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College of Engineering Technology

BACHELOR OF INSTRUMENTATION AND CONTROL ENGINEERING TECHNOLOGY

CMO Reference No. 13, S. 2023; CMO Reference No. 4, S. 2018; CMO Reference No. 20, S. 2013;
CMO Reference No. 39, S. 2021; CMO Reference No. 40, S. 2021
ABET-ETAC Criteria for Accrediting Engineering Technology Programs 2023-2024

I. University Vision

A premier national university that develops leaders in the global knowledge economy.

II. University Mission

A university committed to producing leaders by providing a 21st century learning environment through innovations in education, multidisciplinary research, and community and industry partnerships in order to nurture the spirit of nationhood, propel the national economy, and engage the world for sustainable development

III. University Core Values

Patriotism
This value extends from promoting love of country to taking pride in being a Filipino. The University advocates a strong sense of commitment to national ideals through its active promotion of the Philippine culture and heritage, as well as concern for the environment and the nations, all of which lead to the creation of a pool of professionals who are instrumental for nation building.

Integrity
This pertains to the University's steadfast adherence to morally-sound principles and ideals in the pursuit of institutional goals and objectives. It covers the values of accountability, honesty, righteousness, incorruptibility, and decency in the governance and implementation of academic, administrative, financial policies.

Excellence
This represents the drive of the University to pursue greatness. It includes the cultivation of a culture of excellence in the hearts and minds of the stakeholders, and the continuous improvement in the systems by which the University operates on. This value pushes the institution to go beyond the standard levels of performance, and be in a position of leadership that would inspire the people and other institutions to serve the country to the highest degree.

Service
This refers to the genuine desire of the University to respond to the growing needs of the community. It encompasses the selfless performance of the University's mandates, and in

duty to constantly meet the challenges of development in the country in the spirit of uplifting the lives of the Filipino people.

Resilience

This refers to the ability to conquer the different challenges, hardships and tests of time. This value encompasses the commitment of the University to support the government in pursuing sustainable development, and foster disaster risk reduction and management by dedicating its efforts towards strengthening readiness and capacity of the community and its people.

Faith

The University's initiatives and activities are guided by a strong faith in a Supreme Being. These are anchored on high regard and respect for the beliefs and orientation of each member of the academic community for a productive and meaningful co-existence.

IV. Philosophy or Rationale of the Program

The Bachelor of Instrumentation and Control Engineering Technology envelopes an interdisciplinary program laying the principles of engineering, computer, physics and advancement in technology mapping the core knowledge of instrumentation. This program will help the learners to visualize the concrete scenario in manufacturing, energy, telecommunications, and the need to control, monitor and automate the instruments that are necessary in the field area. It could also enhance the skills and knowledge that elevates the understanding about Internet of things, sensors and data analytics. It also aims to produce more competent professionals who can deliver interpretation of the design, maintain and inject innovations. Learners are expected to have good communication skills with integrity, sensitivity with ethical behavior, social responsibility, leadership skills, good team player and innovation in order to promote the core values of the university.

V. Program Educational Objectives

PEO 1	Title: **Successful Professional Practice**	
	Description: Successfully practice as instrumentation and control engineering technologists for the welfare of the society.	
	KPI 1	Graduates are involved in operations planning with contribution towards improving processes.
	KPI 2	Graduates are able to undertake technology activities in a way that contributes to sustainable development
	KPI 3	Graduates are actively involved in designing of new systems and processes and/or providing consultancy and advice to either internal or external customers.
PEO 2	Title: **Ethics and Professionalism**	
	Description: Demonstrate a high degree of ethics and professionalism at all time	

	KPI 1	Graduates have planned for effective project implementation through managing the planning, budgeting and organization of tasks, people, and resources.
	KPI 2	Graduates have managed teams and developed staff to meet changing technical and managerial needs.
	KPI 3	Graduates are developing or have started a company or partnership business.
	KPI 4	Graduates have managed continual quality improvement.
PEO 3	Title: **Technological Advancement**	
	Description: Contribute to the technological advancement for the welfare of the humanity	
	KPI 1	Graduates have actively contributed to the development of new technologies, processes and/or methodologies or improvements in existing ones
	KPI 2	Graduates participated in research and development projects aimed at technological innovaions
	KPI 3	Graduates have actively engaged with stakeholders including communities and end-users, to understand and address real-world challenges
	KPI 4	Graduates communicate and collaborate with interdisciplinary teams to ensure the societal impact of thei technological contributions.

VI. Career Opportunities

The Bachelor of Instrumentation and Control Engineering Technology program equips students with a comprehensive understanding of integrated engineering disciplines, enabling them to pursue a diverse range of technical roles across various industries. Graduates are prepared for careers as engineering technologists, where they play a pivotal role in designing, implementing and measurement in control systems, driving efficiency, innovation, and safety in modern workplaces.

Potential career paths for graduates include roles as:

1. Control Systems Engineer/Technician
2. Instrumentation Engineer/Technician
3. Automation and Control Systems Engineers/Technician
4. Robotics Engineer/Technician
5. DCS Engineer/ Technician

VII. Allied Programs

The Bachelor of Instrumentation and Control Engineering Technology is a specialized program focusing on the integration and synergy of automation, electrical, electronics, and computing systems.

Being such, the following may be considered allied programs of Bachelor of Instrumentation and Control Engineering Technology:

1. Electrical / Electronics Engineering
2. Computer Science/Engineering
3. Mechatronics Engineering
4. Automation and Control Engineering
5. Instrumentation and Control Engineering
6. other Engineering Technology Programs

VIII. Institutional Graduate Attributes

1. **Knowledge Competence** - Demonstrate a mastery of the fundamental knowledge and skills required for functioning effectively as a professional in the discipline, and an ability to integrate and apply them effectively to practice in the workplace.

