

# ELECTRICITY

## MASTER PLAN OF INSTRUCTION

2023 - 2024

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### MISSION

The mission of Fort Myers Technical College is to provide high quality career and technical training, in order to prepare students for current and emerging industries, delivered by a professional and caring staff in a positive learning environment.

The School Board of Lee County, Florida does not discriminate nor tolerate discrimination on the basis of race (including anti-Semitism), color, ethnicity, national origin, sex, sexual orientation, gender identification, gender expression, disability (physical or mental), pregnancy, marital status, age (except as authorized by law), religion, military status, socioeconomic status, linguistic preference, genetic information, ancestry, or any other reason protected under applicable federal, state, or local law in the provision of educational programs, activities or employment policies as required by Title II, Title VI, and Title VII Civil Rights Act of 1964 including, Title IX of the United States Education Amendments of 1972, Age Discrimination in Employment Act of 1967 (ADEA), Individuals with Disabilities Education Act (IDEA), Section 504 of the Rehabilitation Act of 1973, Florida Civil Rights Act of 1992, Genetic Information Nondiscrimination Act of 2008, Americans with Disabilities Act of 1990 (ADA) and the Amendment Act of 2008 (ADAAA), and the Florida Educational Equity Act of 1984. The School Board also provides equal access of its facilities to youth groups, as required by the Boy Scouts of America Equal Access Act. Any sections of the District's collectively bargained, negotiated agreements dealing with hiring, promotion, and tenure will contain a statement of nondiscrimination similar to that in the Board's statement above. As required by Florida's Educational Equity Act, the Superintendent shall submit an annual equity report addressing the District's educational and employment practices. The School Board of Lee County, Florida, prohibits retaliation by any District personnel against a person for reporting, filing or being a witness in a discrimination (including harassment) charge, complaint, investigation or lawsuit associated or in connection with this policy. Established grievance procedures and appropriate discrimination complaint forms are available from the Office of Civil Rights & Equity, Academic and Student Support Services or the Equity Coordinator at each school. Complaints/inquiries regarding compliance with these regulations may be submitted in writing to: For Employees: Office of Civil Rights & Equity Compliance at (239) 337-8134 or at [CivilRightsEquity@leeschools.net](mailto:CivilRightsEquity@leeschools.net). For Students: Office of Positive Prevention at (239) 939-6858.

Lack of English language skills will not be a barrier to admission and participation. The District may assess each student's ability to benefit from specific programs through placement tests and counseling, and, if necessary, will provide services or referrals to better prepare students for successful participation.



**Fort Myers Technical College**

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In order to prepare students for rewarding employment in the electrical field, FMTC has devised a rigorous program divided into three levels of training. The program covers a broad range of instruction that will be outlined hereafter. Upon completion, students should be fully prepared for entry-level opportunities in electrical service, maintenance, and construction.

### **PROGRAM MISSION**

The mission of the Electricity program is to provide rigorous training for students, so they can compete for entry level jobs in the electrical industry. Our goal is for each student to increase their working potential by providing experienced instruction in both theory and practical application.

### **PROGRAM PHILOSOPHY**

We believe that competent workers in the high-performance workplace need:

1. Skills in communication, mathematics, critical thinking, teamwork, and effective work habits.
2. Training in emerging concepts and technologies.
3. Relevant work-based learning experience.

### **PROGRAM CONTENT**

- Introduction to Electrical Wiring
- DC Circuits
- AC Circuits
- AC Theory and Solid-State Devices
- Residential Wiring
- Commercial Wiring
- Installation of Transformers
- Motors
- Controls for Operation
- Blueprint & Plan Symbols – Calculations
- Tools, Materials, and Methods
- Single phase and 3 phase services
- Control Circuits
- Specialized Skills
- Employability Skills
- Entrepreneurship

### **ESSENTIAL TRAINING TASKS**

#### **Physical Requirements**

- Plan layout and installation of electrical wiring, equipment, or fixtures, based on job specifications and local codes.
- Connect wires to circuit breakers, transformers, or other components.
- Test electrical systems or continuity of circuits in electrical wiring, equipment, or fixtures, using testing devices, such as ohmmeters, or voltmeters, to ensure compatibility and safety of system.
- Use a variety of tools or equipment, such as power construction equipment, measuring devices, power tools, and testing equipment, such as oscilloscopes, ammeters, or test lamps.
- Inspect electrical systems, equipment, or components to identify hazards, defects, or the need for adjustment or repair, and to ensure compliance with codes.
- Prepare sketches or follow blueprints to determine the location of wiring or equipment and to ensure conformance to building and safety codes.
- Diagnose malfunctioning systems, apparatus, or components using test equipment and hand tools to locate the cause of a breakdown and correct the problem.
- Work from ladders, or roofs to install, maintain, or repair electrical wiring, equipment, or fixtures.
- Advise management on whether continued operation of equipment could be hazardous.
- Maintain current electrician's license or identification card to meet governmental regulations

