



**Bismarck State College**  
**National Energy Center of Excellence**  
**Metering Technician Apprenticeship Program**

**APP 106 – Basic Electricity I**

This course covers basic direct current theories and applies those theories to the electrical system and related equipment. Students will study methods of producing a voltage, such as batteries, magnetic fields, basic series and parallel circuits. Students will also study basic DC circuit calculations.

**APP 108 – Basic Electricity II**

This course covers basic alternating current theories and applies those theories to electrical systems and related equipment. Students will also study basic generator and motor design, construction and operating principles.

**APP 109 – Safety I**

This course covers the general safety practices and information employees need while working in any segment of the electrical industry, and the Federal Agencies responsible for insuring a safe working environment. Students will also gain an understanding of the Workers Right to Know regulations and awareness of Public Safety issues.

**APP 110 – Safety II**

This course focuses on specific safety practices of the industry. Students begin by studying general practices, such as confined space entry, lock-out tag out procedures, fall protection, fire safety and working with hazardous materials. Students also learn some specific safety procedures used by linemen, such as proper bucket truck operation, and some techniques used when working with electrical conductors. Finally, students learn some of the specific considerations that must be adhered to as an electrical system dispatcher to ensure the safety of line crews and technicians working on the electrical system.

**APP 111 – Math I**

This course will teach basic math skills and apply those to energy industry situations. Students will learn the metric system, basic volume and area calculations as well as algebra and trigonometry and how they apply to industry specific situations.

**APP 112 – Math II**

This course will cover algebra, geometry, and trigonometry needed for energy technicians working in the electrical system design and metering specialization areas. This course will cover the fundamental concepts of algebra, equations, functions and graphs. This course will also cover trigonometric functions, laws of sines and cosines and vectors. Lastly the course will discuss analytic geometry.

**APP 113 – Math III**

Meter Math 3 provides a brief, but intense focus on mathematics directly related to metering, particularly focusing on vector math related to electric meter quantity measurements.

**APP 131 – Metering Terms, Electronics and Instruments**

This course introduces students to the fundamentals of metering, such as terminology and basic principles of meters. Students learn basic math needed in metering, and review basic electricity and magnetism principles. They are introduced to meter instruments, meter diagrams and standards, and the inter-workings of traditional metering mechanisms.

**APP 133 – Demand Metering**

This course focuses exclusively on metered demand theory, demand registers, and testing and maintenance demand meters. Students will be provided with coursework pertaining to thermal demand meters, mechanical demand meters, and solid-state demand meters.

**APP 134 – Metering Testing**

This course will introduce students to an overview of meter testing and the instruments used to verify accuracy of devices both in the shop and in the field. The course will also cover the topic of current diversion and maintenance procedures to cover while performing field testing.

**APP 130 – Distribution Transformer Banking**

This course is designed to provide an overview of distribution transformers and how they are connected on a given utility distribution system. The course provides a base of knowledge for understanding the different connection types on customer premises.

**APP 135 – Metering Site Verification**

This course is designed to provide an detailed overview of the operation and use of instrument transformers in metering. The course will provide extensive information on the theory and operation of voltage and current transformers at all practical distribution and transmission voltage levels. The course also provides a basic overview of customer installations, including common metering connections at different customer levels.

**APP 136 – Special Metering**

This course is designed to explore reactive and apparent power metering in depth. The course also covers other special metering situations, such as the addition of line losses, transformer losses, parallel CT secondary circuits, net metering, load profile metering and pulse totalization.

**APP 137 – Power Quality**

This course is designed to provide a brief overview of the subject of Power Quality. The student should come away with a limited understanding of some of the sources and issues related to power quality.