2017 Fall SECEDHA Meeting Notes

November 2-3 2017

Friday, November 3

1. Meeting Opens
2. Brief discussion from ECEDHA regarding new membership model and the goal of keeping membership >85% as the new dues process is rolled out.
3. Panel Session on Freshman Year Experience: → slides will be posted to SECEDHA or ECEDHA website
    a. Roger Dougal – University of South Carolina
    b. Mike Johnson – University of Kentucky
    c. Leon Tolbert – University of Tennessee
    d. Key issues
        i. Jealousy among departments about students being "recruited away." So far no obvious evidence that this is happening at Kentucky.
        ii. A question was passed along, "Are we just delaying when students "hit the wall" to the sophomore year?
        iii. Focus on student success should be the driving factor.
        iv. Transfer students – Kentucky has a special course for them.
4. Ashlee Garder, Georgia Tech Communications, presentation on ECE Branding effort
    a. 5 concepts presented
    b. John J. (ECEDHA) – the goal is to provide turn-key solutions to departments
    c. Considerable discussion on pros and cons of chosen themes
    d. Little or no emphasis on robotics, renewable energy, biomedical
    e. Expect to have the tool kit available in fall 2018, some in spring 2018
5. Tim Haskew, Leadership
    a. Inbox exercises
    b. Positive response to proposal to do these on a regular basis at SECEDHA
6. Positive response to the schedule change, i.e. starting after noon on Thursday and continuing to mid-afternoon on Friday.
7. Discussion on rotating the meeting location:
    a. Important that we schedule time for legitimate campus/college/department tours if we make the effort to change to a rotating schedule. A recommendation was made to schedule tours on Friday afternoon in case people want/need to leave early.
    b. Some concern among members that travel will take longer
    c. Proposed as an experiment for 2018 or 2019, not a permanent change.
    d. Some concern that Ga Tech has been a "tradition" and we should tread lightly before changing the process
    e. Potential need to avoid conflicts with football schedules
    f. **Straw Poll** – 4 attendees voted to stay in Atlanta; others (~20) would like to consider the idea of rotating

      g. Plan: a few different location and agenda options for fall 2018 will be put together for consideration at the spring 2018 ECEDHA meeting
8. Luke Lester and Hulya Kirkici were nominated for the SECEDHA Secretary position. Luke won the election in a close race (1 vote difference).
9. Other discussion topics:
   a. Some concern was expressed about lack of notification on the website; John Harris clarified that SECEDHA has been in limbo waiting for movement from ECEDHA on regional website management, and because the person at UF who maintained the website recently retired
   b. A request was made to improve communications among the members, especially with the new chairs; ECEDHA is looking into how they can better communicate and help coordinate regional meetings; they will put out best practices; way to share agendas across different regions, etc.
10. Business meeting:
    a. ABET visits
       i. Recent visits: Tennessee, South Carolina, Clemson, NC State Mississippi State, Seattle University, South Alabama
       ii. Notable issues during the visits:
          1. Document PEO discussions with IAB
          2. Websites – keep them simple, ABET accredited with a link, period
          3. Faculty should be involved with the advising process.
          4. Lab safety was noted by multiple programs.
          5. History of PEOs – don't make them too short
          6. Instructional lab tours can impress evaluators
          7. PEVs were big on standards, and how they are covered in the capstone design
          8. PEVs want to see evidence that the probability and statistics courses are relevant to EE
          9. Keep minutes of meetings in a binder (ABET, IAB, Dept, etc.)
          10. Challenge of separating EE and CE students in the courses
    b. During the survey several discussion points about updating and in some cases clarifying the questions.

Freshman Design component in ELCT 101

Roger Dougal

Carolina Distinguished Professor

Chair, Electrical Engineering

College of Engineering and Computing

Context: Freshman Engineering Year

	1st Semester	2nd Semester
or EMCH 101 BMEN 101 ECHE 101 ECIV 101 →	**ELCT 101**	ELCT 102 ← or EMCH 111 BMEN 211 ECHE 300 ECIV 200
	CHEM 111	CSCE 145
	ENGL 101	ENGL 102
	MATH 141	MATH 142
	Carolina Core - AIU	PHYS 211 & L

- **Engineering and Computing** Living & Learning **Community**
  - Bates West dorm, near the college
  - Exclusively for engineering freshmen
  - "ECC Fellow" title can be earned by students who complete requirements in six categories:
    Professional, Service, Academic, Cultural, Wellness, Social
- Dedicated staff advisors for E&C freshmen


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ELCT 101: Intro to EE

- Recommended but not required first-semester class for EE majors. Note: EE is separate from Computer Engineering, different dept.

