Pr.: CIS 300, MATH 510.

**Rationale:** We would like to allow computer science majors to specialize in computer security, which is an increasingly important area as computing becomes widespread throughout all aspects of society. Cryptography, or the study of securing information, is a

major part of computer security. Security is also a relevant area for computer engineering majors, and they would benefit from learning more about networking and encryption.

**Impact:** This course would serve as an elective for computing and information sciences majors, and would not impact any other department.

**Effective:** Spring 2010

## **NON-EXPEDITED COURSE PROPOSALS**

### **Graduate (Courses number 600-999)**

#### **Architectural Engineering & Construction Science**

**Add:** ARE 711. Building Energy Codes and Standards. (2) II. Study of the background, importance, impact, and application of the energy codes to the mechanical and electrical systems design process. Two hours rec. a week. Pr.: ARE 540, ARE 532, and ARE 533.

**Rationale:** Energy codes and their continuous revision process have become extremely important in building design. This course is primarily designed for those engineering students who will specialize in either mechanical design or electrical design for buildings.

**Impact:** None. This course has been taught as a topics course in prior terms. No similar course exists on campus.

**Effective:** Spring 2010

#### **Computer Science & Information Systems**

**Add:** CIS 753. Applied Cryptography. (3) II. Fundamentals of cryptography, including mathematical background, classical ciphers, public key encryption, block and stream ciphers, cryptographic hash functions, digital signatures, common attacks, and basic network security. Not available for credit to students with credit in CIS 553. Three hours rec. a week. Pr.: CIS 300, MATH 510, or equivalent.

**Rationale:** We would like to allow computer science graduate students to have knowledge in computer security, which is an increasingly important area as computing becomes widespread throughout all aspects of society. Cryptography, or the study of securing information, is a major part of computer security.

**Impact:** None.

**Effective:** Spring 2010

**NON-EXPEDITED UNDERGRADUATE**  
**Curriculum Change for Architectural Engineering**

**Drop:**

◆Art 100	2D Design	OR	
Art 200	3D Design		3

Free Elective \_\_\_\_\_ 4

**Total** \_\_\_\_\_ **7**

**No change in hours required for graduation**

**Add:**

◆Art 190	Drawing 1	OR	
Art 100	2D Design	OR	
Art 200	3D Design		3

Free Elective \_\_\_\_\_ 3

Stat 490      Statistics for Engg      1

\_\_\_\_\_ **7**

**Rationale:** Through the assessment process, it was determined that the topical area of statistics should be added to the program since it is covered in the Fundamentals of Engineering examination. Drawing I is another option that will provide more opportunities to complete the necessary requirement that fits the needs of the program in addition to Design 2D or Design 3D.

**Impact:** The Art Department and the Statistics Department have been contacted, are aware of the proposals, and have approved the impacts upon their courses.

