



THE UNIVERSITY OF ARIZONA
TUCSON ARIZONA



Department of Electrical and Computer Engineering

UNDERGRADUATE STUDENT HANDBOOK

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1.0 General Information

1.1 The Department

The mission of the Department of Electrical and Computer Engineering (ECE) at the University of Arizona (UA) is to develop and maintain programs of excellence in teaching and research which will support the state of Arizona in its development as a leading center for high-technology industry and which will support national needs for the development and application of electrical/electronic/computer-based high technology.

With programs ranging from microwave engineering to communications and information processing, from semiconductor electronics to computer engineering, and from circuits to control systems, the ECE Department conducts a dynamic program of teaching and research that has earned a distinguished national reputation.

The Department is active in research in signal and image processing, communication and control systems, computers, electromagnetics and optics, and microelectronics. The faculty is organized into technical groups reflecting these areas. Research programs are an integral part of the department's educational activities. Specialized laboratories are available to support student and faculty research efforts. All facilities are housed in a four-story structure that includes more than 50,000 square feet of laboratory space. Much of the research is supported by grants and contracts from various industrial sources as well as from state and federal agencies.

An academic advising staff is available to assist you with academic policies and procedures, departmental requirements, course selection, transfer course evaluation, and general academic information. Additionally, faculty advisors in your chosen specialty are available to assist in technical elective selection and general career information.

1.2 Undergraduate Programs

Bachelor of Science degrees in Electrical Engineering and Computer Engineering are accredited by the Accreditation Board for Engineering and Technology (ABET). The undergraduate professional curriculum has the goal of educating students to be productive engineers who are qualified to keep pace with rapidly changing technology. The undergraduate program also prepares students with superior academic records to pursue advanced studies for graduate degrees at The University of Arizona and other top academic institutions.

The Electrical Engineering program prepares students for careers in areas such as communications, computer-aided VLSI circuit design, controls, digital systems, electromagnetics, remote sensing, microelectronics, and digital signal and image processing.

The Computer Engineering program allows students to seek opportunities in computer-related careers that include microcomputer-system design, computer-aided VLSI circuit design, computer networks, software engineering, simulation and artificial intelligence applications.

1.3 Applicability

The degree requirements listed in this document apply to all students beginning their freshman year in/or after August 1, 2009. However, they can be overruled by Departmental, College of Engineering and/or University of Arizona Academic policies. Substantial information can be found in this handbook as well as the College of Engineering website: <http://www.engr.arizona.edu/>.

NOTE-Changes in policy and administrative procedures can be applied to students admitted before the effective date of this document, as long as changes do not increase the total number of units required for the degree in Electrical Engineering or Computer Engineering.

To keep abreast of changes in degree requirements, you should consult with the Academic Advisor at least once per semester.

1.4 Student Responsibilities

Ask questions. The ECE advisors have an open door policy that allows you to stop by and ask questions. It is strongly advised to see your an advisor at least once per semester. This is helpful to make sure you are on the right track toward completing your degree. You may view most current walk-in hours on the ECE web-page at <http://ece.arizona.edu/current-undergrads.php>.

Please be aware that you are responsible for your degree and fulfilling of all your degree requirements. If there are any concerns, questions, troubles about your degree plans, please seek the advice of your advisors. We are here to help you. It is the student responsibility to review and know academic policies; you shouldn't rely on fellow student's information. Academic Policies are listed under your academic catalog. Be familiar with the online catalogue, the catalogue has information on every policy, if you still have questions, ask us!

Student Academic Progress Reports (SAPR's) do NOT replace advising. The purpose of SAPR's is to enhance advising by providing accurate and comprehensive information that you can use in consultation with your advisor to make academic decisions. You are encouraged to contact your advisor for academic and career counseling. Many major and minor requirements call for you to select coursework in consultation with your academic advisor. Additionally, your advisor will be able to anticipate problems and make adjustments when necessary.

If you are having any troubles during your UA academic career, talk with your academic advisors, faculty members, and teaching assistants. There are many resources available to you: tutoring, counseling, academic skills workshops, internships, and career services. Take advantage of these resources. Your fellow students are NOT the best source of information. There are differences between catalog years, college requirements, and transfer institutions that affect degree requirements. The academic advisors are here to help you, come in and ask us!

1.41 University of Arizona E-mail Accounts

You are responsible for checking your email on a daily basis. E-mail is a major method of communication that the University, the department and your advisor use to get essential information out to you. It is required that ALL University of Arizona students have an arizona.edu email account. The University of Arizona will send all official communications to that account. UA email is a very important method of communication; we use email to contact you and give essential information regarding registration, bursar's account, available courses, filing degree checks, and deadlines. You will be responsible to know this information! You are still allowed to have other e-mail accounts such as yahoo.com or hotmail.com. However, it is your responsibility to have arizona.edu messages forwarded to such email accounts.

University policy will only allow us to send and receive messages to your arizona.edu email accounts. We are not permitted to reply or send message to any other email account such as yahoo, hotmail, or gmail. Consider forwarding your other accounts to one you will check daily, this will make your academic life easier and you'll be informed of important information.

We do not tolerate student's excuses about "not knowing" important academic issues or deadlines. Lack of knowledge will affect your academic success and can impact your ability to graduate on time. Read your emails, being well informed can only help you on your way to graduation.

1.5 Registration process in ECE

All ECE students must see an advisor to register for ECE courses. It is important that you meet with an ECE academic advisor during your designated registration time for your class rank. We will announce via E-mail your registration times in accordance with your class rank (your SAPR will tell you whether you are a Freshman, Sophomore, etc- **Check your SAPR!!!**). Keep an eye out for those important e-mail messages! Generally, we will register you for ECE classes one week before your WebReg priority registration time. Please be aware that we are only able to register you for ECE courses. We are unable to register you for any other type of class (INDV, MATH, CHEM, PHYSICS, etc...). You will register for those types of classes either through WebReg or the department offering the class.

It is your responsibility to be aware of your ECE and WebReg registration time in order to get into required core and elective courses. If you have missed your ECE registration time, we do not have to register you for a required core class that has no open seats. If a class is full, attend class the first day and be sure to sign on the form for those that want to add the class. Always attend the first day of all ECE classes you are registered for and be sure to sign on the already registered form. Otherwise, we may drop you for non-attendance. As an example, you may be administratively dropped from a full ECE class with a waiting list.

When it is your turn to register, you must completely fill out an internal ECE registration form (lavender form) available outside any of the advisors' offices. Please fill out all information, as this is very important to allow us to serve you better. **Bring a current SAPR with you to ECE registration.** We need to see what you have completed and how you are doing to design a schedule for you. Students are still ultimately responsible for their own schedules. Adding and dropping courses are the total responsibility of the student. Whether you are added or dropped by the University, ECE advisors, the registrar, or WebReg, you are still responsible for verifying that the changes were made as requested. Students must check their schedules in Student Link to be sure everything is correct.

1.6 Differential Tuition

Beginning with the Fall 2006 semester, students with Advanced Standing will be required to pay differential tuition. The differential tuition is \$300 per semester for a full-time student. A full-time student is a student taking 12 or more units. If a student is taking 11 or fewer units, then the differential tuition is charged at \$25 per unit.

