



Coastal Carolina University

Department of Physics and Engineering Science

First Annual Engineering Day

March 3, 2020

Monica Gray, PhD, MPH, CPH, PE



Program Director

Associate Professor
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- * PhD Civil & Environmental Engineering (Water Resources Concentration)
- * MPH Environmental and Occupational Health
- * MS Biological Engineering
- * BS Agricultural Engineering
- * Licensure & Certifications
 - * PE – Professional Engineer (Environmental)
 - * CPH – Certified in Public Health
- * ABET Program Evaluator (PEV)

Engineering Faculty & Contacts



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Siming Guo, Ph.D.

Assistant Professor
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**BASc Engineering Science (Energy Systems)
PhD Electrical Engineering**

Engineering Faculty & Contacts



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BS Physics
MSc Nuclear Physics
PhD Nuclear Physics



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Associate Professor
Coastal Science 178E | 843-349-5097 |
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BSc Agricultural Engineering
MSc Agricultural Engineering
PhD Mechanical Engineering

Engineering Faculty & Contacts



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B.S. Applied Physics

M.S. Nuclear Engineering



Louis Rubbo, Ph.D.

Professor

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B.A. Physics and Philosophy

M.S. Physic

Ph.D. Physics

Engineering Faculty & Contacts

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Teaching Associate

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B.E. Mechanical Engineering

Agenda

- * Program Overview & Updates
 - * Students' Envelopes
 - * Networking Luncheon & Academic Advising Logistics
- * Engineering Profession, Societies & ABET
- * Accreditation Updates
- * CoBE - Associates

Program Overview & Updates

- * Webpage: <https://www.coastal.edu/engineeringscience/>
 - * Program's Vision
 - * Program Educational Objectives
 - * New ABET Student Outcomes
- * Accreditation Information
- * Curriculum
- * Resources for Students: reference documents from today's events

Program Overview & Updates

- * LinkedIn Group: Chantiners
 - * Create a LinkedIn profile
 - * Request permission to be added to the Chantiners group
 - * Professional photos
- * **Fundamentals of Engineering (FE) Exam**
 - * **On CCU's campus at the Academic Testing Center**
 - * Both FE & FS
 - * Faculty and students are now preparing
 - * Developing a review course
 - * Encouraging all students to take FE before graduating
 - * Visit NCEES: <https://ncees.org/>
- * In South Carolina, you can take the PE exam early

Program Overview & Updates

* Internships

- * New curriculum requires at least one internship experience
- * For majors: at least 3 credits
- * 1 credit = 50 hours of work

* Career Services

- * Get your resume reviewed and updated
- * Practice and video mock interviews
- * Search for internships

* Key Contacts in Career Services

- * Karen Arnie: 843-349-2559 | karnie@coastal.edu
- * Robert Bulsza 843-234-3450 | rbulsza@coastal.edu

Program Overview & Updates

- * Professional Advising
 - * Career Services
 - * LinkedIn Group – Industry Representatives
 - * Industry representatives in our classes
 - * External Advisory Board (EAB)
 - * Mentors
 - * Real-world capstone projects
 - * Course: ENGR 203 Engineering Professionalism and Pathways
 - * Engineer-in-Residence
 - * Future Opportunities
 - * In classes
 - * Check your emails 2-3 times per day
- * Networking Luncheon – Singleton Ballroom

Program Overview & Updates

- * Academic Advising – Student Envelopes
 - * Engineering Day Student Survey – **please include your name**
 - * Rank your interest in specific engineering disciplines
 - * Engineering & business – CoBE Associate
 - * New features for the engineering program
 - * Curriculum Flow Chart and Course Checklist
 - * Correction: Academic Year 2, Fall Term (AY2-FA)
 - * **ENGR 202** – Engineering Problem Solving should be **ENGR 201**
 - * Fundamentals of Engineering (FE) Exam Topics
 - * Core Curriculum Courses
 - * Catalog Substitution Cheat Sheet
 - * Catalog Opt-in Form

Program Overview & Updates

- * Academic Advising – Student Envelopes Cont’d
 - * Information on Envelopes
 - * Number to left of your name: Table number during luncheon
 - * Top left: Guo or Hitt – see specific advisor
 - * Top left: no specific name – see Professional Advisors
- * Academic Advising – Logistics
 - * Alford Ballroom in the Antheneum Hall
 - * Directed by table
 - * **Return to Singleton Ballroom**

Program Overview & Updates

- * Academic Advising – Logistics
 - * Use course checklist and flowchart to check off courses already taken & determine next in sequence
 - * Advising hold removed
 - * Catalog Opt-in Form
- * **IMPORTANT: TODAY IS ONE OF MANY OPPORTUNITIES FOR ACADEMIC ADVISING**
 - * If you have any questions after today, please see a professor in the Program
- * **Return to Singleton Ballroom**

The Professional Engineer (P.E.)

