



**STUDY PROGRAM: Industrial Electrical Maintenance Technician (IEMT)**

**I. CATALOGUE STATEMENT:**

The program is focused to provide trainees with technical knowledge and practical hands-on skills that will enable and prepare them to work as journeymen or technicians in the industry and other organizations related to electrical maintenance. The program is designed to prepare trainees to repair, maintain, troubleshoot, monitor, calibrate, adjust and install electrical equipment and machines. Besides electrician skills, the program also emphasizes to develop trainee's verbal and written communication and interpersonal skills to be ready for immediate employment.

**II. PROGRAM GOALS:**

- To be recognized as an accredited Electrical Maintenance diploma program in the country.
- To graduate competent and employable instrumentation maintenance technicians for the job market.
- To equip the graduates with necessary knowledge and skills to pursue higher studies and stay current with technology.
- To equip with a sense of social, ethical and environmental responsibility towards profession and community.

**III. GRADUATE ATTRIBUTES (GAs):**

A	<b>Lifelong Learning:</b> The ability to recognize the need for, and have the ability to engage in independent updating of technical knowledge.
B	<b>Technical Communication:</b> The ability to communicate effectively on well-defined technical activities within the professional community
C	<b>Professional Ethics:</b> The ability to understand and commit to professional ethics, responsibilities and norms of technician practices.
D	<b>Individual and Teamwork:</b> The ability to function effectively as an individual, and as a member of a technical team.
E	<b>Job-readiness:</b> The ability to perform competently at the workplace utilizing the knowledge and skills learned.



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#### IV. PROGRAM LEARNING OUTCOMES (PLOs)

After the completion of the program, the trainee will be able to:

<b>Knowledge :</b>	
<b>K1</b>	Describe technical terms, concepts, and operating principles and perform basic calculations related to electrical installation, operation, and maintenance.
<b>K2</b>	Demonstrate knowledge of basic science, mathematics, engineering and information technology as applied to electrical maintenance.
<b>Skills</b>	
<b>S1</b>	Read and interpret electrical prints including plans, diagrams and drawings for a wide range of electrical systems.
<b>S2</b>	Install, operate, and maintain various instrumentation equipment, machines, devices, and systems safely using relevant professional standards and operating procedures.
<b>S3</b>	Inspect, test, and troubleshoot different electrical equipment, machines, and devices using proper tools and techniques.
<b>Competence</b>	
<b>C1</b>	Plan, organize, and perform routine technical tasks safely and effectively as a member of collaborative team or individually.
<b>C2</b>	Communicate effectively and demonstrate professional commitment at the workplace through self-management and displaying responsible attitude.

#### V. CAREER OPPORTUNITIES:

After successfully completing the training period, the graduate will be qualified for one of the following jobs:

1. Electrical Maintenance Technician
2. Power Plant Maintenance Technician
3. Electrical Wiring Technician
4. Power Plant Operator
5. Electrical Installation and Operation Technician
6. Technical Sales





**VI. STUDY PLAN:**

**Year 1 (Semester I)**

COURSE CODE	COURSE TITLE	TH	LH	CH	CR	Co-requisite	Prerequisite
BSEN 111	English I	20	0	20	8	None	None
BSIB 111	Islamic Culture and Workplace Behavior	3	0	3	3	None	None
BSHS 111	Occupational Health & Safety	0	2	2	1	None	None
BSED 111	Engineering Drafting	0	3	3	1	None	None
<b>Total</b>		<b>23</b>	<b>05</b>	<b>28</b>	<b>13</b>		

**Year 1 (Semester II)**

COURSE CODE	COURSE TITLE	TH	LH	CH	CR	Co-requisite	Prerequisite
BSEN 121	English II	20	0	20	8	None	BSEN 111
BSWP 121	Workshop Practices	0	3	3	1	None	BSHS 111
BSMA 121	Mathematics	3	3	6	4	None	None
BSCA 121	Computer Application I	0	3	3	1	None	None
<b>Total</b>		<b>23</b>	<b>09</b>	<b>32</b>	<b>14</b>		