1.7 Graduation Requirements

1. To complete all degree requirements for the Bachelor of Science degree in Electrical or Computer Engineering in four years, each student will need to take the required number of units each semester per the curriculum guide. Please see an Academic Advisor before registering for the suggested coursework as listed in the on-line curricula, there are important considerations you should know before attempting such a rigorous schedule.
2. Students are expected to complete the Mid-Career Writing Requirement (MCWA, see Section 4.0). The requirement can be met with completion of English 102 or an equivalent course with a "B" or better. Students who have received a "C" in English102 are required to take ENGL308 (Technical Writing) in order to fulfill the MCWA..
3. All students should take courses in the appropriate sequence. Prerequisites must be completed before taking further courses. ECE prerequisite course requirements must be completed with a grade of "C" or above. **Exceptions must be approved by the ECE Undergraduate Studies Committee.**
4. **Advanced Standing** is required of all students prior to registration of 300/400 level coursework. Please see an ECE advisor for an Advanced Standing form. Advanced Standing procedures and policies are set forth in Section 4.0 of this handbook and the College of Engineering website: http://www.engr.arizona.edu/2_AC/polici.htm
5. Graduation requirements are set forth in the Academic Policies of the University. Students applying for graduation must do so in accordance with all directives of the College of Engineering and the University. An application to graduate must be filed with the College of Engineering and approved by an ECE advisor. All course work at the University must meet the cumulative grade point average of 2.000. Your major and minor GPA must be at least 2.0 as well.
6. **Core ECE coursework must be completed with a minimum grade of "C".** The Department expects students to have a solid foundation in core academics and technical competence. In order to enroll or be allowed to remain in an ECE course, all prerequisite courses must be completed with a "C" or better. Senior-level students wishing to enroll in ECE 498A or ENGR 498A must have completed all 300 level ECE courses, except ECE 352. ECE 352 is scheduled for the first semester senior year and is exempt from this core course requirement. A student may not enroll in ECE 498A or ENGR 498A if the student is on probation.

1.8 Probation and Disqualification

You are considered to be on Probation, if your cumulative or major GPA is below 2.0. Beginning with your first year at the University and the department, your progress is reviewed at the conclusion of each semester. If you fail to make satisfactory progress during your first semester, you will be placed on **probation** and an email will be sent to your UA email account. You will be required to meet with an academic advisor and sign an academic contract. Failure to meet with an advisor may result in an advising hold on your account or college disqualification.

If you fail to meet the criteria for satisfactory progress for two consecutive semesters, you may be **disqualified** from the program or the University of Arizona. Disqualification from the University of Arizona will mean you are no longer a student at the UA. You can apply for re-admittance after completing 24 units at another college with a 3.0 GPA. **Disqualification** notification will be

communicated to you by email to your UA email address on record and any current registration or pre-registrations will be cancelled.

1.9 Petition Procedure

If you are placed on probation, disqualified, or want to request an exception to policy, you may file a written petition with your major Academic Advisor who will forward it to the ECE Undergraduate Studies Committee. You must submit your disqualification petition within **15 days** after the **probation or disqualification email is received (Note: not when you read the email, but when the email appears in your email account)**. Your petition should state facts that justify reconsideration and include supporting documentation. Upon receipt, the ECE Undergraduate Studies Committee will review your petition and return a decision within **15 working days** to your last address on record. Committee results are final.

1.10 Undergraduate Student Advising Information

Type of Advising	Advisors
General Advising	(520) 621-6171
Freshman-Seniors	alonsom@ece.arizona.edu
Applying for Advanced Standing	ECE Advising Office
Transfer Student Course Evaluations	ECE Advising Office
Senior or Graduation Checks	ECE Advising Office
Probation or Readmission	ECE Advising Office
Advising Action	When to schedule
General Advising	Only Walk-in hours are available. For most up to date walk-in hours go to http://ece.arizona.edu/current-undergrads.php
Transfer Course Evaluation	Prior to entry into an ECE program of study, a transfer evaluation should be done as soon as possible.
Course Selection	Prior to each succeeding semester.
Pre-registration	October for Spring courses. Early April for Fall courses.
Registration	Prior to each succeeding semester.
Technical Elective Selection	Second semester Junior year in consultation with a faculty advisor.
Graduation Application	One year prior to expected graduation. (May 2010 graduates should apply early in the Fall 2009 semester).
Scholarships	There are a few scholarships available to ECE students. You must apply each semester with an application found on the ECE Website: www.ece.arizona.edu See your Academic Advisor.
Internships/Co-ops	Local and national companies continually seek

Advising Action**When to schedule**

students for Internships/Co-op positions. Internships are encouraged for practical training in your major.

Visit the Career Services Office in the Student Union Memorial Center for particular information on when companies will be on campus for interviews for these Internships/Co-op positions. Visit the website

<http://career.arizona.edu/>

International students can seek internships/co-ops with the assistance of the International Students Office. <http://internationalstudents.arizona.edu/>

2.0 Academic Programs**2.1 Academic Policy Changes Fall 2006**

The ECE Undergraduate Policy Committee and the ECE Faculty approved recent changes to departmental policy effective Fall 2006. ECE undergraduates are required to have a minimum grade of "C" on all required ECE core classes, a grade of "D" is no longer considered passing. A minimum grade of "C" is required in prerequisites for any ECE class.

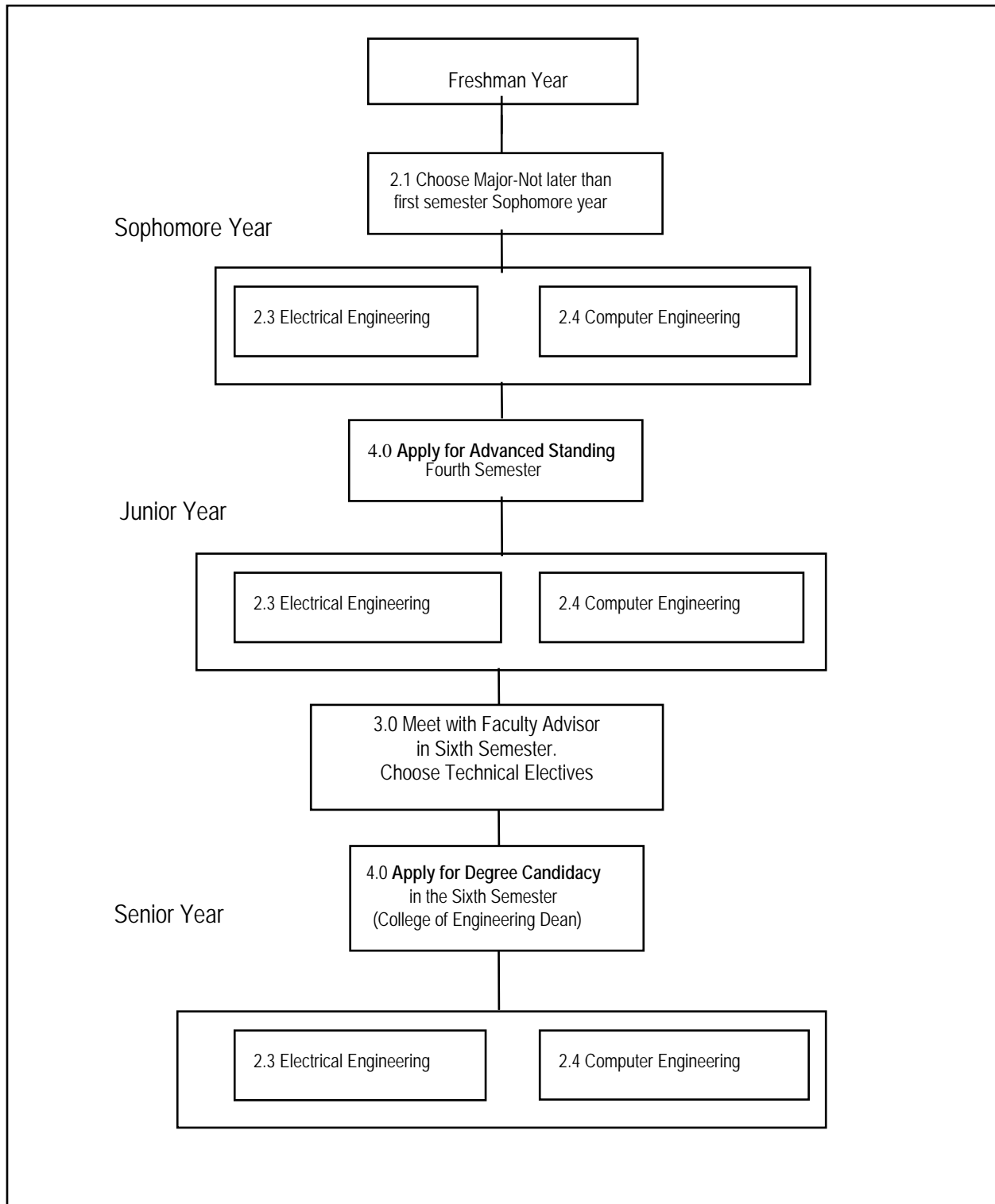
The essential knowledge and skills acquired in prior ECE core classes is put into practical use during the Senior Capstone sequence (ECE 498A/498B or ENGR 498A/498B) and models the industry design process in an academic setting. The Capstone is an opportunity for Senior level ECE majors to demonstrate their knowledge and design talents. There are three important prerequisites: Senior academic status; ECE core classes must be complete (the only exception is ECE 352) and; cumulative and major GPA must be at 2.0 or above. Students, who wish to request an exemption to this policy, should make an appointment with an academic advisor and fill out a departmental petition.