- One section, one instructor (with TA), regular faculty, 60 students, 3 credit hours.

- Mostly non-technical overview of EE as a profession, how to be a student, guest speakers, etc. Not explicitly a "design" class, but….

- In Fall 2013 introduced Freshman Innovation Challenge

  - In small teams, compete to build the best EE display for *EdVenture*, Columbia's children's museum
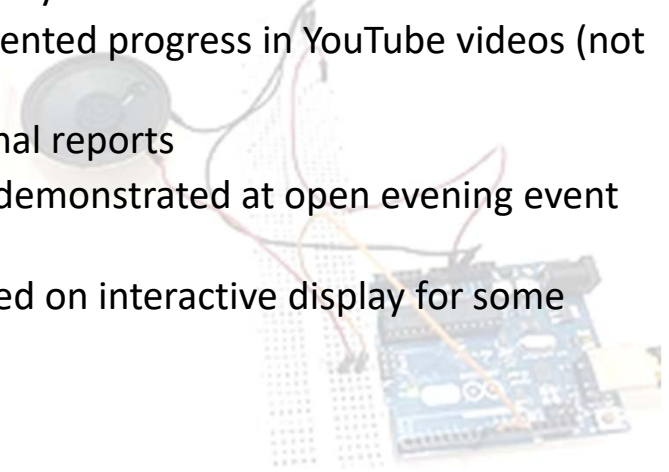
  - Target audience: kids aged 4-12 years

Features of Freshman Innovation Challenge
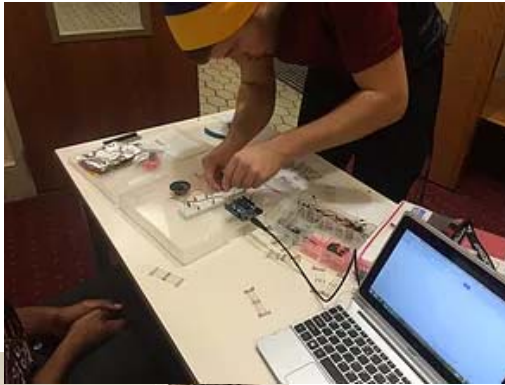
- Immediate opportunity for students to "contribute to society"
- Some, but minimal tech guidance provided by instructor
  - Arduino programming,
  - Transistors as power switches and logic gates,
  - Pulse width modulation for light (LED) and speed (motor) control,
  - Resistors, LEDs, touch sensors, solar cells
- Digilent Analog Discovery kit is now "standard issue" .
- Student teams documented progress in YouTube videos (not notebooks)
- Students submitted final reports
- All ~20 projects were demonstrated at open evening event held at EdVenture
- Top 3 projects remained on interactive display for some period

ELCT 101 Learning Outcomes

- Develop a plan for successful and timely completion of the rigorous EE curriculum by completing a program of study and by recalling and identifying important campus resources (such as for summer internships, for writing help, for tutoring, etc.)

- Describe the design cycle for a simple product, including aesthetics.

- Communicate technical issues in an easily understandable way via written, oral and electronic means, including creation of effective bullet points in presentations, and creation of graphs with appropriate axes and labeling.

- Explain how basic EE concepts such as voltage and current or circuits and systems, apply in the larger contexts of problem solutions and i.e. sustainable energy, electric car, wireless communication, etc.

- Show interest in their professional development by membership in IEEE, participation in at least two IEEE meetings, and active engagement in class modules.

- Explain in their final presentation how Electrical Engineers help society.

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# Observed Outcomes from the Design Project

Students did ….

- learn some aspects of EE that motivate further study, including elementary programming, circuits, product design.

