



Electrical & Computer Engineering Department

School of Engineering & Applied Science

UNDERGRADUATE STUDENT HANDBOOK

**July 1, 2010 - June 30, 2011
(201110)**



TABLE OF CONTENTS

1.	INTRODUCTION	5
1.1	PURPOSE OF THIS GUIDE.....	5
2.	WHERE TO GO FOR HELP: ADVISING	5
2.1	YOUR FACULTY ADVISOR	5
3.	DEPARTMENT MISSION, PROGRAM OBJECTIVES AND EDUCATIONAL OUTCOMES	5
3.1	MISSION	5
3.2	PROGRAM OBJECTIVES: ELECTRICAL AND COMPUTER ENGINEERING	6
3.3	EDUCATIONAL OUTCOMES: ELECTRICAL ENGINEERING AND COMPUTER ENGINEERING	6
4.	THE BIG PICTURE: WHERE WE FIT INTO MIAMI UNIVERSITY	6
5.	MAJORS	7
5.1	ELECTRICAL ENGINEERING	7
5.2	COMPUTER ENGINEERING	8
6.	COMPARISON OF ELECTRICAL AND COMPUTER ENGINEERING MAJORS	9
7.	DEGREE AUDIT REPORT SYSTEM (DARS)	9
8.	REQUIREMENTS	9
8.1	BASIC REQUIREMENTS FOR A BACHELOR OF SCIENCE IN EE OR CPE.....	9
8.2	WHICH YEAR’S DEGREE REQUIREMENTS ARE TO BE MET?.....	9
9.	COURSES	9
9.1	ADDING A COURSE.....	9
9.2	DROPPING A COURSE.....	10
9.3	CHANGE OF SCHEDULE/FORCE ADD PROCEDURES FOR CLOSED/FULL COURSES	10
9.4	REPEATING A COURSE	10
10.	COURSE OFFERING SCHEDULE	11
11.	CREDIT HOURS	11
11.1	CREDIT/NO-CREDIT	11
11.2	CREDIT HOUR LIMITS.....	11
11.3	TRANSFER CREDIT	12
12.	PREREQUISITES	12
13.	STUDENT PETITIONS	12
14.	GRADUATE LEVEL PERMISSION FOR SENIORS	13
15.	GUIDELINES FOR INDEPENDENT STUDY	13
16.	RESOURCES	13
16.1	ENGINEERING SUPPORT ORGANIZATIONS	13
16.2	SCHOOL OF ENGINEERING AND APPLIED SCIENCE SERVERS	13
16.3	MIAMI UNIVERSITY IT SERVICES SERVERS.....	13
17.	OPPORTUNITIES FOR STUDENTS	14
17.1	ECE UNDERGRADUATE STUDENT ADVISORY COUNCIL, DR. DONALD UCCI, ADVISOR.....	14
17.2	PROFESSIONAL AND HONOR SOCIETIES:.....	14
18.	FACULTY	15

- Appendix A:** Requirements and Four-year Plan for the Major in Electrical Engineering
- Appendix B:** Requirements and Four-year Plan for the Major in Computer Engineering
- Appendix C:** EE Course Flow and Prerequisites Diagram
- Appendix D:** CpE Course Flow and Prerequisites Diagram
- Appendix E:** Student Petition Form

1. Introduction

1.1 *Purpose of this Guide*

Welcome to the Electrical and Computer Engineering Department at Miami University. We are glad that you are here! This guide is designed to help you at Miami University plan and successfully complete a program of study leading to a bachelor's degree with a major in either electrical engineering or computer engineering.

2. Where to go for Help: Advising

Our faculty are here to help you succeed in your studies. Each ECE major is assigned a departmental advisor and you are encouraged to see them **at least once a semester** to make sure you stay on track. However, you can consult with any faculty member or the chair of the department regarding questions or concerns you may have about your major

2.1 *Your Faculty Advisor*

Your faculty advisor is a member of the department who is assigned especially to help you to plan your course of study. You are encouraged to visit with your advisor each semester prior to registering for classes. Please fill in the following information for future reference.