2.2 Electrical and Computer Engineering Department Curriculum Requirements

The flow chart in Figure 2.1 depicts, in a normal eight-semester time frame, the progression from entry to graduation and the decision points along the way. Most engineering disciplines at The University of Arizona have a common freshman year. However, Computer Engineering majors take ECE 175, a programming class, in their very first semester, and Electrical Engineering majors, take ECE 175 in their second semester. Once a major has been selected, you will follow the prescribed curricula for your chosen major. The General Education requirements include 18 units of Tier I and Tier II courses in Traditions & Cultures and Individuals & Societies chosen from those offered by the University's list (see Section 2.6). Your technical electives (see Section 3.0) will be chosen with the advice of a Faculty Advisor in your Junior year. As you progress through the program you must also meet the departmental/university requirements for Advanced Standing, Mid-Career Writing Assessment, and Graduation.

Detailed curriculum requirements for a student are dependent upon the catalog in which the student enters the ECE program. The College of Engineering Academic web pages: http://www.engr.arizona.edu/2_AC/index.htm is the location of various year catalogs that students follow, based upon eight semesters in the normal curricula. For example, the 2006-2007 curricula for Electrical Engineering and Computer Engineering starts with Section 2.3.

Figure 2.1 Flow Chart for Majors



2.3 Electrical Engineering Track(2009-2010)

Below is the *advised sequencing* of courses for this degree. **Please meet with an academic advisor before attempting the sequence below.** The Course Descriptions are found in the University General Catalog.

Electrical Engineering Track (2009-10)

Below is the *advised sequencing* of courses for this degree,
the official degree requirements are found in the University General Catalog.

FRESHMAN YEAR				SOPHOMORE YEAR			
First Semester		Second Semester		First Semester		Second Semester	
Course	Units	Course	Units	Course	Units	Course	Units
ENGR 102	3	C SC 245	3	ECE 274	4	ECE 220	5
MATH 125#	3	MATH 129	3	MATH 223	4	MATH 254	3
CHEM 151	4	PHYS 141	4	PHYS 241	4	PHYS 143	2
ENGL 101	3	ENGL 102	3	ECE 275	3	Tier 1 TRAD*	3
Tier 1 INDV*	3	ECE 175	3	Tier 1 INDV*	3	Tier 2 INDV*	3
TOTAL	16	TOTAL	16	TOTAL	18	TOTAL	16

ABE AME ATMO CHE CHEM CE CSC ECE ECOL ENGL ENGR GEN GEOS HWR INDV/TRAD/Art/Hum MATH MNE MSE
OPTI PHYS PSYC SIE

Advanced standing is required for 3/400 level courses taught by the College

JUNIOR YEAR				SENIOR YEAR			
First Semester		Second Semester		First Semester		Second Semester	
Course	Units	Course	Units	Course	Units	Course	Units
ECE 301/351A	4	ECE 304/Methods	4	ENGR 498a**	3	ENGR 498b***	3
ECE 320A	3	ECE 340	3	Tech Elect**	3	Tech Elect**	3
ECE 372	4	ECE 352	3	Tech Elect**	3	Tech Elect**	3
Math Methods	4	ECE 381	4	Tech Elect**	3	Tech Elect**	3
		Tier 1 TRAD*	3	Tech Elect**	3	Tier 2 Art/Hum*	3
TOTAL	15	TOTAL	17	TOTAL	15	TOTAL	15

TOTAL UNITS = 128

MATH 124 is a 5 unit version of MATH 125. Students taking MATH 124 should consider delaying the Tier 1 INDV course to maintain a reasonable academic load.

* INDV/TRAD/Art/Hum courses must meet University general education requirements. One course must be recognized by the University as focusing on non-western culture, race, gender or ethnicity. TRAD 101 satisfies this requirement.

** 21 units of technical electives are required. These consist of ECE 369 and other upper-division courses in engineering, math, or science, chosen in consultation with a faculty advisor. 15 units must be University of Arizona Departmental ECE coursework.

*** ECE 498a grade will be awarded upon completion of ECE 498b.

2.4 Computer Engineering Track(2009-2010)

Below is the *advised sequencing* of courses for this degree. The Course Descriptions are found in the University General Catalog. Please meet with an academic advisor before attempting the sequence below.

Computer Engineering Track(2009-10)
Below is the *advised sequencing* of courses for this degree,
the official degree requirements are found in the University General Catalog.

FRESHMAN YEAR				SOPHOMORE YEAR			
First Semester		Second Semester		First Semester		Second Semester	
Course	Units	Course	Units	Course	Units	Course	Units
ENGR 102	3	CSC 245	3	ECE 274	4	ECE 220	5
MATH 125#	3	ECE 175	3	ECE 275	3	MATH 254	3
CHEM 151	4	MATH 129	3	MATH 223	4	PHYS 143	2
ENGL 101	3	PHYS 141	4	PHYS 241	4	Tier 1 INDV*	3
Tier 1 INDV*	3	ENGL 102	3			Tier 2 INDV*	3
TOTAL	16	TOTAL	16	TOTAL	15	TOTAL	16

Click as appropriate to view course descriptions

ABE AME ATMO CHE CHEM CE CSC ECE ECOL ENGL ENGR GEN GEOS HWR INDV/TRAD/Art/Hum MATH MNE MSE
OPTI PHYS PSYC SIE

Advanced standing is required for 3/400 level courses taught by the College

JUNIOR YEAR				SENIOR YEAR			
First Semester		Second Semester		First Semester		Second Semester	
Course	Units	Course	Units	Course	Units	Course	Units
ECE 320A	3	ECE 351A/301	4	ENGR 498a***	3	ENGR 498b***	3
ECE 373	3	ECE 372	4	Tech Elect**	3	Tech Elect**	3
ECE 369	4	ECE TBD Methods	4	Tech Elect**	3	Tech Elect**	3
ECE TBD Methods	4	Tech Elect**	3	Tech Elect**	3	Tech Elect**	3
Tier 1 TRAD*	3	Tier 1 TRAD*	3	CSC 445/473/452	3	Tier 2 Art/Hum*	3
TOTAL	17	TOTAL	18	TOTAL	15	TOTAL	15

TOTAL UNITS = 128

MATH 124 is a 5 unit version of MATH 125. Students taking MATH 124 should consider delaying the Tier 1 INDV course to maintain a reasonable academic load.

* INDV/TRAD/Art/Hum courses must meet University general education requirements. One course must be recognized by the University as focusing on non-western culture, race, gender or ethnicity. TRAD 101 satisfies this requirement.

** 12 units of technical electives are required. These consist of ECE 304, 381, and 400-level courses in engineering, computer science, math, optical sciences, or physics as approved by a faculty advisor. Six units of technical electives must be University of Arizona Departmental ECE coursework.

*** ECE 498a grade will be awarded upon completion of ECE 498b.

2.5 General Education Requirements for all ECE students since 1998

Tier 1

Traditions and Cultures- Students must take 2 of the following 4 courses. Make sure you take 2 different numbers. In other words, do not take 2 Trad101's!

TRAD 101 - Non-Western Cultures and Civilizations

TRAD 102 - Western Cultures and Civilizations: Classical to Renaissance

TRAD 103 - Western Cultures and Civilizations: Renaissance to Present

TRAD 104 - Topics in Culture and Civilization

Individual and Societies- Students must take 2 of the following 3 courses.

INDV 101 - Mind, Self and Language

INDV 102 - Social Interaction and Relationships

INDV 103 - Societal and Institutional Systems

Natural Science - Met by requirements in major. Do not take any NATS!