Engineering Profession

CODES OF ETHICS

Engineering is considered to be a "**profession**" rather than an "occupation" because of **several important characteristics shared with other recognized learned professions, law, medicine, and theology: special knowledge, special privileges, and special responsibilities**. Professions are based on a large knowledge base requiring extensive training. Professional skills are important to the well-being of society. **Professions are self-regulating, in that they control the training and evaluation processes that admit new persons to the field.** Professionals have autonomy in the workplace; they are expected to utilize their independent judgment in carrying out their professional responsibilities. Finally, professions are regulated by ethical standards.

Page 3 **NCEES** FE Handbook

Professional Societies

- * Each engineering discipline is **self-regulated** by one or more professional societies
- * Examples of **Lead Societies**:
 - * Civil – American Society of Civil Engineers (ASCE)
 - * Electrical – Institute of Electrical and Electronics Engineering (IEEE); (**Cooperating Society** for Computer Engineering Programs - Computer Science Accreditation Board or CSAB)
 - * **General Engineering, Engineering, Engineering Science, Engineering Physics or similarly named programs – American Society for Engineering Education (ASEE)**

ABET

- * ABET (previously known as Accreditation Board of Engineering and Technology)
 - * Currently mononymously as ABET – now accredits applied and natural sciences, etc.
 - * **36 member societies** – “provide experts who develop ABET’s criteria, setting the standards for the accreditation process”
 - * **Commissions & Curricular Areas:**
 - * **EAC – Engineering Accreditation Commission**
 - * ETAC – Engineering Technology Accreditation Commission
 - * **CAC – Computing Accreditation Commission**
 - * ANSAC – Applied and Natural Science Accreditation Commission

General Engineering, Engineering,
Engineering Science, Engineering
Physics or similarly named programs

–

**Lead Society: American Society for
Engineering Education (ASEE)**

**EAC – Engineering Accreditation
Commission**

General vs Other Degrees

ABET'S CRITERIA	General Engineering	Engineering Management	Civil Engineering
GENERAL CRITERIA	√	√	√
1. STUDENTS	√	√	√
2. PROGRAM EDUCATIONAL OBJECTIVES	√	√	√
3. STUDENT OUTCOMES	√	√	√
4. CONTINUOUS IMPROVEMENT	√	√	√
5. CURRICULUM	√	√	√
6. FACULTY	√	√	√
7. FACILITIES	√	√	√
8. INSTITUTIONAL SUPPORT	√	√	√
PROGRAM CRITERIA	No program specific criteria	Engineering Programs with "management" or similar modifiers in their titles	Engineering Programs that include "civil" or similar modifiers in their titles.
Curriculum		1. graduates understand the engineering relationships between management tasks of f planning, organization, leadership, control, and the human element in production, research, and service organizations	1. analyze and solve problems in at least four technical areas (e.g., Environmental, Construction, Structural, Transportation, Geotechnical, Engineering Mechanics etc.) appropriate to civil engineering
Faculty		1. The major professional competence of the faculty must be in engineering	1. faculty teaching courses that are primarily design in content are qualified to teach the subject matter by virtue of professional licensure, or by education and design experience

Benefits of Accreditation

- * Accreditation facilitates student (& faculty) mobility: assure that a **minimum standard** has been achieved
- * **Mobility:** to be able to work and study nationally and internationally
- * **Mutual Recognition Agreements or Accords:** recognize the **substantial equivalency** (comparable standards, outcomes, and processes – **not necessarily identical**) of participating organization
- * ABET is a signatory of 5 accords; **2 for engineering programs**

ABET & Engineering Accords

- 1) Washington Accords (multilateral) – for engineering programs
 - a) 20 full status organizations responsible for **accrediting engineering programs** in: Australia, Canada, Hong Kong China, South Africa, Turkey, US, UK, Korea, Ireland, Chinese Taipei, Singapore, Russia, Malaysia, New Zealand, Sri Lanka, Japan, India, Pakistan and Peru
 - b) 8 organizations with provisional signatory status in: Chile, Thailand, Bangladesh, Costa Rica, Mexico, Philippines, Myanmar, Indonesia
- 2) Bilateral agreement between Canada (Engineers Canada) and US (ABET) – for engineering programs