**Year 2 (Semester III)**

COURSE CODE	COURSE TITLE	TH	LH	CH	CR	Co-requisite	Prerequisite
ENGL 211	English Communication	3	0	3	3	None	BSEN 121
IEMT 211	Electrical Circuits	2	3	5	3	None	None
IEMT 212	Electrical Wiring I	0	6	6	2	IEMT 211	None
IEMT 213	Electrical Machine I	2	6	8	4	IEMT 211	None
IEMT 214	Motor Controls I	1	6	7	3	IEMT 211	None
IEMT 215	Electrical Blueprint Reading	1	3	4	2	IEMT 211	None
<b>Total</b>		<b>9</b>	<b>24</b>	<b>33</b>	<b>17</b>		



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**Year 2 (Semester IV)**

COURSE CODE	COURSE TITLE	TH	LH	CH	CR	Co-requisite	Prerequisite
IEMT 221	Electrical Power System	2	3	5	3	None	IEMT 211
IEMT 222	Electrical Wiring II	0	6	6	2	None	IEMT 212, IEMT 214
IEMT 223	Electrical Machine II	2	6	8	4	None	IEMT 213
IEMT 224	Motor Controls II	2	3	5	3	IEMT 223	IEMT 214
IEMT 225	Electrical Troubleshooting and Maintenance	1	6	7	3	IEMT 221 IEMT 223	IEMT 213
<b>Total</b>		<b>7</b>	<b>24</b>	<b>31</b>	<b>15</b>		

**Year 3 (Semester V)**

COURSE CODE	COURSE TITLE	TH	LH	CH	CR	Co-requisite	Prerequisite
IEMT 311	Cooperative Training (14 Weeks x 40= 560 hours)	0	0	40	3	None	Completion of all academic courses
<b>Total</b>		<b>0</b>	<b>0</b>	<b>40</b>	<b>3</b>		



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## VI. COURSE DESCRIPTIONS:

### 1<sup>st</sup> Semester:

#### Course: BSEN 111- English I

(TH: 20 hrs. LH: 0 hrs. CR: 8 hrs.)

ENG 001/BSEN 111 - English I is a first-semester, 8-credit hour English course (CEFR Level A1-A2) designed to prepare high school graduates planning to pursue their undergraduate studies in RCYCI, where the medium of instruction is English. The course is part of the Prep Year English Program and follows an integrated approach to teaching the four language skills of listening, speaking, reading and writing, with the focus of developing fluency and accuracy. The course emphasizes student-centered learning, use of ICT, and collaborative activities that promote 21st Century skills.

**PREREQUISITE:** None

**CO-REQUISITE:** None

#### Course: BSIB 111 Islamic Culture and Workplace Behavior (TH: 3 hrs. LH: 0 hrs. CR: 3 hrs.)

Discusses topics related to work, work ethics, positive behaviors in the workplace, work values, code of conduct, public job ethics, and the most prominent vocabulary of the work system. Focuses on the impact of Islamic culture on morals in general and positive work ethics and values. Emphasizes the role of the Kingdom of Saudi Arabia in spreading the culture of work ethics in all government sectors.

**PREREQUISITE:** None

**CO-REQUISITE:** None

#### Course: BSHS 111 Occupational Health & Safety

(TH: 0 hrs. LH: 2 hrs. CR: 1 hr.)

Provides the basic understanding and practical concept of the varieties of workplace hazards and relevant risk, and possible effective controls. Includes Hazard Identification and Risk Assessment [HIRA] techniques, Control Measures as recommended by International bodies OSHA, NFPA, HSE, and NSC etc. Applies the knowledge and skills learnt to promote Safety culture, and make the workplace Safe and Healthy as much as possible.

**PREREQUISITE:** None

**CO-REQUISITE:** None

#### Course: BSED 111 Engineering Drafting

(TH: 0 hrs. LH: 3 hrs. CR: 1 hr.)

Introduces the basics concepts of engineering drawing. Covers the topics of how to use geometrical construction and freehand sketching regarding orthographic views. Includes the topic how to draw the orthographic views by using the orthographic projection method and how to draw the isometric drawings.

**PREREQUISITE:** None

**CO-REQUISITE:** None



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**2<sup>nd</sup> Semester:****Course: BSEN 121 English II****(TH: 20 hrs. LH: 0 hrs. CR: 8 hrs.)**

ENG 002/BSEN 121 - English II is a second-semester, 8 credit hour English course (CEFR Level A2-B1) designed to prepare Prep Year students to pursue their undergraduate studies at RCYCI, where the medium of instruction is English. The course is part of the Prep Year English Program and follows an integrated approach to teaching the four language skills, with a focus on developing fluency and accuracy, as well as keeping a balance between General English (GE) and English for Specific Purposes (ESP). The course emphasizes student-centered learning, use of ICT, and collaborative activities that promote 21st-century skills.