2. **Creativity and Innovation** - Experiment with new approaches, challenge existing knowledge boundaries and design novel solutions to solve problems.

3. **Critical and Systems** - Identify, define, and deal with complex problems pertinent to the future professional practice or daily life through logical, analytical and critical thinking.

4. **Communication** - Communicate effectively (both orally and in writing) with a wide range of audiences, across a range of professional and personal contexts, in English and Pilipino

5. **Lifelong learning –** Identify own learning needs for professional or personal development; demonstrate an eagerness to take up opportunities for learning new things as well as the ability to learn effectively on their own.

6. **Leadership, teamwork, and Interpersonal Skills** - Function effectively both as a leader and as a member of a team; motivate and lead a team to work towards goal; work collaboratively with other team members; as well as connect and interact socially and effectively with diverse culture.

7. **Global Outlook** - Demonstrate an awareness and understanding of global issues and willingness to work, interact effectively and show sensitivity to cultural diversity.

8. **Social and National Responsibility** - Demonstrate an awareness of their social and national responsibility; engage in activities that contribute to the betterment of the society; and behave ethically and responsibly in social, professional and work environments.

IX. Student Outcomes

SO 1	**Problem Analysis**	
	Ability to apply their knowledge of mathematics, science, engineering, and technology, along with analytical tools, to solve broadly-defined engineering problems within their discipline and to enhance industrial technology processes creatively and innovatively that is within industry standards	
	KPI 1	Determine the present technology's issues and limitations
	KPI 2	Analyze the situation and come up with a solution using scientific and mathematical principles
	KPI 3	Use logical, mathematical and technical principles in formulating solutions
SO 2	**Design and Development of Solutions**	
	Ability to design and implement systems, components, and processes to address broadly-defined engineering problems within the discipline, while demonstrating proficiency, adaptability, and adherence to global standards in meeting industry-specific requirements	
	KPI 1	Design systems, components or processes that will achieve program objectives
	KPI 2	Formulate solutions through various technology-based outputs that will address the needs of the community and industry
SO 3	**Communication**	
	Ability to demonstrate proficiency in written, oral, and graphical communication in broadly-defined technical and non-technical environments, effectively utilizing relevant technical literature and culturally sensitive language while ensuring clarity and persuasion in conveying information, including the ability to understand and provide clear instructions, maintain high comprehension levels, deliver compelling presentations, compose effective documents, and articulate technological innovation outputs to diverse clientele	
	KPI 1	Convey ideas through written, oral, and graphical communication in well-defined technical and non-technical environments;
	KPI 2	Exhibit oral and visual communication skills suited to the industrial technology profession
	KPI 3	Show proficiency in writing research-based papers, stylistic essays and technical reports
SO 4	**Investigation**	
	Ability to perform standard tests, measurements, and experiments, and subsequently analyze and interpret the results to enhance processes, while also applying contemporary techniques, resources, and cutting-edge engineering technology tools to address current industry requirements and to foster entrepreneurial growth, all while upholding the safety and health standards of business and industry.	
	KPI 1	Examine a series of experimental results
	KPI 2	Conduct experiments to evaluate the interpretation of theories
	KPI 3	Design the solution to mitigate the identified gaps
SO 5	**Leadership and Teamwork**	
	Ability to function effectively both as team members and leaders in technical teams, while also developing and demonstrating leadership and management competencies within team-based environments, making informed decisions,	

	motivating teams, delegating responsibilities, and inspiring positive organizational change through the practice of their profession with integrity and accountability.	
	KPI 1	Establish team rapport, priorities and action plans to meet the goal
	KPI 2	Participate actively in team activities as a member(s) in meetings and help to reinforce concepts
	KPI 3	Show appreciation for the efforts exerted by each member
SO 6	**Ethics and Professionalism**	
	Ability to adhere to the moral, ethical and professional responsibility of an engineering technologist in balancing the broader public interest while upholding the ethical norms and safety standards within the industrial technology profession.	
	KPI 1	Demonstrate professional and ethical values in the workplace
	KPI 2	Examine the condition that necessitates a decision based on moral, legal and technical aspects
SO 7	**Lifelong Learning**	
	Ability to demonstrate enthusiasm and commitment to lifelong learning, nurturing ongoing personal and professional development, and driving positive transformations within the broadly-defined engineering technology field for entrepreneurial and industrial development.	
	KPI 1	Promote lifelong learning programs in order to progress and grow one's career
SO 8	**Social and National Responsibility**	
	Apply acquired engineering technology knowledge and skills in addressing community problems that contribute to national development.	
	KPI 1	Be updated with the current national and global issues, technologies and problems in the technological and non-technical space concerning one's profession
	KPI 2	Be abreast with the recent trends in the industry

X. Teaching, Learning, and Assessment Pedagogies

- **Lecture.** Although the usefulness of other teaching strategies is being widely examined today, the lecture still remains an important way to communicate information.
- **Case Method.** Providing an opportunity for students to apply what they learn in the classroom to real-life experiences has proven to be an effective way of both disseminating and integrating knowledge. The case method is an instructional strategy that engages students in active discussion about issues and problems inherent in practical application.
- **Discussion.** Other faculty find it helpful to have student's list critical points or emerging issues, or generate a set of questions stemming from the assigned reading(s).
- **Distance Learning.** Distance learning is not a new concept. We have all experienced learning outside of a structured classroom setting through television, correspondence courses, etc. Distance learning or distance education as a teaching pedagogy, however, is an important topic of discussion on college campuses today.
- **Integrating Technology.** Today, educators realize that computer literacy is an important part of a student's education. Integrating technology into a course curriculum when appropriate is proving to be valuable for enhancing and extending the learning experience for faculty and students