The selection of courses in each of the above topical areas is defined by the University-wide General Education Committee and is common across all colleges. Currently, available courses are described in the Schedule of Classes and are accessible on the web.

Tier 2

Arts or Humanities- Students must take 1 course.

Tier 2

Individual and Societies- Students must take 1 course.

Natural Science - Met by requirements in major.

In addition to the above course requirements:

One course focusing on a non-western culture or on race, gender, class or ethnicity is required. This may be fulfilled by an appropriate first or second tier course (**for example TRAD 101 satisfies this requirement**). For a list of applicable courses visit: <http://catalog.arizona.edu/>.

Students must take the language placement examination on entrance to the University. Before applying for advanced standing, they must remove any University entrance requirements relative to the two required high school courses in a single foreign language.

3.0 Recommended Technical Elective Courses

ECE students can expand the breadth and depth of their degree program by choosing senior technical electives. Electrical engineering majors have the most latitude in their selection, with seven courses to be chosen, compared to four courses for computer engineering majors.

Listed below for electrical engineering majors are areas of emphasis in Communications and Signal Processing, Control Systems, Digital Systems, and so on. The listed course groupings are for guidance only, and are not exclusive. Also listed is a General Option with courses spanning a wide range of ECE subjects. Students seeking more depth may elect a single area of emphasis (Single Option), or possibly two areas (Split Option). Affording greatest breadth, of course, is the General Option.

The single area of emphasis listed for computer engineering majors covers a wide range of subjects, including digital signal processing and electronics, as well as, traditional hardware and software courses.

Independent of which option is chosen; students interested in working on a research project under the guidance of a particular faculty mentor may substitute ECE 492 Directed Research for one or possibly two technical electives. This course, which awards letter grades (unlike independent study), can be taken for 1-3 credits each time, up to a maximum of 6 credits. See your faculty mentor(s) for the requirements and expectations of this research course.

Students, in consultation with a faculty advisor, should draft a list of technical electives during their junior year.

3.1 Electrical Engineering Majors

Seven (6) technical electives (2009-2010 Catalog) are required for the electrical engineering major. At least five (5) of the technical elective courses should be ECE courses. Although students are allowed freedom in choosing their technical electives, they should be chosen in consultation with a Faculty Advisor.

3.1.a. General Option

The following courses have been identified by the faculty as being fundamental to a broad education in electrical engineering. This option is not just for students who cannot decide on an area of emphasis. Employers are often looking for students with broad interests and training. To select this option, choose at least one course from each of the four technical groups I-IV listed below, with no more than three courses in one group. All ECE faculty act as advisors in this option.

I. Signals and Systems Courses

<u>Course</u>	<u>Title</u>
ECE 422/522	Analog Signal Processing and Filtering
ECE 429/529	Digital Signal Processing
ECE 435	Digital Communication Systems
ECE 441	Automatic Control

II. Computer Engineering Courses

<u>Course</u>	<u>Title</u>
ECE 369	Fundamentals of Computer Architecture
ECE 373	Object-Oriented Software Design
ECE 478/578	Fundamentals of Computer Networks
ECE 407/507	Digital VLSI System Design

III. Electromagnetics and Optics Courses

<u>Course</u>	<u>Title</u>
ECE 481	Microwave Measurements
ECE 459/559	Fundamentals of Optics for EE's
ECE 482	Electromagnetics

IV. Microelectronics Courses

<u>Course</u>	<u>Title</u>
ECE 453/553	Design-Oriented Analysis of Electronic Circuits
ECE 458	Solid State Circuits

3.1.b. Communications and Signal Processing

Signals are encountered in one form or another in all types of engineering systems. Signals are filtered, scrambled and unscrambled, interpreted, identified, transmitted, and transformed in many ways for many reasons. Students interested in this field should obtain a background in the fundamentals of signals and linear systems, as well as in digital systems. A good background in mathematics, especially probability, transforms, and linear systems is essential.

Advisors: Cui, Djordjevic, Goodman, Marcellin, Neifeld, Rodriguez, Ryan, Strickland, Sundareshan, Tharp, and Vasic,

<u>Course</u>	<u>Title</u>
ECE 422/522	Analog Signal Processing and Filtering
ECE 425	Image Science & Engineering
ECE 429/529	Digital Signal Processing
ECE 435	Introduction to Digital Communication
ECE 478/578	Fundamentals of Computer Networks

Technical electives may also be chosen from areas such as digital systems, controls, optics, electromagnetics, and microelectronics.

3.1.c. Control Systems

Due to the ever-growing need for the use of sophisticated computer-based control systems in diverse industrial applications, many students are interested in preparing for careers in the area of control systems. The fundamental control area courses provide a good background in modeling (441, 449), analysis (441, 442), and design (441, 442) of control systems. The remaining courses provide more in-depth background on particular application areas and/or simulation (449). In many cases, students combine the fundamental control courses (441, 442) with the basic signal processing (429), filtering/circuits (422), and communication courses (435) to allow a broad coverage of signals and systems material.

Advisors: Sundareshan, Tharp.

<u>Course</u>	<u>Title</u>
ECE 441	Automatic Control
ECE 442/542	Digital Control Systems
ECE 429/529	Digital Signal Processing
ECE 449/549	Continuous-System Modeling

Technical electives may also be chosen from areas such as signal processing, communications, optics, electromagnetics, and microelectronics.

3.1.d. Digital Systems

Students preparing for careers in digital computer software and hardware will normally choose the computer engineering programs. However, those students whose interests overlap computer and electrical engineering should specialize in digital systems. Check with your Faculty Advisor about registering and/or receiving technical elective credit for ECE 369, as well as, regarding prerequisites for each of the following technical electives.

Advisors: Akoglu, Hariri, Krunz, Louri, R. Lysecky, S. Lysecky, Marefat, Ramasubramanian, Rozenblit, Wang, and Zeigler.

<u>Course</u>	<u>Title</u>
ECE 369	Fundamentals of Computer Architecture
ECE 373	Object Oriented Software Design
ECE 473/573	Software Engineering Concepts
ECE 474a/574a	Computer Aided Logic Design
ECE 407/507	Digital VLSI System Design
ECE 478/578	Fundamentals of Computer Networks
ECE 479/579	Principles of Artificial Intelligence

Technical electives may also be chosen from areas such as signal processing, communications, controls, optics, and microelectronics.

3.1.e. Electromagnetics

The electromagnetics option is structured to provide the students with the basic understanding of electromagnetic fields and their engineering applications. The courses explore the basic concepts of wave propagation, guidance, diffraction, and radiation, as well as the consequences and the engineering applications of wave interaction with materials (reflection, attenuation, and dispersion). The student learns why circuit theory is only valid at low frequencies, how to analyze and design antennas and microwave components used in high-frequency transmission systems, and how to analyze and design optical components and systems.

Advisors: Dvorak, Kostuk, Melde, Neifeld, Potter, Szilagyi, Xin, and Ziolkowski.

<u>Course</u>	<u>Title</u>
ECE 456/556	Optoelectronics
ECE 459/559	Fundamentals of Optics for EE's
ECE 481	Microwave Measurements
ECE 482	Electromagnetics
ECE 484/584	Antenna Theory & Design
ECE 485/585	Radio Waves and Telemetry
ECE 486/586	Microwave Engineering I
ECE 487/587	Fiber Optics Laboratory
ECE 488/588	Microwave Engineering II
Math 422b	Advanced Analysis for Engineers
Math 424	Elements of Complex Variables

Technical electives may also be chosen from areas such as signal processing, communications, controls, optics, and microelectronics.

3.1.f. Electronics and Microelectronics

Microelectronics has revolutionized society by providing vast, reliable computer power and information processing in very small volumes. The integrated circuit is now central to modern electronic systems, ranging from computers to communications. These integrated circuits are assemblies of a few to many millions of semiconductor devices, some with minimum dimensions of a few tenths of a micrometer. To prepare engineers to work in this area, the Department provides courses in semiconductor devices, integrated circuit fabrication, circuit design, and integrated circuit packaging for high-

speed systems. As background for semiconductor devices, the Department recommends Physics 242 (Modern Physics) as an elective from outside the Department, as well as, a strong mathematics background.

