

Bicycle Design and Fabrication

Red Wing Campus

OVERVIEW

The design and fabrication of bicycles and their components is both engineering and art. The Bicycle Design & Fabrication program in Red Wing, Minnesota, is an Associate of Applied Science (AAS) degree option at Minnesota State College Southeast.

In this program, students explore a hands-on mechanical engineering technology and design curriculum, revolving around the fabrication of bicycles and associated components.

Build your own bike. As a student in Bicycle Design & Fabrication, you will gain the skills required to conceive and build a cycle creation of your own design. Along the way you will study metal fabrication, 3D printing, mechanical design, and composites.

Lab courses have been developed in welding, machining, and CNC as applied specifically for bike fabrication. The lecture components provide breadth and rigor to topics critical to understanding the physics and characteristics of bicycles. This includes algebra, statistics, and thermodynamics.

In addition to preparing students for careers in the bicycle industry, the skills mastered in this degree can be applied to any industry involving fabrication, manufacturing, and engineering technology.

Red Wing is a cycling lovers' paradise. In your free time, ride the scenic bluff roads throughout Southeast Minnesota, the Cannon Valley Trail, or a challenging mountain bike loop in Red Wing's Memorial Park.

MAJORS WITHIN

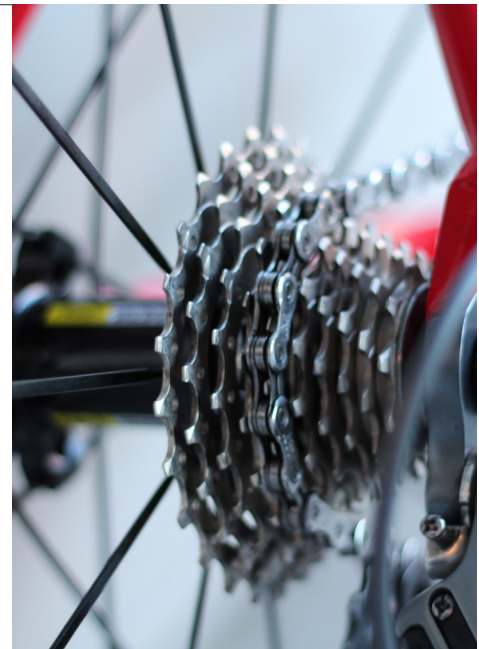
Bicycle Design and Fabrication, AAS 60 credits

See back for program plans

PROGRAM OUTCOMES

Program graduates will be able to:

1. Understand the nuances of metal working as it pertains to bicycle design and light manufacturing
2. Gain mechanical design skills encompassing both structural integrity as well as aesthetic elements
3. Experience performing CAD modeling and 3D rapid prototyping
4. Understand physics-based concepts applicable to mechanical components, principles of statics, and thermodynamics



PROGRAM HIGHLIGHTS

Opportunity to design and build a custom bicycle or bicycle component

Understand the art, aesthetics, and history of bicycle design

Coursework is created specifically as it applies to bikes

Gain transferable skills that can lead to a career in a wide range of industries

CAREER OPPORTUNITIES

Test Technician
Quality Assurance Technician
Mechanical Design
Composite Manufacturing Technician
Production Specialist
Engineering Technician
Other careers spanning light manufacturing, mechanical design, and engineering technology.

JOB PLACEMENT

TBD

PROGRAM COSTS -
estimated cost including tuition,
books and supplies

Bicycle Design and Fabrication \$13,153

Bicycle Design and Fabrication - Associate of Applied Science Proposed Program Plan

Bicycle Design and Fabrication - AAS

Course No.	Course Name	Credits
First Semester		
MATH 1220	College Algebra	3
BIKE	Oxy/MIG/TIG for bikes	3
BIKE	Machining for Bikes	3
BIKE	CAD/CAM (Autocad/Fusion360)	3
BIKE	History & Theory of Bike Design + Case Studies	3
Semester total		15
Second Semester		
PHYS 1215	College Physics 1	4
BIKE	Al/Fe/Ti Welding for Bikes	3
BIKE	CNC for Bikes	3
BIKE	Solidworks	3
BIKE	Safety & PPE	1
Semester total		14
Third Semester		
BIKE	2d/3d Prototyping (Wood/Plastic/etc.)	3
BIKE	Carbon Fiber & Composites	5
BIKE	Mechanics/Materials/FEA/Springs	3
BIKE	Chains/Gears/Belts/Linkages/Drive Tranes	3
BIKE	Bicycle Electronics & Test Ficture Automation	3
Semester total		17
Fourth Semester		
MATH 1230	Introduction to Statistics	3
ARTS 1223	Intro to the Digital Arts and Creative Multimedia	3
ENGL 1215	College Writing 1	3
BIKE	Physics for Bikes (Rolling Resistance/Drag/Thermo)	1
BIKE	Capstone	4
Semester total		14
Required Credits		60