- **Cooperative Learning.** Cooperative Learning is a systematic pedagogical strategy that encourages small groups of students to work together for the achievement of a common goal. The term 'Collaborative Learning' is often used as a synonym for cooperative learning when, in fact, it is a separate strategy that encompasses a broader range of group interactions such as developing learning communities, stimulating student/faculty discussions, and encouraging electronic exchanges (Bruffee, 1993). Both approaches stress the importance of faculty and student involvement in the learning process.
- **Active Learning.** Many studies show that learning is enhanced when students become actively involved in the learning process. Instructional strategies that engage students in the learning process stimulate critical thinking and a greater awareness of other perspectives.
- The assessment methods at the end of the topic like assignments, quizzes, midterm and final examinations will be conducted throughout the duration of the course.
- Class test and return demonstration methods are after the discussion of the major topics while the other works are distributed throughout the duration of the course.

XI. Integration of New Principles in the Enhanced OBE Framework

Outcome-based education (OBE) is an approach that emphasizes learning outcomes and skills that students should possess after completing a program. The Bachelor of Instrumentation and Control Engineering Technology is a degree that prepares students to enter the workforce in various fields of engineering technology. To enhance the OBE framework in this program, several new principles have been integrated to align with current trends and needs.

The new principles that have been integrated into the enhanced OBE framework of the program include technology infusion, CDIO approach, SDGs, Gender and Development, Peace studies/education, indigenous studies/education, Internationalization, and Red Spartan Spirit. These principles provide students with practical skills, cultural awareness, social responsibility, and a broad understanding of global issues that are essential for success in today's workforce.

The integration of these principles into the enhanced OBE framework provides students with a comprehensive education that prepares them for their future careers. The program, with its enhanced OBE framework, focuses on providing students with the knowledge and skills they need to succeed in their chosen field, while also contributing to sustainable development and social responsibility.

Technology Infusion

The Bachelor of Instrumentation and Control Engineering Technology program necessitates continuous infusion of technology to stay relevant in the fast-paced, ever-changing industrial landscape. Rapid technological innovation has transformed traditional engineering practices, and the program must adapt to these changes to remain competitive and address industry demands.

By integrating technology into the curriculum, students gain a comprehensive understanding of the latest advancements in instrumentation and control engineering technology. This knowledge enables them to adeptly incorporate cutting-edge technologies like control systems, process variable measurement, robotics, and automation into their work processes. The integration of software and hardware components further enhances efficiency, precision, and safety in engineering and industrial practices. Therefore, the infusion of technology is imperative to equip students with the knowledge and skills needed to meet the challenges of the modern industrial world.

Integration of Conceive, Design, Implement, Operate Principles (CDIO)

The integration of CDIO principles into the Bachelor of Instrumentation and Control Engineering Technology program is essential to prepare students to become innovative and competent professionals capable of meeting the challenges of the rapidly evolving industrial landscape. The CDIO framework emphasizes the integration of theory and practice in engineering and technology education, providing students with a hands-on, practical approach to learning. This approach is particularly relevant to this program, and it enables students to develop a comprehensive understanding of the entire industrial process, from conception to operation, through project-based learning activities and real-world projects. Furthermore, this approach fosters teamwork, communication, and problem-solving skills, which are vital in the modern industrial world.

Integration of Sustainable Development Goals Principles

The Sustainable Development Goals (SDGs) principles, adopted by the United Nations, aim to achieve a better and more sustainable future for all by addressing various global challenges such as poverty, inequality, climate change, and environmental degradation. The SDGs provide a framework for action and serve as a universal call to end poverty, protect the planet, and ensure that all people enjoy peace and prosperity. The relevance of the SDGs principles to the Bachelor of Instrumentation and Control Engineering Technology program is crucial as it equips students with the knowledge and skills necessary to create innovative and sustainable solutions in various fields, especially in engineering and industrial fields.

The program requires the integration of the SDGs into the curriculum to promote responsible production and consumption, sustainable infrastructure, clean energy, and environmentally-friendly practices. Hence, the inclusion of the SDGs in the program prepares students to become responsible and innovative engineering technologists who contribute to achieving a sustainable future.

Integration of Gender and Development

Gender and Development (GAD) is a crucial aspect of contemporary societies as it helps to create equitable opportunities for people of all genders. In the context of the Bachelor of Instrumentation and Control Engineering Technology, GAD is highly relevant to the program's learning objectives and outcomes, as it can help students gain a deeper understanding of how gender roles and stereotypes affect the industries they are preparing to enter. Specifically, the program requires students to be proficient in engineering and technological knowledge and skills. However, without an understanding of GAD, students

may overlook how gender norms affect the way people interact with technology and how this can perpetuate gender inequalities. Therefore, incorporating GAD into the program can help students become more socially aware and responsible professionals who can contribute to a more equitable and sustainable future.

Integration of Peace Studies / Education

Integration of peace studies/education into the Bachelor of Instrumentation and Control Engineering Technology equips students with vital knowledge, skills, and attitudes needed for a peaceful and sustainable world. This integration exposes students to diverse conflict perspectives, fosters critical thinking, and enhances communication and problem-solving skills. Those exposed to peace studies/education can apply their expertise to promote workplace peace, engage in constructive dialogue, and contribute to sustainable technology development. Thus, the integration is essential for producing socially responsible, ethical engineering technologists committed to building a peaceful world.