- develop team work and presentation skills.

- develop (at least partly successful) educational projects for children, and an appreciation for how EEs can positively influence society.

- request that the class include more multidisciplinary content.
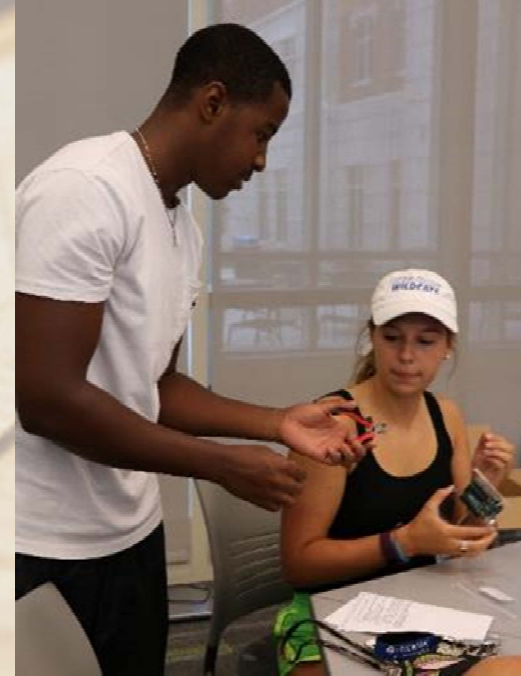
FIRST-YEAR ENGINEERING PROGRAM

Janet Lumpp

Director

FYE Vision

Cross-disciplinary first-year program

- ➢ Critical thinking, problem solving, core technical skills
- ➢ Professional and career development in first year
- ➢ Introduce disciplines through "Grand Challenges" theme

➢ College-supported, Director + 6 FT FYE instructors

➢ 3 Courses, 5 credits: EGR101 Intro to Eng (1 credit), EGR102 Computing (2 credits), EGR103 Project (2 credits) Uses Dormitory Classroom space (Living Learning program)

➢ Coordinated retention efforts with MA, CHE, PHY

EGR 101 Engineering Exploration I

1 credit

75 min/week

- Discipline-specific perspectives
  - Approach shared problems
  - Similarities and differences
- Informed choice of major
  - FYEIS – choose four
  - Reflections
- Skills transferable to any major
  - Drawing, communications, spreadsheets
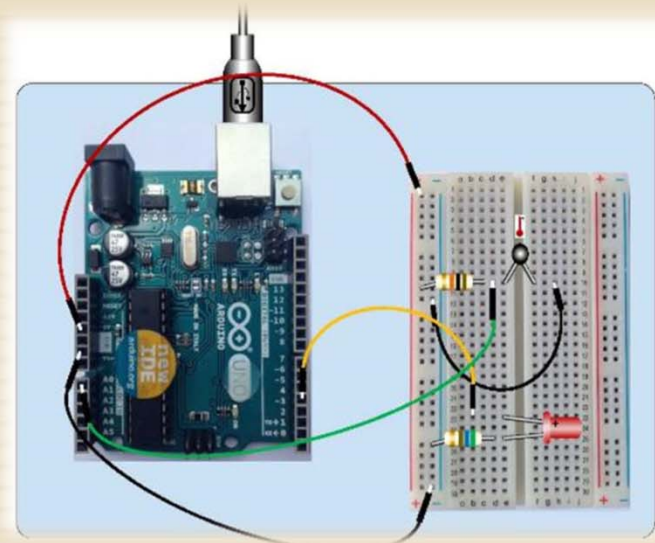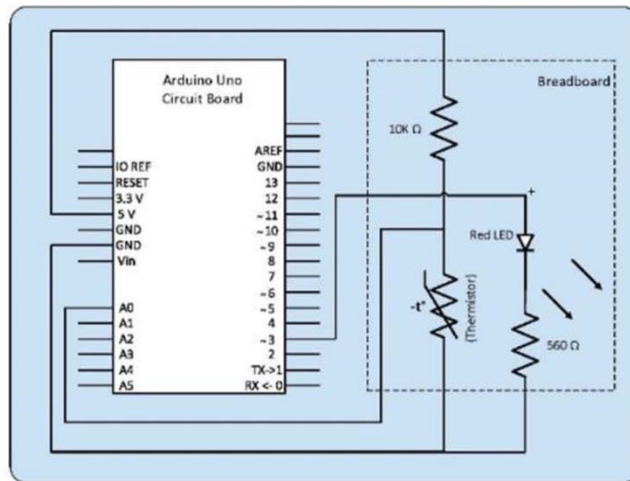 - Ethics, time management, study skills
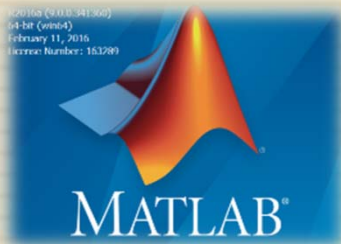
NAE GRAND CHALLENGES FOR ENGINEERING

