

FERRIS STATE UNIVERSITY

SURVEYING ENGINEERING (SURE) – 135 CREDITS

2020-2021

Bachelor of Science (BS)

College of Engineering Technology

Student Name	Student ID

CREDIT VARIANCE

Credits required may vary based on course placement, prerequisites, etc. If you have questions, contact your advisor.

UNIVERSITY REQUIREMENTS – 60 CREDITS REQUIRED

(Course prerequisites are shown in parentheses)

FIRST YEAR SEMINAR REQUIREMENT (FSUS 100 OR EQUIVALENT) – 1 CREDIT REQUIRED

All First-Time-In-Any-College Freshmen (FTIACs) must complete a one-credit FSUS 100 course, or its equivalent. Additional information and the definition of FTIAC for FSUS purposes can be found in the: [Ferris State University Academic Affairs FSUS Policy](#)

Prefix	Code	Course Title and Prerequisites	Credits	Grade
SURE	100	Introduction to Surveying Engineering (None)	1	

UNIVERSITY GENERAL EDUCATION REQUIREMENTS – 59 CREDITS REQUIRED

Courses in this section are required to satisfy the University General Education Requirements for a bachelor's degree. The University General Education requirements can be found on the: [Ferris State University General Education Requirements Webpage](#)

COMMUNICATION COMPETENCY – 9 CREDITS REQUIRED (OR THEIR EQUIVALENT)

SURE 365, 420, and 465 are major courses that are also considered Writing Intensive Courses (WICs) and satisfy the upper level English requirement.

Prefix	Code	Course Title and Prerequisites	Credits	Grade
COMM	121	Fundamentals of Public Speaking (None)	3	
ENGL	150	English 1 (ENGL 074 or English ACT 14 or (Pre-2016) Reading SAT 370 or (Post-2016) ERW SAT 450 or TOEFL Internet Total Score 61 or MSU-ELT Composite 73 or IELTS Overall 5.5)	3	
ENGL	250	English 2 (ENGL 150 with C- or higher)	3	
SURE	365	Legal Aspects of Survey 1 (ENGL 250; Co-Requisite SURE 215) (<i>Met in Major</i>)	0	
SURE	420	Professional Practice of Surveying (SURE 365 and ENGL 250) (<i>Met in Major</i>)	0	
SURE	465	Legal Aspects of Survey 2 (SURE 365 and ENGL 250) (<i>Met in Major</i>)	0	

QUANTITATIVE LITERACY COMPETENCY – 4 CREDITS REQUIRED (OR THEIR EQUIVALENT)

Prefix	Code	Course Title and Prerequisites	Credits	Grade
MATH	220	Analytical Geometry and Calculus 1 (MATH 126 or 130 either with C- or higher or Math ACT 26 or (Pre-2016) Math SAT 590 or (Post-2016) Math SAT 620)	4	

NATURAL SCIENCES COMPETENCY – 8 CREDITS REQUIRED

Two courses are required with a minimum of 6 credits: must have at least one lab course.

Prefix	Code	Course Title and Prerequisites	Credits	Grade
CHEM	121	General Chemistry 1 (CHEM 103 with C- or higher and (MATH 115 with C- or higher or Math ACT 24 or (Pre-2016) Math SAT 560 or (Post-2016) Math SAT 580))	5	
GEOL	131	Geology and Land Use Management (None)	3	

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CULTURE COMPETENCY – 9 CREDITS REQUIRED

Three courses are required with a minimum of 9 credits: must be from two different disciplines and have at least one 200 level or higher course.

Prefix	Code	Course Title and Prerequisites	Credits	Grade
SURE	331	Ethics-Prof in Engineering-Technology (ENGL 150)	3	

SELF AND SOCIETY COMPETENCY – 9 CREDITS REQUIRED

Three courses are required with a minimum of 9 credits: must be from two different disciplines, have at least one 200 level or higher course, and at least one Self and Society Foundation course.

Prefix	Code	Course Title and Prerequisites	Credits	Grade
		[Foundation]		
		[200+]		

U.S. DIVERSITY COMPETENCY – 1 COURSE REQUIRED

If not met by courses taken for Culture Competency, Self and Society Competency, or Michigan Transfer Agreement (MTA), a student must have one course with the U.S. Diversity attribute. Some courses include both Global and U.S. Diversity attributes.

Prefix	Code	Course Title and Prerequisites	Credits	Grade

GLOBAL DIVERSITY COMPETENCY – 1 COURSE REQUIRED

If not met by courses taken for Culture Competency, Self and Society Competency, or Michigan Transfer Agreement (MTA), a student must have one course with the Global Diversity attribute. Some courses include both Global and U.S. Diversity attributes.