#### **Skills**

- **Troubleshooting** – Determining causes of operating errors and deciding what to do about it.
- **Repairing** – Repairing machines or systems using the needed tools.
- **Active Listening** – Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.
- **Critical Thinking** – Using logic and reasoning to identify the strengths and weakness of alternative solutions, conclusions or approaches to problems.
- **Judgment and Decision-Making** – Considering the relative costs and benefits of potential actions to choose the most appropriate one.
- **Installation** – Installing equipment, machines, wiring, or programs to meet specifications.
- **Active Learning** – Understanding the implication of new information for both current and future problem-solving and decision making.
- **Complex Problem-Solving** – Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.
- **Equipment Maintenance** – Performing routine maintenance on equipment and determining when and what kind of maintenance is needed.
- **Instructing** – Teaching others how to do something.

### Abilities

- **Problem Sensitivity** – The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem.
- **Deductive Reasoning** – The ability to apply general rules to specific problems to produce answers that make sense.
- **Inductive Reasoning** – The ability to combine pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events).
- **Near Vision** – The ability to see details at close range (within a few feet of the observer).
- **Oral Comprehension** – The ability to listen to and understand information and ideas presented through spoken words and sentences.
- **Visual Color Discrimination** – The ability to match or detect differences between colors, including shades of color and brightness.
- **Arm-Hand Steadiness** – The ability to keep you hand and arm steady while moving your arm or while holding your arm and hand in one position.
- **Finger Dexterity** – The ability to make precisely coordinated movements of the fingers of one or both hands to grasp, manipulate, or assemble very small objects.
- **Information Ordering** – The ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations).
- **Manual Dexterity** – The ability to quickly move your hand together with your arm, or your two hands to grasp, manipulate, or assemble objects.

### Work Activities

- **Getting Information** – Observing, receiving, and otherwise obtaining information from all relevant sources.
- **Identifying Objects, Actions, and Events** – Identifying information by categorizing, estimation, recognizing differences or similarities, and detecting changes in circumstances or events.
- **Making Decisions and Solving Problems** – Analyzing information and evaluating results to choose the best solution and solve problems.
- **Handling and Moving Objects** – Using hands and arms in handling, installing, positioning, and moving materials, and manipulating things.
- **Inspecting Equipment, Structures, or Material** – Inspecting equipment, structures, or materials to identify the cause of errors or other problems or defects.
- **Monitor Processes, Materials, or Surroundings** – Monitoring and reviewing information from materials, events, or the environment, to detect or assess problems.
- **Updating and Using Relevant Knowledge** – Keeping up-to-date technically and applying new knowledge to your job.
- **Organizing, Planning, and Prioritizing Work** – Developing specific goals and plans to prioritize, organize, and

accomplish your work.

- **Evaluating Information to Determine Compliance with Standards** – Using relevant information and individual judgment to determine whether events or processes comply with laws, regulations, or standards.
- **Performing General Physical Activities** – Performing physical activities that require considerable use of your arms and legs and moving your whole body, such as climbing, lifting, balancing, walking, stooping, and handling of materials.

### **Cognitive Requirements**

Must have the ability to:

- Handle confrontation and frustration and assist in problem resolution.
- Interpret a variety of instructions furnished in written, oral, and diagrammatic form
- Collaborate with others
- Cope with high levels of stress
- Perform mathematical computations at a level of ninth grade or higher
- Make fast decisions under pressure
- Demonstrate a high degree of patience
- Read and understand computer and related equipment
- Work in close or crowded areas

### **ACCOMMODATIONS**

Federal and state legislation requires the provision of accommodations for students with disabilities as identified on the secondary student's IEP or 504 plan or post-secondary student's accommodations plan to meet individual needs to ensure equal access. Post-secondary students with disabilities must self-identify, present documentation, required accommodations if needed, and develop a plan with their post-secondary service provider. Accommodations received in post-secondary education may differ from those received in secondary education. Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology, and special communication systems. Documentation of the accommodations requested and services provided are maintained in a confidential file.

### **TUITION**

Tuition is charged for adult students at a reasonable rate that may vary slightly from year to year and is due prior to the first day of each payment period. Current fee information is available from Student Services. Tuition is waived for eligible high school dual-enrolled students. Failure to pay all fees due at the time class begins will result in the student not being able to attend class and/or clinical.

### **CLASS SCHEDULE**

Classes meet Monday through Friday from 8:00 A.M. until 2:30 P.M. This amounts to 30 hours of classroom instruction per week. Lunch breaks are 30 minutes in length.