EGR 102 Fund. of Engr. Computing

2 credits

2.5 hr/week

➢ MATLAB programming

   ➢ Variables, loops, strings, functions

➢ Arduino programming

   ➢ Circuits aligned with Grand Challenges

Course Materials

- Students Buy
  - eBook access codes
  - Laptop
- UK and College Provide
  - MATLAB campus-wide student license
  - Arduino IDE
  - Microsoft Office
  - Canvas – online content, assignments, eBooks, etc
  - Computer based testing
  - Arduino and parts kit – to be returned

EGR 103 Engineering Exploration II

2 credits

50 min/week
75 min/week

- Design process
- Teamwork
- Project
  - Build on transferable and technical skills
  - Scope and scale appropriate
    - 150+ teams
    - Woodland Glen III classroom facilities
- Development committee
  - FYE Faculty
  - Department Faculty

EGR 112 Engr. Expl. for Transfer Students

1 credit

75 min/week

➢ Already selected major

➢ Mixed with upper level students

➢ Content parallels EGR 101

➢ Skills applicable to any major

➢ Going forward

  ➢ Needs assessment needed

  ➢ Revise content in response

NAE GRAND CHALLENGES FOR ENGINEERING

WG3 Classroom Capacity

- Large Classroom (72)
  - 15 Sections = over 1000 students
- Small Classroom (36)
  - 26 Sections = 900+ students

- EGR 112
  - 4 sections
  - Transfers and upper level

Already

at capacity!

FYE Advisory Board

- Representatives
  - Each degree program
  - Students
  - College – Advisors, Assoc. Dean, Student Success
  - Industry
- Role
  - Assess program success – curriculum, students, faculty
  - Plan for growth – facilities, faculty, staff, sponsors
  - Advocate for FYE

First-Year Engineering Program

The smartest, most talented engineers around the world are devoting themselves to tackling immense global challenges. As a First-Year Engineering (FYE) student, you get to join them!

In 2008, the National Academy of Engineering identified 14 "Grand Challenges for Engineering in the 21st Century"—opportunities to greatly increase humanity's sustainability, health, security and joy of living. Themes include making solar energy economical, enhancing virtual reality, reverse-engineering the brain, securing cyberspace, providing access to clean water and more.

These ambitious goals demand engineers roll up their sleeves and get to work, which is why we put them front and center during your first year as an engineering student. We have designed the FYE program to inspire you. We want you to discover your passion. We want you to explore where you might make your unique contribution. We want you to get your hands dirty and make stuff that might, one day, lead to a breakthrough.

Why wait until you're taking upper-level classes to figure out what interests you? Through real engineering classes taught by top faculty and exposure to engineering's greatest challenges, the FYE program gets you into the game from day one.

What benefits can you expect from being an FYE student?

- You get to take engineering classes from day one. Previously, students spent their first year taking calculus, physics, chemistry, etc., and didn't get into engineering classes until their sophomore year.
- Studies have demonstrated that students in FYE programs perform better in their upper-level classes and are more likely to graduate with an engineering or computer science degree.
- We give you hands-on engineering challenges. In fact, you will complete a design project by the end of your first year as an engineering student.
- FYE courses are taught by real engineering faculty, not graduate students. What's more, you get more attention and interaction with faculty due to smaller class sizes.
- You get to learn about each major in the college. Sure, you might want to be a civil engineer because a family member was a civil engineer, but you may discover another field of engineering that opens up a whole new world. Plus, learning about other disciplines will better enable you to collaborate with students in other majors.
- If you transfer from another institution, the FYE program gives you a community of your own within the college. That will help you adjust to life at UK in a hurry!

