

Department of Industrial Engineering

BSIE Course Planning Guide

**Spring 2021
Updated March 1, 2021**

Important dates for Spring 2021 Registration

**Course Planning Assignment Opens (on Canvas)
Week of March 1, 2021**

**IE Fall 2021 Schedule “set”
Approx Week of March 15, 2021**

**Due date for plans to be submitted (on Canvas)
March 31, 2021**

**Registration for Fall 2021 Opens
April 12, 2021**

***Check for your specific time ticket in iROAR**

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All colleges and departments establish certain academic requirements that must be met before a degree is granted. Advisors, department chairs, and deans are available to help the student understand and meet these requirements; but the student is responsible for fulfilling them. If, at the end of a student's course of study, the requirements for graduation have not been satisfied, the degree will not be granted. For this reason, it is important for students to acquaint themselves with all academic requirements throughout their college careers and to be responsible for completing all requirements within prescribed deadlines and time limits. –*Policy of Student Responsibility, Undergraduate Catalog*

1 VERY IMPORTANT POLICIES

1. Students who fail to pass an IE course with a D or better within three attempts will be dismissed from the program (see Section 9.4).
2. Students who fail to maintain a 2.0 engineering grade point average (EGPA) will be placed on IE probation (see Section 9.5).
3. For all IE courses, a D is a passing grade. However, some of the prerequisite courses have to be completed with a C or better:
 - a. In order to register for IE 2100 a student must have a C in CE 2010
 - b. In order to register for IE 3600 a student must have a C in MATH 2060
 - c. In order to register for IE 3800 a student must have a C in MATH 3110

2 Advising in IE

The advising structure in the Department of Industrial Engineering is composed of two types of advising with different goals and processes.

2.1 Academic advising

Academic advisors are professional advisors within the Department of Industrial Engineering and are assigned by your last name:

A-G: Jess LeCroy (jpruszk@clemsn.edu) H-Z: Arthur Alvarez (aaalvar@clemsn.edu)

2.1.1 What you can expect from your academic advisor:

- You can contact your academic advisor for questions related to (but not limited to): your course schedule, registration, course plans, curriculum matters, and signing/processing student forms, success strategies in college.
- Informs you of administrative, academic, and personal services and resources.
- Offers regular office hours or appointment times in order to meet with you.
- Approves all student forms (e.g., coursework elsewhere, forgiveness, GS6 forms)
- Protects your privacy of student information as set forth in The Family Educational Rights and Privacy Act (FERPA)
- Refers students to appropriate resources (both academic and personal) for issues that may require intervention by other professionals.

2.1.2 What your academic advisor expects from you:

- Meeting requirement: your first two semesters in IE you MUST schedule in-person meetings with your academic advisor. Following the first two semesters, you can either meet in person or have your course plan reviewed through CANVAS only.
- Make appointment with your assigned advisor BEFORE registration begins using CU Navigate.
- SHOW UP PREPARED: Have your course plan completed and forms filled out.
- Seek assistance and guidance when curriculum planning and/or wishing to change majors.
- Follow through on next steps identified in your advising session.
- Be aware of your academic standing at all times.
- Be aware of important dates and deadlines on the academic calendar.
- Accept final responsibility for all decisions. That means that you are fully responsible for your course scheduling, registration, and making degree progress.

2.1.3 Advising Process/pre-registration

How do I get my PIN to register?

1. Complete a course planning worksheet from now until your graduation following all curriculum requirements, prerequisites, and your remaining course requirements.
2. Submit plan in the CANVAS assignment in the “IE Department” workgroup for the appropriate registration advising ‘assignment’.
3. If you submitted a viable course plan following the guidelines above, your grade for that ‘assignment’ will be your 6-digit PIN to register. If your plan contains errors, you will be given feedback and will be required to resubmit a correct plan. You will not receive your PIN until a viable plan is submitted.

There are two options for pre-registration advising: one-on-one appointments or workshop advising. Note that in your first two semesters in IE, you must attend one of these advising options.

1. **Appointments:** Select “preregistration advising” as your appointment type in CU Navigate and you will find the times available to meet with your academic advisor about preregistration
2. **Workshops:** Throughout preregistration season, the department holds workshops on how to successfully complete the course planning worksheet and answer question you may have about curriculum requirements. The goal at the end of these workshops is to have to you submit an accurate plan in CANVAS.

2.2 Faculty advising

Your assigned faculty member on your success team helps you with all career advising. Your faculty advisor is identified in the ‘Your Success Team’ section of CU Navigate.

2.2.1 What you can expect from your faculty advisor:

- You can discuss anything related (but not limited to) career options, graduate school, co-ops, internships, professional development, minors in other programs, and course information
- Direct students to resources for strategies for success in college, the job search process, resume review
- Assist students in exploring career and professional opportunities.
- Offers regular office hours or appointment times in order to meet with you.
- Help select or suggest courses based on career and educational goals.
- Protect your privacy of student information as set forth in The Family Educational Rights and Privacy Act (FERPA).
- Refer students to appropriate resources (both academic and personal) for issues that may require intervention by other professionals.

2.2.2 What your faculty advisor expects from you:

- Meeting requirement: You are expected to meet with your faculty advisor at least once an academic year.
- SHOW UP PREPARED: Know what you want to talk about; bring appropriate materials based on faculty advisor request.
- Engage in active dialogue with advisor.
- Follow through on next steps outlined in career advising meeting.
- Take ownership for your own education experience.

