

**Monthly Faculty Meeting  
Department of Electrical Engineering**

**Present:** Roger Dougal, Chair

Mohammad Ali	David Matolak
Seongtae Bae	Enrico Santi
MVS Chandrashekhar	Grigory Simin
Yinchao Chen	Guoan Wang
Herbert Ginn,	Xiaofeng Wang
Asif Khan	Bin Zhang
Krishna Mandal	

**Absent:** Andrea Benigni, Paul Huray

**Recorder:** Nat Paterson

The meeting was called to order by Dr. Roger Dougal at 3:30 p.m. in EE Conference Room 3A75 on October, 2016.

**1. Announcements –**

- Minutes from last month were electronically approved
- ELCT 302 Top Gun Race – Thur Dec 1, 2016 at 2 PM in 2D36
- ELCT 201 Final Presentation – Wed Dec 7, 2016 in 2D32 at 12:30 PM
- CEC Cording Ceremony at Seawell's on Mon Dec 12, 2016 8:30 AM – RSVP!
- 2017-2018 Sabbatical Leave Request Deadline – January 13, 2017
- Faculty Senate –
  - More program to assist high-risk students – detailed information can be found at <http://sc.edu/success/>
  - Vote on granting voting right to Adjunct faculty – more information would be passed on to the department

**2. Guest Speaker – Michael Cantelmi – Technology Commercialization Office**

Mr. Cantelmi encouraged the faculty to contact him for any assistance in patent application or any related intellectual property questions.

**3. Committee Reports --**

**I. Undergraduate Committee --**

**Undergraduate Committee – Dr. Simin**

Dr. Simin updated the faculty on the assessment process for fall 2016. The rubric showed more complete implementation of assessment across all courses (see Appendix A). However Dr. Simin encouraged the faculty to increase the use of rubrics and if they needed assistance, they could contact him.

Dr. Simin also reminded of the importance of separating and identifying columns for assessment results in Blackboard. He provided a sample (see Appendix B).

**Action –**

- The word, "Course Outcomes" in all course syllabi will be changed to "Learning Outcomes" effective spring 2017. Please be sure to get the updated syllabus for your class from the syllabus repository.

**II. Graduate Committee – No report****Action–**

- The Graduate Committee will conduct a survey to get input from the faculty on the concept of Qualifying Exam and an exam format preference. Result from the survey will be presented in the next faculty meeting.

**III. T & P Committee – Dr. Matolak**

The 1<sup>st</sup> version of revised T & P Unit Criteria was circulated among full professors. Once received inputs, the second version will then be circulated to the rest of the faculty.

As a request by the Dean, a T & P Criteria for research faculty will be developed and included in the Unit Criteria as well.

**IV. Special Item – Five-Year Research Vision**

Brief reports were made by each research group (see Appendix C).

- Power and Energy Systems
- Electronic Materials & Devices
- Communications & Electromagnetics – will present in December meeting
- Decision & Control
- Biomedical Electronics

**Action –**

- Information from each group will be compiled into one document as part of the department's research strategic plan.
- The summative plan will be presented at January 19, 2017 faculty meeting

**V. Report of Chairman****Report #1 – Summary key points from Fall 2016 Industrial Advisory Board Meeting on November 4, 2016**

- **Course Syllabus Review** – will pass comments from IAB to Undergrad Program Committee
- **Student Feedback** –
  - Need more IEEE activities – making progress
  - Advisement – Advisers please discuss career plans
  - Lack of Graduation Planning tool
- **Internships** – Advise students to start early, even as freshmen. Companies desire more interactions.

**Report #2 – Discussion on policy and review of graduate offerings for future semesters**

Dr. Dougal encouraged each research group to review graduate courses in their research areas for the following actions.