Advisor name: _____

Advisor email address: _____

Advisor phone number and office number _____

Professor **Donald R. Ucci** is Chair of the Electrical and Computer Engineering Department. His contact information is:

Email address: uccidr@muohio.edu
Phone number: 529-0423
Office number: 260F Engineering Building

3. Department Mission, Program Objectives and Educational Outcomes

3.1 *Mission*

The mission of the department is dedicated to providing a well-rounded undergraduate education in electrical and computer engineering. The program prepares students for a wide range of careers. Our graduates exhibit a high level of professionalism and ethical behavior, and exercise socially responsible and reasoned judgment.

The faculty foster an academic environment conducive for strong faculty-student interaction in classroom and laboratory. They will also encourage student participation in research projects. The faculty conduct innovative applied and basic research that is appropriate for dissemination in nationally recognized journals and conference proceedings.

3.2 Program Objectives: Electrical and Computer Engineering

The educational objectives of the electrical and computer engineering programs are that our graduates:

1. Have a successful career based on an electrical and/or computer engineering education.
2. Understand the fundamentals of mathematics, physical science, and engineering science and are able to apply this knowledge to the solution of engineering problems.
3. Can function effectively in a multidisciplinary team environment.
4. Are skillful in oral and written communication.
5. Continue to develop professionally through a life-long learning process.
6. Exhibit a high standard of ethical conduct and citizenship.
7. Have a global outlook about world events.

3.3 Educational Outcomes: Electrical Engineering and Computer Engineering

To achieve these educational objectives, we expect our graduates to attain the following outcomes upon their graduation:

1. An ability to apply knowledge of mathematics, science, and engineering.
2. An ability to design and conduct experiments, as well as to analyze and interpret data.
3. An ability to design a system, component, or process to meet desired needs.
4. An ability to function on multi-disciplinary environments.
5. An ability to identify, formulate, and solve engineering problems.
6. An understanding of professional and ethical responsibility.
7. An ability to communicate effectively.
8. A broad education necessary to understand the impact of engineering solutions in a global societal context.
9. A recognition of the need for, and an ability to engage in life-long learning.
10. A knowledge of contemporary issues.
11. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

4. The Big Picture: Where We Fit into Miami University

Miami University is organized into four main units:

- Business Affairs – collects fees and pays bills
- Advancement – fundraising
- Student Affairs – runs student programs, such as residence hall advisors
- Academic Affairs – provides majors, minors, and courses
-

Miami also has four campuses:

- Oxford – the most students and classes are on this “main” campus
- Hamilton – this is a “regional” campus in Hamilton, Ohio
- Middletown – this is a “regional” campus in Middletown, Ohio
- Luxembourg – this is a small “study abroad” campus

Academic Affairs administers majors and minors course offerings. Academic Affairs is organized into “Colleges” and “Schools”:

- College of Arts and Science
- School of Business Administration
- School of Education and Allied Professions
- School of Fine Arts
- School of Interdisciplinary Studies (Western College Program)
- School of Engineering and Applied Science

Each college or school is organized into departments. We are one of four departments in the School of Engineering and Applied Science on the Oxford campus:

- Mechanical and Manufacturing Engineering (MME)
- Paper and Chemical Engineering (PCE)
- Computer Science and Software Engineering (CSE)
- Electrical and Computer Engineering (ECE)

Our department (ECE) fits under Academic Affairs on the Oxford campus.

The ECE department offers majors and minors that we call “programs of study.” Our department is made up of:

- Students, like you, who are majoring or minoring in one of our programs.
- Faculty who teach courses.
- Support staff (full time employees and part-time students) who work in our office or as student aides, supplemental instructors, and other capacities.

The department is responsible for all programs and courses offered. Our department has committees that carry out these functions. Students are also involved as they serve on advisory councils.

5. Majors

The cell phone, computer, high definition television, Internet as well as other developments that make up the “high tech” world come largely from the efforts and creativity of electrical and computer engineers. These, and other high technology devices and systems, are now a major part of the economy. As we move into the “knowledge age”, society will depend even more on the development and production of electrical and computer engineers.