2.3 Interacting with your advisors

2.3.1 How to identify your advisors & set up appointments

We use CU Navigate (available at <https://clemsontechcampus.eab.com/> and as the “Guide” app from the Google Play or Apple app stores) to schedule meetings and communicate with advisors.

Identifying your advisors

1. On your CU Navigate home page you will see “Your Success Team” listed in the bottom right corner.
2. Your academic and faculty advisors are both identified.

To make an appointment with either your academic or your faculty advisors:

1. “Schedule an Appointment”
2. Select your scheduling options
3. Select “Engineering, Computing, & Applied Science Advising” for your location
4. Choose your day and time from the times that are identified as available.
5. Include any information that will tell your advisor what the appointment is regarding and help them prepare for your appointment.

If you need to cancel an existing appointment: click the appointment you need to cancel in your upcoming appointments list and click “Cancel my attendance”. Provide a reason and any additional comments.

Additional information and guides for using CU Navigate:

<https://www.clemson.edu/academics/advising/cunavigate/guide/resource-page.html>

2.3.2 Course Planning Worksheet

Your academic advisor or faculty advisor will review the course plan you submit in CANVAS and distribute your PIN to you through the CANVAS grade book.

The course planning worksheet is available from the IE website (ie.clemson.edu). In order to properly fill out the course planning worksheet, you will need to gather information from DegreeWorks and this document. Degree Work will help you identify your current standing, completed and remaining requirements, GPA, etc. Your catalog year is available to you in DegreeWorks.

The screenshot displays the DegreeWorks interface. At the top, there are input fields for Student ID, Name, and Degree (Bachelor of Science). Below these are filters for Advanced search, including Level (Undergraduate), Classification (Senior), Major (Industrial Engineering), Minor, and Program (BS Industrial Engineering). The College is listed as Engr, Computing & Applied Sci. The interface is divided into Academic and What-If tabs. Under the Academic tab, there is a dropdown for Format (Student View) and a section for Degree progress showing an Overall GPA of 3.24. There are checkboxes for In-progress classes and Preregistered classes, along with a Process button. The audit date is 2/5/2021 8:10 AM. At the bottom, the Bachelor of Science Degree is shown as INCOMPLETE. The Credits required is 125, and Credits applied (includes In-progress) is shown. The Catalog year 2018-2019 is highlighted with a red box and three red arrows pointing to it.

3 BSIE Curricula

IE courses are offered each fall and spring semester. IE classes can be taken in any semester as long as prerequisite and other requirements are satisfied. If you are on a catalog year prior to 2014, please contact your academic advisor for your curriculum and curriculum related questions. **Your catalog year is identified at the top of the degree works page.**

3.1 The 2016-current IE curriculum

Year 1			
16	First Semester	17	Second Semester
4	CH 1010 General Chemistry	3	ENGR 1410 Programming
3	ENGL 1030 Comp. & Rhetoric	4	MATH 1080 Calc of One Var II
2	ENGR 1020 Engr Discip. & Skills	3	PHYS 1220 Physics I
4	MATH 1060 Calc. of One Var I	3	Arts and Human./Social Sciences ⁵
3	Arts and Human./Social Sciences ⁵	4	Lab Science Requirement ⁵
Year 2			
16	First Semester	17	Second Semester
3	CE 2010 Statics ^{2,6}	3	IE 2100 Design and Ana. Of Work Sys. ⁴
4	MATH 2060 Calc. of Several Var. ²	4	IE 3010 Systems Design I
3	MATH 3110 Linear Algebra ²	1	IE 3140 Seminar in IE
3	PHYS 2210 Physics with Calc. II	3	IE 3600 Ind. App. Of Prob./Stat. I ⁴
1	PHYS 1240 Physics Lab. II ³	3	IE 3800 Deterministic Oper. Res. ⁴
2	ENGR 2080 (or 2090 or 2100)	3	MSE 2100 Intro to Mater. Science
Year 3			
15	First Semester	16	Second Semester
3	IE 3610 Ind. App. Of Prob./Stat. II	3	IE 3860 Production Plan. And Cont.
3	IE 3810 Probabilistic Oper. Res. ⁴	3	IE 4610 Quality Engineering
3	IE 3840 Engr. Economic Ana.	3	IE 4650 Facilities Plan. And Design
3	IE 4400 Dec. Support Systems in IE	4	IE 4820 Systems Modeling
3	Arts and Human./Social Sciences ⁵	3	Oral Communication ⁵
Year 4			
15	First Semester	13	Second Semester
3	IE 4880 Human Factors Engr.	4	IE 4670 Systems Design II
6	IE Technical Requirement^{5, 7}	3	IE Technical Requirement^{5, 7}
3	ECE 2070/2080 or 2020/2110	3	Management Requirement ⁵
3	Ethics and Prof. Practice ⁵	3	Arts and Human./Social Sciences ⁵

Notes:

1 Refer to the General Engineering first year curriculum.

2 This course must be passed with a C or better as a prereq for other courses.

3 PHYS 2230 may be substituted.

4 This course has prereq with C or better requirements.

5 Select from the list in Degree Works or Section 4.1

6 ME 2010 completed with a C or better can be used to satisfy this requirement.

7 At most 3 credits of IE technical elective can be substituted with 3 credits from the Broadening list.

3.2 The 2018-current IE curriculum (with computing emphasis)

Year 1			
16	First Semester	17	Second Semester
4	CH 1010 General Chemistry	3	ENGR 1410 Programming
3	ENGL 1030 Comp. & Rhetoric	4	MATH 1080 Calc of One Var II
2	ENGR 1020 Engr Discip. & Skills	3	PHYS 1220 Physics I
4	MATH 1060 Calc. of One Var I	3	Arts and Human./Social Sciences ⁵
3	Arts and Human./Social Sciences ⁵	4	Lab Science Requirement ⁵
Year 2			
16	First Semester	17	Second Semester
3	CE 2010 Statics ^{2,6}	4	CPSC 1020 Computer Science II ⁷
4	CPSC 1010 Computer Science I ⁷	3	IE 2100 Design and Ana. Of Work Sys. ⁴
4	MATH 2060 Calc. of Several Var. ²	4	IE 3010 Systems Design I
3	MATH 3110 Linear Algebra ²	3	IE 3600 Ind. App. Of Prob./Stat. I ⁴
2	ENGR 2080 (or 2090 or 2100)	3	IE 3800 Deterministic Oper. Res. ⁴
Year 3			
16	First Semester	17	Second Semester
3	IE 3610 Ind. App. Of Prob./Stat. II	1	IE 3140 Seminar in IE
3	IE 3810 Probabilistic Oper. Res. ⁴	3	IE 3860 Production Plan. And Cont.
3	IE 3840 Engr. Economic Ana.	3	IE 4610 Quality Engineering
3	IE 4400 Dec. Support Systems in IE	3	IE 4650 Facilities Plan. And Design
3	PHYS 2210 Physics with Calc. II	4	IE 4820 Systems Modeling
1	PHYS 1240 Physics Lab. II ³	3	Oral Communication ⁵
Year 4			
15	First Semester	13	Second Semester
4	CPSC 2120 Algorithms & Data Struct.	4	IE 4670 Systems Design II
3	ECE 2070/2080 or 2020/2110	3	MSE 2100 Intro to Mater. Science
3	IE 4880 Human Factors Engr.	3	Management Requirement ⁵
3	Social Science Requirement ⁵	3	Arts and Human./Social Sciences ⁵
3	Ethics and Prof. Practice. ⁵		

Notes:

1 Refer to the General Engineering first year curriculum.

2 This course must be passed with a C or better as a prereq for other courses.

3 PHYS 2230 may be substituted.

4 This course has prereq with C or better requirements.

5 Select from the list in Degree Works or Section 4.1

6 ME 2010 completed with a C or better can be used to satisfy this requirement.

7 CPSC 1060 and CPSC 1070 may be substituted for CPSC 1010 and CPSC 1020.

3.3 The 2014-2015 and 2015-2016 IE curricula

Year 1	
16 First Semester	17 Second Semester
2 ENGR 1020 Engr. Discip. And Skills ^{1,2}	3 ENGR 1410 Prog. And Prob. Sol. ^{1,3}
4 CH 1010 General Chemistry 1	3 PHYS 1220 Physics with Calc. I 1
4 MATH 1060 Calc. of One Var. II	4 MATH 1080 Calc. of One Var. II 1
3 ENGL 1030 Accel. Composition 1	4 Lab Science Requirement 4
3 Arts and Human./Social Sciences ⁴	3 Arts and Human./Social Sciences 4
Year 2	
15 First Semester	18 Second Semester
1 IE 2000 Sophomore Seminar in IE	3 IE 2100 Design and Ana. Of Work Sys. ⁸
4 MATH 2060 Calc. of Several Var. ^{1,9}	4 IE 3010 Systems Design I
3 CE 2010 Statics ^{5,9}	3 IE 2800 Deterministic Oper. Res. ⁸
3 PHYS 2210 Physics with Calc. II	2 ENGR 2080 (or 2090 or 2100)
1 PHYS 2230 Physics Lab. II ⁶	3 IE 3840 Engr. Economic Ana.
3 Math/Science Requirement ^{4,7}	3 MSE 2100 Intro to Mater. Science
Year 3	
16 First Semester	15 Second Semester
1 IE 3680 Professional Practice in IE	3 IE 3860 Production Plan. And Cont.
3 Ethics and Prof. Practice ⁴	3 IE 3810 Probabilistic Oper. Res. ⁸
3 IE 3600 Ind. App. Of Prob./Stat. I ⁸	3 IE 3610 Ind. App. Of Prob./Stat. II
3 IE 4400 Dec. Support Systems in IE	3 ECE 2070/2080 or 2020/2110
6 Arts and Human./Social Sciences	3 COMM 1500 or 2500
Year 4	
16 First Semester	12 Second Semester
4 IE 4820 Systems Modeling	3 IE 4670 Systems Design II
6 IE Technical Requirement ^{4,10}	3 IE Technical Requirement ^{4,10}
3 IE 4610 Quality Engineering	3 Management Requirement ⁴
3 IE 4650 Facilities Plan. And Design	3 Arts and Human./Social Sciences ⁴

Notes:

- 1 This course must be passed with a C or better.
- 2 ENGR 1050 and 1060, completed with a C or better, will satisfy this requirement.
- 3 ENGR 1070, 1080, and 1090, completed with a C or better, will satisfy this requirement. Alternatively, completing ENGR 1300 (or CHE 1300) plus one of CPSC 1610, 1110 or 1010 (with C or better) will satisfy this.
- 4 Select from the list in Degree Works or Section 4.1
- 5 ME 2010 completed with a C or better can be used to satisfy this requirement (if IE 2100 has not yet been completed).
- 6 PHYS 1240 may be substituted.
- 7 If a course other than MATH 3110 chosen to satisfy this requirement, and you haven't yet completed IE 3800 and IE 3810 then you still need to take MATH 3110 to satisfy the prerequisites for IE 3800 and 3810.
- 8 This course has prereq with C or better requirements.
- 9 A grade of a C or better is required if later course has not yet been passed.
- 10 At most 3 credits of IE technical elective can be substituted with 3 credits from the Broadening list.

