



**STUDY PROGRAM:** Industrial Instrumentation Maintenance Technician (IIMT)

**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 instrumentation and control equipment maintenance. The program is designed to prepare trainees to repair, maintain, troubleshoot, monitor, calibrate, adjust and install instruments and control equipment/systems. Besides instrumentation skills, the program also emphasizes developing trainee's verbal and written communication and interpersonal skills to be ready for immediate employment.

**II. PROGRAM GOALS:**

Always in demand, Industrial Instrumentation Maintenance technicians will be able to:

- To be recognized as an accredited Instrumentation 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 instruments installation, operation, and maintenance.
<b>K2</b>	Demonstrate knowledge of basic science, mathematics, engineering and information technology as applied to instrumentation maintenance.
<b>Skills</b>	
<b>S1</b>	Read and interpret instrumentation prints including plans, diagrams and drawings for a wide range of instrumentation 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 instrumentation 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. Instrumentation Technician.
2. Process Control Technician.
3. Automation Technician
4. Plant operation Technician.
5. Calibration and Test Technician
6. Technical Sales



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**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
IEMT 211	Electrical Circuits	2	3	5	3	IIMT 211	None
IIMT 211	Electronic Circuits	2	6	8	4	IEMT 211	None
IIMT 212	Principles of Instrumentation	2	3	5	3	IIMT 213	None
IIMT 213	Instrument Documentation	0	6	6	2	IIMT 211	None
IIMT 214	Process Control System	2	6	8	4	IIMT 212	None
<b>Total</b>		<b>8</b>	<b>24</b>	<b>32</b>	<b>16</b>		



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**YANBU TECHNICAL INSTITUTE**  
**Department: Electrical, Electronics & Instrumentation Skills Department**  
**Program: Industrial Instrumentation Maintenance Technician (IIMT)**



Year 2 (Semester IV)

COURSE CODE	COURSE TITLE	TH	LH	CH	CR	Co-requisite	Prerequisite
ENGL 211	English Communication	3	0	3	3	None	BSEN 121
IIMT 221	PLC Instrument Application	1	6	7	3	None	IIMT 211
IIMT 222	Instrument Calibration	2	6	8	4	None	IIMT 212
IIMT 223	Process Troubleshooting and Maintenance	2	6	8	4	None	IIMT 214
IIMT 224	Instrumentation Skills Practice	0	6	6	2	None	IIMT 213
Total		8	24	32	16		

Year 3 (Semester V)

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



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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**



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**3<sup>rd</sup> Semester:**

**Course: IEMT 211: Electrical Circuits**

**(TH: 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:** IIMT 211

**Course: IIMT 211: Electronic Circuits**

**(TH: 2 hrs LB: 6 hrs CR: 4 hrs)**

Provides basic concepts and working principles of semiconductor devices. Introduces various bipolar and unipolar electronic devices such as diodes, transistors, FETs, MOSFETS, operational amplifiers (op-amps) and their applications. Includes concepts of digital electronics like numbering systems, logic gates, combinational circuits, sequential circuits, digital timers and their industrial applications. Provides hands-on activities that covers familiarization of multisim for simulations, measurement instruments, basic operations and project-based applications of the discussed electronics devices and circuits.

**PREREQUISITE:** None

**CO-REQUISITE:** IEMT 211

**Course: IIMT 212: Principles of Instrumentation**

**(TH: 2 hrs LB: 3 hrs CR: 3 hrs)**

Introduces industrial instrumentation, measurement systems, the basic characteristic of industrial process instrumentation and its signals, instruments for measuring process variables in temperature, pressure, flow, and level. Provides hands-on activities on types of process switches, continuous and point measurement using different sensors and transducers.

**PREREQUISITE:** None

**CO-REQUISITE:** IIMT 213

**Course: IIMT 213: Instrument Documentation**

**(TH: 0 hrs LB: 6 hrs CR: 2 hrs)**

Introduces standard Instrument Society of America (ISA) instrument symbols and abbreviation. Introduces the drawings, specifications and other documents that are commonly used by instrument technicians. Emphasizes the interpretation of symbols used to identify lines on drawings and also used to represent components and instrument location. Covers the use of tag numbers and also the function of the process.

**PREREQUISITE:** None

**CO-REQUISITE:** IIMT 211



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**Course: IIMT 214: Process Control System** (TH: 2 hrs LB: 6 hrs CR: 4 hrs)

Introduces fundamentals process control systems. Emphasizes on various types of control systems, single control loop, multi-loop control, controller parameters, controller tuning and their comparison.

**PREREQUISITE: None**

**CO-REQUISITE: IIMT 212**

**4<sup>th</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: IIMT 221: PLC Instrument Application** (TH: 1 hrs LB: 6 hrs CR: 3 hrs)

Introduces Programmable Logic Controllers (PLC), components and its functions, the assembly of the components and wiring. Emphasizes on troubleshooting techniques focusing on PLC components and its wiring as well as electrical measurement and testing related to the PLC system. Provides hands-on activities on assembly of components, wiring of components and wiring techniques, wiring of input/outputs, hardware configuration, basic instructions and program testing.

**PREREQUISITE: IIMT 211**

**CO-REQUISITE: None**

**Course: IIMT 222 Instrument Calibration** (TH: 2 hrs LB: 6 hrs CR: 4 hrs)

Introduces industrial instruments calibration, different instruments parameters functionality, calibration modes. Provides hands-on activities on industrial calibration.

**PREREQUISITE: IIMT 212**

**CO-REQUISITE: None**



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**Course: IIMT 223: Process Troubleshooting and maintenance (TH: 2 hrs LB: 6 hrs CR: 4 hrs)**

Introduces maintenance and provides the facilities trouble free operation all the time and achieving good productivity and efficiency for all equipment and instruments. Provides instruction and practice in maintenance and troubleshooting of process control systems, fault diagnosis techniques, noise reduction techniques, concept of distributed control system (DCS) and its use in troubleshooting of loops and components. Emphasizes on the laboratory experiments are used to test, diagnose and rectify faults and support the theoretical lectures.

**PREREQUISITE: IIMT 214**

**CO-REQUISITE: None**

**Course: IIMT 224: Instrumentation Skills Practice (TH: 0 hrs LB: 6 hrs CR: 2 hrs)**

Introduces the basic mechanical, electrical, drawing and planning skills required by the trainees in order to perform the tasks of instrumentation maintenance technician. Provides hands on skills and techniques including planning, mechanical, electrical, drawing and preparatory techniques necessary to perform the task of disassembling and assembling a process plant up to the point of commissioning and testing.

**PREREQUISITE: IIMT 213**

**CO-REQUISITE: None**

**5<sup>th</sup> Semester:**

**Course: IIMT 311: Cooperative Training (TH: 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**



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