5.1 Electrical Engineering

Electrical engineering covers many fields related to production and of electricity and electrical signals. The field is extremely broad and encompasses a wide range of areas such as:

1. Automatic Control
2. Biomedical Imaging and Sensing
3. Circuits and Systems
4. Communication Systems
5. Energy Sources
6. Electromagnetic Fields and Optics
7. Microelectronics
8. Nanotechnology

9. Networking
10. Signal Processing

Progress in electrical engineering has lead society from the electrical age through the radio communication era to the present global Internet century.

5.2 Computer Engineering

Computer engineering focuses on the development and enhancement of computer systems and services; the field focuses on a variety of areas such as:

1. Algorithms
2. Architecture
3. Digital
4. Electronics
5. Embedded Systems
6. Microprocessor
7. Networking
8. VLSI Design

Progress in computer design and architecture produced machines that filled rooms to those that fit in the palm of a human hand.

6. Comparison of Electrical and Computer Engineering Majors

Common Course Requirements

The General Education, Mathematics and Science, and General Engineering requirements are the same.

Common Engineering Core Requirements

ECE 205 Electric Circuit Analysis I (3)
ECE 287 Digital Systems Design (4)
ECE 304 Electronics (3)
ECE 305 Electric Circuit Analysis II (3)
ECE 306 Signals and Systems (3)
ECE 345 Random Signal Processing (3)
ECE 387 Embedded Systems Design (4)
ECE 425 Digital Signal Processing (3)

Double Majors

EE and CpE double majors must have a total of 18 technical elective credit hours and they cannot use a required course in one major as an elective for the other major.

If the double major is with MME then they only have to take 448 and 449 once.
If the double major is with another major then both department/senior project courses are required.

Course Requirements That Are Different

Electrical Engineering (EE) Required ECE Courses

ECE 325 Applied Electromagnetics (3)
ECE/MME 436 Control of Dynamic Systems (3)
ECE 453 Communication Systems (3) or
ECE 461 Network Performance Analysis (3)

Professional EE Elective Choices

Requires 9 credit hours of professional EE electives.

ECE 414 Intro to VLSI Circuit (3)
ECE 426 Biomedical Signal analysis (3)
ECE 427 Radar Signal Processing (3)
ECE 428 Real-Time digital Signal Processing (3)
ECE 429 Digital Image Processing (3)
ECE 430 Electromagnetics in Wireless Sensing
and Communications (3)
ECE 453 Communication Systems (3)
ECE 461 Network Modeling and Performance (3)
ECE 491 Power Systems Engineering (3)

Computer Engineering (CpE) Required ECE Course

ECE 278 Computer Architecture (3)
ECE 461 Network Performance Analysis (3)

Professional CpE Elective Choices

Requires 9 credit hours of professional CpE electives.

ECE 325 Applied Electromagnetics (3)
ECE 414 Intro to VLSI Circuit (3)
ECE 426 Biomedical Signal analysis (3)
ECE 427 Radar Signal Processing (3)
ECE 428 Real-Time digital Signal Processing (3)
ECE 429 Digital Image Processing (3)
ECE 430 Electromagnetics in Wireless Sensing
and Communications (3)
ECE/MME 436 Control of Dynamics Systems (3)
ECE 453 Communication Systems (3)
ECE 491 Power Systems Engineering (3)

7. Degree Audit Report System (DARs)

To help you to keep track of your progress toward your major and possibly your minor, Miami provides an automated system called the Degree Audit Report (DARs). You can obtain your DARs report from the web. Go to <http://mymiami.muohio.edu>.

8. Requirements

When you look at the requirements for a major or minor you will see that courses are categorized as *required* or *electives*. A *required course* is one that you must take unless your advisor and the ECE Undergraduate Curriculum Committee have approved an exception. An *elective course* is one that gives you choice: you may take that course but you may also take one or more alternatives in place of the elective.

8.1 *Basic Requirements for a Bachelor of Science in EE or CpE*

You must attain a minimum 2.0 g.p.a. for required departmental courses in your major. A required departmental course is a course with the department prefix ECE (electrical and computer engineering). The basic requirements for graduation:

- Fulfillment of the Miami Plan
- At least 32 of the total 128 semester credit hours must be from Miami University (any campus), including 12 of the final 20 hours required for the bachelor's degree.
- Apply for graduation through the Office of the Registrar, 102 Campus Avenue at least a semester in advance whether or not you plan to attend the ceremony.



