

SUCCEED – School of Universal Computing, Construction, and Engineering Education

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SUCCEED was formed in 2018, through a collaboration between the College of Engineering and Computing and the STEM Transformation Institute, as the first engineering and computing education department at a minority-serving institution. The school was created in alignment with the university's vision to be a "leading urban public research university focused on student learning, innovation, and collaboration." As such, SUCCEED aims to be the premier department in the U.S. with expertise in developing engineering and computing leaders who reflect the growing diversity of the 21st century.

Faculty within the school, along with students and staff, seek to connect research and innovation with student learning through collaboration with other members of the college and FIU as a whole. In particular, SUCCEED faculty research and promote evidence-based approaches that broaden participation and improve educational outcomes. Through these efforts, the faculty impact current and future engineering and computer science students at FIU and beyond. We offer the following undergraduate degree:

Bachelor of Science in Interdisciplinary Engineering

Interdisciplinary students are exposed to the fundamentals of science and engineering, while also developing their skills as leaders, systems thinkers and engineering designers through engineering leadership and business courses as well as a project-based course sequence.

Rather than focusing exclusively on an existing Engineering subfield such as Biomedical, Civil, Environmental, Electrical, Computer, or Mechanical Engineering, this is a unique interdisciplinary program with broad flexibility and a student-guided focus. The core vision of the program's design is to provide a customizable degree for students, so they may optimize their opportunities to enter the workforce, including emergent entrepreneurial businesses. The curriculum aims to develop students into engineering leaders who utilize a systems-perspective to collaborate across disciplines and design innovative, human-centered solutions to local, national, and global challenges. It

combines a core encompassing math, sciences, business, communication, and engineering courses from all disciplines along with a secondary field that could include traditional existing engineering areas, or focus on grand challenges such as personalized learning, cybersecurity, and water accessibility. Through this program, students and graduates will be prepared to tackle complex engineering and business situations. The curriculum will allow students to engage in projects and learning experiences that develop their skills managing complex and open-ended projects, designing solutions for multidisciplinary engineering challenges, and working in a real-world team environment. A Bachelor's degree in Interdisciplinary Engineering will prepare students to become leaders in various aspects of industry, including health care, communications, environmental stewardship, government, and business.

Program Educational Objectives

The curriculum is designed to give students a broad understanding of the fundamentals of science and engineering, and to develop students into engineering leaders who utilize a systems-perspective to collaborate across disciplines and design innovative, human-centered solutions to local, national, and global challenges.

As a result, the program educational outcomes of the BS in Interdisciplinary Engineering are to develop graduates who, within three to five years after graduation, will:

1. Exhibit strong critical thinking, design, and problem-solving skills within the engineering industry, an advanced degree program, or another field where they can apply these skills.
2. Demonstrate an increasing level of leadership and professional responsibility by using effective communication skills and participating in multidisciplinary collaboration.
3. Exhibit a commitment to professional ethics, global awareness, and life-long learning.

Student Outcomes:

At the time of graduation, students within the Interdisciplinary Engineering program at FIU will be able to demonstrate:

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.

Degree Program Hours: 120

Common Prerequisite Courses

For a list of all state-approved common prerequisites, including alternatives, visit <https://cpm.flvc.org>.

CHM 1045	General Chemistry I	3
CHM 1045L	General Chemistry Lab I	1
MAC 2281	Calculus for Engineering I	4
MAC 2282	Calculus for Engineering II	4
MAC 2283	Calculus for Engineering III	4
MAP 2302	Differential Equations	3
PHY 2048	Physics with Calculus I	4
PHY 2048L	General Physics Lab I	1
PHY 2049	Physics with Calculus II	4
PHY 2049L	General Physics Lab II	1
EEL 2880	C Programming for Embedded Systems ¹	3

Academic Progression Standards

Students who are unsuccessful in passing common prerequisites after two attempts will be advised to change their major into an area where they can be successful. Drops after the add/drop period, which result in a DR grade, are considered an attempt in the course and count as an unsuccessful enrollment.