Integration of Indigenous Studies / Education

Integration of Indigenous Studies/Education into the Bachelor of Instrumentation and Control Engineering Technology provides students with a deep understanding of indigenous history, cultures, and perspectives, fostering collaborative work with indigenous communities and businesses. This knowledge enhances cultural competence, making students more sensitive to the unique needs of Indigenous peoples. Through critical analysis, students reflect on their professional roles, promoting ethical practices that prioritize sustainability, social justice, and equity. Incorporating this principle into the program will empower students to operate effectively in diverse contexts and contribute to positive social change.

Internationalization

Internationalization is integral to the objectives of the Bachelor of Instrumentation and Control Engineering Technology. Embracing it exposes students to diverse cultures, languages, and perspectives, enhancing their global competency. This broader outlook aids in understanding global markets and technology, crucial in the rapidly evolving world of engineering technology. Internationalization also opens doors to study abroad, international internships, and collaborations with peers and experts worldwide, offering valuable experiences that enrich students' education and career prospects.

Integration of the Red Spartan Spirit Course / Topics

The Red Spartan Spirit embodies passion, perseverance, and dedication—essential qualities for Bachelor of Instrumentation and Control Engineering Technology students. Aligned with program goals, it cultivates knowledge, competence, creativity, critical and systems lifelong learning, leadership, teamwork, interpersonal skills, global outlook, and social and national responsibility. This spirit instills determination, fostering mastery of foundational knowledge and skills in Instrumentation and Control Engineering Technology. Encouraging the challenge of existing boundaries and experimentation with novel approaches, it promotes creativity and innovation. Through critical and systems

lifelong learning, students adapt to technological advancements, developing leadership, teamwork, and interpersonal skills for effective global collaboration while honoring social and national responsibilities.

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ACADEMIC PROGRAM			Technology Infusion	Integration of Conceive, Design, Implement, Operate Principles (CDIO)	Integration of Sustainable Development Goals Principles	Integration of Gender and Development	Integration of Indigenous Studies / Education	Integration of Peace Studies / Education	Internationalization	Integration of the Red Spartan Spirit Course
No.	Course Code	Course Title								
NON-TECHNICAL COURSES										
A. Required General Education Courses					SDG 5	1		1		2,6
1	GEd 101	Understanding the Self	1							
2	GEd 102	Mathematics in the Modern World	1				1			
3	GEd 104	The Contemporary World	1		SDG 4				1	
4	GEd 105	Readings in Philippine History	1		SDG 16			1		

5	GEd 106	Purposive Communication	1		Intro to SD	1	1		1	
6	GEd 107	Ethics	1						1	1
7	GEd 108	Art Appreciation	1			1		1		2, 5,6
8	GEd 109	Science, Technology, and Society	1							
B. Mandated Courses										
1	GEd 103	Life and Works of Rizal	1							1
C. Elective Course										
1	Litr102	ASEAN Literature	1	1		1				3,4
2	GAD101	Gender and Society	1							
3	ES101	Environmental Science	1							
D. PATHFit & NSTP										
1	PATHFit 1	Movement Competency Training	1		SDG 3					
2	PATHFit 2	Exercise-based Fitness Activities	1							1
3	PATHFit 3	Traditional and Recreational Games	1							
4	PATHFit 4	Team Sports (Basketball and Volleyball)	1							
5	NSTP 111	National Service Training Program 1			SDG 11			1		1,4
6	NSTP 121	National Service Training Program 2			SDG 11			1		1,4
TECHNICAL COURSES										
A. Math and Sciences Courses										
1	MathET1 40	Comprehensive Math (Algebra, Trigonometry, Analytic Geometry)	1							
2	MathET1 41	Differential Calculus for BET	1							
3	MathET2 41	Integral Calculus for BET	1							

4	MathET242	Probability and Statistics	1							
5	SciET141	Chemistry	1							
6	SciET142	Physics	1							
B. Management and Tool Courses										
1	CpET140	Computer Programming	1							
2	BET141	Production Drawing	1							
3	BET142	Computer Aided Design	1							
4	BET 143	Occupational Health and Industrial Safety Management	1							
5	BET 241	Materials Selection & Testing	1							
6	BET 341	Quality Control and Assurance	1							
7	BET 342	Technopreneurship for BET	1							
8	BET 344	Engineering Technology Ethics	1							
9	BET 345	Industrial Operation & Management Practices	1							
10	BET 346	Engineering Technology Management	1							
C. Professional Courses										
1	ICET 141	Instrumentation Codes and Standards	1		SDG 9,17					
2	ELXET 142	Electronic Devices	1	1	SDG 9					
3	ICET 142	Introduction to Electrical Power Distribution	1		SDG 7					
4	ICET 143	AC/DC Circuits	1		SDG 7					
5	ICET 144	Digital Electronics and Microprocessor	1		SDG 9					

6	ICET 145	Instrumentation System Diagram and Process Equipment	1		SDG 9,12						
7	ICET 241	Fluid Mechanics & Heat Transfer	1		SDG 6,9						
8	ICET 242	Process Measurement	1		SDG 9						
9	MXET 241	Electric Motors and Control	1		SDG 7,9						
10	MXET 242	Electro-Pneumatics and Electro-Hydraulics	1		SDG 7,9						
11	ELXET 242	Analog and Digital Signal Analysis	1		SDG 9						
12	ICET 341	Industrial Networks	1		SDG 9,11						
13	ICET 342	Analytical Instrumentation	1		SDG 9						
14	ICET 343	Instrumentation PLC	1		SDG 9						
15	ICET 344	Process Control Application	1		SDG 9						
16	ICET 345	Distributed Control Systems	1		SDG 9,11						
17	BET343	Technology Capstone Project 1	1	1							
18	BET347	Technology Capstone Project 2	1	1							
19	BET441	Supervised Industrial Training 1	1	1							
20	BET442	Supervised Industrial Training 2	1	1							

*Legend: **0**-Not Integrated, **1**- Integrated*
For Red Spartan Spirit, core values of the university are mapped to the different courses of the program.