4 Material for all curricula

4.1 1415 and later BSIE Curriculum – Lists of Approved Courses

DegreeWorks provides a list of the current set of courses associated with your degree. Please consult your course advisor if there appears to be an error.

Each requirement in the degree must be satisfied without “double-dipping”, except CCA and STS.

Lab Science Requirement: 4 units required

BIOL 1030 and 1050
BIOL 1040 and 1060
BIOL 1100
BIOL 1200 and 1220
BIOL 1200 and 1230
CH 1020
GEOL 1010/1030

Management Requirement: 3 units

MGT 2010
MGT 3070
MGT 4110
E L E 4000
ACCT 2010
ML 3010
AS 3090

Ethics & Professional Practice Reqt: 3 units

PHIL 1030
PHIL 3440
PHIL 3450
PHIL 3460
LAW 3220

IE Technical Requirement: 9 units - these courses are offered erratically – see Canvas for planned offerings

Unlisted 4000 level courses can be used by substitution

Such courses include IE 4640 or IE 4700 – they were created after this list

IE 4000 (6 units maximum)
IE 4300
IE 4460
IE 4520
IE 4560
IE 4570
IE 4600
IE 4620

IE 4630
IE 4810
IE 4850
IE 4860
IE 4870
IE 4880
IE 4890
IE 4910

Math / Science Requirement: 3 units – 1415-1516 Curriculum only

BIOL 2010
BIOL 2030
BIOL 2040
BIOL 3150
CH 1020
CH 2230
ENSP 2000
GEOL 2700
GEOL 3000
PHYS 2220
PHYS 3210
PHYS 4170
PHYS 4320

MATH 2080 (4 units)
MATH 3110
MATH 3600
MATH 3650
MATH 4000
MATH 4020
MATH 4100
MATH 4310
MATH 4340
MATH 4350
MATH 4530
MATH 4630
MICRO 2050

Additional IE Technical Electives (Broadening Electives) – incorporated into 2020 and later curricula

- If you wish to use a broadening elective, submit a ‘change of academic program request’ to change your catalog year to 2020-2021 or later. Speak with your academic advisor if you have questions regarding this change.
- Students may utilize ***at most*** 3 credits of broadening elective.
- If you cannot change your catalog year to 2020 or later, you can use a substitution to apply ***up to 3 units*** of broadening elective to the IE Technical Requirement.
- Does not apply to computing emphasis students!

Course	Title
AGM 2050	Principles of Fabrication
AMFG 3800	Introduction to Manufacturing Systems and Processes
AMFG 4200	Collaboration and Teamwork in Manufacturing Systems (by sub only)
ARCH 4240	Product Design
BE/CE 4400	Sustainable Energy Engineering
BIOE 4610	International Study in Bioengineering
BT 2200	Biosystems Technology 1
CE 2060	Structural Mechanics
CE 2550	Geomatics
CE 3310	Construction Engineering and Management
CE 3410	Introduction to Fluid Mechanics
CE 4530	Non-Destructive Evaluation
CH 2010	Survey of Organic Chemistry
CH 2230	Organic Chemistry
CPSC 1010 OR 1060 OR 1110	Computer Science 1 / Intro to Programming in Java / Introduction to Programming in C (the university only allows credit for one of these under all circumstances)
CPSC 4550	Computational Science
CRP 4010	Introduction to City and Regional Planning
CRP 4300	The Nature of Geographic Information Systems (GIS)
CTE 1150	Contemporary Technological Problems
CU 2010 / SUST 2010	Sustainability Leadership
ECE 1010	Robots in Business and Society
ECE 4420	Knowledge Engineering
EES 4860	Environmental Sustainability
ELE 4000	Technology Entrepreneurship
EM 2020	Engineering Mechanics: Dynamics
ENGL 3140	Technical Writing
ENGR 2200	Evaluating Innovations: Fixtures, Fads and Flops
ENGR 2210	Technology, Culture and Design
ENR 3120	Environmental Risks and Society
ENSP/GEOL 1250	Sustainable Resource Use
GEOL 2700	Experiences in Sustainable Development: Water
HLTH 4750	Principles of Health Care Operations Management and Research
HON 2070	Reasoning, Critical Thinking, and Problem Solving
MATH 2080	Differential Equations
MATH 3190	Intro to Proof
ME 4550	Design for Manufacturing
PSYC 3680	Organizational Psychology
PSYC 4350	Human Factors Psychology
STAT 4020	Introduction to Statistical Computing

- Students in some curricula may need to use the Course Substitution mechanism. Check your DegreeWorks first OR change your catalog year to 2020 or later (after consulting your advisor)!

4.2 Important notes from the Clemson Catalog:

Arts and Humanities/Social Science (HSS) Requirement:

The 2016 and later IE curricula include a minimum of 12 credits of HSS courses to satisfy Clemson University's General Education Humanities and Social Science Requirements. Each requirement in the degree must be satisfied without "*double-dipping*," except for the CCA and STS attribute requirements.

The CCA and the STS attribute requirements require that at least one course be taken that has the CCA attribute and one course that has the STS attribute. Students can take certain HSS courses that will also satisfy the CCA and STS requirements. The Undergraduate Catalog provides the list of HSS, CCA, and STS courses <http://catalog.clemson.edu/>.

