



**STUDY PROGRAM: Industrial Process Plant Operator (IPPO)**

**I. CATALOGUE STATEMENT:**

The IPPO program prepares trainees to become refinery, chemical, and related industry operator. Process technicians work with the latest computer control systems, monitor equipment, and solve problems in a collaborative environment. This program provides knowledge and skills in the fundamental principles of process technology as applied in the oil and gas industry.

**II. PROGRAM GOALS:**

- Provide accredited chemical process technology related programs to empower the national industries.
- Ascertain continuous program/course offering improvement through active collaboration with the industries.
- Ensure effective and sustainable operation by coordinating with various entities within the Royal Commission.
- Actively participate in community development Programs.

**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 member of a technical team.
E	<b>Job-readiness:</b> The ability to perform competently at workplace utilizing the knowledge and skills learned.



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

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

Knowledge :	
K1	Describe technical terms, concepts, and operating principles related to Process Technology.
K2	Demonstrate knowledge of basic science, mathematics, and engineering and information technology as applied to process technology.
Skills	
S1	Read and interpret process drawings for major process systems.
S2	Operate and maintain various process equipment and systems safely using relevant professional standards, and operating procedures.
S3	Inspect, test, and troubleshoot different process equipment, using proper tools and techniques.
S4	Monitor instrumentation and control system process variables within acceptable range to maintain quality
Competence	
C1	Plan, organize, and perform routine technical tasks safely and effectively as a member of collaborative team or individually.
C2	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:

- Chemical process Operator;
- Power Plant Process Operator;
- Refinery Process Operator;
- Petrochemical Process Operator;
- Beverage Process Operator;
- Pharmaceutical Process Operator.

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**Department: Chemical Skills Department**  
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**VI. STUDY PLAN:**

**Year 1 (Semester I)**

COURSE CODE	COURSE TITLE	TH	LH	CH	CR	Co-requisite	Pre-requisite
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	Pre-requisite
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	Pre-requisite
ENGL 211	English Communication	3	0	3	3	None	BSEN 121
IPPO 211	Applied Physics	1	3	4	2	None	BSMA 121
IPPO 212	Process Technology I - Equipment	2	4	6	4	IPPO 211	None
IPPO 213	Process Instrumentation	1	3	4	2	IPPO 211	None
IPPO 214	Process Drawings	0	3	3	1	IPPO 212, IPPO 213	None
IPPO 215	Process Safety & Quality	1	3	4	2	None	BSHS 111
IPPO 216	Applied Chemistry	2	3	5	3	IPPO 211	BSMA 121
<b>Total</b>		<b>10</b>	<b>19</b>	<b>29</b>	<b>17</b>		



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Year 2 (Semester IV)

COURSE CODE	COURSE TITLE	TH	LH	CH	CR	Co-requisite	Prerequisite
IPPO 221	Process Technology II - Systems	2	3	5	3	None	IPPO 212
IPPO 222	Process Troubleshooting	1	3	4	2	IPPO 226	IPPO 212, IPPO 213
IPPO 223	Process Control	1	3	4	2	None	IPPO 213, IPPO 214
IPPO 224	Process Technology III - Operations	2	6	8	4	IPPO 223	IPPO 212, IPPO 214
IPPO 225	Industrial Processes	1	3	4	2	None	IPPO 212
IPPO 226	Process Simulation	0	4	4	2	IPPO 224	IPPO 212, IPPO 214
<b>Total</b>		<b>7</b>	<b>22</b>	<b>29</b>	<b>15</b>		

Year 3 (Semester V)

COURSE CODE	COURSE TITLE	TH	LH	CH	CR	Co-requisite	Pre-requisite
IPPO 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**

**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**



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**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**

**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: IPPO 211 Applied Physics**

**(TH: 1 hrs LH: 3 hrs CR: 2 hrs)**

Introduces basic principles of physics and their application to process technicians' daily job routine. Covers basics of measurements, fluid mechanics, thermodynamics, energy and mass conservation.

**PREREQUISITE: BSMA 121**

**CO-REQUISITE: None**

**Course: IPPO 212 Process Technology I Equipment**

**(TH: 2 hrs LH: 4 hrs CR: 4 hrs)**

Explores the use of common process equipment. Identifies the use of appropriate terminology to describe components of the equipment. Includes pipefittings, valves, pumps, compressors, heat exchangers, reactors, furnaces and separation equipment.