All required electrical and computer engineering courses and prerequisite mathematics and statistics courses must be taken for a grade.



8.2 *Which Year's Degree Requirements are to be Met?*

You will ordinarily be graduated under the university and divisional requirements in effect at the time of your entrance into Miami University; however, you always have the option of completing, in its entirety, a more current program. Exceptions may occur when changing professional or accreditation standards necessitate new requirements. If your course of study is prolonged beyond ten (10) years, curricula changes adopted after your entrance date may be required by the university, division, or department.

If you have earned credits more than ten years before your planned graduation date you must petition the divisional Committee of Advisors to validate these credits. Please use the green student petition form available from the administrative assistant for this. The DARS reflects the requirements in effect at the time of your admission into the university. If the department no longer offer those courses, then you must substitute the new courses for the old. Please see you department advisor to process a divisional comment degree progress form.

9. Courses

9.1 *Adding a Course*

You can add open courses to your schedule online through MyMiami during the Change of Schedule period.

After the Change of Schedule period, (fifth day of each semester), you can only add a course if an exception is made for you. Please see the section below on “Change of Schedule/Force Add Procedures for Closed/Full Courses.

9.2 Dropping a Course

You must officially drop each unwanted course. Nonattendance does not avoid a grade of W. You can drop a course online through MyMiami during the Change of Schedule. A student may drop a course within three calendar weeks of the date classes begin, in which case no grade or other designation will appear on your official record.

You may **withdraw** from a full-semester course through the **9th week** of the semester. After the end of the 9th week, you may not withdraw from a course unless a petition is approved by the Inter-Divisional Committee of Advisors. Forgetting to drop a course or not doing well in the course are not sufficient reasons to petition. A successful withdrawal will be indicated by a grade of “W” on your official record; a “W” is not calculated in your grade point average.

9.3 Change of Schedule/Force Add Procedures for Closed/Full Courses

1. After registration has closed or if the course is closed, you must submit a request directly to the administrative assistant (Michele) at leamb@muohio.edu. to be placed on a waiting list. Do not submit your request to the instructor. You must provide the following information:
 - a. A current copy of your class schedule.
 - b. The course and section into which you want to be added along with a second choice.
 - c. Email address or telephone number where you can be contacted.
2. Your request will be based on your class rank, requirement for your major, and the time of your request. Please keep in mind that the department will do its best to get you into the class you requested. However, if the class is full you will have to wait until the class starts and check with the instructor at that time and see if any student has dropped the class.
3. Both you and the instructor will be notified on whether or not you were added to the class.
4. The administrative assistant will process the change of schedule request by contacting the Office of the Registrar. The instructor and you do not have to do anything. Your name will appear on the instructor’s class list. If it doesn’t, please contact the administrative assistant.
5. Once classes start then it will be up to you to contact the instructor to see if you can be added to the class. If so, you will need to fill out a Change of Schedule form, obtain all appropriate signatures, and then you must submit the form to the Office of the Registrar.

9.4 Repeating a Course

You can repeat any course for which you have not received credit. You can also repeat a course once for which you have received credit (**the hours will count only once toward**

your graduation requirements, but both grades will be figured into your grade point average.)

10. Course Offering Schedule

The following is a tentative schedule for required ECE course offerings. It is subject to change due to student demand and other factors.

Offered Both Fall and Spring Semesters:

ECE 205	Electric Circuit analysis I (3)
ECE/CSA 278	Computer Architecture (3)
ECE/MME 303	Computer-Aided Experimentation (3)
ECE 306	Signals and Systems (3)
ECE/MME 436	Control of Dynamic Systems (3)
ECE 448	Senior Design Project I (2)
ECE 449	Senior Design Project II (2)

Offered Fall Semester Only:

ECE 287	Digital Systems Design (4)
ECE 304	Electronics (3)
ECE 325	Applied Electromagnetics (3)
ECE/MME 436	Control of Dynamic Systems (3)
ECE 453	Communication Systems (3)

Offered Spring Semester Only:

ECE 305	Electric Circuit Analysis II (3)
ECE 345	Random signal Processing (3)
ECE 387	Embedded Systems Design (3)
ECE 425	Digital Signal Processing (3)
ECE 461	Network Modeling & Perf. Analysis (3)