1. ***Patriotism***
2. ***Integrity***
3. ***Excellence***
4. ***Service***
5. ***Resilience***
6. ***Faith***

XII. Proposed Curriculum Structure

BACHELOR OF INSTRUMENTATION AND CONTROL ENGINEERING TECHNOLOGY

FIRST YEAR							
FIRST SEMESTER							
Course Code	**Course Title**	**Lec**	**Lab**	**Credit Units**	**Pre-requisite(s)**	**Co-requisite(s)**	**Category**
ICET 141	Instrumentation Codes and Standards	2	0	2			TC-C
ELXET 142	Electronic Devices	2	3	3			TC-C
ICET 142	Introduction to Electrical Power Distribution	2	3	3			TC-C
GEd 101	Understanding the Self	3	0	3			NTC-A
GEd 102	Mathematics in the Modern World	3	0	3			NTC-A
SciET141	Chemistry	3	3	4			TC-A
BET141	Production Drawing	1	6	3			TC-B
MathET140	Comprehensive Math (Algebra, Trigonometry, Analytic Geometry)	3	0	0			TC-A
PATHFit 1	Movement Competency Training	2	0	2			NTC-D
NSTP 111	National Service Training Program 1	3	0	3			NTC-D
	Total	**24**	**15**	**26**			
FIRST YEAR							
SECOND SEMESTER							
Course Code	**Course Title**	**Lec**	**Lab**	**Credit Units**	**Pre-requisite(s)**	**Co-requisite(s)**	**Category**
ICET 143	AC/DC Circuits	2	6	4	ELXET 142,ICET 142		TC-C
ICET 144	Digital Electronics and Microprocessor	2	3	3		ICET 143	TC-C
ICET 145	Instrumentation System Diagram and Process Equipment	2	3	3	ICET 141		TC-C
Ged 103	Life and Works of Rizal	3	0	3			NTC-B
SciET142	Physics	3	3	4	MathET140		TC-A
BET142	Computer Aided Design	1	3	2	BET141		TC-B
PATHFit 2	Exercise-based Fitness Activities	2	0	2	PATHFit 1		NTC-D
NSTP 121	National Service Training Program 2	3	0	3	NSTP 111		NTC-D
	Total	**18**	**18**	**24**			
FIRST YEAR							
MIDTERM SEMESTER							
Course Code	**Course Title**	**Lec**	**Lab**	**Credit Units**	**Pre-requisite(s)**	**Co-requisite(s)**	**Category**
GEd 104	The Contemporary World	3	0	3			NTC-A
MathET141	Differential Calculus for BET	3	0	3	MathET140		TC-A
BET 143	Occupational Health and Industrial Safety Management	3	0	3			TC-B
	Total	**9**	**0**	**9**			

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SECOND YEAR							
FIRST SEMESTER							
Course Code	**Course Title**	**Lec**	**Lab**	**Credit Units**	**Pre-requisite(s)**	**Co-requisite(s)**	**Category**
ICET 241	Fluid Mechanics & Heat Transfer	2	3	3	MathET 141, SciET142	MathET241	TC-C
ICET 242	Process Measurement	2	3	3	MathET 141,ICET 144	MathET241	TC-C
MXET 241	Electric Motors and Control	2	3	3	ICET 143		TC-C
Litr102	ASEAN Literature	3	0	3			NTC-C
GEd 105	Readings in Philippine History	3	0	3			NTC-A
MathET241	Integral Calculus for BET	3	0	3	MathET141		TC-A
CpET140	Computer Programming	2	3	3			TC-B
PATHFit 3	Traditional and Recreational Games	2	0	2	PATHFit 1 & 2		NTC-D
	Total	**19**	**12**	**23**			
SECOND YEAR							
SECOND SEMESTER							
Course Code	**Course Title**	**Lec**	**Lab**	**Credit Units**	**Pre-requisite(s)**	**Co-requisite(s)**	**Category**
MXET 242	Electro-Pneumatics and Electro-Hydraulics	2	3	3	ICET 241		TC-C
ELXET 242	Analog and Digital Signal Analysis	2	3	3	MathET241, ICET 144		TC-C
GAD101	Gender and Society	3	0	3			NTC-C
BET 241	Materials Selection & Testing	3	0	3			TC-B
GEd 106	Purposive Communication	3	0	3			NTC-A
MathET242	Probability and Statistics	3	0	3	MathET241		TC-A
PATHFit 4	Team Sports (Basketball and Volleyball)	2	0	2	PATHFit 1 & 2		NTC-D
	Total	**18**	**6**	**20**			