Benefits of Accreditation Cont'd

- * **Jobs**

- * Graduate of an ABET-accredited program
- * Indirectly; EIT certification or PE registration

- * **Graduate school**

- * Graduate of an ABET-accredited program
- * International program

- * **State licensing boards**

- * Graduate of an ABET-accredited program or equivalent before sitting the FE and/or PE exams
- * Agreements between states – comity/reciprocity

Effective Date of Initial Accreditation

- * Each commission, at the time of the accreditation decision, has the authority to set the date of initial accreditation as conditions warrant, **but the date of initial accreditation can be no earlier than two academic years prior to the on-site review.**

Effective Date of Initial Accreditation

- * In order for a program to be considered for **retroactive accreditation two academic years prior to the on-site review**, the program must inform the ABET team chair and the program reviewer prior to the on-site review. The program must also provide the following additional information to the review team:
 - * I.E.6.a. Documentation in the Self-Study Report **that no changes that potentially impact the extent to which an accredited program satisfies ABET accreditation criteria and policies have occurred during the two academic years prior to that of the initial review.**
 - * I.E.6.b. **Records of academic work** and sample student work for both academic years prior to that of the initial review.

2019 -2020 Accreditation Changes

ABET's General Criteria

- * For baccalaureate and associate degree level programs, the eight General Criteria are:
 - * 1. Students
 - * 2. Program Educational Objectives
 - * 3. **Student Outcomes**
 - * 4. Continuous Improvement
 - * 5. **Curriculum**
 - * 6. Faculty
 - * 7. Facilities
 - * 8. Institutional Support

Curriculum Changes

- * Criterion 3 Student Outcomes
 - * Changed from 11 SOs to 7 SOs
 - * 11 (a-k) to 7 (1-7)
- * Criterion 5 Curriculum
 - * Minimum of **30 semester credit hours** of college-level mathematics and basic sciences with experimental experience
 - * Minimum of **45 semester credit hours** of engineering topics (including engineering and computer sciences, engineering design, utilizing modern engineering tools)
 - * A broad education component that complements the technical content...
 - * Culminating major engineering design...

Student Outcomes

- * Criterion 3 Student Outcomes

- * Changed from 11 SOs to 7 SOs

- * 11 (a-k) to 7 (1-7)

- * Student Outcomes

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. An ability to communicate effectively with a range of audiences
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Curriculum at CCU