11. Credit Hours

11.1 Credit/No-credit

If you take an undergraduate course on a credit/no-credit basis, you receive credit for a grade of C or better; if your grade is C- or less, no credit is awarded. **Any ECE course or any course that is a prerequisite for an ECE course (e.g. MTH 245, STA 368, CSA 174, 271, and MME 211) must be taken for a letter grade ONLY.**

11.2 Credit Hour Limits

The maximum credit-hour limit for undergraduate students is 20 credit hours during a semester, eight credit hours during a five or six week summer term, 12 credit hours during overlapping summer terms, or 1.5 credit hours per week and proportionately less for periods less than a week.

Students with a need to exceed the maximum credit-hour limits must obtain permission (by submitting a student petition) from the dean of their division which is the School of Engineering & Applied Science, 1st Floor Benton Hall.

11.3 Transfer Credit

Students transferring into Miami from another university are not normally given credit by the Admission Office for any electrical and computer engineering course. The ECE Department, normally through the department chair, upon recommendation of the ECE Undergraduate Curriculum Committee, (UCC) gives credit for a course from another accredited college or university if the course is equivalent to one of the existing ECE courses.

To verify if a course has been approved you can go to www.transfer.org or go to CAS (Course Applicability System) at <http://units.muohio.edu/reg/transferecredits/Index.php>

If a course has not been approved and you wish it to be evaluated by the department you will need to submit a Student Petition and Transfer Credit Form (*obtain form from department office*) to the ECE UCC (Undergraduate Curriculum Committee) for approval. You will need to provide a course syllabus, detailed course description, and textbook used with these two documents. If the course is a math, science, or other department course, the request should be submitted to the appropriate department. If it is a Miami Plan course, contact the Registrar's office at 529-8703.

If a course from another accredited college or university is not equivalent to a Miami ECE course but is deemed by the advisor and department chair to be a suitable ECE elective, then the course can be used toward meeting the requirements for ECE electives.

Students transferring into Miami who do not receive credit for a course as outlined above but who have completed courses or gained knowledge in the subject area, may receive credit for the course by passing a comprehensive proficiency exam administered by the ECE department.

12. Prerequisites

In many cases you may be required to complete "course A" before you can take "course B." In this example course A is called a *prerequisite course* for course B. For example, you must complete CSA 174 before taking ECE 278; you must complete PHY 182 before taking ECE 205. Course prerequisites are listed in the catalog description for every course. The prerequisite flow charts for the electrical and computer engineering courses are also illustrated in Appendix C and D. It is very important to follow the prerequisite requirements because, in many cases, our courses (like math courses) build upon one another.

13. Student Petitions

All Miami students have the right to petition any academic regulation or action, however, it should be understood that, generally, petitions are approved only if verifiable, extenuating circumstances exist.

All petitions except those concerning university requirements or individual departmental requirements should be submitted to the Assistant Dean's Office, 106 Benton Hall. For departmental requirements, go to the ECE office to pick up a Student Petition Form (Appendix E) to complete and submit to the UCC (Undergraduate Curriculum Committee).

14. Graduate Level Permission for Seniors

Seniors may apply for permission to take 500- and 600-level courses, normally open only to graduate students, for graduate credit or undergraduate credit. These conditions must be met: you must have at least 112 semester hours toward a bachelor's degree, and you must have a cumulative grade point average of 2.75 and an average of 3.0 in the field in which you are taking the graduate course. Up to 10 semester hours of this work may count toward a graduate degree.

The student's academic advisor, the Graduate School, and the instructor for the course must grant approval. Application forms are available in the Graduate School, 102 Roudebush Hall. Applications should be submitted to the Graduate School at least one week before classes begin.

15. Guidelines for Independent Study

1. Independent study (ECE 177, 277, 377, 477) is not offered to replace any existing Miami courses. Exceptions to this are made rarely in extreme hardship cases.
2. Independent Study forms are now online at www.muohio.edu/registrar under the link for FORMS.
3. Independent study is only offered on a credit-no credit basis.