**PREREQUISITE: None**

**CO-REQUISITE: IPPO 211**





**Course: IPPO 213 Process Instrumentation**

**(TH: 1 hrs LH: 3 hrs CR: 2 hrs)**

Introduces the fundamentals of instrumentation used in process industries. Emphasizes on process variables like pressure, temperature, flow, level measurement. Includes the simple control loop and its associated components. The lab exercises develop the skills of monitoring and recording the process variables.

**PREREQUISITE: None**

**CO-REQUISITE: IPPO 211**

**Course: IPPO 214 Process Drawings**

**(TH: 0 hrs LH: 3 hrs CR: 1 hrs)**

Develops practical experience in reading, interpreting, and drawing process block diagrams, process flow diagrams (PFDs) and Piping & Instrumentation diagrams (P&IDs)

**PREREQUISITE: None**

**CO-REQUISITE: IPPO 212, IPPO 213**

**Course: IPPO 215 Process Safety and Quality**

**(TH: 1 hrs LH: 3 hrs CR: 2 hrs)**

Introduces the fundamentals of process safety, process hazards and hazard controls. Emphasizes on process quality, quality tools and sampling. Includes process safety devices and quality measures.

**PREREQUISITE: BSHS 111**

**CO-REQUISITE: None**

**Course: IPPO 216 Applied Chemistry**

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

Introduces basic chemistry fundamentals required in the process operation field. Includes chemical formulae and equations, formula simplification, atomic mass, mole concept, molarity, the periodic table, molecules and chemical bonding, and introductory organic chemistry.

**PREREQUISITE: BSMA 121**

**CO-REQUISITE: IPPO 211**

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

**Course: IPPO 221 Process Technology II Systems**

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

Explores the interrelation of process equipment and process systems involving related scientific principles. Includes commonly available systems in industries like utility, steam generation and separation systems.

**PREREQUISITE: IPPO 212**

**CO-REQUISITE: None**



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**Course: IPPO 222 Process Troubleshooting**

**(TH: 1 hrs LH: 3 hrs CR: 2 hrs)**

Provides students with troubleshooting skills to identify problems and take necessary corrective actions to operate a processing plant.

**PREREQUISITE: IPPO 212, IPPO 213**

**CO-REQUISITE: IPPO 226**

**Course: IPPO 223 Process Control**

**(TH: 1 hrs LH: 3 hrs CR: 2 hrs)**

Provides the necessary knowledge base to work with Process Control systems. Includes principles of control loops and digital controllers as well as the basic features of distributed control systems (DCS).

**PREREQUISITE: IPPO 213, IPPO 214**

**CO-REQUISITE: None**

**Course: IPPO 224 Process Technology III Operations**

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

Covers an entire unit's operation within the process industry utilizing existing knowledge of equipment, systems, and instrumentations. Studies concept related to commissioning, normal startup, normal operations, normal shut down and abnormal situations. Applies process technicians' role in performing the tasks associated with their concepts within an operating unit.

**PREREQUISITE: IPPO 212, IPPO 214**

**CO-REQUISITE: IPPO 223**

**Course: IPPO 225 Industrial Processes**

**(TH: 1 hrs LH: 3 hrs CR: 2 hrs)**

Explores local chemical process industries. Provides an overview of natural gas and petroleum processing. Covers various miscellaneous downstream industries such as petrochemicals, cement and chemical processes. Includes field visits to the nearby process industries.

**PREREQUISITE: IPPO 212**

**CO-REQUISITE: None**

**Course: IPPO 226 Process Simulation**

**(TH: 0 hrs LH: 4 hrs CR: 2 hrs)**

Develops the skills and understanding required for running dynamic simulations. Exposure to various scenarios like Normal Operations, Malfunctions and Disturbances using different DCS systems.

**PREREQUISITE: IPPO 212, IPPO 214**

**CO-REQUISITE: IPPO 224**

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

**Course: IPPO 311 Cooperative Training**

**(TH: 0 hrs LH: 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**

