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.

Common Prerequisite Courses and Equivalencies

FIU Course(s)	Equivalent Course(s)
CHM 1045, CHM 1045L	CHMX045/X045L or CHMX045C or CHSX440 and CHMX045L
MAC 2281	MACX311 or MACX281
MAC 2282	MACX312 or MACX282
MAC 2283	MACX313 or MACX283
MAP 2302	MAPX302 or MAPX305
PHY 2048, PHY 2048L	PHYX048/X048L or PHYX048C or PHYX043 and PHY048L
PHY 2049, PHY 2049L	PHYX049/X049L or PHYX049C or PHYX044 and PHYX049L
EEL 2880	Intro programming in Python, C, C++, Java, or equivalent

Courses which form part of the statewide articulation between the State University System and the Florida College System will fulfill the Lower Division Common Prerequisites.

Please visit https://cpm.flvc.org for a current list of state-approved common prerequisites.

Degree Program Hours: 120

Common Prerequisites:

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

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		**19**
SLS 1501	Freshman Experience	1
ENC 1101	English Composition 1	3
ENC 1102	English Composition 2	3
UCC1	Humanities 1	3
UCC2	Humanities 2 – *GL*	3
UCC3	Arts 1	3
UCC4	Social Science 1	3
Engineering Foundation		**23**
EGS 1006	Introduction to Engineering[2]	2
EGS 2030	Ethics and Legal Aspects in Engineering[2]	1
CWR 3201	Fluid Mechanics	3
CWR 3201L	Fluid Mechanics Lab	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[3]	3
Engineering Secondary Field[4]		**12**
Engineering Business and Leadership		**12**
EGN 3613	Engineering Economy	3
EIN 4328	Introduction to Engineering Entrepreneurship[5]	3
	Business or Leadership Courses[6]	6
Interdisciplinary Project Experiences		**12**
EGN 3910	Human-centered Design within Systems and Society	3
	Engineering Projects Course Elective[7]	3
EGN 4943	Interdisciplinary Capstone Design Project I[8]	3
EGN 4944	Interdisciplinary Capstone Design Project II[8]	3
University-wide Electives		**10**

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

[2]Waivable for AA transfer students; other transfer students should see an advisor; may substitute department-specific equivalents. EGS-1006 and EGS-2030 are not required for students who select EGS 2053 (Foundations of Interdisciplinary Engineering).

[3]May substitute STA-3033 or STA-3111

[4]Students 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.

[5]May substitute ENT-4113, EEL-4933, or an alternative course as approved by advisor.

[6]List held by SUCCEED. Courses may include MAN 3022: Introduction to Management and MAR 3023: Introduction to Marketing (GL)

[7]Project course in engineering (list held by SUCCEED) or approved three-credits of co-op or independent study.

[8] Alternative, the Vertically Integrated Project course (IDS-4918) may be taken in two consecutive semesters starting in the junior year for three credits each attempt.

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. All UCC courses and courses that are prerequisites for other courses taken later in the curriculum must be passed with a grade of "C" or higher. Also see the Undergraduate Studies portion of this catalog for additional information.

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;
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 introduction to interdisciplinary design using systems thinking and human-centered design principles.

EGN 4943 Interdisciplinary Capstone Design Project I (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 (3). A senior-level capstone design experience focusing on prototyping, testing, iterating, examining the 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 course emphasizes the opportunities and challenges of interdisciplinarity while providing experiences of interdisciplinary engineering work, humanistic engineering, and design.

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