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THIRD YEAR							
FIRST SEMESTER							
Course Code	**Course Title**	**Lec**	**Lab**	**Credit Units**	**Pre-requisite(s)**	**Co-requisite(s)**	**Category**
ICET 341	Industrial Networks	2	3	3	ELXET 242, ICET 144		TC-C
ICET 342	Analytical Instrumentation	2	3	3	ICET 242		TC-C
ICET 343	Instrumentation PLC	2	3	3		ICET 342	TC-C
GEd 107	Ethics	3	0	3			NTC-A
GEd 108	Art Appreciation	3	0	3			NTC-A
BET 341	Quality Control and Assurance	3	0	3			TC-B
BET 342	Technopreneurship for BET	3	0	3			TC-B
BET 343	Technology Capstone Project 1	2	3	3	MXET242	ICET 343	TC-C
	Total	**20**	**12**	**24**			
THIRD YEAR							
SECOND SEMESTER							
Course Code	**Course Title**	**Lec**	**Lab**	**Credit Units**	**Pre-requisite(s)**	**Co-requisite(s)**	**Category**
ICET 344	Process Control Application	2	3	3	ICET 343		TC-C
ICET 345	Distributed Control Systems	2	3	3	ICET 341, ICET 343		TC-C
GEd 109	Science, Technology and Society	3	0	3			NTC-A
ES 101	Environmental Science	3	0	3			NTC-C
BET 344	Engineering Technology Ethics	3	0	3			TC-B
BET 345	Industrial Operation & Management Practices	3	0	3			TC-B
BET 346	Engineering Technology Management	3	0	3			TC-B
BET 347	Technology Capstone Project 2	2	3	3	BET343		TC-C
	Total	**21**	**9**	**24**			

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FOURTH YEAR							
FIRST SEMESTER							
Course Code	**Course Title**	**Lec**	**Lab**	**Credit Units**	**Pre-requisite(s)**	**Co-requisite(s)**	**Category**
BET 441	Supervised Industrial Training 1	0	540	6	BET347		TC-C
	Total	**0**	**540**	**6**			
FOURTH YEAR							
SECOND SEMESTER							
Course Code	**Course Title**	**Lec**	**Lab**	**Credit Units**	**Pre-requisite(s)**	**Co-requisite(s)**	**Category**
BET 442	Supervised Industrial Training 2	0	540	6	BET 441		TC-C
	Total	**0**	**540**	**6**			
	Grand Total	**129**	**1152**	**162**			

XIII. Comparison of Proposed Curriculum Structure with CMO of the Program

Comparison Summary			
Courses	**CMO No.13 S.2023 (BIndTech-AT)**	***BIT Curriculum 2023***	***Proposed* BICET**
	Number of Units		
NON-TECHNICAL COURSES			
A. Required General Education	24		24
B. Mandated Courses	3		3
C. Elective Courses	9		9
D. PATHFit & NSTP	14		14
Sub-Total	**50**		**50**
TECHNICAL COURSES			
A. Math and Sciences Courses	11		17
B. Management and Tool Courses	29		29
C. Professional Courses	65		66
Sub-Total	**105**		**112**
GRAND TOTAL	**155**	**165**	**162**

XIV. Curriculum Mapping

Course Code	Course Title	Credit Units	SO1	SO2	SO3	SO4	SO5	SO6	SO7	SO8
First Year – First Semester										
ICET 141	Instrumentation Codes and Standards	2	I	I						
ELXET 142	Electronic Devices	3	I/R	I/R				I/R		
ICET 142	Introduction to Electrical Power Distribution	3	I							
GEd 101	Understanding the Self	3						I	I	
GEd 102	Mathematics in the Modern World	3	I							
SciET141	Chemistry	4	I/R			I/R				
BET141	Production Drawing	3							I	
MathET140	Comprehensive Math (Algebra, Trigonometry, Analytic Geometry)	0	I							
PATHFit 1	Movement Competency Training	2	I							
NSTP 111	National Service Training Program 1	3							I	
First Year – Second Semester										
ICET 143	AC/DC Circuits	4	I/R	I/R	I/R					
ICET 144	Digital Electronics and Microprocessor	3		I/R	I/R					
ICET 145	Instrumentation System Diagram and Process Equipment	3				I/R				
GEd 103	Life and Works of Rizal	3			I					I
SciET142	Physics	4							I/R	I/R
BET142	Computer Aided Design	2	I/R			I/R				
PATHFit 2	Exercise-based Fitness Activities	2	I/R	I/R						
NSTP 121	National Service Training Program 2	3							I/R	

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First Year – Midterm Semester										
GEd 104	The Contemporary World	3			I/R				I/R	I/R
MathET141	Differential Calculus for BET	3	I/R							
BET143	Occupational Health and Industrial Safety Management	3						I/R		I/R
Second Year – First Semester										
ICET 241	Fluid Mechanics & Heat Transfer	3	I/R			I/R				
ICET 242	Process Measurement	3						R		
MXET 241	Electric Motors and Control	3				R	R	R		
Litr102	ASEAN Literature	3							I	
GEd 105	Readings in Philippine History	3			I				I	I
MathET241	Integral Calculus for BET	3	R							
CpET140	Computer Programming	3	I/R	I/R						
PATHFit 3	Traditional and Recreational Games	2							R	
Second Year – Second Semester										
MXET 242	Electro-Pneumatics and Electro-Hydraulics	3						R		
ELXET 242	Analog and Digital Signal Analysis	3	R	R						
GAD101	Gender and Society	3							I	I
BET241	Materials Selection & Testing	3	I/R	I/R		I/R				
GEd 106	Purposive Communication	3			R			R		
MathET242	Probability and Statistics	3	R							
PATHFit 4	Team Sports (Basketball and Volleyball)	2					R		R	
Third Year – First Semester										
ICET 341	Industrial Networks	3					D	D		
ICET 342	Analytical Instrumentation	3						D		
ICET 343	Instrumentation PLC	3		D	D			D		
GEd 107	Ethics	3						I		
GEd 108	Art Appreciation	3					I		I	
BET341	Quality Control and Assurance	3	R			R				
BET342	Technopreneurship for BET	3	D	D						D
BET343	Technology Capstone Project 1	3	D	D					D	
Third Year – Second Semester										
ICET 344	Process Control Application	3	D	D			D			
ICET 345	Distributed Control Systems	3	D	D		D				
GEd 109	Science, Technology and Society	3						I/R	I/R	I/R
ES101	Environmental Science	3	R							R
BET344	Engineering Technology Ethics	3						R	R	R
BET345	Industrial Operation & Management Practices	3				D		D		D
BET 346	Engineering Technology Management	3			R		R			
BET347	Technology Capstone Project 2	3	D	D					D	