Admission Requirements

The qualifications for admissions to the Interdisciplinary Engineering Program are the same as for admission to the College of Engineering and Computing.

Lower Division Preparation

Lower division requirements include at least 60 hours of pre-engineering credits (see the Undergraduate Studies portion of this catalog for specific requirements). These courses include the common prerequisites shown above, and Introduction to Engineering. (EML-1533 Introduction to CAD for Mechanical Engineers is required unless previously taken in high school). In addition, both FIU freshman and transfer students who have not completed their core curriculum at the transfer institution must take the FIU University Core Curriculum Requirements, whose topics also complement the goals and objectives of the College of Engineering and Computing (including economic, environmental, political, and/or social issues). Students must make up any missing prerequisites before they will be allowed to begin taking certain engineering courses (see course listing for required pre-/co-requisites).

Interdisciplinary Engineering Curriculum

Common Prerequisites	32	
Additional UCC Courses	22	
SLS 1501	Freshman Experience	1
ENC 1101	Writing and Rhetoric I	3
ENC 1102	Writing and Rhetoric II	3
UCC1	Humanities Group I	3
UCC2	Humanities Group II– GL	3
UCC3	Arts	3
UCC4	Social Science Group I	3
UCC 5	Social Science Group II	3

Engineering Foundation 23

EGS 2053	Foundations of Interdisciplinary Engineering ²	3
CWR 3201	Fluid Mechanics ³	3
CWR 3201L	Fluid Mechanics Lab ³	1
EGN 3311	Statics	3
EGN 3321	Dynamics	3
EGN 3365	Materials in Engineering	3
EEL 3110C	Circuit Analysis and Lab	4
ESI 3215	Evaluation of Engineering Data I ⁴	3

Engineering Secondary Field⁵ 12

Engineering Business and Leadership 12

EGN 3613	Engineering Economy	3
	Business or Leadership Courses ⁶	9

Interdisciplinary Project Experiences 12

EGN 3910	Human-Centered Design within Systems and Society	3
EGN 4943	Interdisciplinary Capstone Design Project I – GL	3
EGN 4944	Interdisciplinary Capstone Design Project II – GL	3
	Engineering Projects Course Elective ⁷	3

University-wide Electives 7

¹May substitute EML-2032, COP-2210/2250, or other department specific equivalents

²Students who have taken another project-based introductory sequence (e.g., EGS 1006) upon entry into the IDE program, can count EGS 2053 as their Engineering Projects Course Elective.

³May be substituted via other approved Engineering Science course. If the replacement course is 3 credits the student may take an approved Engineering Lab coupled with an approved ESF course to make up the credit deficiency.

⁴May substitute STA-3033 or STA-3111

⁵Students must select twelve credits of additional required or elective courses in a degree-granting ABET-accredited program in the College of Engineering and Computing (CEC) to form a coherent secondary field. At least nine credits must be upper division courses hosted in CEC. A sample list of courses is held by SUCCEED. The undergraduate curriculum committee in SUCCEED will be responsible for reviewing secondary field course requests that are not included on this list.

⁶List held by SUCCEED. Courses may include ENT 4113 (Entrepreneurship: New Business Development), ENG 3060 (Engineering Professional Development for a Global Society), MAN 3022: Introduction to Management, MAR 3023: Introduction to Marketing (GL), and courses in pedagogy from the FIU Teach teacher certification program.

⁷Project course in engineering (list held by SUCCEED) or approved three-credits of co-op (EGN 3945) or research-based independent study.

Other Requirements

Students must meet the University Foreign Language Requirement, must have a minimum 2.0 GPA, must complete all required classes, and must otherwise meet all of the state and university requirements in order to graduate. Students who enter the university with fewer than 60 transferred credits must take 9 summer credits. Courses that are part of the student's study plan can be passed with a D unless a grade of C or higher is required by the teaching

department to register for another course in the student's current study plan or to satisfy a university requirement for graduation (such as many UCC courses).