Advisors: Brews, Higgins, Ma, Palusinski, Parks, Wang, and Xin.

<u>Course</u>	<u>Title</u>
ECE 453/553	Design-Oriented Analysis of Electronic Circuits
ECE 407/507	Digital VLSI System Design
ECE 458	Solid State Circuits
ECE 456/556	Optoelectronics
MSE/ECE 465/565	Microelectronics Packaging Materials
ECE 557	Integrated Circuit Laboratory

Technical electives may also be chosen from areas such as signal processing, communications, controls, and optics.

3.1.g. Optics

Undergraduate studies in optics introduce students to many current areas of research and development in information processing, optical communication, optoelectronic devices, and remote sensing. Courses ECE 412, 416, 470a, and 470b are part of the Optical Science and Engineering (OPTSCI) sequence, and have a number of 200 and 300 level prerequisites. Suitable prerequisites for non- OPTSCI courses are ECE 381 and ECE 352.

Advisors: Kostuk, Louri, Neifeld, and Potter.

<u>Course</u>	<u>Title</u>
OPTI/ECE 412	Optical Instrumentation
OPTI/ECE 416	Optical Design, Fabrication and Testing
ECE 425	Image Science and Engineering
ECE 430/530	Fiber Optics Communication Systems
ECE 434/534	Electrical and Optical Properties of Semiconductors
ECE 456/556	Optoelectronics
ECE 459/559	Fundamentals of Optics for EE's
ECE 487/587	Fiber Optics Laboratory
OPTI/ECE 470a	Optics Laboratory
OPTI/ECE 470b	Optics Laboratory

Technical electives may also be chosen from areas such as signal processing, communications, controls, optics, and microelectronics.

3.1.h. Biomedical Engineering

Biomedical Engineering is a rapidly growing field, broadly defined as the application of engineering principles to biological systems. Application areas include such diverse areas as imaging, sensors and instrumentation, informatics, and tissue engineering. This field is interdisciplinary by nature, and students interested in biomedical engineering need an introduction to biology and physiology. Other technical electives should be chosen in the student's particular area of interest.

Advisors: Barton, Higgins, Rodriguez, and Strickland.

<u>Course</u>	<u>Title</u>
SIE 410a	Human Factors & Ergonomics
ECE 412/OPTI 412	Optical Instrumentation
ABE 423	Agriculture Systems Analysis & Design
ECE 425	Image Science and Engineering
ECE 429/529	Digital Signal Processing
PHYS 430	Introduction to Biophysics
PHYS 440	Medical Physics
PHYS 445	Spect., Acoust., Micro, Optics
ECE 459/559	Fundamentals of Optics for Electrical Engineers
MSE 461	Biological and Synthetic Materials
CHEE 481A	Engineering of Biological Processes
CHEE 481B	Bioprocess Engineering Applications
ABE 484	Biosystems Transport Phenomena
ABE 485	Engineering of Biological Processes
ABE 489	Engineering Properties and Micro/Nano Technologies for Biological Systems
BME 510	Biology for Biomedical Engineering
BME 511	Physiology for Biomedical Engineering
BME 516	Principles of Biomedical Engineering
BME 517	Measurement & Data Analysis in BME

Qualified students in engineering must have a 3.0 GPA and be a first semester senior to take 500-level courses with the approval of the instructor and Graduate School. Technical electives may also be chosen from areas such as signal processing, communications, controls, optics, and microelectronics.

3.2 Computer Engineering Majors

Four (4) technical electives, and one (1) computer science elective (CSC 445 or 473), are required for the Computer Engineering major. Although students are allowed freedom in choosing their technical electives, their technical electives should be chosen in consultation with a Faculty Advisor.

Advisors: Akoglu, Hariri, Krunz, Louri, R. Lysecky, Ramasubramanian, Rozenblit, and Zeigler.

<u>Course</u>	<u>Title</u>
ECE 407/507	Digital VLSI System Design
ECE 429/529	Digital Signal Processing
ECE 449/549	Continuous-System Modeling
ECE 462/562	Computer Architecture & Design
ECE 473/573	Software Engineering Concepts
ECE 474a/574a	Computer-Aided Logic Design
ECE 478/578	Fundamentals of Computer Networks
ECE 479/579	Principles of Artificial Intelligence
ECE 304	Electronic Circuits/Design Lab
ECE 381	Electromagnetics

Technical electives may also be chosen from areas such as signal processing, communications, controls, optics, and microelectronics.

4.0 Special Requirements

4.1 The Mid-Career Writing Assessment

The Mid-Career Writing Assessment is satisfied by earning a grade of "B" or better in second semester English Composition (ENGL102, 104H, 108 or 109H). Students who do not earn a grade of "B" or better in ENGL102, 104H, or 108 must take English 308 Technical Writing prior to graduation.

4.2 Advanced Standing Requirement

In order to receive Advanced Standing and advance to the Junior (third) year in the ECE program, students must meet the following requirements:

1. Successful completion (passing grades) of all the required freshman and sophomore technical courses listed in the appropriate degree curriculum (excluding Traditions & Cultures, Individual & Societies, Humanities, and Social Science Courses) with a grade point average (GPA) of 2.750 or higher. When necessary, the Grade Replacement Opportunity (GRO) may be used in technical classes to satisfy the GPA requirement.
2. Transfer students must satisfy the requirements listed above. However, only UA courses will be used to satisfy the GPA requirement. Transfer students will be granted Advanced Standing when they have completed 12 or more units of technical courses (Mathematics, Physics, Engineering, Optical Science, Computer Science or any combination) listed in their curriculum with a minimum UA GPA of 2.750.
3. Transfer students with fewer than 12 units of freshman and sophomore courses (as listed in 3a) remaining to be taken, must satisfy the GPA requirement with the remaining freshman and sophomore courses. Upper division technical courses may be added to complete the 12-unit provision to meet the 2.750 GPA requirement. Students who do not satisfy the GPA requirement at the time they first complete 12 or more units, will not be allowed to register for additional upper division ECE courses.

4.3 Senior Capstone Design Course

Students entering their senior year are required to register for the senior capstone course sequence, which culminates in a comprehensive design project. Working on these projects allows students to integrate their four-year learning experiences within the major, including a mastery of technical communication and a comprehensive knowledge of the ECE discipline. Eligible students must meet the following criteria:

1. Senior departmental standing.
2. Completion of all required ECE 300 level core courses in ELE and COE, except ECE 352, and
3. Have a cumulative and major GPA of 2.0 or above.

The senior design project course is a significant two-course sequence taken over the two semesters of the senior year. **ECE 498A (2CR) or ENGR 498A (3CR)** covers the problem statement, brainstorming and proposal writing phases of the project. The follow-on course, **ECE 498B (3CR) or ENGR 498B (3 CR)** is where the design is realized, and requires the completion of a formal technical report and final presentation. Another aspect of the 498A,B-sequence is that all students will be required to work in teams. Team projects are an integral part of academic and industry life, team members should make a concerted effort to be a productive, active member of the capstone team. Students, who are not functioning, or not collaborative team members, may regret their lack of effort when potential employers ask about their capstone project details. Much of the feedback we get from employers indicates that interpersonal skills and being a good team member are just as essential as a sound technical ability. Organizing the course in teams also helps the instructors monitor the progress and design content of the projects.

Honors students may, with advisor approval, register for **ECE 498H (3 CR)** to complete Honors Thesis requirements during the second semester. ECE 498H will substitute for ECE 498B for major requirements. The senior capstone technical document (with minor revisions) will satisfy the Honors College requirements for a senior honors thesis for graduation with honors. Please check with the Honors College for specifics. However, you will have to personally contribute a significant level of writing of the technical document to have the document qualify for honors credit.

Students wishing to work with faculty on individual research projects may still do so using independent study (**ECE 499**) or, better yet, the new Directed Research course (**ECE 492**). With the approval of the advisor, ECE 492 may count as up to three technical elective credits. However, it will not replace the senior design course.

Students may elect to take the College of Engineering Senior Capstone course to complete the capstone requirement. The two course sequence is **ENGR 498A** (3 Units) and **ENGR 498B** (3 units).