FYE Course Descriptions

EGR 101: Engineering Exploration I (1 credit)

☐ Engineering Exploration I introduces students to the creativity inherent in how engineers and computer scientists approach innovation, design and problem solving from blue sky brainstorming to implementing a solution. Students will work in teams, practice with tools of the trade (modeling, analysis and visualization), provide peer reviews and discuss ethical implications of creative endeavors. This class is also a process of personal discovery where students explore a variety of traditional and non-traditional study and learning methods, reflect on the results of using different methods and determine what work best for their individual learning styles and personality type. The final individual artifact is a Create Your Future project describing the student's exploration of their own talents and aptitudes, discovery process for identifying a specific discipline and a visual presentation of their career goals.

EGR 102: Fundamentals of Engineering Computing (2 credits)

☐ Fundamentals of Engineering Computing introduces students to the practice and principles of computer programming and computational problem solving. Students will engage in hands-on project-based problem solving using modern computer software and hardware, with a particular emphasis on problems and techniques commonly appearing in various domains of engineering.

EGR 103: Engineering Exploration II (2 credits)

☐ Engineering Exploration II focuses on a semester long creative engineering design project with students working in teams to apply the skills and tools introduced in EGR 101 (or EGR 112) and EGR 102. Topics and assignments include more in depth engagement with engineering tools for modeling, analysis, visualization, programming, hardware interfacing, team development, documentation and communication. Students gain experience in project management, identifying constraints, accepting and providing critical analysis, iterating to refine their work, and technical report writing.

EGR 112: Engineering Exploration for Transfer Students (2 credits)

☐ Engineering Exploration for Transfer Students welcomes transfer students to the College of Engineering and introduces them to the creativity inherent in how engineers and computer scientists approach innovation, design and problem solving from blue sky brainstorming to implementing a solution. Students will work in teams, practice with tools of the trade (modeling, analysis and visualization), provide peer reviews and discuss ethical implications of creative endeavors. This class is also a process of personal discovery where students explore a variety of traditional and non-traditional study and learning methods, reflect on the results of using different methods and determine what work best for their individual learning styles and personality type. The final individual artifact is a Create Your Future project describing the student's exploration of their own talents and aptitudes, discovery process for identifying a specific discipline and a visual presentation of their career goals.

FYE FAQ

When do I declare a major?

☐ When you apply, you can select a pre-major or remain undeclared during the first year while you explore your options. Undeclared engineering students will declare their majors in the spring semester when they register for their sophomore year courses.

What classes will I take in addition to the FYE classes during my first year?

☐ The curriculum sheets for all majors show the same UK core courses like CIS/WRD, CHE 105, PHY 231 and calculus. Some majors will also require chemistry lab CHE 111, physics lab PHY 241 or CS 215 which you can take during your first year.

Do other engineering schools have First-Year Engineering programs?

☐ Yes. Many colleges of engineering have seen a positive correlation between First-Year programs and academic retention and instituted their own programs. Among schools in the SEC, Alabama, Tennessee, Texas A&M and Vanderbilt all have First-Year programs.

Is every incoming engineering freshman required to be in the First-Year Engineering Program?

☐ Yes. Participation in the FYE program is mandatory for all nine undergraduate engineering degrees.

What about scholarships that have traditionally been tied to particular majors? Are they still available?

☐ Yes. Students will designate an interest area when applying for admission and scholarships tied to a particular interest area may be provided. However, you are not committed to declaring for that major. If you declare a different major, you may not receive that scholarship in subsequent years.

Once I choose a major, am I free to change majors later?

☐ Yes, many of the second year courses are common across majors and some courses from one major may count as electives in another major. The advisors in the College of Engineering will help determine whether you will need to take extra courses.

Do I need a laptop computer for FYE courses?