Prefix	Code	Course Title and Prerequisites	Credits	Grade

COLLABORATION COMPETENCY – COURSES REQUIRED MET IN MAJOR

If not met by courses taken in the bachelor's degree program, a student must have two courses with the Collaboration attribute. Some courses include both Collaboration and Problem Solving attributes.

Prefix	Code	Course Title and Prerequisites	Credits	Grade
SURE	453	Geodesy 2 (SURE 373 and 452) (<i>Met in Major</i>)	0	
CENG	499	Applied Research in Surveying Engineering (SURE 420) (<i>Met in Major</i>)	0	

PROBLEM SOLVING COMPETENCY – COURSES REQUIRED MET IN MAJOR

If not met by courses taken in the bachelor's degree program, a student must have two courses with the Problem Solving attribute. Some courses include both Collaboration and Problem Solving attributes.

Prefix	Code	Course Title and Prerequisites	Credits	Grade
SURE	453	Geodesy 2 (SURE 373 and 452) (<i>Met in Major</i>)	0	
CENG	499	Applied Research in Surveying Engineering (SURE 420) (<i>Met in Major</i>)	0	

ADDITIONAL GENERAL EDUCATION REQUIREMENTS – 20 CREDITS REQUIRED

These courses are additional General Education courses to meet the requirements for this specific program.

Prefix	Code	Course Title and Prerequisites	Credits	Grade
MATH	230	Analytical Geometry and Calculus 2 (MATH 220 with C- or higher)	4	
PHYS	241	General Physics 1 (MATH 220 with C- or higher)	5	
PHYS	242	General Physics 2 (PHYS 241 and MATH 230 both with C- or higher)	5	
MATH	322	Linear Algebra (MATH 230 with C- or higher)	3	
MATH	330	Differential Equations (MATH 230 with C- or higher)	3	

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COLLEGE REQUIREMENTS – 75 CREDITS REQUIRED

(Course prerequisites are shown in parentheses)

MAJOR COURSES – 75 CREDITS REQUIRED

These courses are used to calculate the major 2.00 GPA requirement.

Prefix	Code	Course Title and Prerequisites	Credits	Grade
SURE	110	Fundamentals of Surveying (None; Co-Requisite MATH 120)	4	
SURE	115	Introduction to Computer Mapping (None)	2	
CONM	121	Materials Properties and Testing (MATH 115, 116, 120, 126, 130, 132, 216, 220, or 230 any with C- or higher or Math ACT 24 or (Post-2016) Math SAT 580)	3	
SURE	215	Surveying Computations (SURE 110 and 115)	3	
CENG	220	Engineering Surveying (SURE 110)	3	
GISC	225	Principles of Geographic Information Systems (None)	3	
CENG	240	Engineering Statistics (MATH 230; Co-Requisite PHYS 241)	3	
SURE	230	Advanced Surveying (SURE 110 and 115)	3	
GISC	239	Remote Sensing (None)	3	
SURE	272	Programming Applications in Geomatics (SURE 215 and (MATH 130 or Math ACT 26 or (Pre-2016) Math SAT 590 or (Post-2016) Math SAT 610))	2	
CENG	321	Hydraulics Engineering (PHYS 242 and MATH 230)	4	
SURE	340	Photogrammetry (SURE 110)	3	
SURE	365	Legal Aspects of Surveying 1 (ENGL 250; Co-Requisite: SURE 215)	3	
SURE	366	Evidence and Procedure for Boundary Locations (SURE 365)	3	
SURE	372	Adjustment Computations 1 (SURE 230, 272, MATH 230, and 322)	2	
SURE	373	Adjustment Computations 2 (SURE 372)	3	
SURE	420	Professional Practice of Surveying (SURE 365 and ENGL 250)	3	
CENG	421	Soils Engineering (CENG 240, CONM 121 and MATH 220)	4	
GISC	425	Technical Issues in Geographic Information Systems and Cartography (GISC 225 and SURE 272)	3	
SURE	440	Advanced Photogrammetry (SURE 340 and 373)	3	
SURE	452	Geodesy 1 (SURE 230 and 372)	4	
SURE	453	Geodesy 2 (SURE 373 and 452)	4	
SURE	465	Legal Aspects of Survey 2 (SURE 365 and ENGL 250)	3	
CENG	499	Applied Research in Surveying Engineering (SURE 420)	4	

NOTES

- Students who return to the university after an interrupted enrollment, not including summer semester, must normally meet the requirements of the curriculum which are in effect at the time of their return, not the requirements which were in effect when they were originally admitted.
- This program is accredited by Engineering Accreditation Commission (EAC) of Accreditation Board for Engineering and Technology, Inc. (ABET).