4.3 Prerequisites

Prerequisite requirements

The IE department strictly enforces course prerequisites. Students should familiarize themselves with all course prerequisites. The course prerequisite information for required IE classes is presented below.

Prerequisite list

The table below shows the prerequisite list for all required IE classes.

IE Course	Prerequisites
IE 2100	ENGL 1030 (C or better), CE 2010 (C or better, starting Fall 19)
IE 3010	ENGL 1030 (C or better), ENGR 1020 (C or better)
IE 3140	-
IE 3600	MATH 2060 (C or better, starting Fall 19)
IE 3610	IE 3600
IE 3800	MATH 3110 (C or better)
IE 3810	MATH 3110 (C or better, starting Fall 19), IE 3600
IE 3840	MATH 1080 (C or better)
IE 3860	IE 3800
IE 4400	ENGR 1410 (C or better)
IE 4610	IE 3610
IE 4650	IE 2100, IE 3800, IE 3810
IE 4820	IE 3610, IE 3810
IE 4880	Junior Standing
IE 4670	IE 2100, IE 3010, IE 3600, IE 3610, IE 3800, IE 3810, IE 3840, IE 3860, IE 4400, IE 4610, IE 4650, IE 4820, [IE 4880 (effective Spring 2020)]

Prerequisite flowchart 2016- current curriculum

The flowchart below shows the prerequisite requirements but not the semester in which each course is to be taken. IE courses can be taken in any semester they are offered as long as prerequisite and other requirements are satisfied.

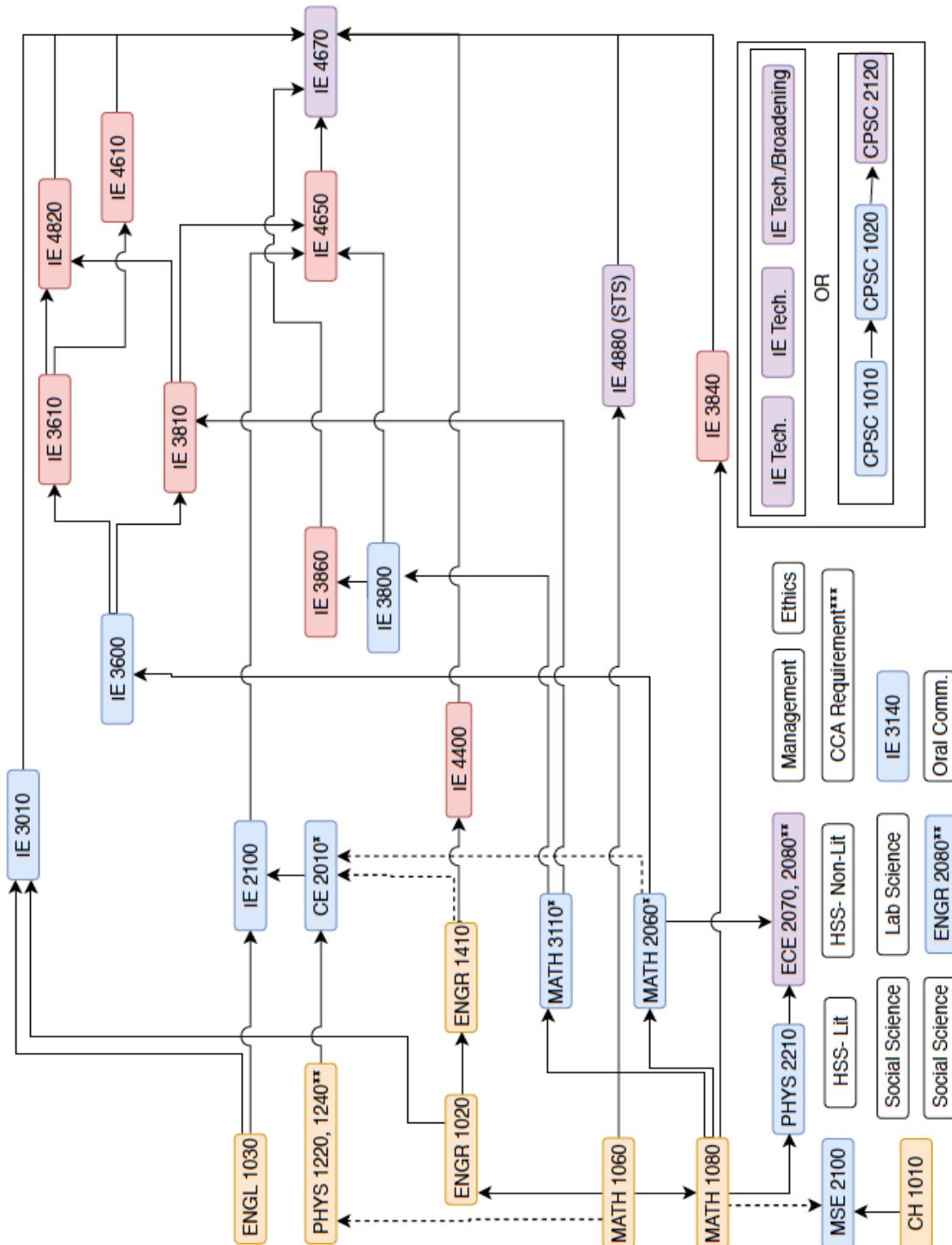
Notes: Courses are color coded according to the semester identified in the curriculum

