# 11/6/2020

# 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:** Electrical Level 3 Part 2

**BRCC Course Rubric:** ELEC 1326

**Previous Course Rubric**:

**Lecture Hours per week-Lab Hours per week-Credit Hours**: 2-8-6

**Per semester: Lecture Hours-Lab Hours-Instructional Contact Hours**: 30-120-150

**Louisiana Common Course Number:**

**CIP Code:** 46.0302

**Course Description:** Covers the National Center for Construction Education and Research (NCCER) Electrical Level 3 Modules 6 - 11: Distribution Equipment, Transformers, Commercial Electrical Services, Motor Calculations, Voice, Data, and Video, and Motor Controls. Successful completion of this course requires passing the NCCER Level 3 Electrical Modules 6 – 11 Exams with a 70% or higher.

**Prerequisites:**  ELEC 1316

**Co-requisites:** None

**Suggested Enrollment Cap:** 15

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

1. Describe the purpose, construction, metering layouts, wiring requirements, and maintenance of swtichgear and the different categories for voice-data-video (VDV) cabling systems.

2. Describe the four general classifications of circuit breakers and the visual and mechanical inspections and electrical tests associated with low-voltage and medium-voltage cables, metal-enclosed busways, and metering and instrumentation.

3. Describe the operating characteristics of various types of transformers and various types of electric services for commercial and industrial installations.

4. Size branch circuits and feeders for electric motors, overcurrent protective devices for motors, overload relays for electric motors, devices to improve the power factor at motor locations, motor short circuit protectors, multi-motor branch circuits and motor disconnects, and contactors, relays, and pilot devices for use in specific electrical motor control systems.

5. Install raceways, boxes, and enclosures for VDV systems.

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

1. Practical demonstrations and skills performances.

2. Homework assignments, quizzes, and tests.

3. NCCER Electrical Level 3 Modules 6 - 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. Distribution Equipment

A. Voltage Classifications

B. Switchboards and Switchgear

C. Switchboard Testing and Maintenance

D. National Electrical Code (NEC) Requirements

E. Ground Faults

F. High Voltage Load (HVL) Switches and Bolted Pressure Switches

G. Transformers and Instrument Transformers

H. Circuit Breakers

I. Electrical Drawing Identification, Electrical Prints, and Manufacturer Drawings

J. Panelboards

II. Transformers

A. Transformer Basics, Transformer Construction, and Transformer Taps

B. Basic Transformer Connections and Autotransformers

C. Transformer Data and Control Transformers

D. National Electrical Code (NEC) Requirements

E. Power Factor and Vectors

F. Troubleshooting and Transformer Maintenance

III. Commercial Electrical Services

A. Drawings and Specifications

B. General Installation Considerations

C. Service Components

D. National Electrical Code (NEC) Requirements

E. Typical Installations

IV. Motor Calculations

A. Motor Basics

B. Calculating Motor Circuit Conductors

C. Motor Protective Devices

D. Circuit Breakers

E. Multi-Motor Branch Circuits

F. Equipment Grounding Conductors for Motor Feeder and Branch Circuits

G. Power Factor Correction at Motor Terminals

V. Voice, Data, and Video

A. Structured Cabling Systems

B. Unshielded Twisted Pair (UTP) and Coax Cable Terminations

C. Fiber-Optic Installation Considerations

D. Grounding and Bonding

E. Testing

VI. Motor Controls

A. Electromechanical Relays

B. Magnetic Contactors

C. Overload Protection

D. Magnetic and Manual Motor Starters

E. Control Transformers and Pilot Devices

F. Drum Switches

G. Enclosures

H. Diagrams

I. NEC Regulations for the Installation of Motor Control Circuits

J. Connecting Motor Controllers for Specific Applications