Fourth Year – First Semester										
BET441	Supervised Industrial Training 1	6					D	D	D	D
Fourth Year – Second Semester										
BET441	Supervised Industrial Training 2	6					D	D	D	D

Legend: **I** – *Introduced,* **R** – *Reinforced,* **D** - *Demonstrated*

XV. Course Description

First Year – First Semester Courses

ICET 141 - Instrumentation Codes and Standards (2 units)

The course magnifies the criteria and measures to determine if the instruments and devices follow the standard qualification established by IEC and ANSI/ISA 5.1-2022 based on its functions, systems and applications. Technical considerations, graphical symbols and technical committees are identified to determine its objectives, instructions and standard operating procedures. This program also allows the student to determine the problems encountered in using sub-standard instruments and devices, and involves offices/agencies. Students will learn to observe both theoretical and experimental determinations, such as level of uncertainties in the field of instrumentation.

ELXET 142 - Electronics Devices (3 units)

This course introduces some of the basic electronic devices like diodes and different types of transistors. It also aims to introduce students to the analysis and design techniques of circuits involving these discrete devices as well as the integrated circuits.

ICET 142 - Introduction to Electrical Power Distribution (3 units)

In this course, learners will learn all about electricity infrastructure, including electricity generation, transmission, use and safety. The focus is on actual installations, so students can learn about electrical substations, 3-phase power distribution, typical power plant voltages, large transformers, as well as single-phase, split-phase, and 3-phase circuit breaker boxes and wiring setups found around the world. Learners will understand the importance of AC in an electricity grid, as well as grounding/earthing, pole transformer setups, as well as residual current/ground fault interrupt and safety setups and lightning protection.

GEd 101 - Understanding the Self (3 units)

The course deals with the nature of identity, as well as the factors and forces that affect the development and maintenance of personal identity. The directive to Know Oneself has inspired countless and varied ways to comply. Among the questions that everyone has had to grapple with at one or other is “Who am I?” At no other period is this question asked more urgently than in adolescence – traditionally believed to be a time of vulnerability and great possibilities. Issued of self and identity are among the most critical for the young. This course is intended to facilitate the exploration of the issues and concerns regarding self and identity to arrive at a better understanding of one’s self. It strives to meet this goal by stressing the integration of the persona; with the academic – contextualizing matters discussed in the classroom and in the everyday experiences of students – making for better learning, generating a new appreciation for the learning process, and developing a more critical and reflective attitudes while enabling them to manage and improve themselves to attain a better quality of life.

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SciET141 Chemistry (4 units)
This course is tailored to provide a comprehensive understanding of fundamental chemical principles and their practical applications in engineering contexts. The course covers key topics essential for engineering technology, including atomic structure, chemical bonding, stoichiometry, thermodynamics, and kinetics. Emphasis will be placed on the practical aspects of chemistry relevant to engineering, such as material properties, corrosion prevention, and environmental impact. Through a combination of theoretical lectures and hands-on laboratory sessions, students will gain proficiency in chemical analysis techniques and learn to apply chemical principles to solve engineering problems. The course aims to equip engineering technology students with a solid foundation in chemistry, fostering an appreciation for its role in various engineering disciplines and preparing them for future challenges in their careers.

BET141 Production Drawing (3 units)
This course focuses on the fundamentals of technical drawing. Specific skills introduced in this course may include sketching, lettering, manipulation of drawing tools and instruments, geometric construction, dimensioning, and orthographic drawing. The application of the general principles and practices of sketching, lettering, instrumental drawing, geometrical construction and orthographic drawing are exploratory activities to prepare and challenge the class for the succeeding topics of this course. It provides students with knowledge and challenges in the construction of different working drawings that would help improve their skills in drawing and later use in the construction and manufacturing industries.

MathET140 Comprehensive Math (Algebra, Trigonometry, Analytic Geometry) (0 unit)
This course is designed to provide engineering technology students with a robust foundation in algebra, trigonometry, and analytic geometry. Beginning with fundamental algebraic principles such as linear and quadratic equations, inequalities, and systems of equations, the course progresses to cover essential trigonometric concepts and their applications. Analytic geometry is introduced to study points, lines, and curves in a coordinate system. Emphasis is placed on practical applications of these mathematical concepts in engineering scenarios, including mechanics, circuit analysis, and geometric modeling. The goal is to enable students to develop a strong mathematical skill set that is essential for success in their engineering technology careers. This course serves as comprehensive preparation for advanced mathematical studies and their practical application in diverse engineering disciplines.

GEd 102 – Mathematics in the Modern World (3 units)
This course deals with the nature of mathematics, appreciation of its practical, intellectual, and aesthetic dimensions, and application of mathematical tools in daily life. The course begins with an introduction to the nature of mathematics as an exploration of patterns (in nature and in environment) and as an application of inductive and deductive reasoning. By exploring these topics, students are encouraged to go beyond the typical understanding of mathematics as merely a set of formulas but as a source of aesthetics in patterns of nature, for example, and a rich language in itself (and of science) governed by logic and reasoning.

NSTP 111 - National Service Training Program 1 (3 units)
This course is one (1) of the (3) components under National Service Training Program Act of 2001 (RA.A. No. 9163) designed to encourage, develop and train the students to contribute to the general

welfare and betterment of life for the members of the community or the enhancement of its facilities, especially those devoted to improving health, education, environment, entrepreneurship, safety, recreation, and moral of the citizenry and other social welfare services.