AY1: Freshman Year

AY2: Sophomore Year

AY3: Junior Year

AY4: Senior Year

AY1-FA

AY1-SP

AY1-SU

AY2-FA

AY2-SP

AY2-SU

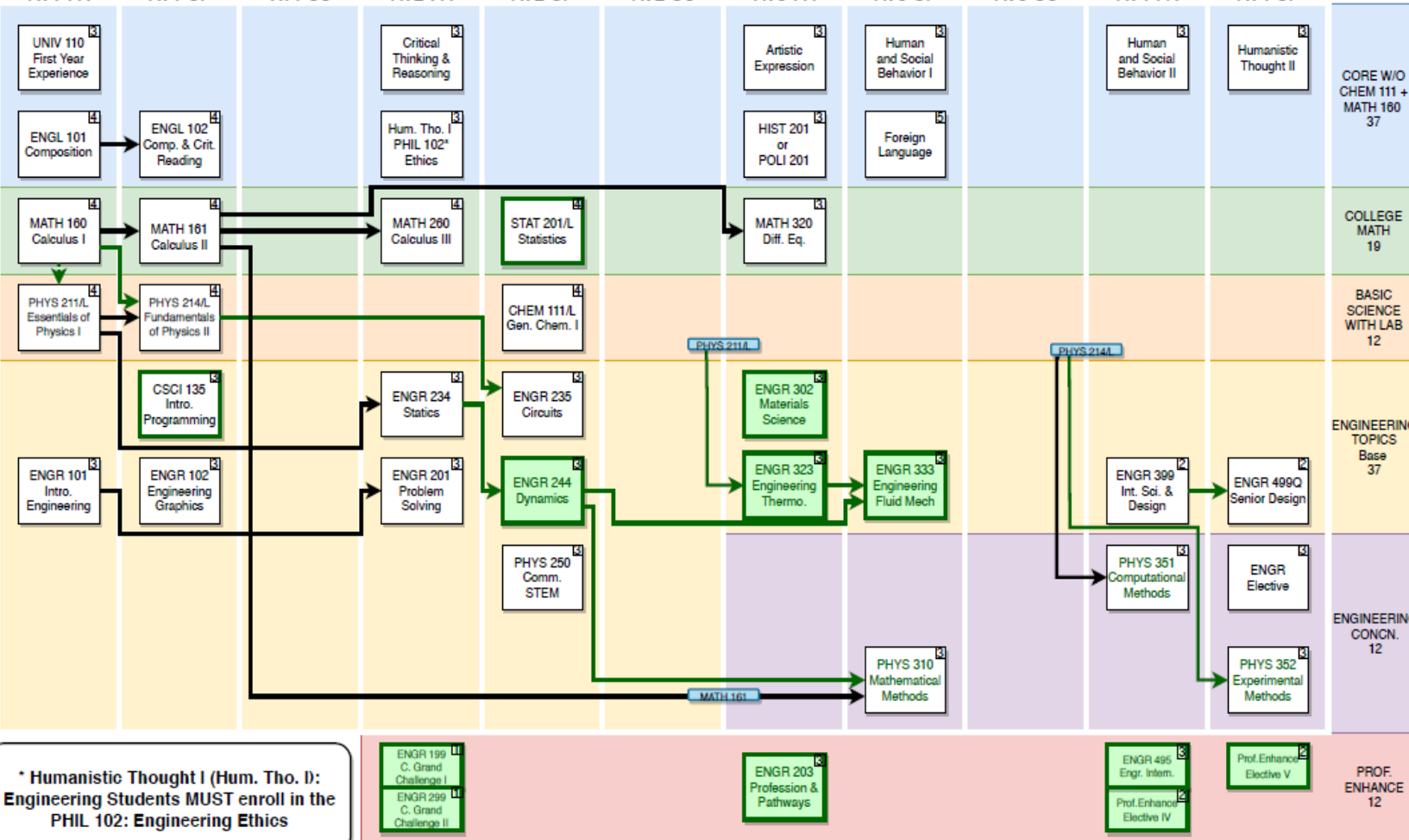
AY3-FA

AY3-SP

AY3-SU

AY4-FA

AY4-SP



LEGEND

- Existing Course, Existing Requirement
- Existing Course, New Requirement
- New Course, New Requirement
- Shortcut to distant prereq.
- existing →
- prereq. →
- coreq. →
- new →
- prereq. →
- coreq. →

ENGR Selective Electives: Physics Concentration

Choose ONE of the following to satisfy

- ENGR 315 Electric Power and Renewable Energy (3)
- ENGR321 Electronics (3)
- ENGR450 Radiation Detection & Meas. (3)

18 + 18 + 0 + 18 + 17 + 0 + 18 + 14 + 0 + 13 + 13 = 129

Professional Enhancement requirements totaling 12 credit hours equivalent can be any combination of the following:

- ENGR 199 C. Grand Challenge I
- ENGR 299 C. Grand Challenge II
- ENGR 397 Ind. Research
- ENGR 495 Engr. Internship
- CCU Education Abroad
- CCU International Internship
- Co-operative Education
- Service Learning
- Cohort Grand Challenge
- Graduate course
- Professional certification
- Professional course



B.S. Engineering Science Physics Concentration

CCU Curriculum: College Math

Categories	Course Code and Title	Number of Credits
College Math	MATH160 Calculus I	4
	MATH161 Calculus II	4
	MATH260 Calculus III	4
	MATH320 Elementary Differential Equations	3
	MATH 201/L Elementary Statistics	4

Curriculum: Basic Science with Lab

Categories	Course Code and Title	Number of Credits
Basic Science with Lab	CHEM 111/L (4) General Chemistry I	4
	PHYS211/L (4) Essentials of Physics I	4
	PHYS214/L (4) Fundamentals of Physics II	4