All ECE students must take the Senior Capstone Course (ECE 498A/498B or ENGR498A/498b) at the University of Arizona prior to graduation.

4.4 Writing Portfolio

In 1998, the ECE department established a set of seven writing outcomes which graduates of the ECE department should be able to demonstrate. The seven outcomes are:

1. Procedural Document . Document a procedure, how something works, how to perform an operation, or how to solve a problem.
2. Problem Statement. Write a clear and succinct definition of an open-ended problem including a summary of known attempts to solve the problem.
3. Proposal. Write a proposal to perform a project, undertake research, develop a program, solicit funding, or some combination of the above.
4. Abstract/Summary. Write an abstract or summary of a technical document.
5. Persuasive Letter/Memo. Write a letter or memorandum taking a clear position defending or selling an idea to an audience.
6. Professional Design Report. Document a project in a professionally written design report.
7. Technical Explanation for a Non-technical Audience. Explain technical information to a non-technical audience.

To demonstrate competence in these seven writing outcomes, each graduating senior must collect examples of these writing outcomes into a portfolio.

Consequently, ECE undergraduates - do not throw away your graded papers! We ask that, throughout your academic career, you keep papers, lab and design project reports, and all other written work. Some of these papers can be included in your senior portfolio when you take the Senior Capstone Design course sequence, ECE 498A,B. Portfolios help us (the ECE Department) evaluate our curriculum and your writing ability. The portfolios provide you tangible evidence of your milestones and accomplishments, and have been used by some students to impress potential employers during interviews.

5.0 Academic Misconduct

Academic misconduct and/or violation of professional ethics are **unacceptable** in the practice of engineering. As you prepare to be an engineer, you are subject to the University of Arizona "Code of Academic Integrity" rules regarding academic misconduct, as well as, the "Code of Conduct." Upon graduation, practicing engineers are subject to the Engineering Society's Canon of Ethics. A copy of this is included in Appendix I.

Academic misconduct includes plagiarism, cheating on examinations or on individual project assignments, fraud, and theft or alteration of other people's work on academic materials. If you are accused of academic misconduct, you will be referred for disciplinary action pursuant to the Code of Academic Integrity. If found guilty of academic integrity violations, you are subject to academic sanctions which may range from disciplinary warning to immediate disqualification from the ECE Department at the University of Arizona. The latter can be and has been applied to first offenses.

The ECE Department expects you to behave in a mature manner and to be responsible for your own actions. The Department does not accept excuses for misconduct and will prosecute all allegations of misconduct according to the procedures outlined in the "Code of Academic Integrity" and the "Code of Conduct" available in the ECE Departmental Office, Room 230, or on-line: dos.web.arizona.edu/uapolicies.

5.1 Plagiarism

Plagiarism¹ is defined as “taking the ideas, writings, or inventions of another and representing them as your own.” As long as you give credit to the originator of the material you are not guilty of plagiarism. But, merely enclosing statements or sentences in quotation marks is not sufficient: you must cite the source.

Examples of Plagiarism:

1. Turning in a paper from a previous or concurrent class.
2. Having another person write an assignment (for pay or for free) and putting your name on it.
3. Modifying or paraphrasing someone else’s ideas or writings and submitting them as your own.
4. Having someone rewrite substantial portions of your paper and submitting the final version as your own.
5. Copying phrases, sentences, sections, paragraphs, or graphics from another, and not giving credit by citing the source.
6. Turning in someone else’s work as your own.

Examples that are not plagiarism:

1. Asking someone to read your assignment and suggest possible improvements.
2. Getting together with other students to discuss (not write) an assignment.
3. Asking your instructor for help with an assignment.
4. Quoting extensively from someone else’s works but giving credit.
5. Not citing sources for information that is considered common knowledge or that is readily available in dictionaries or your course textbook. For example, you need not cite your textbook as the source of the equations that you use in an assignment (but you may need to do so in a formal project report).

5.2 Cheating

It is clear from the above definitions that a large number of academic misconduct cases fall under the definition of plagiarism. Another form of misconduct is cheating. The following list gives examples of cheating that have resulted in probation or disqualification:

1. Allowing someone else to prepare an assignment for you or preparing an assignment for someone else.
2. Having someone else take an examination for you or taking an examination for someone else.
3. Obtaining unauthorized information about an examination.
4. Altering an answer to an examination after it has been turned in, whether it has been graded or not.
5. Looking at someone else’s paper during an examination or on an assignment where the work is to be done independently.
6. Collaborating with someone else during an examination or on an assignment where the work is to be completed independently.

¹ March 2, 1992 memo from Dean A.F. Emery to Engineering Departments and Programs at the University of Washington, Seattle.

7. Bringing material or information into an examination that is not permitted by the instructor.

6.0 Student Services

Service

Honors Program
 Career Services
 Dean of Students Office

Dept of Multicultural Programs and Services
 International Student Programs and Services
 The Disability Resource Center (DRC)
 University Learning Center (ULC)

Website

www.honors.arizona.edu
<http://www.career.arizona.edu/index.aspx>
<http://dos.web.arizona.edu/>

<http://dmpps.arizona.edu/>
<http://internationalstudents.arizona.edu/>
<http://drc.arizona.edu/>
www.ulc.arizona.edu

7.0 General Undergraduate Regulations

Policies and procedures for all students can now be found on the university website: <http://catalog.arizona.edu/2006-07/policies/aaindex.html>. This website is a great place to start, if you have a question about UA academic topics such as grades, policy, course descriptions, or minor requirements.

7.1 Grade Replacement Opportunity (G.R.O)

G.R.O gives you the opportunity to replace grades up to 10 units during your undergraduate program.

A total of 3 courses, not to exceed a maximum of 10 semester hours, may be repeated under GRO. A GRO repeated course grade will replace only one previous grade. (Example: if a course has been graded more than once, the GRO repeated course grade will replace only one of the graded courses.) **Students must file a GRO request form in the Office of Curriculum and Registration**, Administration Building, Room 210. See the GRO information page at <http://www.registrar.arizona.edu/gro/default.htm>. The repeated attempt under GRO is the grade used in the calculation of the [grade-point-average \(GPA\)](#), even if lower than the first attempt, except in the case of #8 below. Both grades earned in the first and the GRO repeat attempts will remain on the academic record. If a student passes the first attempt, but fails the repeat attempt, the failing grade is calculated in the grade-point-average; however the units earned in the first attempt may be applied toward degree requirements.

