

# Minnesota State College Southeast

## **BIKE 2050: Chains-Gears-Belts-Linkages-Drivetrains**

### **A. COURSE DESCRIPTION**

Credits: 3

Lecture Hours/Week: 2

Lab Hours/Week: 1

OJT Hours/Week: \*.\*

Prerequisites: None

Corequisites: None

MnTC Goals: None

Provide instruction on mechanical design for the bicycle fabrication industry and applications. Course will cover Belts, Chain, Gear Drives, Lubrication, Couplings, Alignment, Bearings, Ball Screws, Seals, Clutches, Brakes, Vibration. Read blueprints and schematics to determine sequences of assembly. (Prerequisite: None) (3 credits: 2 lecture/1 lab)

### **B. COURSE EFFECTIVE DATES: 02/27/2018 - Present**

### **C. OUTLINE OF MAJOR CONTENT AREAS**

1. Understand kinematics of mechanical systems
2. Understand differences between belts, chains, bearings, and other drive trains
3. Show laboratory proficiency in testing drive train systems
4. Draw free body diagrams and mechanical schematics
5. Understand gearing ratios

#### **D. LEARNING OUTCOMES (General)**

1. Students will be able to evaluate mechanical systems for purpose and efficiency
2. Students will be able to explain mechanical systems using free-body diagrams and kinematics
3. Students will understand and be able to describe the role of mechanical components in a bicycle system
4. Students will be able to describe the flow of mechanical energy in a mechanical system
5. Students will be able to explain and demonstrate safety rules while working with mechanical components and systems
6. Students will be able to explain and how to apply various mechanical components within a given mechanical system
7. Students will be able to understand and analyze forces, speeds, torque, and power for mechanical drives such as gears, belt drives, chain drives, and timing drives
8. Students will be able to describe differences between types of different types of drive trains
9. Students will be able to describe and demonstrate shaft, couplings, and sealing device lubrication and maintenance requirements
10. Students will be able to demonstrate procedures for applying adjustments on mechanical components in a mechanical system
11. Students will be able to read, analyze, and demonstrate proficiency with technical data sheets and schematics
12. Students will be able to describe the application of shafts, gears, and coupling devices in mechanical systems
13. Students will be able to analyze and describe the kinematics of gears and proper components for drive applications
14. Students will be able to recognize the different styles of gearing and know how to apply for best case systems
15. Students will understand tolerances and fits for mechanical designs
16. Students will be able to describe mechanical fasteners and their usage in systems
17. Students will be able to describe different styles of springs and when to apply their types in systems
18. Students will be able to analyze clutches and brakes to select the appropriate usages in mechanical systems

#### **E. Minnesota Transfer Curriculum Goal Area(s) and Competencies**

None

#### **F. LEARNER OUTCOMES ASSESSMENT**

As noted on course syllabus

#### **G. SPECIAL INFORMATION**

None noted