* Must be passed with a C or better

** Alternative courses are listed in DegreeWorks

***CCA requirement may be satisfied by another course with CCA attribute.

- - - (a dotted line) Indicates Corequisites



4.4 Information for ROTC Students

ROTC students are required to satisfy the curriculum in which they are enrolled. Several course equivalencies / substitutions exist, however:

- The ROTC Oral Communication cluster is integrated into the requirements of the 1415 and later BSIE curricula.
- ML 3010 or AS 3090 are options for the *Management Requirement*.
- ML 4010 and 4020 can be substituted as ENGL 3140, which can then be utilized as a Broadening Elective

4.5 Information regarding the Fundamentals of Engineering Exam

The BSIE curriculum at Clemson University is designed to offer students the opportunity to prepare for the Fundamentals of Engineering Exam. Passing the Fundamentals of Engineering (FE) Exam is the first step in pursuing a professional engineering license. The National Council of Examiners for Engineering and Surveying manages the process and documents it at their website www.ncees.org/exams/fundamentals. The 1415 and later BSIE curricula includes the following required courses outside of Industrial Engineering in part to support instruction in the topics on the FE:

- MSE 2100 Introduction to Materials Science
- ECE 2070/2080 Basic Electrical Engineering
- CE 2010 Statics
- Ethics and Professional Practice course

The courses allowed to satisfy the *Management Requirement* are selected to support the IE FE exam topics in Industrial Management.

5 Planned Course Offerings

Planned course offerings for the following terms are identified in the table below. Note that this list is subject to change, but we offer all required IE classes both in the fall and spring semesters. We also plan to offer three IE technical electives in the fall and the spring semesters.

Summer 2021	Fall 2021	Spring 2022	Summer 2022 TENTATIVE!
Summer I IE 3600 (online) IE 4910 (online) (Case Studies in T&L)	IE 2100 IE 3010 IE 3140 IE 3600 IE 3610 IE 3800	IE 2100 IE 3010 IE 3140 IE 3600 IE 3610 IE 3800	Summer I IE 3600 (online)
Summer II IE 3610 (online) IE 3810 (online) IE 4880 (online)	IE 3810 IE 3840 IE 3860 IE 4400 IE 4610 IE 4650	IE 3810 IE 3840 IE 3860 IE 4400 IE 4610 IE 4650	Summer II IE 3610 (online) IE 3810 (online)
Long Summer IE 3840 (online) IE 4620 (online) IE 4670 (in person) IE 4671 (in person)	IE 4670 IE 4820 IE 4880 At least 3 IE tech electives	IE 4670 IE 4820 IE 4880 At least 3 IE tech electives	Long Summer IE 3840 (online) At least one IE tech elect

6 Co-op Schedules

The Industrial Engineering Department supports the Co-operative Education Program. If you plan to participate, you must be prepared for your graduation to be delayed by one calendar year, even if you only participate in the co-op program for one regular semester.

Please consult your advisor before taking any co-op assignment, and especially before taking a co-op assignment that is not listed below.

In general, the curriculum proceeds as published, simply delaying semesters based on when the co-op semesters are taken.

Standard Curriculum	
Fall	spring
fa, soph	sp, soph
fa, jr	sp, jr
fa, sr	sp, sr

Co-op Option #1		
begin summer, prior to sophomore year		
fall	spring	summer
		co-op
fa, soph	co-op	
co-op	sp, soph	
fa, jr	sp, jr	
fa, sr	sp, sr	

Co-op Option #2		
begin fall, sophomore year		
fall	spring	Summer
co-op	fa, soph	co-op
sp, soph	co-op	
fa, jr	sp, jr	
fa, sr	sp, sr	

Co-op Option #3		
begin spring, sophomore year		
Fall	spring	summer
fa, soph	co-op	
co-op	sp, soph	co-op
fa, jr	sp, jr	
fa, sr	sp, sr	

Co-op Option #4		
begin summer, after sophomore year		
fall	spring	Summer
fa, soph	sp, soph	co-op
fa, jr	co-op	
co-op	sp, jr	
fa, sr	sp, sr	

Co-op Option #5		
begin fall, junior year		
fall	spring	summer
fa, soph	sp, soph	
co-op	fa, jr	co-op
sp, jr	co-op	
fa, sr	sp, sr	

7 Study Abroad

The Industrial Engineering Department encourages students to consider study abroad, whether through a summer or semester experience. If you plan to participate, you must be aware that the semester abroad may increase the course load taken in other semesters. Summer study abroad provides great opportunities!

The best advice is to plan ahead! The best semester for Study Abroad is Fall sophomore year because so many of the courses are offered at many institutions with math and engineering courses. The second best semesters are Spring sophomore year and Fall junior year because several of those IE courses are offered online in summer and you have time to rearrange your courses to accommodate the courses that are offered at your abroad institution.

8 Changing majors into IE

In order for any student change majors in IE the following courses must be completed with a C or better:

CH 1010

ENGL 1030

ENGR 1020 or ENGR 1050 and ENGR 1060

ENGR 1410 or ENGR 1070 and ENGR 1080 and ENGR 1090

or ENGR 1300 (or CHE 1300) plus one of CPSC 1610, 1110, 1010

MATH 1060 or MATH 1040 and MATH 1070

MATH 1080

PHYS 1220

Furthermore,

1. Student must have a 2.0 overall GPA
2. Student must have 2.0 Engineering GPA

8.1 Changing into IE from General Engineering

1. The semester prior to entering IE, the student will meet with their GE advisor during registration advising to plan their next semester.
2. The GE student will not be able to submit their change of major until passing final grades are posted for the courses listed above.
3. The GE student will not be able to register for IE courses 3000 level or higher until their change of major is complete.