**PRE-REQUISITE: BSEN 111****CO-REQUISITE: None****Course: BSWP 121 Workshop Practices****(TH: 0 hrs. LH: 3 hrs. CR: 1 hr.)**

Provides practical instruction on basic technician hand skills needed by the trainees during their study and in their future careers. Involves trainees in practical work and observations in the applied workshops and laboratories at YTI. Includes welding, machining, bench fitting, rigging, Mechanical Maintenance workshops and chemical, Electrical/Electronic laboratories. Includes all the required hands-on skills activities to build and strengthen the knowledge base of the subject.

**PREREQUISITE: BSHS 111****CO-REQUISITE: None****Course: BSMA 121 Mathematics****(TH: 3 hrs. LH: 3 hrs. CR: 4 hrs.)**

Provides the elementary mathematical knowledge and skills needed to understand the basic technical courses in different majors. Covers the basics of numeracy, algebra, geometry, and trigonometry. Pedagogically graded problem solving exercises are used to build and strengthen the knowledge base of the subject.

**PREREQUISITE: None****CO-REQUISITE: None****Course: BSCA 121 Computer Applications I****(TH: 0 hrs. LH: 3 hrs. CR: 1 hr.)**

Provides trainees with basic knowledge of using computers and MS Office Applications for doing day-to-day office operations. Includes topics that cover basics of computer fundamentals, PC operating skills, basic word processing, spreadsheets and presentation skills. Includes all the required hands-on skills activities to build and strengthen the knowledge base of the subject.

**PREREQUISITE: None****CO-REQUISITE: None**No. 2021 - 2 / 3  
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**3<sup>rd</sup> Semester:****Course: ENGL 211- English Communication****(TH: 3 hrs LH: 0 hrs CR: 3 hrs)**

ENG 201/ ENGL 211- English Communication is first semester, 3 credit hour English for Specific Purpose (ESP) designed for students who have completed their Basic Skill Year. The course focuses on English Communication in academic and professional settings; both oral and written. Oral communication skills include using effective communicative strategies in delivering presentations and participating in discussions. Written communication skills include writing business letters in a workplace. As a culminating project, students will present a topic related to their specialized fields or work-related topics incorporating the skills learned in class.

**PRE-REQUISITE: None****CO-REQUISITE: None****Course: IEMT 211: Electrical Circuits****(LT: 2 hrs LB: 3 hrs CR: 3 hrs)**

Provides the trainees with an introduction to direct current (DC) and alternating current (AC) electricity and the physical laws that apply to electrical circuits. Includes basic definitions of voltage, current, resistance, and power; analysis of series, parallel, series-parallel combinational resistive circuits; Ohm's law and Kirchhoff's laws; capacitors, inductors, impedance, resistive-inductive, resistive-capacitive, resistive-inductive-capacitive circuits and power calculation

**PREREQUISITE: None****CO-REQUISITE: None****Course: IEMT 212 Electrical Wiring I****(LT: 0 hrs LB: 6 hrs CR: 2 hrs)**

Provides the trainees with necessary knowledge and skills related to electrical wiring. Introduces usage of hand tools, machine tools, and materials used in residential electrical installations. Covers electrical safety, types of cables, splicing methods, planning, layout, and installation of conduit, boxes, switches, receptacles, lighting circuits, conductors, and branch circuits.

**PREREQUISITE: None****CO-REQUISITE: IEMT 211****Course: IEMT 213 Electrical Machine I****(LT: 2 hrs LB: 6 hrs CR: 4 hrs)**

Provides the trainees with essential knowledge and skills related to magnetism, single-phase transformers and DC machines in a logical and organized manner. Examines the construction, operational principles, losses, applications, characteristics of ideal, practical transformers, and autotransformers. Includes types, speed control, losses, efficiency, and applications of DC machines.