Curriculum: Engineering Topics

Categories	Course Code and Title	Number of Credits
Engineering Topics	ENGR 101 Inquiring Minds Want to Design: An Introduction to Engineering	3
	ENGR 201 Engineering Problem Solving	3
	ENGR 102 Engineering Graphics Communication	3
	ENGR 234 Engineering Mechanics I: Statics	3
	ENGR 235 Electric Circuits	3
	ENGR 244 Engineering Mechanics II: Dynamics	3
	ENGR 302 Materials Science for Engineers	3
	ENGR 323 Engineering Thermodynamics and Heat Transfer	3
	ENGR 333 Engineering Fluid Mechanics	3
	ENGR 399 Q* Integrated Science and Design (1 to 3 credits)	2
	ENGR 499 Q Senior Design	2
	ENGR 495 Engineering Internship	3
	ENGR/PHYS 250 Communication in STEM	3
	CSCI 135 Introduction to Programming	3

Curriculum: Concentrations

Categories	Physics	Credits	Electrical (Pending)	Credits
Required	MATH 242/L Modelling for Scientists I/PHYS 351 Computational Methods for Physicists and Engineers	3	ENGR 315 Electric Power and Renewable Energy	3
	PHYS 310 Mathematical Methods for Physicists and Engineers	3	ENGR 321 Electronics	3
	PHYS 352 (3) Experimental Methods for Physicists and Engineers	3	ENGR 360 Signals and Systems	3
			PHYS 302/ENGR 365 Electricity and Magnetism	
Selective Elective	Choose ONE			
	ENGR 315 Electric Power and Renewable Energy	3		
	ENGR 321 Electronics	3		
	ENGR 450/L Radiation Detection and Measurement	3		

Curriculum: Concentrations

Categories	Innovation Design (Pending)	Credits	Nuclear Security & Nonproliferation (Pending)	Credits
Required	MGMT 324: Idea Generation in the Innovation Process	3	PHYS 104/L – Science for Security	4
	MGMT 325: Communicating Novel Ideas in Dynamic Settings	3	INTEL 344 – Weapons of Mass Destruction	3
	MGMT 424 Feasibility and Commercialization of Novel Ideas	3	ENGR 450/L – Radiation Detection and Measurement	4
	ENGR 356: Supply Chain Engineering	3	ENGR 444 – Design for Physical Protection	3
Capstone Design	MGMT 429 Q* Practicum in Entrepreneurship & Innovation = ENGR 399 & ENGR 499 Engineering Capstone Sequence	4		

Engineering Minor

Categories	Course Code and Title	Number of Credits
Engineering Topics	ENGR 101 Inquiring Minds Want to Design: An Introduction to Engineering	3
	ENGR 102 Engineering Graphics	3
	ENGR 199 Cohort Grant Challenge I	1
	ENGR 299 Cohort Grant Challenge II	1
	ENGR 201 Engineering Problem Solving	3
	ENGR 203 Engineering Professionalism and Pathways	3
	PHYS 250 Communication in STEM	3
	ENGR 495 Engineering Internship	1
	TOTAL CREDITS	18