**Effective Date: Spring 2010**

<p>From: (Current list of courses for the curriculum, curriculum description, and admission criteria.) Strike through deleted courses or wording within the curriculum description or admission criteria.</p> <p><b>First Semester</b></p> <table> <tr><td>MATH 220</td><td>Analytical Geom &amp; Calc I</td><td>4</td></tr> <tr><td>CHM 210</td><td>Chemistry I</td><td>4</td></tr> <tr><td>DEN 210</td><td>History of Bldg &amp; Const</td><td>3</td></tr> <tr><td>ARE 100</td><td>Arch Engg Orientation</td><td>1</td></tr> <tr><td>GEOL 100</td><td>Earth in Action</td><td>3</td></tr> <tr><td>ARE 020</td><td>Arch Engg Seminar</td><td><u>0</u></td></tr> <tr><td></td><td></td><td>15</td></tr> </table> <p><b>Second Semester</b></p> <table> <tr><td>CNS 320</td><td>Construction Materials</td><td>2</td></tr> <tr><td>MATH 221</td><td>Analytical Geom &amp; Calc II</td><td>4</td></tr> <tr><td>CHM 210</td><td>Chemistry II <b>OR</b></td><td>4</td></tr> <tr><td>BIOL 198</td><td>Prin of Biology</td><td>4</td></tr> <tr><td>ECON 110</td><td>Prin of Macroeconomics</td><td>3</td></tr> <tr><td>ENGL 100</td><td>Expository Writing I</td><td>3</td></tr> <tr><td>ARE 020</td><td>Arch Engg Seminar</td><td><u>0</u></td></tr> <tr><td></td><td></td><td>16</td></tr> </table> <p><b>Third Semester</b></p> <table> <tr><td>PHYS 113</td><td>Engineering Physics I</td><td>5</td></tr> <tr><td>COMM105</td><td>Public Speaking IA</td><td>2</td></tr> <tr><td>ENGL 200</td><td>Expository Writing II</td><td>3</td></tr> <tr><td>MATH 222</td><td>Analytic Geom &amp; Calc III</td><td>4</td></tr> <tr><td>CNS 200</td><td>Comp Appl in Engg &amp; Const.</td><td>2</td></tr> <tr><td>ARE 020</td><td>Architectural Engg Seminar</td><td><u>0</u></td></tr> <tr><td></td><td></td><td>16</td></tr> </table>	MATH 220	Analytical Geom & Calc I	4	CHM 210	Chemistry I	4	DEN 210	History of Bldg & Const	3	ARE 100	Arch Engg Orientation	1	GEOL 100	Earth in Action	3	ARE 020	Arch Engg Seminar	<u>0</u>			15	CNS 320	Construction Materials	2	MATH 221	Analytical Geom & Calc II	4	CHM 210	Chemistry II <b>OR</b>	4	BIOL 198	Prin of Biology	4	ECON 110	Prin of Macroeconomics	3	ENGL 100	Expository Writing I	3	ARE 020	Arch Engg Seminar	<u>0</u>			16	PHYS 113	Engineering Physics I	5	COMM105	Public Speaking IA	2	ENGL 200	Expository Writing II	3	MATH 222	Analytic Geom & Calc III	4	CNS 200	Comp Appl in Engg & Const.	2	ARE 020	Architectural Engg Seminar	<u>0</u>			16	<p>To: (Proposed list of courses for the curriculum, curriculum description, and admission criteria.) Underline new courses, edited version of the curriculum description or admission criteria.</p> <p><b>First Semester</b></p> <table> <tr><td>MATH 220</td><td>Analytical Geom &amp; Calc I</td><td>4</td></tr> <tr><td>CHM 210</td><td>Chemistry I</td><td>4</td></tr> <tr><td>DEN 210</td><td>History of Bldg &amp; Const</td><td>3</td></tr> <tr><td>ARE 100</td><td>Arch Engg Orientation</td><td>1</td></tr> <tr><td>GEOL 100</td><td>Earth in Action</td><td>3</td></tr> <tr><td>ARE 020</td><td>Arch Engg Seminar</td><td><u>0</u></td></tr> <tr><td></td><td></td><td>15</td></tr> </table> <p><b>Second Semester</b></p> <table> <tr><td>CNS 320</td><td>Construction Materials</td><td>2</td></tr> <tr><td>MATH 221</td><td>Analytical Geom &amp; Calc II</td><td>4</td></tr> <tr><td>CHM 210</td><td>Chemistry II <b>OR</b></td><td>4</td></tr> <tr><td>BIOL 198</td><td>Prin of Biology</td><td>4</td></tr> <tr><td>ECON 110</td><td>Prin of Macroeconomics</td><td>3</td></tr> <tr><td>ENGL 100</td><td>Expository Writing I</td><td>3</td></tr> <tr><td>ARE 020</td><td>Arch Engg Seminar</td><td><u>0</u></td></tr> <tr><td></td><td></td><td>16</td></tr> </table> <p><b>Third Semester</b></p> <table> <tr><td>PHYS 113</td><td>Engineering Physics I</td><td>5</td></tr> <tr><td>COMM105</td><td>Public Speaking IA</td><td>2</td></tr> <tr><td>ENGL 200</td><td>Expository Writing II</td><td>3</td></tr> <tr><td>MATH 222</td><td>Analytic Geom &amp; Calc III</td><td>4</td></tr> <tr><td>CNS 200</td><td>Comp Appl in Engg &amp; Const.</td><td>2</td></tr> <tr><td>ARE 020</td><td>Architectural Engg Seminar</td><td><u>0</u></td></tr> <tr><td></td><td></td><td>16</td></tr> </table>	MATH 220	Analytical Geom & Calc I	4	CHM 210	Chemistry I	4	DEN 210	History of Bldg & Const	3	ARE 100	Arch Engg Orientation	1	GEOL 100	Earth in Action	3	ARE 020	Arch Engg Seminar	<u>0</u>			15	CNS 320	Construction Materials	2	MATH 221	Analytical Geom & Calc II	4	CHM 210	Chemistry II <b>OR</b>	4	BIOL 198	Prin of Biology	4	ECON 110	Prin of Macroeconomics	3	ENGL 100	Expository Writing I	3	ARE 020	Arch Engg Seminar	<u>0</u>			16	PHYS 113	Engineering Physics I	5	COMM105	Public Speaking IA	2	ENGL 200	Expository Writing II	3	MATH 222	Analytic Geom & Calc III	4	CNS 200	Comp Appl in Engg & Const.	2	ARE 020	Architectural Engg Seminar	<u>0</u>			16