ADMISSION REQUIREMENTS

NEW STUDENT ADMISSION REQUIREMENTS

- 2.75 High School GPA (on a 4.00 scale)
- Math ACT Score of 26 or Post-2016 Math SAT Score of 610

TRANSFER STUDENT ADMISSION REQUIREMENTS

- 2.00 Minimum GPA (on a 4.00 scale)
- Placement into MATH 220
- Placement into ENGL 150

PROGRAM OUTCOMES

1. The student will have a broad education and knowledge of contemporary issues necessary to understand the impact of surveying engineering solutions in a global, societal, and environmental context.
2. The student will have an ability to solve surveying engineering problems in practice by applying fundamental knowledge of mathematics, statistics, science, and by using modern surveying engineering techniques, skills, and tools.
3. The student will have the ability to identify, formulate, and solve surveying engineering problems, particularly the planning, design, establishing horizontal and vertical control, land use design, boundary determination, mapping and field layout of infrastructure that meet standards of accuracy and precision, keeping in mind cost, time, safety and quality needs, and objectives.
4. The student will have an ability to design and conduct experiments and to analyze and interpret data in engineering surveying, topographic surveying, geodetic surveying, and boundary surveying.
5. The student will have the ability to communicate technical material, written papers/reports, and oral presentations.
6. The student will have the ability to function within multi-disciplinary teams.
7. The student will have an understanding of professional, societal, and ethical practice and responsibilities.
8. The student will have the recognition of the importance of professional licensure and a recognition of the need for, and an ability to engage in, life-long learning.

GRADUATION REQUIREMENTS

In order to graduate from Ferris State University, students must meet both University and Programmatic Graduation Requirements.

UNIVERSITY GRADUATION REQUIREMENTS

These are the minimum graduation requirements for a bachelor's degree at Ferris State University:

- All requirements as specified in the [University Requirements](#) section must be met.
- A minimum of 120 credits must be earned.
- A 2.00 or higher cumulative Ferris State University GPA is required.
- A minimum of 30 credits must be earned from Ferris State University to meet the Residency requirement.
- A minimum of 40 credits of 300 level or higher courses must be earned.

PROGRAMMATIC GRADUATION REQUIREMENTS

These are the additional graduation requirements mandated by the program:

- All requirements as specified in the [College Requirements](#) section must be met.
- A 2.00 or higher cumulative GPA is required in the [Major Courses](#) section.

CONTACT INFORMATION

COLLEGE: College of Engineering Technology

PHONE: 231-591-2633

DEPARTMENT/SCHOOL: Engineering and Computing Technology

EMAIL: surveying@ferris.edu

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SUGGESTED SEMESTER LAYOUT

Consult Advisor to Approve Your Customized Plan in MyDegree

FIRST YEAR

Fall Courses	Credits
SURE 100	1
SURE 110	4
SURE 115	2
ENGL 150	3
MATH 220	4
Culture Competency	3
Total Credits	17

Spring Courses	Credits
GISC 225	3
ENGL 250	3
MATH 230	4
CHEM 121	5
Self and Society Competency	3
Total Credits	18

Summer Courses	Credits
Total Credits	

SECOND YEAR

Fall Courses	Credits
CENG 220	3
MATH 330	3
PHYS 241	5
SURE 215	2
CONM 121	3
Total Credits	16

Spring Courses	Credits
SURE 230	3
SURE 272	2
MATH 322	3
PHYS 242	5
GISC 239	3
Total Credits	16

Summer Courses	Credits
Total Credits	

THIRD YEAR

Fall Courses	Credits
CENG 240	3
SURE 365	3
SURE 372	2
GEOL 131	3
Self and Society Competency	3
COMM 121	3
Total Credits	17

Spring Courses	Credits
SURE 331	3
SURE 340	3
SURE 373	3
SURE 420	3
SURE 452	4
Total Credits	16

Summer Courses	Credits
Total Credits	

FOURTH YEAR

Fall Courses	Credits
GISC 425	3
SURE 366	3
SURE 440	3
SURE 453	4
Culture Competency	3
Total Credits	16

Spring Courses	Credits
CENG 321	4
CENG 421	4
CENG 499	4
SURE 465	3
Self and Society Competency 200+	3
Total Credits	18

Summer Courses	Credits
Total Credits	