# 11/8/2020

# brcc keystone logo

Baton Rouge Community College

*Academic Affairs Master Syllabus*

Date Approved: 3 September 2020

Term and Year of Implementation: Spring 2021

**Course Title:** Millwright Level 4

**BRCC Course Rubric:** MILL 1419

**Previous Course Rubric**: MILL 2413, MILL 2423, and MILL 2433

**Lecture Hours per week-Lab Hours per week-Credit Hours**: 3-12-9

**Per semester: Lecture Hours-Lab Hours-Instructional Contact Hours**: 45-180-225

**Louisiana Common Course Number:**

**CIP Code:** 47.0303

**Course Description:** Covers the National Center for Construction Education and Research (NCCER) Millwright Level 4 Modules 1 – 11. Successful completion of this course requires passing the NCCER Level 4 Modules 1 – 11 Exams with a 70% or higher. This course requires lab and exam fees.

**Prerequisites:**  MILL 1326

**Co-requisites:** None

**Suggested Enrollment Cap:** 20

**Learning Outcomes.** *Upon successful completion of this course, the students will be able to:*

1. Explain conveyor safety and the use of roller, belt, chain, screw, and pneumatic conveyors and their components.

2. Demonstrate how to troubleshoot and repair roller, belt, chain, screw, and pneumatic conveyors.

3. Describe centrifugal, rotary, reciprocating, metering, and vacuum pumps, as well as suction head and cavitation.

4. Describe pneumatic safety, principles of compressor operation, types of compressors and compressor components, compressed air treatment, pneumatic system components and symbols.

5. Explain the principles of hydraulics, hydraulic fluids, hydraulic system parts, hydraulic pumps, and hydraulic motors.

**Assessment Measures.** Assessment of all learning outcomes will be measured using the following methods:

1. Practical demonstrations and skills performances

2. Quizzes and tests

3. NCCER Millwright Level 4 Modules 1 – 11 Exams

**Information to be included on the Instructor’s Course Syllabi:**

* ***Disability Statement*:** Baton Rouge Community College seeks to meet the needs of its students in many ways. See the Office of Disability Services to receive suggestions for disability statements that should be included in each syllabus.
* ***Grading:*** The College grading policy should be included in the course syllabus. Any special practices should also go here. This should include the instructor’s and/or the department’s policy for make-up work. For example in a speech course, “Speeches not given on due date will receive no grade higher than a sixty” or “Make-up work will not be accepted after the last day of class”.
* ***Attendance Policy*:** Include the overall attendance policy of the college. Instructors may want to add additional information in individual syllabi to meet the needs of their courses.
* ***General Policies*:** Instructors’ policy on the use of things such as beepers and cell phones and/or hand held programmable calculators should be covered in this section.
* ***Cheating and Plagiarism*:** This must be included in all syllabi and should include the penalties for incidents in a given class. Students should have a clear idea of what constitutes cheating in a given course.
* ***Safety Concerns:*** In some courses, this may be a major issue. For example, “No student will be allowed in the lab without safety glasses”. General statements such as, “Items that may be harmful to one’s self or others should not be brought to class”.
* ***Library/ Learning Resources:*** Since the development of the total person is part of our mission, assignments in the library and/or the Learning Resources Center should be included to assist students in enhancing skills and in using resources. Students should be encouraged to use the library for reading enjoyment as part of lifelong learning.