- Update all 700-800 course syllabi: use syllabus content checklist from CTE as a guideline
- Complete the course offering schedule – the spreadsheet can be found at [https://live.sharepoint.sc.edu/sites/cec/EE/EEDocs/Documents/Documents%20in%20Development/Draft%20ELCTCourseOffering\\_2016\\_10\\_24.xlsx](https://live.sharepoint.sc.edu/sites/cec/EE/EEDocs/Documents/Documents%20in%20Development/Draft%20ELCTCourseOffering_2016_10_24.xlsx)
- Agree on minimum enrollments – still needs to be discussed
- Regularly teach new special topics in each research area (re-create topic area special topic classes)

Action –

- The updated course offering schedule will be presented at December 8, 2016 faculty meeting

Meeting adjourned at 5:34 pm

# Outcomes Assessment Fall 2016

Course	Syllabus has been updated with course outcomes	BB Rubrics are defined	Grades are assigned using BB rubrics	BB is used to give and collect course assignments	Grades are available on BB	All course outcomes are assessed	
102	100%	50%	50%	50%	100%	Unknown	Other 50% tests are LON-CAPA-based
201	100%	100%	25%	100%	75%	Unknown	
220	100%	Unknown	Unknown	Unknown	Unknown	Unknown	
221	100%	100%	50% (100% for outcomes)	Assignments announced on BB	100%	Unknown	All HWs & tests are LON-CAPA-based
222	100%	75%	75%	BB used to give assignments	100%	Unknown	
301	100%	100%	25%	100%	100%	Unknown	
302	100%	100%	50%	100%	75%	Unknown	
321	100%	50%	50%	50%	100%	Unknown	Most HW's and tests are LON-CAPA based
331	100%	50%	50%	50%	100%	Unknown	
350	100%	100%	100%	75%	100%	Unknown	
361	100%	0%	0%	50%	100%	Unknown	
363	100%	0%	0%	0%	0%	Unknown	Nothing in BB
371	100%	100%	0%	25%	100%	Unknown	
403	100%	100%	100%	100%	100%	Unknown	
404	100%	100%	100%	100%	25%	Unknown	



# Outcomes Information example

**Outcome CO1 is assessed in the following assignments:**

Topic	Assignments	Comments
(1) Nodal analysis	Final exam	Pr. 2 - AC nodal analysis
(2) Mesh analysis	Final exam	Pr. 1 - AC mesh analysis
(3) Thevenin transformation	Final exam	Pr. 3 - AC Thevenin

**Outcome CO2 is assessed in the following assignments:**

Topic	Assignments	Comments
(1) Impedance calculations	Test 4	Impedance
(2) Power calculations	Final exam	Pr. 4 - AC power

**Outcome CO3 is assessed in the following assignments:**

Topic	Assignments	Comments
(1) MATLAB for Nodal analysis	Final exam	Pr. 2 - AC nodal analysis
(2) MATLAB for Mesh analysis	Final exam	Pr. 1 - AC mesh analysis

**Outcome CO4 is assessed in the following assignment:**

Topic	Assignment	Comments
SPICE (or equivalent) tool	Test 6	<ol style="list-style-type: none"> <li>1. Build the circuit schematic according to the provided R-L-C circuit diagram.</li> <li>2. Run the simulations and find the amplitude of the output voltage at a given frequency.</li> <li>3. Plot the frequency dependence of the load voltage amplitude and phase.</li> </ol>



# Five-Year Research Vision by Groups



# Power & Energy Systems in 2021

- The group has five professors, five post-docs, three professional research staff, and two administrative staff. On average, the profs supervise five PhD students each, and each of the 25 phd students is assisted by and supervises one MS student and one BS student.
- The GRAPES center is robust, with 8 industry members. It generates \$0.5M per year in base revenue and spin-off projects generate another \$0.5M to \$1M per year. Navy related activities continue to generate \$1.5 to \$2M per year. Each faculty member also has one or two single investigator projects (NSF, etc) at a total the level of \$150k-250k per person per year. And also supports other research as co-PI on one or two outside-of-EE projects.
- Total research activity = \$4.0M per year
- Total research students = 25 PHD, 25 MS, and 25 BS.
- The research portfolio is pursued in collaboration with many external academic research partners, some international. Research topics include DC microgrids, grid-connected power electronics, control of multi-converter systems, power-hardware-in-the-loop, real-time power system analysis with power electronics penetration.
- On average, one new PhD-level topic is taught each year.