Combined BS in Interdisciplinary Engineering/MS in Engineering Management (BSIE/MSEM) Degree Pathway

Students who pursue a BS degree and are in their first semester of the senior year in Interdisciplinary Engineering and have earned at least a 3.2 overall GPA may, upon recommendation from three faculty members, apply to the department to enroll in the combined BSIE/MSEM pathway. Students must also submit an online application to the University Graduate School for admission to the MSEM program. In addition to the admission requirements of the MSEM program, students must meet all the admission requirements of the University Graduate School.

Students need only apply once to the combined degree pathway; the application is submitted to Graduate Admissions typically before the student starts the last 30 credits of the bachelor's degree program. A student admitted to the combined degree pathway will be considered to have undergraduate status until the student applies for graduation from their bachelor's degree program. Upon conferral of the bachelor's degree, the student will be granted graduate status and be eligible for graduate assistantships.

Students enrolled in the combined degree pathway could count up to three Management Electives toward their twelve "Engineering Business and Leadership" in the BSIE degree program, for a total saving of 9 credit hours.

The combined BSIE/MSEM pathway has been designed to be a continuous program. During this combined BSIE/MSEM pathway, upon completion of all the requirements of the BSIE program, students will receive their BSIE degree. Students may elect to permanently leave the combined pathway and earn only the BSIE degree. Students who elect to leave the combined pathway and earn only the BS degree will have the same access requirements to regular graduate programs as any other student, but will not be able to use the 9 credit hours in both the BSIE and MSEM degrees.

For each of the graduate courses counted as credits for both BSIE and MSEM degrees, a minimum grade of "B" is required. Only graduate courses with formal lecture can be counted for both degrees. The students are responsible for confirming the eligibility of each course with their undergraduate advisors.

Students interested in the combined pathway should consult with their undergraduate advisor on their eligibility to the pathway, preferably during their junior year, since appropriate planning of coursework is required in order to achieve the full nine-credit benefit. The student should also meet the MSEM Program Director to learn about the graduate program and available tracks/courses before completing the application form. Final decision for admission to the MSEM program will be made by the University Graduate School upon recommendation by the Engineering Management program director. Applicants will be notified by the Engineering Management Program and

the University Graduate School of the decision on their applications.

Course Descriptions

Definition of Prefixes

EGN - Engineering General; EGS – Engineering: Support Courses that meet the University's Global Learning requirement are identified as GL.

EGN 3910 Human-centered Design within Systems and Society (3). A collaborative, projects-based course in human-centered design and systems analysis. Should be taken one semester prior to or concurrently with EGN 4943, EML 4905, or equivalent courses.

EGN 4943 Interdisciplinary Capstone Design Project I – GL (3). A senior-level capstone design experience focusing on problem definition, stakeholder & system analysis, requirements definition, global implications, ethics, ideation, teamwork, and communication. Corequisite: EGN 3910.

EGN 4944 Interdisciplinary Capstone Design Project II – GL (3). A senior-level capstone design experience focusing on prototyping, testing, iterating, examining the global and local implications of your project, and manufacturing a final product. Prerequisite: EGN 3910, EGN 4943

EGN 3945 Cooperative Education in Engineering (3). The cooperative education in engineering course is for current interdisciplinary engineering students to pursue an experiential education opportunity at an organization focused on their area of study. Prerequisite: Junior standing

EGS 1002 Engineering Enrichment Lab (0). Introduction of engineering disciplines to incoming freshmen. Planning for academic and career success. Engagement activities and presentations by engineering departments.

EGS 2053 Foundations of Interdisciplinary Engineering (3). This project-based course introduces students to interdisciplinary engineering work and human-centered design. May not be taken concurrently with or after Senior Design.

EGS 3060 Engineering Professional Development for a Global Society – GL (3). This course will equip engineering students with an understanding of core competencies that engineers are expected to possess in an increasingly globalized context.