AY1: Freshman Year

AY2: Sophomore Year

AY3: Junior Year

AY4: Senior Year

AY1-FA

AY1-SP

AY1-SU

AY2-FA

AY2-SP

AY2-SU

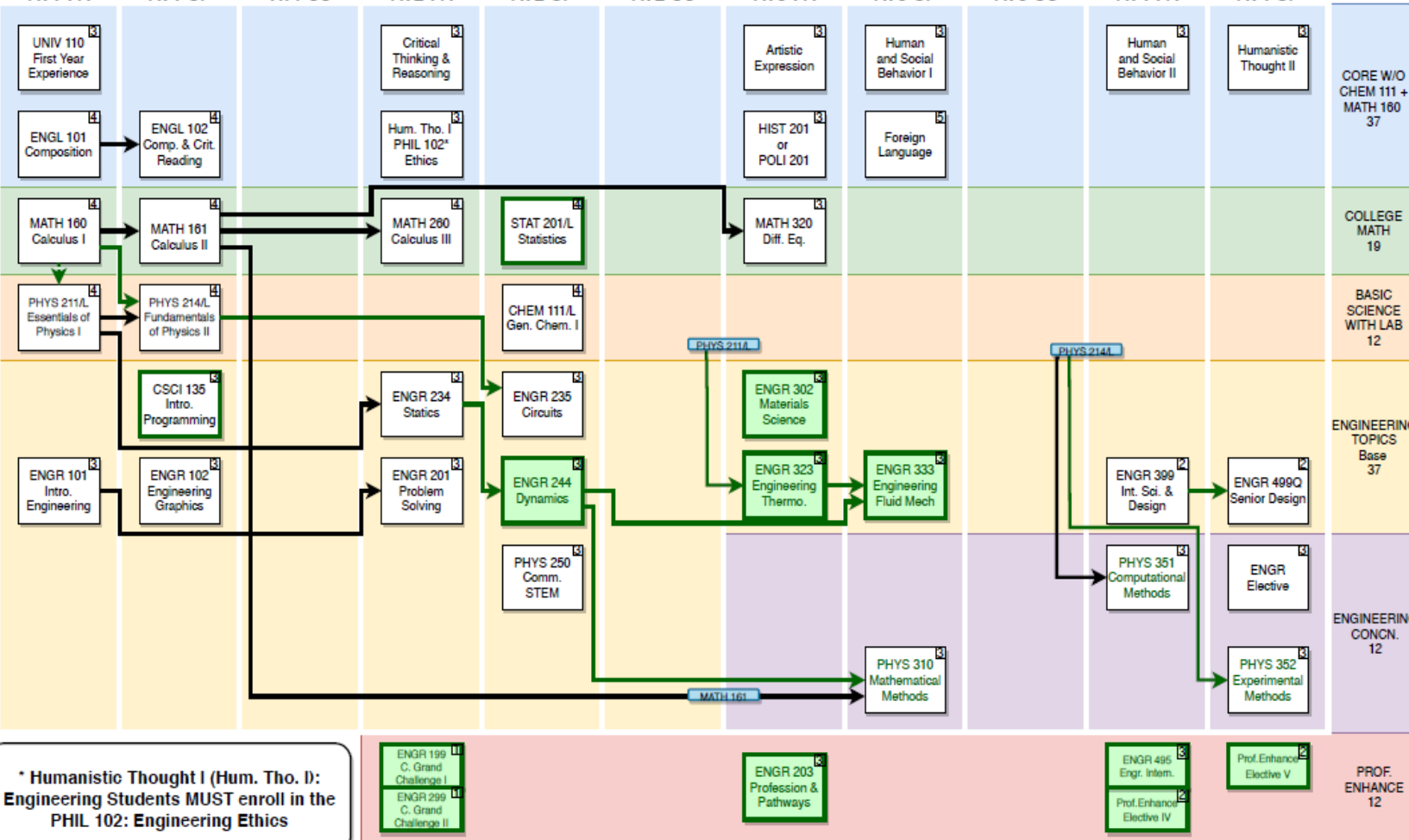
AY3-FA

AY3-SP

AY3-SU

AY4-FA

AY4-SP



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- Cohort Grand Challenge
- Graduate course
- Professional certification
- Professional course

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* Humanistic Thought I (Hum. Tho. I): Engineering Students MUST enroll in the PHIL 102: Engineering Ethics



B.S. Engineering Science Physics Concentration

Professional Enhancements

Categories	Course Code and Title	Number of Credits
Professional Enhancements	ENGR 199 Cohort Grant Challenge I	1
	ENGR 299 Cohort Grant Challenge II	1
	ENGR 203 Engineering Professionalism and Pathways	3
	ENGR 495 Engineering Internship	3
	Professional Enhancements	4
	TOTAL CREDITS	12

Vision

- * **Special Interest Housing**
 - * Submission Fall 2020
 - * Effective Fall 2021
- * **100% of engineering students have at least 1 abroad experience**
 - * Faculty-led & traditional opportunities
- * **Engineering Outreach**
 - * Local Schools Adoptions
 - * Dual Enrollment
 - * Engineering Summer of Science (Engineering SOS)
- * **100% of engineering students have at least 1 internship**



Community and Business Engagement Institute

CBE
institute

What is CoBE?

- Real-world, hands-on experience
- Behind the scene access
- Company visits
- Paid student position
- Faculty collaboration
- Build professional network
- Great resume builder
- Course and Honors credit available

Why CoBE?

Real-world experience

Problem solving skills

Contact Information

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cobeinstitute.com



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Next Agenda Item

- * If serious about being a CoBE Associate, complete information on Engineering Day Student Survey
 - * **Name, email and cellphone number**
- * Career Advise Panel
- * Moderator: Ms. Yvette Jefferson
- * Panelists:
 1. **Marquay Byrd** - Cryptologic Warfare Officer in the United States Navy
 2. **Christy Everett** - Chief Operations Officer at Grand Strand Water & Sewer Authority
 3. **Carlita Goff** - Area Distribution Engineering Supervisor at Santee Cooper
 4. **Reggie Bell** - Engineer-in-Residence and a Teaching Associate in the engineering program here at CCU

Thank You