



Undergraduate Degree Map for Completion in Four Years

College:	College of Science, Engineering & Technology <input type="button" value="v"/>
Department:	Integrated Engineering <input type="button" value="v"/>
Name of Program:	IRON RANGE/TWIN CITIES ENGINEERING <input type="button" value="v"/>
Degree Designation:	BSE <input type="button" value="v"/>
Emphasis/Concentration:	<input type="text"/> <input type="button" value="v"/>
Option:	<input type="text"/>
Version:	<input type="text"/> <input type="button" value="v"/>
Version Explanation:	<input type="text"/>
Type of Program:	Standard Major <input type="button" value="v"/>
Minor Required:	No <input type="button" value="v"/>
Specific Minor (if required):	<input type="text"/>

Program Description:

The Bachelor of Science in Engineering (BSE) is a novel and unique engineering educational program offered in the Iron Range region of northeast Minnesota (Virginia, MN) and in the metro Twin Cities area on the campus of Normandale Community College (Bloomington, MN) for the 3rd and 4th year of the undergraduate engineering program. Students transfer into the Bachelor of Science in Engineering program after two years of pre-engineering work elsewhere.

These students learn traditional engineering knowledge and skills in a project based learning environment. The Iron Range Engineering (IRE) educational model is a project-based-learning (PBL) model in which students work with industry and others on real-life design projects with a focus on producing graduates with integrated technical/professional knowledge and competencies. Learning is done in the context of the design projects.

The IRE educational model emphasizes innovation, creativity, design, experimental techniques, and modeling techniques with an ultimate goal of regional economic development in the Iron Range region. The BSE program allows students to tailor their education to emphasize different engineering fields. Successful completion of the program culminates in the Bachelor of Science in Engineering.

Graduates will achieve at least two of the objectives, but will be capable of achieving all within one to four years of graduation.

- 1) Designing, implementing and integrating thermal, electrical, mechanical, and computer-controlled systems, components, and processes that will serve the region, the nation and the world
- 2) Continuing their education through technical or professional graduate programs, professional licensure, or certifications, and the wide variety of other types of life-long learning
- 3) Creating, developing, leading, and managing in a wide range of enterprises that result in sustainable and enhanced economic regional development through their disciplinary expertise
- 4) Demonstrating actions such as community service, professional ethics, professional responsibility and mentoring future

Admission Requirements:

Admission to the program is granted by the department. In addition to the University admissions requirements, and prior to entering the engineering curriculum in the first semester of the junior year in full standing, students must complete a minimum of 49 semester credit hours in the following areas:

Calculus and Differential Equations - 16 semester hours.

General Physics (calculus-based) - 8 semester hours.

Additional math and science courses, including one semester of chemistry, - 8 semester hours.

Introductory engineering courses including programming, statics, dynamics, and lab-based electric circuits - 13 semester hours.

English Composition - 4 semester hours.

All courses and credits shown above must be completed before full enrollment in 300-level engineering courses, unless special permission is granted by the department chair. All of the above courses must be taken for "grade". It is not acceptable for the student to take any of these courses on a pass/no credit basis. A grade of "C-" or better must be achieved in each course.

To be considered for admission, students must have a 2.5 GPA in all courses required for admission.

Students may be admitted provisionally while these requirements are being satisfied.


Advising:

You are expected to meet with your advisor on a regular basis to ensure courses are taken in an order that will lead to successful completion of the degree.

A complete listing of program faculty, policies, and course descriptions is available in the undergraduate bulletin.

TERM 1 - FALL

<i>Designator:</i>	<i>Course:</i>	<i>Course Name:</i>	<i>Credits:</i>	<i>Milestones:</i>
				Overall GPA \geq 2.0 Course Completion Rate \geq 67% Completion of \geq 15 credit hours
MATH	121	Calculus 1	4	
CHEM	201	General Chemistry OR CHEM 191 Chemistry for Engineers	5	Only take CHEM 191 if you plan to take 3 semesters of physics. Otherwise, you will need to take CHEM 201 to prepare for CHEM 202 and 2 semesters of physics.
ENG	101	Composition	4	
ENGR	110	Intro to Project-based Engineering OR CS 110 Computer Science 1	3	Choose at least 3 credits of intro to engineering or programming coursework.