**PREREQUISITE: None****CO-REQUISITE: IEMT 211**

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**Course: IEMT 214 Motor Controls I**

(LT: 1 hrs LB: 6 hrs CR: 3 hrs)

Provides trainees with fundamental knowledge and hands-on skills related to motor control circuits. Introduces the fundamental concepts of motor controls using electromagnetic and solid-state devices used in industrial applications. covers all control system components such as control transformers, contactors, control relays, overcorrect relays, pilot devices, mechanical switches, circuit breakers, manual starters and motor starters for AC and DC motors. It also discusses and applies electrical braking, rotation direction reversing, and the starting methods of electric motors

**PREREQUISITE:** None**CO-REQUISITE:** IEMT 211**Course: IEMT 215 Electrical Blueprint Reading**

(LT: 1 hrs LB: 3 hrs CR: 2 hrs)

Provides the trainees with the necessary knowledge and skills to be able to read and interpret electrical prints. Covers the blueprint fundamentals needed in residential, commercial, and industrial projects. Includes the information that are related to electrical prints such as line types, abbreviations, schedules, print divisions, block titles, revisions, notes, print scales, and specifications. Emphasizes on electrical symbols used in residential, commercial, and industrial prints. Covers all types of electrical prints such as plans, drawings, and diagrams.

**PREREQUISITE:** None**CO-REQUISITE:** IEMT 211**4<sup>th</sup> Semester:****Course: IEMT 221 Electrical Power System**

(LT: 2 hrs LB: 3 hrs CR: 3 hrs)

Provides trainees with an understanding of electrical power generation, transmission, and distribution systems. Includes the components of generation stations, alternators, types of transformers, overhead and underground transmission systems, voltage levels, substation components, protective devices, types of loads, and types of electrical distribution systems. Explores the calculations of true power, reactive power, apparent power, power factor and power factor improvement and electrical power measurements for single and three phase circuits.

**PREREQUISITE:** IEMT 211**CO-REQUISITE:** None**Course: IEMT 222 Electrical Wiring II**

(LT: 0 hrs LB: 6 hrs CR: 2 hrs)

Provides the trainees with knowledge, skills, layout, planning, and installation of wiring systems in industrial and commercial facilities. Includes industrial installation methods, using different raceway systems and cables such as cable tray system, busway system, and metal conduits installation. Covers wire sizing, overcurrent protective devices selection, three-phase receptacles, and panel boards. Explores the electrical system grounding and bonding methods.

**PREREQUISITE:** IEMT 212, IEMT 214**CO-REQUISITE:** None

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**Course: IEMT 223 Electrical Machine II****(LT: 2 hrs LB: 6 hrs CR: 4 hrs)**

Provide trainees with fundamental knowledge and hands-on skills related to three-phase transformers, single-phase motors, three-phase induction motors, universal motors and synchronous motors. Include the construction, working principle, different configurations and applications of three phase transformers. Explore the types of motors, starting and running characteristics, starting methods, speed control, application, losses, efficiency, basic calculations of voltage, current, powers, torque, and speed of different types of motors.

**PREREQUISITE: IEMT 213****CO-REQUISITE: None****Course: IEMT 224 Motor Controls II****(LT: 2 hrs LB: 3 hrs CR: 3 hrs)**

Provide trainees with the basic knowledge and hands on skills to enable them to apply Programmable Logic Controllers (PLC) programming techniques. Provides trainees with basic knowledge of the programming techniques and operation. Covers Input /output devices, internal relays, timers, counters and motor control applications. Explores various techniques of motor control using PLCs.

**PREREQUISITE: IEMT 214****CO-REQUISITE: IEMT 223****Course: IEMT 225: Electrical Troubleshooting and Maintenance (LT: 1 hrs LB: 6 hrs CR: 3 hrs)**

Provides trainees with required knowledge and skills to enable them to test and eliminate electrical faults malfunction. Explores electrical safety, lockout/tag out procedures, different types of troubleshooting methodologies, maintenance programs, maintenance schedules, work order, work permits, common types of faults, tools and equipment used for troubleshooting. Includes the maintenance, troubleshooting, and testing of different electrical equipment such as transformers, motors and protective devices.

**PREREQUISITE: IEMT 213****CO-REQUISITE: IEMT 221, IEMT 223****5<sup>th</sup> Semester:****Course: IMMT 311: Cooperative Training****(LT: 0 hrs LB: 0 hrs CR: 3 hrs)**

Provides an opportunity to practice the acquired knowledge and improve hands-on skills. Applies the skills acquired to perform a variety of tasks competently under supervision in a real working environment. Applies oral and writing skills to prepare a comprehensive technical report and formal presentation regarding all activities performed during the cooperative training.

**PREREQUISITE: Completion of all academic courses****CO-REQUISITE: None**No. 2021 - 2 / 3  
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