16. Resources

16.1 Engineering Support Organizations

There are two primary organizations that support student computing:

Miami University Information Technology (IT) Services - The Miami IT Services provides campus-wide services like the telephone system and the MUNet campus network. Miami IT provides a help desk that you can use if you are having computer problems, such as problems connecting to the Internet contact IT Services Support Desk: 529-7900.

School of Engineering and Applied Science Information Technology (SEAS-IT) - Maintains the all laboratories and classrooms in the new engineering building. 529-0790

- 16 Benton Hall – An open computer laboratory for any student taking SEAS courses. You are welcome to use this laboratory when it is open anytime that you need access to a computer in Benton Hall. Support staff is available for help with using the computers in that room or in one of the computer classrooms.

16.2 School of Engineering and Applied Science Servers

SEAS-IT also maintains a number of servers, including Windows and Linux servers that are used to support teaching and research.

16.3 Miami University IT Services Servers

Miami IT services provide a Unix system, named Unixgen, with accounts for all students -- the login id is based on the university standard that is up to six characters from the last (surname) and the first initial of the first and middle names. Conflicts are resolved by appending an integer. The password is MMDDSSSS where MM is your birth month, DD is

your birth year and SSSS is the last 4 digits of your student i.d. number. Students can verify their login id by using the on-line phone directory: www.muohio.edu/ph.

17. Opportunities for Students

17.1 ECE Undergraduate Student Advisory Council, Dr. Donald Ucci, Advisor

This council consists of students whose purpose is to advise and assist the department with the aim of improving the programs and climate for students. The council periodically meets with the department chair during the school year. The council has student officers who work with the chair to organize and carry out meetings and activities. This council has been responsible for significant improvements, including creation of Miami's Living/Learning Community Technology and Society. If you are interested in learning more about this council, please contact the department chair. (Note: there is an equivalent advisory council at the second level; contact the assistant dean for information regarding this council!)

- ECE Advisory Council – Dr. Donald Ucci, 260F Engineering Building.

17.2 Professional and Honor Societies:

- IEEE Student Chapter – Dr. Chi-Hao Cheng, Advisor, 260L Engineering Building
- Tau Beta Pi Student Chapter – Dr. Jeff Herdtner, Advisor, 260M Engineering Building
- Society of Women Engineers (SWE) – Dr. Yu Morton, Advisor, 260P Engineering Building

18. Faculty

CHIOU S.
CHEN

- Ph. D. in Electrical Engineering 1968
University of Rochester
- Signal processing, instrumentation, and control

CHI-HAO
CHENG

- Ph.D. in Electrical Engineering 1998
University of Texas at Austin
- Wireless/optical communications, time-series analysis, digital signal processing, optical device design, and bioinformatics.

DMITRIY
GARMATYUK

- Ph.D. in Electrical Engineering 2001
University of Nebraska-Lincoln
- Analog and digital CMOS integrated circuit design, signal integrity in high-speed systems and wireline/wireless channel modeling, ultra-wide band radar and communication system design and modeling, imaging radar and multi-dimensional signal processing techniques.

JEFFREY D.
HERDTNER

- Ph.D. in Electrical Engineering 2004
Purdue University
- Cellular and ad hoc networks.

PETER
JAMIESON

- Ph. D. in Computer Engineering 2007
University of Toronto
- Programmable Gate Array (FPGA) Architecture and Computer-aided Design (CAD) tools that map digital designs to FPGAs. Serious Games with a focus on harnessing human computation through the medium of leisure video games.

YU (JADE)
MORTON

- Ph.D. in Electrical Engineering 1991
Pennsylvania State University
- Software radio, global positioning system receiver, digital signal processing, and ionosphere modeling.

GOKHAN
SAHIN

- Ph.D. in Electrical Engineering 2001
University of Washington
- Wireless and optical communications.

DONALD
UCCI

- Ph.D. in Electrical Engineering 1979
City University of New York
- Communications theory and systems, digital communications, analog and digital systems, digital signal processing, adaptive arrays, signal processing, phase locked loops, mobile radio, wireless communications, and ultra-wideband communications.

QIHOU
ZHOU

- Ph.D. in Electrical Engineering 1991
Pennsylvania State University
- Radar remote sensing, digital signal processing, and space science.