

## Engineering

## Associate of Science (AS) Degree | 60 credits

Campus: Itasca-Grand Rapids, Mesabi Range-Virginia

### Required Engineering Courses (13 credits)

ENGR 1105	Careers in Engineering, var cr	ENGR 2101	Static Mechanics, 3 cr.
ENGR 1220	Introduction to Engineering, 3 cr.	ENGR 2233	Engineering Design 3, 2 cr.
ENGR 1232	Engineering Design 2, 2 cr.	ENGR 2234	Engineering Design 4, 3 cr.

### Required MNTC Core Courses (25 credits)

#### Goal 3 Natural Sciences (12 cr minimum)

CHEM 1521	General Chemistry 1, 4 cr.
PHYS 2261	General Physics 1, 4 cr.
PHYS 2262	General Physics 2, 4 cr.

#### Goal 4 Mathematics/Logical Reasoning (13 cr minimum)

MATH 1300	Precalculus, 5 cr.
MATH 1311	Calculus 1, 5 cr.
MATH 1312	Calculus 2, 4 cr.
MATH 2313	Calculus 3, 4 cr.
MATH 2321	Differential Equations-Linear Algebra, 4 cr.

### Engineering Electives (choose 16 credits)

BIOL 1561	General Biology of Cells, 4 cr.	ENGR 2103	Mech of Materials, 3 cr.
CHEM 1522	General Chemistry 2, 4 cr.	ENGR 2104	Fluid Mechanics, 3 cr.
CHEM 2311	Organic Chemistry 1, 5 cr.	ENGR 2105	Thermodynamics, 3 cr.
CSCI 1525	C++ Programming, 3 cr.	ENGR 2106	Circuits 1, 4 cr.
ENGR 1115	Digital Logic, 3 cr.	ENGR 2107	Circuits 2, 4 cr.
ENGR 2001	Fundamentals of Solid Modeling, 3 cr.	GEOL 1215	Physical Geology, 4 cr.
ENGR 2011	Solid Modeling 1, 1 cr.	MATH 2313	Calculus 3, 4cr.
ENGR 2012	Solid Modeling 2, 1 cr.	MATH 2321	Differential Eq-Linear Algebra, 4cr
ENGR 2013	Solid Modeling 3, 1 cr.	PHYS 2263	General Physics 3, 4 cr.
ENGR 2102	Dynamics, 3 cr.		

### MNTC Electives (6 credits)

Choose electives from MNTC Goals 1-10, excluding MNTC Goals 3 and 4 as they are fulfilled by required courses listed above. Courses from Goals 1, 5, and 6 that are cross-listed in Goals 7-10 are strongly recommended. Students must select courses in at least **six** of the ten goal areas.

### Graduation Requirements

- Complete all required content area courses.
- 2.0 minimum GPA required for both the MNTC and AS degree.
- Transfer courses with grades of A-D will be included in the GPA calculation for MNTC.

### Program Description

Minnesota North College\* features the most comprehensive two-year engineering program in the state. This nationally recognized program provides the first full two years of engineering coursework in an engaging, project-based learning environment. Students completing the program graduate with an A.S. Degree in Engineering and are prepared for a seamless transfer to their chosen university.

### Program Outcomes

- Apply knowledge of mathematics, science, or engineering.
- Perform engineering analysis.
- Design, conduct, and evaluate experiments.
- Design a system, component, or process to meet a need subject to constraints.
- Work effectively in teams and learning communities.
- Understand and appreciate professional and ethical responsibilities.
- Communicate effectively and professionally in a variety of media.
- Use the techniques, technologies, skills and modern engineering tools necessary for engineering practice.
- Develop a recognition of the need for, and an ability to engage in life-long learning.

### Program Coordinators

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