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<b>Fourth Semester</b>				<b>Fourth Semester</b>			
<del>ART 100</del>	<del>2D Design</del>	<b>OR</b>		<u>ART 100</u>	<u>2D Design</u>	<b>OR</b>	
<del>ART 200</del>	<del>3D Design</del>		3	<u>ART 200</u>	<u>3D Design</u>	<b>OR</b>	
CE 333	Statics		3	<u>ART 190</u>	<u>Drawing I</u>		3
PHYS 214	Engineering Physics II		3	CE 333	Statics		3
MATH 240	Elem Diff Equations		4	PHYS 214	Engineering Physics II		3
ARE 020	Architectural Engg Seminar		<u>0</u>	MATH 240	Elem Diff Equations		4
			15	ARE 020	Architectural Engg Seminar		<u>0</u>
							15
<b>Fifth Semester</b>				<b>Fifth Semester</b>			
CNS 321	Const Tech and Detailing		3	CNS 321	Const Tech and Detailing		3
CE 533	Mechanics of Materials		3	CE 533	Mechanics of Materials		3
CE 534	Mechanics of Materials LAB		1	CE 534	Mechanics of Materials LAB		1
ME 513	Thermodynamics I		3	ME 513	Thermodynamics I		3
ARE 532	Lighting Systems Design		2	ARE 532	Lighting Systems Design		2
IMSE 530	Engineering Economics		2	IMSE 530	Engineering Economics		2
CE 212	Elem Surveying Engg		3	CE 212	Elem Surveying Engg		3
ARE 020	Architectural Engg Seminar		<u>0</u>	ARE 020	Architectural Engg Seminar		<u>0</u>
			17				17
<b>Sixth Semester</b>				<b>Sixth Semester</b>			
CNS 325	Construction Drawing		3	CNS 325	Construction Drawing		3
ARE 534	Thermal Systems		3	ARE 534	Thermal Systems		3
CE 537	Intro Structural Analysis		3	CE 537	Intro Structural Analysis		3
<del>ECEE</del> 519	Elect Circuits and Controls		4	<u>ECE</u> 519	Elect Circuits and Controls		4
ARE 522	Loading & Load Paths/Bldg		2	ARE 522	Loading & Load Paths/Bldg		2
ARE 310	Introduction to AutoCAD		1	ARE 310	Introduction to AutoCAD		1
ARE 020	Architectural Engg Seminar		<u>0</u>	<u>STAT 490</u>	<u>Statistics for Engineers</u>		1
			16	ARE 020	Architectural Engg Seminar		<u>0</u>
							17
<b>Seventh Semester</b>				<b>Seventh Semester</b>			
ARE 411	Arch Engineering Design		3	ARE 411	Arch Engineering Design		3
ENGL 415	Written Comm for Engg		3	ENGL 415	Written Comm for Engg		3
ME 512	Dynamics		3	ME 512	Dynamics		3
ARE 528	Reinf Concrete Structures		3	ARE 528	Reinf Concrete Structures		3
ARE 533	Building Electrical Systems		3	ARE 533	Building Electrical Systems		3
ARE 537	Acoustic Systems		2	ARE 537	Acoustic Systems		2
ARE 020	Architectural Engg Seminar		<u>0</u>	ARE 020	Architectural Engg Seminar		<u>0</u>
			17				17
<b>Eighth Semester</b>				<b>Eighth Semester</b>			
ARE 524	Steel Structures		3	ARE 524	Steel Structures		3
ARE 536	Plumb/Fire Prot Sys Design		3	ARE 536	Plumb/Fire Prot Sys Design		3
ARE 540	Building Mechanical Sys		3	ARE 540	Building Mechanical Sys		3
ME 571	Fluid Mechanics		3	ME 571	Fluid Mechanics		3
	UGE Hum or Soc Sci Elect*		3		UGE Hum or Soc Sci Elect*		3
	(Upper Level)				(Upper Level)		
ARE 020	Architectural Engg Seminar		<u>0</u>	ARE 020	Architectural Engg Seminar		<u>0</u>
			15				15
<b>Ninth Semester</b>				<b>Ninth Semester</b>			
ARE 590	Integrated Bldg Sys Des		3	ARE 590	Integrated Bldg Sys Des		3
CE 522	Soil Mechanics I		3	CE 522	Soil Mechanics I		3
	Complementary Elective*		3		Complementary Elective*		3
	Complementary Elective*		3		Complementary Elective*		3
	<del>Free Elective</del>		4		<u>Free Elective</u>		3
ARE 020	Architectural Engg Seminar		<u>0</u>	ARE 020	Architectural Engg Seminar		<u>0</u>
			16				15

<b>Tenth Semester</b>				<b>Tenth Semester</b>			
ARE	690	Senior Project	3	ARE	690	Senior Project	3
ARE	539	Arch Engg Management	3	ARE	539	Arch Engg Management	3
		Complementary Elective*	3			Complementary Elective*	3
		Complementary Elective*	3			Complementary Elective*	3
		UGE Hum or Soc Sci Elect* (Upper Level)	3			UGE Hum or Soc Sci Elect* (Upper Level)	3
ARE	020	Architectural Engg Seminar	<u>0</u>	ARE	020	Architectural Engg Seminar	<u>0</u>
			15				15
Number of hours required for graduation 158				Number of hours required for graduation 158			
* Humanities & Social Science Electives are to be selected from the approved catalog list of UGE courses (see Engineering UGE course requirements).				* Humanities & Social Science Electives are to be selected from the approved catalog list of UGE courses (see Engineering UGE course requirements).			
* Complementary Electives are to be selected from the approved departmental list.				* Complementary Electives are to be selected from the approved departmental list.			