### **ATTENDANCE POLICY**

In an effort to develop appropriate employability skills, FMTC students are expected to attend all class sessions. As is expected in the workplace, when it is necessary to be absent due to illness or emergency situations, all students are to notify the instructor on or before the date of the absence. The student attendance policy for each post-secondary program is consistent with industry standards.

Campus attendance is kept via a computerized system. It is the responsibility of the student to **log in and out** in order to receive credit for class time. This allows the school to keep accurate attendance records for the actual number of hours and minutes attended.

All adult students are expected to be in attendance at least 90% of their scheduled hours during each payment period. Adult students failing to maintain the 90% attendance standard may not be permitted to continue in their program and may be withdrawn.

## **Absences**

A student who is absent for 6 consecutive class sessions, without prior approval and without contacting the instructor, will be withdrawn from enrollment in his/her program.

Students who are late for class, including returning late from lunch, must clock in. Students who leave school early must notify their instructor and clock out. This time out of class is recorded as time absent and is counted against the required 90% attendance.

Adult students who know they will be out of school for an extended period of time may apply for a Leave of Absence from their program. Students who exercise a leave of absence may have to extend their time in their program and pay additional fees.

## **Leaving Campus During School Hours**

Students must notify their instructor when leaving campus early. This is for the safety of students, to accurately track time, and to allow the instructor to best utilize instructional resources.

# **PLAN OF INSTRUCTIONAL PRACTICES**

## **Teaching Methods**

The curriculum will be taught by a combination of methods and will evolve as the student progresses through the three courses. Students will be expected to complete multiple reading assignments per day. Hands on training will follow when applicable. There will be written as well as Lab projects due each week. Students will gain knowledge in commercial construction by repair and maintenance of the school's electrical system.

## **Safety**

Students will find that safety is a critical component of the Electrical industry. It will be the first order of business for every new student. Personal protective equipment (PPE) such as safety glasses and hard hats are required on many industry locations. Students must have required PPE equipment available on a daily basis.

## **Evaluation**

Tests will be administered on a weekly basis both written and online. At least 10 hours of written and computer-based assignments will be completed each week. Lab projects will be evaluated based on criterion reference models and/or checklists. Interpersonal skills are as important to success as is the knowledge to use a power tool --- good behavior, teamwork, safety, cleanliness, punctuality, and a positive attitude will be required if you are to fully succeed.

## **Work-Based Activities**

Work-based learning activities play an integral part of the curriculum of FMTC's career-technical training programs. These activities are planned with two objectives in mind. First, the activity provides students with the opportunity to develop and apply 'real world' experience using the knowledge and skills attained in the program. Second, the activity provides the instructor with objective input from potential employers or customers of program graduates. Each work-based activity has a written instructional plan outlining objectives, experiences, competencies, and evaluation required during the activity.

Work-based activities are program specific and may include:

- Unpaid in-school shop activities to provide customer service opportunities under the direct supervision of the program instructor.
- Unpaid job shadowing experiences that may include in-school or off-campus employer-based experiences under the supervision of a qualified employer representative who is working closely with the program instructor.
- Paid or unpaid cooperative training experiences conducted at the employer's work location under the supervision of a qualified employer representative and under the direction of the program instructor.

## **Cooperative Education**

Cooperative training is available for students and coordinated by the instructor and career specialist. Cooperative training is for students who have shown competence in program training that indicates readiness for placement in an on-the-job program. High school students participating in the cooperative job placement program must be in the 12<sup>th</sup> grade. To be eligible for a cooperative education experience, students must have completed at least one-half of the required program

hours and requirements.

Student may be returned to the program for additional training if they do not function satisfactorily on the job or when the cooperative agreement is terminated at the request of the student, parent, employer, or program instructor. Veterans will be accepted into the program in accordance with the Department of Veterans Affairs approved program.

Additional information regarding cooperative training opportunities may be obtained from the program instructor or career specialist.

## **GRADING POLICIES**

### **Grading Categories:**

Assessments .....	50%
Career Application .....	25%
Employability Skills.....	25%

### **Grading Scale:**

A	90-100
B	80-89
C	70-79
D	60-69
F	0-59

Each program has an employability skills rubric based on employee expectations in the industry.

### **Program Progress**

Students are required to complete the program of training within the hours allotted by the state of Florida for completion. Progress must be at a rate that will allow completion of the program with the number of hours stated in the Curriculum Frameworks.

### **Work Habits**

Effective work habits are the cornerstone to successful employment. Students are expected to demonstrate productive work habits during all phases of enrollment. Instructors will work with students who need assistance in this area to improve all overall possibility for successful employment.