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Term 1 Notes:

Overall GPA \geq 2.5. All courses this semester completed with a C- or better for admission to program.

TERM 2 - SPRING

<i>Designator:</i>	<i>Course:</i>	<i>Course Name:</i>	<i>Credits:</i>	<i>Milestones:</i>
				Overall GPA \geq 2.0 Course Completion Rate \geq 67% Completion of \geq 30 credit hours Advance to Sophomore status

<i>Designator:</i>	<i>Course:</i>	<i>Course Name:</i>	<i>Credits:</i>	<i>Milestones:</i>
				Overall GPA \geq 2.0 Course Completion Rate \geq 67% Completion of \geq 30 credit hours Advance to Sophomore status
MATH	122	Calculus 2	4	Grade of C- or better
PHYS	221	General Physics 1	4	Grade of C- or better
CMST	102	Public Speaking OR ENG 271W Technical Writing	3	
ECON	201	Macroeconomics OR ECON 202 Microeconomics	3	
		Arts & Humanities or Social Science class (See List)	3	

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Term 2 Notes:

TERM 3 - FALL

<i>Designator:</i>	<i>Course:</i>	<i>Course Name:</i>	<i>Credits:</i>	<i>Milestones:</i>
				Overall GPA \geq 2.0 Course Completion Rate \geq 67%
MATH	321	Ordinary Differential Equations	4	Grade of C- or better
PHYS	222	Physics 2	3	Grade of C- or better
PHYS	232	Physics 2 Laboratory	1	Grade of C- or better
ME	212	Statics	3	Grade of C- or better
		Arts & Humanities or Social Science class (See List)	4	Must have one AH/SS class that is four credits.

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Term 3 Notes:

TERM 4 - SPRING

<i>Designator:</i>	<i>Course:</i>	<i>Course Name:</i>	<i>Credits:</i>	<i>Milestones:</i>
				Overall GPA \geq 2.0 Course Completion Rate \geq 67% Completion of \geq 60 credit hours Advance to Junior status
MATH	223	Calculus 3	4	Grade of C- or better
PHYS	232	Physics 3 OR CHEM 202 General Chemistry 2	3	Grade of C- or better
PHYS	233	Physics 3 Laboratory (if taking PHYS 232)	1	Grade of C- or better
ME	214	Dynamics	3	Grade of C- or better
EE	230	Circuit Analysis 1	3	Grade of C- or better
EE	240	Evaluation of Circuits (Lab companion to EE 230)	1	Grade of C- or better

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Term 4 Notes:

TERM 5 - FALL

<i>Designator:</i>	<i>Course:</i>	<i>Course Name:</i>	<i>Credits:</i>	<i>Milestones:</i>
				Overall GPA \geq 2.0 Course Completion Rate \geq 67% Apply for Graduation
ENGR	492	Seminar	1	
ENGR	301	Design I	3	
ENGR	311W	Professionalism I	3	
ENGR		Engineering Competencies	8	

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Term 5 Notes:

Engineering competencies are 1 credit engineering technical topics selected from the following sets:
 ENGR 320 Engineering Core Competencies (2 required credits)
 ENGR 370 Mechanical Core Competencies (6 required credits)
 ENGR 371 Electrical Core Competencies (6 required credits)
 ENGR 420 Advanced Engineering Core Competencies (2 required credits)
 ENGR 455 Advanced Technical Competency
 ENGR 470 Mechanical Advanced Competency
 ENGR 471 Electrical Advanced Competency
 Please see the bulletin for more detailed description of subtopics.
 Focus areas are based on topics in the advanced elective competencies (ENGR 455, ENGR 470, ENGR 471). Students must complete 14 credits in their focus area to have it recognized by the department.
 Students who do not select a focus area, must complete 16 credits of ENGR 455, ENGR 470 and ENGR 471 without restrictions.
 All grades in ENGR coursework need to be C- or better. The cumulative GPA of all ENGR coursework needs to be 2.5 or higher for

TERM 6 - SPRING

<i>Designator:</i>	<i>Course:</i>	<i>Course Name:</i>	<i>Credits:</i>	<i>Milestones:</i>
				Overall GPA \geq 2.0 Course Completion Rate \geq 67% Completion of \geq 90 credit hours Advance to Senior status
ENGR	492	Seminar	1	
ENGR	302	Design II	3	
ENGR	312W	Professionalism II	3	
ENGR		Engineering Competencies	8	Select from ENGR 320, 370, 371, 420, 455, 470, 471.
		Arts & Humanities or Social Science class (See List)	3	This class should be chosen to make sure that you have taken 2 arts and humanities or 2 social science classes.