8.0 ECE Faculty Directory 2009-2010

<u>NAME</u>	<u>POSITION</u>	<u>PHONE</u>	<u>ROOM</u>
AKOGLU, ALI	ASSISTANT PROFESSOR	626-9249	320b
AL NASHIF, YOUSSEF	RES. ASST. PROFESSOR	621-9915	356N
BARTON, JENNIFER	ASSOCIATE PROFESSOR	621-4116	423
BILGIN, ALI	RESCH ASST PROF	626-8943	422M
BREWS, JOHN R.	PROFESSOR	621-8734	501
CARLILE, ROBERT N.	PROFESSOR EMERITUS	621-6689	524L
CUI, SHUGUANG	ASSISTANT PROFESSOR	626-9627	323
DERENIAK, EUSTACE	PROFESSOR (OP/SCI.)	621-1019	OPSCI
DIDAN, KAMEL	RES. ASST. PROFESSOR	621-8514	456E
DJORDJEVIC, IVAN	ASSISTANT PROFESSOR	626-5119	422N
DVORAK, STEVEN L.	PROFESSOR	621-6170	422F
FENG, CHUAN	ASSISTANT PROFESSOR	626-2117	546
GEHM, MICHAEL	ASSISTANT PROFESSOR	626-1120	556F
GOODMAN, NATHAN	ASSISTANT PROFESSOR	621-4462	422A
GRUBBS, ELMER	SENIOR LECTURER	621-5061	320R
HARIRI, SALIM	PROFESSOR	621-4378	421
HIGGINS, CHARLES	ASSISTANT PROFESSOR	621-6604	504
KOSTUK, RAYMOND K.	PROFESSOR	621-6172	524E
KRUNZ, MARWAN	ASSOCIATE PROFESSOR	621-8731	323
LAZOS, LOUKAS	ASSISTANT PROFESSOR	626-0736	357
LEWIS, ANTHONY	ASSOCIATE PROFESSOR	626-9627	359
LOURI, AHMED	PROFESSOR	621-2318	422H
LYSECKY, ROMAN	ASSISTANT PROFESSOR	621-6192	320F
LYSECKY, SUSAN	ASSISTANT PROFESSOR	621-3291	320C
MA, DONGSHENG (BRIAN)	ASSISTANT PROFESSOR	621-8733	320E
MARCELLIN, MICHAEL W.	PROFESSOR	621-6190	422E
MAREFAT, MICHAEL M.	ASSOCIATE PROFESSOR	621-4852	320G
McBRIDE, ROBERT	ADJUNCT LECTURER	621-6169	456G
MELDE, KATHLEEN	ASSOCIATE PROFESSOR	626-2538	524A
NEIFELD, MARK A.	PROFESSOR	621-6102	502
PALUSINSKI, OLGIERD, A.	PROFESSOR	621-4928	524C
PARKS, HAROLD G.	ASSOCIATE PROFESSOR	621-6180	524D
POTTER, KELLY	ASSOCIATE PROFESSOR	626-0525	404
POWERS, LINDA	PROFESSOR	621-7634	201
RAMASUBRAMANIAN, SRINI	ASSISTANT PROFESSOR	621-4521	320D
RODRIGUEZ, JEFFREY J.	ASSOCIATE PROFESSOR	621-8732	524B
ROZENBLIT, JERZY W.	DEPT. HEAD/PROFESSOR	621-6193	230
RYAN, WILLIAM	ASSOCIATE PROFESSOR	621-8690	422C
SCHOWENGERDT, ROBERT A.	PROFESSOR/EMERITUS	621-2706	402
SPRINKLE, JONATHAN	ASSISTANT PROFESSOR	626-0737	356N
STRICKLAND, ROBIN N.	PROFESSOR	621-6191	406
SUNDARESHAN, MALUR K.	PROFESSOR		621-2953
	422D		
SZILAGYI, MIKLOS N.	PROFESSOR	621-6183	422G
THARP, HAL S.	ASSOC. DEPT. HEAD/ASSOC PROFESSOR	621-2436	230
UTZINGER, URS	ASSISTANT PROFESSOR	621-4366	320K
VASIC, BANE	ASSOCIATE PROFESSOR	626-5550	524F
WANG, JANET "MEILING"	ASSISTANT PROFESSOR	621-6182	523
XIN, HAO	ASSISTANT PROFESSOR	626-6930	525
ZEIGLER, BERNARD P.	PROFESSOR	621-2108	320H
ZHANG, HUALIANG "BRUCE"	RES. ASST. PROFESSOR	621-6099	401
ZIOLKOWSKI, RICHARD W.	PROFESSOR	621-6173	419

9.0 ECE Staff Directory

UPDATED 6/16/09

<u>NAME</u>	<u>POSITION</u>	<u>PHONE</u>	<u>ROOM</u>
BOOTH, CURT	SECRETARY ADMIN	621-2434	230
BRESLER, JOSEPH	ELECTRONIC TECHNICIAN	621-6179	316
CANIZALES, ROZANNE A.	ADMINISTRATIVE MANAGER	621-6193	230C
DUPONT, LEWIS A.	INSTRUMENT SHOP SUPER, SR.	621-4610	320P
ELLERMAN, TREVOR	SYSTEMS PROG. SR.	621-4792	228
EMPTAGE, NANCY	ADMIN. ASSOCIATE	621-6189	228
ENFIELD, LEO J.	COMPUTER MGR. PRIN.	621-2189	422J
HENSLEY, BRENDA	ACCOUNTANT SR.	621-2400	234
LONG, JACK	ACCOUNTANT	621-4115	268
LYONS, BETSEY	ADMIN ASSOCIATE	621-4055	519
MAINVIELLE, CAROLL K.	SECRETARY ADMIN.	621-6094	524P
MARTINEZ, A. "MARTY"	SUPPORT SYSTEMS ANALYST	465-6257	228
MINJAREZ, ALONSO	UNDERGRAD ADVISOR	621-61	261
MONTANO, FRANK	ACCT. ASST./PAYROLL	621-9838	236
RUIZ, JOSIE	STOCK/INVENTORY ASSISTANT	621-3074	313
STAGGS, RHONDA	ELECTRONIC TECHNICIAN, SR	621-6178	316
STENGEL, JESSE	SUPPORT SYSTEM ANALYST	621-6207	228
VIDEBECK, KAREN	MANAGER	621-6199	230E
WHELAN, TAMI	GRAD. ACADEMIC ADVISOR	621-6195	244

10.0 Frequently Asked Questions (FAQ's)

Where do I go for academic advising?

- The Department of Electrical and Computer Engineering is located in the ECE Building, 1230 E. Speedway Blvd. Ground Floor, Tucson, Arizona 85721. The ECE building is located on the main part of campus across the street from the College of Law.
- There is paid parking in the Park Avenue garage, just East of Park Avenue. Parking is also available in the 2nd Street garage.
- Look for the Academic Advisor in the Advisor's Hallway, near the North end of the ECE Building. The Undergraduate Advisor's office is ECE room 261 or 259.

Who is my academic advisor? We endeavor to provide students with advising that affords the proper academic information and choices.

- The ECE department practices team advising with an Academic Advisor and a Faculty Advisor. This approach allows students to see an advisor who specializes in the academic requirements, as well as, general knowledge of engineering. The Academic Advisor helps the student with general advising, pre-registration, registration, transfer credit, and course selection from the Freshman through the Junior years at the university. As progression occurs, the advisor assists with advanced standing, and other university requirements. It is the faculty advisor who knows the specialty within the major who ably assists the student to choose technical elective classes.
- The ECE faculty advisor is selected by the student according to his/her major and the technical emphasis within the major. A faculty member in the technical emphasis can answer questions regarding courses and general information prior to seeing the academic advisor.

What are the walk-in hours of the ECE Department? Walk-in hours vary throughout the year but someone is usually available Monday through Friday, from 9:00 a.m. to 11:30 a.m. and 1:30 p.m. to 4:00 p.m.

How do I make an appointment to see an academic advisor?

Appointments are not taken to see an advisor. Only Walk-in advising is offered on a first come-first served basis. You may view most up to date Walk-in hours at <http://ece.arizona.edu/current-undergrads>.

Why do I have to wait so long to see an academic advisor? As a walk-in, your waiting time varies due to the number of other students waiting to see an academic advisor. On average, your wait should not be longer than 20 minutes, but again, this depends on peak periods. During walk-in periods occurring during registration, your waiting times could be longer. It is important to note that we serve over 600 students. Walk-in service is provided so students have the opportunity to see the academic advisor before registration.

Why is the phone line busy when I call for an appointment? Since each advisor has one phone line, it is quite often busy during peak times. We don't answer our phones when we are with a student. You are welcome and encouraged to email advisor with questions at alonsom@ece.arizona.edu. **Remember to always include your name and student ID when emailing or leaving a message.**

Can my academic advisor get my grade changed? No, your Academic Advisor cannot change your grade. However, your academic advisor can give you the proper procedure to follow to request a change of grade.

Do I need to see an academic advisor every semester?

- If you are on academic probation, you must see an academic advisor at least twice a semester.
- First-semester students are also required to see their academic advisor before their registration time before the middle of their first semester.
- If you are in good standing (2.000 Cumulative GPA or above) it is not necessary, but highly recommended in order to receive the most accurate and up-to-date information.

- Continuing students will see the academic advisor during a pre-registration session to discuss up-coming classes, pre-requisites, and class registration.
- For Upper Division ECE courses at the 300 level, second semester Sophomores applying for Advanced Standing and Juniors will coordinate their class selection with the Advisor. Seniors selecting their 400 level technical electives should visit with a Faculty Member prior to meeting with the Academic Advisor.

How do I apply for Advanced Standing? Students who have completed the first two years of their coursework must apply for Advanced Standing prior to taking Junior level courses. Your academic advisor has advanced standing forms in their office. There are two requirements:

- 1) GPA of 2.750 is required for a select set of courses depending on your major, and
- 2) Completion of the MCWA.