**Attendance:** Attends class, arrives/leaves on time; begins and ends work as expected.

**Character:** Displays loyalty, honesty, trustworthiness, dependability, reliability, initiative, self-discipline, and self-responsibility; displays a high level of effort and commitment to performing and completing work.

**Teamwork:** Respects the right of others; respects confidentiality; is cooperative; is assertive; displays a customer service attitude; seeks opportunities for continuous learning; demonstrates mannerly behavior; encourages and facilitates cooperation, pride, trust, and group identity; fosters commitment and team spirit.

**Appearance:** Displays appropriate dress, grooming, hygiene, and etiquette; wears full regulation uniform.

**Attitude:** Displays a willingness to cooperate and accept constructive criticism; sets realistic expectations; approaches assignments with interest.

**Productivity:** Is prepared for class by reading assignments and completing homework; contributes to class discussions; and involvement in lab activities (in other words, no sleeping or daydreaming). Follows safety practices; conserves and maintains equipment and supplies; keeps work area neat and clean; follows directions and procedures; makes up assignments and tests punctually; notifies proper authorities of situations presenting potential safety hazards; does not use or knowingly permit others to use tools and equipment improperly; stays on task and utilizes time constructively.

**Organization:** Manifests skill in prioritizing and managing time and stress; demonstrates flexibility in adapting to changes.

**Communication:** Communicates accurate information to others in a professional and courteous manner; displays appropriate nonverbal (eye contact, body language) and oral (listening, telephone etiquette, grammar) skills; asks pertinent questions; listens attentively to others, notifies instructor in advance of absences or tardies.

## **SATISFACTORY ACADEMIC PROGRESS**

In order to receive and continue to receive financial assistance of any type, a student must maintain satisfactory academic progress. The Financial Aid Administrator will require a progress report to be completed and submitted to the Financial Aid Office prior to each disbursement.

Students are considered to be making Satisfactory Academic Progress (SAP) if they successfully complete their scheduled clock hours, achieve a specific cumulative grade average (CGA), and do not exceed the maximum time limits to complete their course of study. Each student's academic progress will be checked at 450 clock hours (300 hours for CHCA) and prior to subsequent disbursements for students enrolled in programs one academic year or greater. Progress will be checked at the half-way point for programs less than one academic year.

No SAP is required prior to the first disbursement.

## **REQUIREMENTS FOR CERTIFICATE**

Certification for FULL program completion is determined by (1) mastery of 85% of program competencies as determined by the instructor, (2) a final grade of 75% or better (80% Health Sciences) in each course, and (3) proof of state-mandated basic skills levels; (4) attendance of a minimum of 90% of scheduled program hours (95% of scheduled hours for some Health Science programs). Under unique circumstances, instructors in our competency-based programs have the discretion to graduate students who fall short of 90% as long as #1-3 above are met. Students meeting these requirements are awarded a full program certificate.

A record of the student's progress is kept up-to-date by the instructor and available to the student in the FOCUS Student Portal. High school grades are reported to the assigned high school.

## **STUDENT DRESS CODE**

Each program at FMTC has a designated uniform.

**Uniform Required:** Khaki uniform work shirt (included in tuition and fees), work pants or jeans, work shoes with non-conductive soles, and visible FMTC student ID badge.

## **PROGRAM STRUCTURE**

Below is a summary of the Electricity program structure. For more detailed information for each course, visit the FLDOE Curriculum Framework website: <https://www.fldoe.org/academics/career-adult-edu/career-tech-edu/curriculum-frameworks/2023-24-frameworks/architecture-construction.stml>.

### **OCP A            Electrician Helper**

Helpers are expected to do rudimentary tasks as laid out by their lead person or job foreman. This may include material handling, ditch digging and prep work in new construction, attic work, dock wiring and equipment installation in service.

### **OCP B            Residential Electrician**

Residential electricians read blueprints and layout single family homes. They install the boxes and cables during the phase in of new construction. They return to trim the devices and install lights and fans. Residential Service Electricians add receptacles, light and switches on existing homes.

### **OCP C            Commercial Electrician**

Commercial electricians work on large projects with heavier equipment and higher voltages. They must be familiar installing complex raceway and wiring systems. They may need to work at great heights from scaffolds or hydraulic lifts.

## **TEXTBOOKS**

Required textbooks for the Electricity program can be found on the disclosure fee sheet located on the program's page on the FMTC website: <https://fortmyerstech.edu/course/electricity/>

## **REQUIRED MATERIALS**

Two loose-leaf notebooks

One 1" 3-ring binder

Notebook paper (non-spiral)

#2 Pencils w/ erasers

Yellow highlighter

Colored pencils or markers (Red, Black, Yellow, Green) 1 of each color