

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 tuition

Bicycle Design and Fabrication \$11,675
(does not include books or supplies)

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 1010	Oxy-Fuel Welding, GMAW, Plasma and Flame Cutting, and Brazing for Bikes	3
BIKE 1020	Machining for Bikes	3
BIKE 1040	History and Theory of Bike Design	3
BIKE 1070	Solidworks	3
BIKE 2080	Safety and PPE	1
Semester total		16
Second Semester		
ARTS 1223	Intro to the Digital Arts and Creative Multimedia	3
BIKE 1030	CAD CAM	3
BIKE 1050	AL-FE-SS-TI Welding for Bikes	3
BIKE 1060	CNC for Bikes	3
BIKE 2010	3D Prototyping	3
Semester total		15
Third Semester		
PHYS 1215	College Physics 1	4
BIKE 2020	Carbon Fiber & Composites	5
BIKE 2040	Mechanics/Materials/FEA/Springs	3
BIKE 2050	Chains/Gears/Belts/Linkages/Drivetrains	3
Semester total		15
Fourth Semester		
MATH 1230	Introduction to Statistics	3
ENGL 1215	College Writing 1	3
BIKE 2060	Bicycle Electronics & Test Fixture Automation	3
BIKE 2070	Physics for Bikes	1
BIKE 2090	Capstone	4
Semester total		14
Required Credits		60