**Expanded Course Outline:**

I. Conveyors

A. Conveyor Safety

B. Roller Conveyors

C. Belt Conveyors

D. Chain Conveyors

E. Screw Conveyors

F. Pneumatic Conveyors

II. Troubleshooting and Repairing Conveyors

A. Maintaining and Repairing Roller Conveyors

B. Maintaining and Repairing Belt Conveyors

C. Maintaining and Repairing Chain Conveyors

D. Maintaining and Repairing Screw Conveyors

E. Maintaining and Repairing Pneumatic Conveyors

III. Conventional Alignment

A. Misalignment and Coupling Stress

a. Types of Misalignment

b. Coupling Stress

B. Alignment: Straightedge and Feeler Gauge Method

a. Adjusting Vertical Angularity

b. Adjusting Vertical Offset

c. Adjusting Horizontal Angularity

d. Adjusting Horizontal Offset

e. Adjusting Vertical Angularity and Offset

f. Adjusting Horizontal Angularity and Offset

C. Alignment: Dial Indicator Method

a. Setting Up Dial Indicators

b. Taking Top View Measurements

c. Taking Side View Measurements

d. Taking Angularity and Offset Measurements

IV. Pumps

A. Centrifugal Pumps

B. Rotary Pumps

C. Reciprocating Pumps

D. Metering Pumps

E. Vacuum Pumps

F. Cavitation

G. Installing Pumps

V. Troubleshooting and Repairing Pumps

A. Inspecting Pumps

B. Performing Preventive Maintenance on Pumps

C. Troubleshooting Pumps

D. Disassembling and Reassembling Pumps

a. Preparing a Pump for Shutdown and Repair

b. Removing a Pump from the System

c. Disassembling a Split-Casting Pump

d. Reassembling a Pump

E. Pump Start-Up Procedures

a. Installing a New or Removed Pump

b. Pump Start-Up Procedures and Operational Testing

VI. Compressors and Compressor Maintenance

A. Pneumatic (Compressed Air) Safety

B. Principles of Compressor Operation

a. Physical Characteristics of Gases

b. Pneumatic Transmission of Energy

c. Principles of Compressor Operation

C. Compressor Types

a. Positive-Displacement Compressors

b. Continuous Flow Compressors

c. Compressor Support Systems

D. Troubleshooting Compressors

a. Drive Section Problems

b. Compressor Section Problems

c. Overall System

d. Troubleshooting Reciprocating Compressors

E. Repairing Compressors

a. General Maintenance

b. Preparing to Repair Components

c. Removing Components

d. Replacing Components

e. Preforming Post-Repair Actions

VII. Basic Pneumatic Systems

A. Pneumatic Safety

B. Physical Characteristics of Gases

C. Pneumatic Systems

a. Distribution and Treatment of Compressed Air

b. Pneumatic System Components

D. Pneumatic Symbols

VIII. Troubleshooting and Repairing Pneumatic Equipment

A. Preventive Maintenance

B. Inspecting Pneumatic System Components

C. Reading Pneumatic Schematic Diagrams

D. Troubleshooting Pneumatic Systems

E. Pneumatic System Troubleshooting Charts

F. Repairing Pneumatic System Components

a. Preparing the System for Shutdown and Repair

b. Repairing and Overhauling Components

1. Removing Components from the System

2. Disassembling Components

3. Reassembling Components

G. Replacing Pneumatic Gauges

IX. Basic Hydraulic Systems

A. Hydraulic System Safety

B. Principles of Hydraulics

C. Hydraulic Fluids

D. Hydraulic System Parts

a. Strainers and Filters

b. Reservoirs

c. Accumulators

d. Piping, Tubing, and Fittings

e. Directional-Control valves

f. Cylinders

E. Hydraulic Pumps

F. Hydraulic Motors

X. Troubleshooting and Repairing Hydraulic Equipment

A. Inspecting Hydraulic System Components

B. Reading Hydraulic System Schematic Diagrams

C. Troubleshooting Hydraulic Systems

D. Repairing Hydraulic System Components

XI. Troubleshooting and Repairing Gearboxes

A. Understanding Gearboxes

B. Gear Types

C. Types of Gearboxes

D. Troubleshooting Gearboxes

E. Repairing Gearboxes

F. Removing Gearboxes

G. Disassembling and Reassembling Gearboxes

H. Gear Wear Patterns

a. Identifying Gear Wear Patterns

I. Repairing Gearboxes

a. Measuring and Adjusting Backlash

b. Measuring and Setting Bearing Clearance

c. Installing Gearboxes

d. Maintaining Gearboxes