☐ Yes. In fact, FYE students need to bring a laptop to every class meeting. The system requirements are available here. All software used in FYE courses is provided at no additional cost through the UK Download site.

What if I am transferring from another school?

☐ We have a specially designed course that integrates you into the College of Engineering and into your major courses quickly. If you have already selected a major, you can take the combined EGR 112/103 course your first semester. It covers the professional skills, design methods and problem solving strategies used by all types of engineers and computer scientists. If you have already taken a programming course such as CS 115, then you do not need to take EGR 102. Whichever combination of FYE courses you select can be taken concurrently.

- Engineering Fundamentals is managed by the College of Engineering.

- There are 5 full-time faculty, 3 staff, 18 GTAs, 11 UTAs, and 7 Tutors.

- Courses Taught: EF 151, EF 152, EF 105, EF 230

- **EF 105** (1 hour) – Computer Methods in Engineering Problem Solving

- **EF 230** – (2 hours) – Computer Solutions of Engineering Problems
  Primary focus is on development of computer programs in a modern programming language to solve engineering problems

EF 151-Physics for Engineers I

- Calculus-based study of basic physics concepts, including vectors, kinematics, Newton's laws, forces, work-energy, and impulse-momentum. Introduction to team work. Introduction to the engineering disciplines. Examination of engineering principles and design issues. Oral and written presentation skills.
Grading: A, B, C, NC

EF 152-Physics for Engineers II

- Calculus-based study of basic physics concepts, including rotational dynamics, statics, oscillations, waves, fluids, heat and temperature, and first and second law of thermodynamics. Introduction to team work. Introduction to the engineering disciplines, examination of engineering principles and design issues. Oral and written presentation skills.

EE and CE Freshmen Courses

- ENGL 101 3 credits
- MATH 141 4 credits
- COSC 102 4 credits
- EF 151   4 credits

- ENGL 102 3 credits
- MATH 142 4 credits
- COSC 130 4 credits
- EF 152   4 credits

COSC 102 - Problem solving and algorithm development. Organization and characteristics of modern digital computers with emphasis on software engineering, building abstractions with procedures and data, and programming in a modern computer language (C++). Credit: A, B, C, NC

COSC 130 - Number systems, Boolean algebra, combinational and sequential circuits, registers, processor functional units and control, pipelining, memory and caching, stored program computing, memory management, computer system organization, and assembly language programming.

* CS students can take EF 151, 152 or PHYS 135, 136

** EE and CE students take PHYS 231 – Electricity and Magnetism,
    PHYS 232 – Wave Motion, Optics, Modern Physics during their sophomore year

Engineering Fundamentals Topics

- **Engineering perspectives:** An introduction to the different engineering majors offered at UT.

- **Teamwork:** Learning to be an effective team member.

- **Communication:** Students are taught basic communication skills through written project reports and oral presentations.

- **Physics as an engineering fundamental**: Topics covered include mechanics, fluids, waves, sound, thermodynamics, and electricity. See EF 151 and EF 152 for details.

Community

The Freshman Village

- Perkins Hall features newly remodeled laboratory classrooms for hands-on activities, a large student workshop and project area, the Innovation and Collaboration Studio, a computer classroom, study rooms, and an open computer lab. (Note: University will break ground on a new >$100 million building to house freshmen engineering programs in 2018.)

Learning Community

- All qualified first-year engineering students have the option to live in the Engage Learning Community, a residence hall exclusively for admitted engineering students. This environment allows students to be conveniently located near others taking the same core classes, making it easier to share notes, form study groups and develop a sense of camaraderie.

Retention and Advising

- ~70 (10%) freshmen leave the College during the first year

- Freshmen advisors meet with students during each semester.

- <u>EECS has two Professional Advisors for Sophomores to Seniors</u> – Mike Taylor and Olivia Finley

- Systers: Women in EECS has a mentoring program where all students have either student mentors or professional mentors

- College may start a mentoring program for freshmen in Fall 2018

- College looking at how to get freshmen more involved in academic community their first semester and improving class attendance.

Systers: Women in EECS

- Mission: Recruit, Mentor, Retain
- Founded in 2013
- 75 Active Members
- 7 Core Programs
- Funded by Donations