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Term 6 Notes:

Complete at least 14 competencies before registering for ENGR 401. Be aware of the Arts & Humanities and Social Science requirements: 2 of each plus either ECON 201 or ECON 202 for a total of 16 credits. One pair of classes must come from the same department, for example, two MUS classes, or two PHIL classes or two ECON classes. The diverse cultures requirement is waived for students transferring in 60 or more credits. On campus students should select Arts & Humanities and Social Science courses that help them meet the diverse cultures requirements.

TERM 7 - FALL

Designator:	Course:	Course Name:	Credits:	Milestones:
				Overall GPA \geq 2.0 Course Completion Rate \geq 67%
ENGR	492	Seminar	1	
ENGR	401	Capstone Design I	3	
ENGR	411W	Professionalism III	3	
ENGR		Engineering Competencies	8	Select from ENGR 320, 370, 371, 420, 455, 470, 471.
		Arts & Humanities or Social Science class (See List)	3	This class should be chosen to make sure that you have completed the Arts & Humanities and Social Sciences requirements.

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Term 7 Notes:

Complete at least 22 competencies before registering for ENGR 402.
Apply for graduation in this term.

TERM 8 - SPRING

Designator:	Course:	Course Name:	Credits:	Milestones:
				Overall GPA \geq 2.0 Course Completion Rate \geq 67%
ENGR	492	Seminar	1	
ENGR	402	Capstone Design II	3	
ENGR	412W	Professionalism IV	3	
ENGR		Engineering Competencies	8	Select from ENGR 320, 370, 371, 420, 455, 470, 471.

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Term 8 Notes:

Complete all technical competencies and take the Fundamentals of Engineering exam in this term.

PROGRAM NOTES

Students apply to the program in Term 4. Admission is based on GPA, completion of prerequisite coursework, a letter of recommendation and essays. Please see <http://cset.mnsu.edu/ie/apply.html> for more information. 16 credits of Arts & Humanities and Social Sciences are required

6-7 credits of Arts & Humanities Courses
 6-7 credits of Social Science Courses
 3 credits of Macro or Microeconomics

At least 2 courses must come from the same department.
 History classes can count as either Arts & Humanities or Social Sciences but not both.

A list of acceptable courses is maintained by the engineering departments. Typical excluded courses are ones where you learn a particular skill (like ceramics, photography or introductory French). Analysis of these topics would be included (e.g., history of photography, intermediated French, French literature)

DEGREE MAP CHECKLIST: GRADUATION REQUIREMENTS

<input checked="" type="checkbox"/>	1. Minimum of 15 credits per semester
<input type="checkbox"/>	2. General Education = 44 credits
<input checked="" type="checkbox"/>	3. Diverse Cultures = 2 course (6 credits minimum) from two disciplines
<input checked="" type="checkbox"/>	4. Writing Intensive = 2 courses (6 credits minimum)
<input checked="" type="checkbox"/>	5. Major = 128 credits
<input checked="" type="checkbox"/>	6. Upper-Division Requirements = 40 credits minimum
<input type="checkbox"/>	7. Professional Education (if required) = 30 credits
<input type="checkbox"/>	8. Language Requirements (if BA) = 8 credits minimum
<input type="checkbox"/>	9. Minor = <input type="text"/> credits
<input checked="" type="checkbox"/>	10. Total credits required for degree 128

DEGREE MAP COMPLETE

<input checked="" type="checkbox"/>	Map is complete and ready for review <ol style="list-style-type: none"> 1. Faculty please send an email to your Department Chair when map is ready to review. 2. Department Chair please send an email to your Dean when map is ready to review. 3. Dean please send an email to the Assistant Vice President for Undergraduate Studies when map is ready to review.
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DEAN APPROVAL

<input checked="" type="checkbox"/>	Map reviewed and approved by Dean
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Save and Close