There is **no Temporary Advanced Standing**, you must meet the GPA requirement of 2.750 on a 4.000 scale.

HOW DO I OBTAIN MY SAPR?

You may obtain an On Course SAPR by requesting it directly from Student Link at the following URL:

http://www.arizona.edu/student_link/

- 1) Select Graphical Version or Text Version (depending on the type of web browser you are using).
- 2) Enter your 9-digit Student ID and 4-digit PIN Number and click the Login button.
- 3) Scroll to the bottom of the page and click on the SAPR (On Course) icon.
- 4) Verify your current degree program which is displayed and, if correct, click the Yes button to generate a SAPR. (NOTE: If the degree program information is not correct, please see your advisor.)
- 5) The following message will appear: "A Student Academic Progress Report (SAPR) will be created for your student ID. Please return to Student Link on the next business day to view it."
- 6) The following business day, or anytime within the next seven days, log on to the Student Link and repeat Steps 1-3 above.
- 7) After completing Step 3, the following message will appear: "A Student Academic Progress Report exists for your student ID." To view your SAPR, click the Display button. Always bring your most recent SAPR with you whenever you consult with your advisor.

HOW DO I READ MY SAPR?

Complete instructions on how to read and interpret your SAPR are available online via Student Link at URL:

<http://w3.arizona.edu/~oncourse/howto.htm> . Please feel free to go through your SAPR with your major advisor, we'll point out important areas and help you understand what it means.

WHAT IS AN APRR?

Academic Program Requirements Reports (APRR's) outline the requirements for each undergraduate degree program offered at The University of Arizona. These reports allow you to make an informed decision about the degree program best suited to your educational goals. You may view online APRR's for any degree program offered in the 1993-95 and subsequent catalogs via Student Link at URL:

<http://www.arizona.edu/academic/oncourse/data/interface>.

Can I take Graduate Level (500 level) courses as technical electives? You may take Graduate Level courses as technical electives if you meet these criteria:

<ol style="list-style-type: none"> 1) within 15 semester hours of graduation, 2) a Major GPA of 3.000/4.000, and 3) Faculty Advisor approval. 	See your Advisor
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How do I transfer classes in to my degree program?

There are two basic steps students must take to ensure their transfer credits are utilized in their degree program correctly.

1. Students are responsible for having transcripts sent to the Admissions Office, Nugent Bldg. (for newly admitted students) or the Office of Curriculum & Registration, Administration Bldg., Room 210 (for currently enrolled students).
2. Students must go through the Electrical and Computer Engineering Transfer Evaluation Advisor to see how the units are used in their degree program. Please check with Sue BEFORE taking any classes at another educational institution. We don't want you taking a class that doesn't fulfill any requirements in your major.

Students must check with both offices to insure proper transfer articulation. In-state courses at most Arizona institutions have already been evaluated by the University and can be checked easily in the Course Equivalency Guide (http://az.transfer.org/cgi-bin/WebObjects/Admin_CEG) on line. Students may also view hard copies of the guide in the Advising Center.

Current students, if you are planning to take courses at another institution, check with your Academic Advisor to be sure the course you are planning to take fits properly into your degree program. Students must receive a "C" or better in the courses they wish to transfer in order to receive U of A credit. Grades from other institutions do not affect your GPA at the U of A. We strongly suggest taking ECE 220 Basic Circuits from the University of Arizona. This will ensure an academic background and technical skill set consistent with ECE departmental guidelines. All transfer students are required to take the ECE 220 exam for credit before enrolling in ECE advanced standing coursework.

Note: If the student is a registered U of A student, transcripts should be sent to Curriculum and Registration. If the student has filed a Degree Check they should have their transcripts sent to Graduation Services officer, Marty Gawlik.

Appendix I: Code of Ethics

National Society of Professional Engineers (NSPE) Code of Ethics for Engineers**

Preamble

Engineering is an important and learned profession. As members of this profession, engineers are expected to exhibit the highest standards of honesty and integrity. Engineering has a direct and vital impact on the quality of life for all people. Accordingly, the services provided by engineers require honesty, impartiality, fairness and equity, and must be dedicated to the protection of the public health, safety and welfare. Engineers must perform under a standard of professional behavior which requires adherence to the highest principles of ethical conduct.

I. Fundamental Canons

Engineers, in the fulfillment of their professional duties, shall:

1. Hold paramount the safety, health and welfare of the public.
2. Perform services only in areas of their competence.
3. Issue public statements only in an objective and truthful manner.
4. Act for each employer or client as faithful agents or trustees.
5. Avoid deceptive acts.
6. Conduct themselves honorably, responsibly, ethically and lawfully so as to enhance the honor, reputation and usefulness of the profession.

II. Rules of Practice

1. Engineers shall hold paramount the safety, health and welfare of the public.
 - a. If engineers' judgment is overruled under circumstances that endanger life or property, they shall notify their employer or client and such other authority as may be appropriate.
 - b. Engineers shall approve only those engineering documents which are in conformity with applicable standards.
 - c. Engineers shall not reveal facts, data or information without the prior consent of the client or employer except as authorized or required by law or this Code.
 - d. Engineers shall not permit the use of their name or associate in business ventures with any person or firm which they believe are engaged in fraudulent or dishonest enterprise.
 - e. Engineers having knowledge of any alleged violation of this Code shall report thereon to appropriate professional bodies and, when relevant, also to public authorities, and cooperate with the proper authorities in furnishing such information or assistance as may be required.
2. Engineers shall perform services only in the areas of their competence.
 - a. Engineers shall undertake assignments only when qualified by education or experience in the specific technical fields involved.
 - b. Engineers shall not affix their signatures to any plans or documents dealing with subject matter in which they lack competence, nor to any plan or document not prepared under their direction and control.
 - c. Engineers may accept assignments and assume responsibility for coordination of an entire project and sign and seal the engineering documents for the entire project, provided that each technical segment is signed and sealed only by the qualified engineers who prepared the segment.
3. Engineers shall issue public statements only in an objective and truthful manner.

- a. Engineers shall be objective and truthful in professional reports, statements or testimony. They shall include all relevant and pertinent information in such reports, statements or testimony, which should bear the date indicating when it was current.
 - b. Engineers may express publicly technical opinions that are founded upon knowledge of the facts and competence in the subject matter.
 - c. Engineers shall issue no statements, criticisms or arguments on technical matters which are inspired or paid for by interested parties, unless they have prefaced their comments by explicitly identifying the interested parties on whose behalf they are speaking, and by revealing the existence of any interest the engineers may have in the matters.
4. Engineers shall act for each employer or client as faithful agents or trustees.
- a. Engineers shall disclose all known or potential conflicts of interest which could influence or appear to influence their judgment or the quality of their services.
 - b. Engineers shall not accept compensation, financial or otherwise, from more than one party for services on the same project, or for services pertaining to the same project, unless the circumstances are fully disclosed and agreed to by all interested parties.
 - c. Engineers shall not solicit or accept financial or other valuable consideration, directly or indirectly, from outside agents in connection with the work for which they are responsible.
 - d. Engineers in public service as members, advisors or employees of a governmental or quasi-governmental body or department shall not participate in decisions with respect to services solicited or provided by them or their organizations in private or public engineering practice.
 - e. Engineers shall not solicit or accept a contract from a governmental body on which a principal or officer of their organization serves as a member.
5. Engineers shall avoid deceptive acts.
- a. Engineers shall not falsify their qualifications or permit misrepresentation of their, or their associates' qualifications. They shall not misrepresent or exaggerate their responsibility in or for the subject matter of prior assignments. Brochures or other presentations incident to the solicitation of employment shall not misrepresent pertinent facts concerning employers, employees, associates, joint ventures or past accomplishments.
 - b. Engineers shall not offer, give, solicit or receive, either directly or indirectly, any contribution to influence the award of a contract by public authority, or which may be reasonably construed by the public as having the effect of intent to influencing the awarding of a contract. They shall not offer any gift, or other valuable consideration in order to secure work. They shall not pay a commission, percentage or brokerage fee in order to secure work, except to a bona fide employee or bona fide established commercial or marketing agencies retained by them.