8.2 Changing into IE from other majors

1. Student must have completed the courses documented above with a C or better
2. The student must complete a course plan that documents all courses to be taken until graduation.
3. These plans can be reviewed via email by sending to the appropriate advisor identified in the Academic Advising section of this document.
4. You may also set up an "Explore Industrial Engineering" appointment with the appropriate IE academic advisor through CU Navigate.

Creating a What-If DegreeWorks Report, along with the table below, will indicate how your courses will map to the IE curriculum.

Equivalent	Course in IE curriculum
Ch E 319	MSE 2100
ENGR 1300 or CHE 1300 Plus one of: CPSC 1610, CPSC 1010, CPSC 1110	ENGR 1410 OR ENGR 1070, 1080, 1090

Although course substitutions are required for the courses listed above, this is essentially a formality ***provided that the courses are required by your curriculum***. To receive credit for a course that does not appear here or in your DegreeWorks Report, it must be deemed equivalent to a course in the IE curriculum. In this case, you would have to submit a specific request for a course substitution (e.g., ECE xxxx for IE yyyy), along with the syllabus of the course that you believe to be equivalent.

8.3 How to change majors

After receiving approval from an academic advisor in IE:

Submit an Undergraduate Change of Program request in iROAR by navigating through to Students -> Student Records -> Undergraduate Change of Program. For more instructions on the process in iRoar:

<https://www.clemson.edu/registrar/student-menu/student-records/majors-minors.html>

9 Additional Registration and Course Planning Topics

9.1 Credit to be earned at another school

The student should obtain approval of each course *prior* to scheduling the class. By obtaining advance approval, the student is assured of receiving proper credit at Clemson upon satisfactory completion of the course. Information and forms relative to this approval may be obtained at

<https://www.clemson.edu/registrar/forms/student-forms/index.html>. The *Transfer Credit Equivalency List*, which is a database containing the Clemson University course equivalencies for approximately 1200 accredited colleges and universities nationwide, may be found at

<https://www.clemson.edu/admissions/tcel/>.

Please reference this list before seeking approval from your advisor. When considering taking courses elsewhere, keep in mind that to qualify for an undergraduate degree, a student must complete through instruction from Clemson *a minimum of 37 of the last 43 credits* presented for the degree. However, a waiver may be obtained for approved study abroad experiences through the Undergraduate Academic Services Office, E-103 Martin Hall.

9.2 Petitions

Students may petition for exceptions to departmental registration policies and curriculum requirements. The merits of the petition should first be discussed with your academic advisor. If you elect to pursue a petition, the petition form (that you must complete) and the associated documentation is then routed to the Undergraduate Curriculum Committee through your academic advisor for review. The Committee makes a recommendation to the Chair, who renders a decision based on your documentation and the recommendation of the Committee. The Undergraduate Program Coordinator will contact your academic advisor with the results of the petition.

9.3 Enrolling in a course and its prerequisites concurrently

The IE department strictly enforces prerequisite requirements. At the present time, only the following exceptions are allowed:

- IE 3860 may be taken concurrently with IE 4670 provided that MGT 3900 has been completed. Please note that MGT 3900 has the following prerequisites: MGT 2180 and IE 3610.
- IE 3610 may be taken concurrently with IE 4610 and/or IE 4820 provided that one of STAT 2300 (not AP credit), MATH 3020, or STAT 4110 has been successfully completed before either IE 4610 or IE 4820 is taken.

Summer courses offered by other institutions *may* also be a viable option to satisfy prerequisite content. It is the responsibility of the petitioner to identify any candidate course and to assemble documentation for review by the Undergraduate Committee.

9.4 IE course attempt policy (2016 – 2017 catalog year and later)

No student may exceed three attempts, including a W and grade forgiveness (with the exception of a withdrawal from the University), to complete any IE course with a grade of D or better. Moreover, a third attempt is granted by a written request to the department chair (through the Undergraduate Program Coordinator) before the deadline to add a course in a subsequent term. This policy applies only to students in the 2016 and later catalog years.

9.5 IE academic eligibility

Industrial Engineering students who have a cumulative grade-point average (GPA) or cumulative engineering grade-point average (EGPA) below 2.0 are on probation and will have restricted enrollment in classes. Students whose cumulative grade-point average is below 2.0 are subject to the regulations stipulated under Academic Eligibility Policy. Students on probation for EGPA below 2.0 who fail to recover in the first regular semester (fall or spring) will not be allowed to register for industrial engineering classes. After one year, such students may petition the Industrial Engineering Department for continued enrollment. An advising policy for students on probation is available from the Industrial Engineering Department.

IE academic probation: A student who fails to maintain a cumulative engineering grade-point average (EGPA) of 2.0 or higher is placed on academic probation. A student on academic probation may enroll in a maximum of 13 credit hours, unless permission for a higher course load is granted by the undergraduate committee. Students on academic probation are expected to participate in the Department's Academic Recovery Program.

IE academic suspension: A suspended student is ineligible to enroll in IE classes immediately following the suspension notification. Suspension is for one semester only, and the student is eligible to reenroll the following semester. A student who enrolls after a suspension is not allowed to register for IE classes if he/she does not meet the academic eligibility criteria listed below.

IE academic eligibility standards: A student on academic probation (EGPA below 2.0) will remain academically eligible if one of the following conditions is met.

1. The student earns a 2.4 or higher grade-point average on the engineering courses for the semester.
2. The student achieves the minimum cumulative Engineering Grade-Point Average (EGPA) listed below.