# Electrical Engineering Materials and Devices Group

## Members:

Dr. Asif Khan, Dr. Simin, Dr. Mandal, Dr. Chandra,  
Dr. Wang, Dr. Bae, Dr. Santi

## Technology Focus (Departmental Relevance):

- Power Electronics
- Nuclear Radiation Detectors
- Innovative Sensors





# Electrical Engineering Materials and Devices Group

## Research Focus:

- Materials Fabrication and Characterization
  - Widebandgap Semiconductors
  - Narrow Gap, Graphene
  - Nano-magnetic
- Devices Fabrication, Characterization and Packaging
  - FETs, LEDs, Switches, Sensors
- Device and Circuits Modelling and Simulation

## Strengths:

Good Infrastructure and Background Technology  
Sufficient Manpower (Professor)

## Weaknesses:

Current Research to show relevant Activity (State of Art)

Coordination between members.

Technical support and shared facilities



# Electrical Engineering Materials and Devices Group

## Potential Large Proposals:

GaN Materials ARPAAE \$500 K/year for 3 years. (Power Electronics)

SiC/GaN Based Nuclear Detectors (Nuclear Detectors)

ARPAAE Funded Widebandgap Technology Center (Power Electronics-Nuclear Sensors)

Internal Aspire proposals. (Facilities and Joint Research)

## Action Plan:

- Initiate proposal writing involving relevant expertise.
- Develop strategy for ARPAAE Center.
- Aggressive R/D to position ourselves as technology leaders.

Start Joint Projects to demonstrate state-of-art results:



# Electrical Engineering Materials and Devices Group

## Activities:

- Initiated joint work with Dr. Chandra (Power Electronics).
- Will Initiate work with Dr. Mandal (Nuclear Detectors).
- Discussions with Dr. Wang, Dr. Bae and Dr. Simin



# Decision & Control

- The Decision and Control group will target at different application domains such as healthcare, smart city, smart microgrids, ground-air vehicle cooperation, drone design and application, cyber security, real-time fault diagnosis and prognosis.
- In the next 5 years, it is expected to have 4-5 members in the group with an average funding level at \$150k per year per member. Meanwhile, we intend to increase the number of submissions of large proposals to 2-4 per year.
- Each member will advise 5 PhD students and 3-5 MS students in average. The group plans to develop 1-2 new graduate courses and 1 online course in the next 5 years.



# Biomedical Electronics

- Biomedical Electronics division will focus on four primary research areas:
  - (1) Biomaterials and Nanomedicine,
  - (2) Biomedical Devices and Device Materials for “Therapeutics’,
  - (3) Materials and Bioinstrumentation (Bioelectronics) for “Diagnosis”, and
  - (4) Experimental and numerical calculation modeling based “Bioinformatics”.
- We will hire 3 more faculties in these areas and subsequently we hire 4~5 graduate students and 2~3 undergraduate students so that 3 new labs will create in our EE department and we can focus our unique biomedical research works primarily concentrate on “Brain, Brain activity, Brain related disease treatment modality”, “Cardiovascular diseases, Cardiac electrical activity”, and “magnetic and electrical stimulation for cancer and other malignant disease treatment”.
- Considering our merit on electronics and electricics, if our biomedical research division put our research direction on the development of electronic and magnetic field induced treatment for patients such as DBS (Deep Brain Stimulation), TMS (Transcranial Magnetic Stimulation), Current stimulator for arthritis etc., our division will be very unique and advanced compare to other biomedical research groups in other Universities and research institutes.