Total Attempted Engineering Hours	EGPA
10-19	1.75
20-39	1.85
40-59	1.95
60+	2.00

9.6 Graduate Coursework

Seniors with 3.0 or higher GPA are eligible to request enrollment in graduate level courses by completing the GS6 form. For additional information and to obtain a copy of the GS6 form please visit (<https://www.clemson.edu/graduate/students/forms.html>).

Seniors with 3.4 or higher GPA are eligible to request participation in the Combined Bachelor's/Master's Plan. Under this plan, students may reduce the time necessary to earn a master's degree by applying graduate credits to both undergraduate and graduate program requirements. Interested students need to complete the GS6-Bachelor-to-Graduate form. For additional information and to obtain a copy of the GS6-Bachelor-to-Graduate form please visit <https://www.clemson.edu/graduate/students/forms.html>.

What is the difference between GS6 and GS6-Bachelor-to-Graduate forms? In the IE Department, the GS6-Bachelor-to-Graduate form allows IE students to double-count up to 12 credit hours towards both BS and MS requirements. The total credit hours taken for the bachelor's and master's must be at least 150 credit hours; that is, the credit hours counted towards the bachelor's degree plus the credit hours taken after the bachelor's is awarded must total at least 150. For the bachelor's and PhD, the total must be 180 credit hours. The GS6 form allows you to take graduate level courses, but there is no double-counting. Graduate courses taken using the GS6 form can either be used to meet BS requirements or MS requirements but not both.

10 Expanding Experiences Outside of the Classroom

10.1 Creative Inquiry (CI)

CI provides opportunities in the form of open-ended problems that extend beyond the classroom. These research experiences are guided by one or more faculty mentors and will typically involve other undergraduate and graduate students. Industrial Engineering CIs are limited both by the number of faculty participating and the number of slots available in the groups of the participating faculty. In order to be considered as a member of a research group, you must first apply. The application process varies across the faculty, from very informal to formal. It may include an interview and/or a written statement of purpose (a brief essay about one's research goals, including motivation), for example; GPA may also be a criterion. General information about CI may be found at <http://www.clemson.edu/centers-institutes/watt/creative-inquiry/>.

Universal CIs are listed on the Creative Inquiry website with details on how to apply. Universal CIs do not count towards the IE curriculum but are encouraged experiences. Departmental CIs (IE 4040) are listed in Banner and the student may contact the faculty member for details on how to apply. Departmental CI experiences (IE4040) may count towards the IE Technical Requirements with a maximum of 6-credits.

10.2 IE 2680: CI Seminar

IE 2680/2680 (HON) is our introductory CI course. It is a one-hour seminar that is graded on a pass/fail basis. The objectives of this seminar are to introduce the research process and to make known research opportunities in the Department. It is one way to dip your toe into the water before diving in, so to speak. While it is not a degree requirement, IE 2680 (HON) is required of all students seeking Departmental Honors. Individual faculty mentors may require IE 2680 of other students at their discretion. IE 2680/2680 (HON) does not necessarily have to be taken prior to beginning the IE 4040/4000 (HON) sequence. In instances where it is required, individual mentors may permit it to be taken concurrently.

10.3 Departmental Honors

Departmental Honors, unlike General Honors, is thesis-based rather than course-based. The IE honors students must complete IE 2680 (HON) and IE 4000 (HON). These courses serve as a mechanism to get academic credit for the thesis. While the word 'thesis' may be somewhat intimidating, it basically

documents the research process and outcomes. If students are researching in a team setting, each student must make a distinct contribution, but team members may submit a common document as his or her thesis. Honors students may satisfy up to 6 hours of the IE technical requirement by completing their 6-hour thesis requirement, IE 4000 (HON). For additional information please visit <https://www.clemson.edu/cuhonors/current-students/student-handbook/departmental-honors.html>.

10.4 Course and curriculum requirements of other departments

There are certain curriculum requirements of other departments that do not currently apply to IE majors. One example is the requirement of the mechanical engineering curriculum that “a student is allowed to enroll in any ME course only when all prerequisites, as defined by current official listings for that course, have been passed with a grade of C or higher”. However, requirements of courses apply to all students in all majors taking that course. For example, as of Fall 2012, CE 2080 requires CE 2010 be passed with a C or better. Since this is a course requirement, it applies to all students.

Contact the Undergraduate Coordinator if you should experience any difficulty with these course registrations.

11 Information for Non-IE and Transfer Students

Registration Requirements

General Engineering students are permitted to enroll in industrial engineering courses, but only those at the 2000-level. Other qualified students are also permitted to enroll in IE courses, although a cumulative GPA of 2.0 or higher is required for registration in courses numbered 3000 or higher. Nevertheless, priority for registration in these courses is given to those majors for whom the course is a degree requirement

12 IE Objectives and Outcomes

Program Educational Objectives:

Within 3-5 years of graduation, BSIE students will:

- Build a record of successful work experiences designing, developing, implementing and/or improving engineering systems.
- Demonstrate a commitment to professional development through the pursuit of professional certification, advanced degrees, and/or knowledge of advances in their field.
- Take on greater responsibility or leadership roles in their workplace, profession, and/or community.

Program Educational Objectives Affirmed by the IE department October 9, 2019.

Student Outcomes

By the time of graduation, BSIE students will have:

- an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
- 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
- an ability to communicate effectively with a range of audiences
- an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgements, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
- 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
- an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions
- an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Student Outcomes adopted by the IE department May 8, 2019