PATHFit 1 - Movement Competency Training (2 units)
This course reintroduces the fundamental movement patterns that consist of non-locomotor and locomotor skills, which are integrated with core training to meet the demands of functional fitness and physical activity performance. Emphasis will be on exercise regression and progression for the enhancement of fitness and the adaptation of movement competencies to independent physical activity pursuits. In conjunction with fitness and wellness concepts, exercise and healthy eating principles, periodic evaluation will be conducted of one's level of fitness and physical activity, as well as eating patterns to monitor one's progress and achievement of personal fitness and dietary goals.

First Year – Second Semester Courses

ICET 143 - AC/DC Circuits (4 units)
An introductory course to the fundamentals and basic principles of DC and AC circuits. Topics include: resistance, voltage, current, Ohm's Law, Kirchhoff's Laws, power, superposition, network theorems, Thevenin's and Norton's Theorems, maximum power transfer, introduction to AC, capacitors and inductors. Laboratory hours complement class work**.**

ICET 144 - Digital Electronics and Microprocessor (3 units)
This course provides the basic fundamentals of number system, number conversion, History of Microprocessor and its operation with interfacing. It provides the study of 8085 architecture, functional diagram details, instruction types with simple programming, addressing modes, interfacing with memories and the timing diagram. Interfacing with peripheral devices like 8155 and 8255.

ICET 145 - Instrumentation System Diagram and Process Equipment (3 units)
This course intends to illustrate the P & ID system, the symbols, tag numbers, and its design. This program also delivers the full details of installed instruments, open and closed loops, location and specifications. The learning concepts tackle the components from the instruments connected in a process company, the steps in designing the process line, instrument consideration, factors affecting the output and the variables involved. Several processes involved, showcases the equipment in different applications, the need to enhance knowledge about pumps, compressors, valves, turbines, motors, heat exchangers, furnaces and cooling towers are necessary to be learned by the students in visualizing its importance in instrumentation. The learners are expected to create, interpret and analyze the piping and instrumentation diagram in various scenarios and locations.

GEd 103 - Life and Works of Rizal (3 units)
As mandated by Republic Act 1425, this course covers the life and works of the country's national hero, José Rizal. Among the topics covered are Rizal's biography and his writings, particularly the novels Noli me tangere and El filibusterismo, some of his essays, and various correspondences.

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SciET142 Physics (4 units)

This course is designed to provide students with a foundational understanding of key physical principles applicable to engineering disciplines. Covering classical mechanics, thermodynamics, electromagnetism, and optics, the course emphasizes the practical application of physics concepts in engineering technology. Students will explore the laws governing motion, energy, and forces, as well as delve into topics such as heat transfer, electrical circuits, and wave phenomena. Through a combination of theoretical lectures, hands-on experiments, and problem-solving exercises, students will develop the analytical and critical thinking skills necessary to tackle real-world engineering challenges. The course aims to instill a deep appreciation for the role of physics in engineering, preparing students to apply these principles effectively in their future careers.

Computer Aided Design (2 units)

This course is intended to develop the students' knowledge about basic computer aided design. The course work is designed to introduce new users to the software used for drafting. Introduction to drafting will also be presented. At the completion of this course the student should be able to print out a simple construction drawing which conforms to industry accepted drafting standards using the AutoCAD program. The course helps students to develop their skills in the field of technology and to be more competitive locally and abroad

NSTP 121 - National Service Training Program 2 (3 units)

The National Service Training Program 2 (NSTP 102). Complements knowledge learned from NSTP 101. It is the application and implementation of NSTP Law, which focuses on participation in community development. While NSTP 101 provides the backdraft and theoretical framework of the program, NSTP 102 is the continuation and validation phase. It is designed to equip and empower students with the fundamentals of project identification, planning and implementation in pursuit of contributing to the upliftment of the general welfare and the quality of life of the people in the community through enhancement, in particular, of the school and community facilities. Its advocacy is related to the protection and preservation of the environment, as well as improvement of lives, health and safety of the populace through the promotion of risk reduction, peace-making process, safety, recreation and morals of the citizenry.

PATHFit 2 - Exercise-based Fitness Activities (2 units)

This course builds on the foundation of motor skills achieved through core training. It will provide experiences in a variety of exercise programs for the purpose of maintaining and enhancing cardiorespiratory and musculoskeletal fitness (i.e., core stability, muscle strength, endurance and power). It includes speed and agility training with a focus on body coordination and balance. In conjunction with fitness and wellness concepts, exercise and healthy eating principles, learners will be able to enhance their fitness through goal setting and application of the exercise principles (i.e., frequency, intensity, time, type, progression, and volume); adapt their movement competencies to independent physical activity (PA) pursuits and periodically evaluate their PA and eating patterns to monitor their progress and achievement of personal fitness and dietary goals

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First Year – Midterm Semester Courses

BET 143 Occupational Health and Industrial Safety Management (3 units)
This course provides engineering technology students with a comprehensive understanding of occupational health and industrial safety management within various engineering and industrial settings, with a specific emphasis on the application of engineering standards and codes. The curriculum covers the identification, assessment, and mitigation of workplace hazards to ensure the well-being of employees and the sustainable operation of industrial facilities, aligned with established engineering standards.

GEd 104 - The Contemporary World (3 units)
This course introduces the students to the contemporary world by examining the multifaceted phenomenon of globalization. Using various disciplines of the social sciences, it examines the economic, social, political, technological and other transformations that have created an increasing awareness of interconnectedness of peoples and places around the globe. To this end, the curse provides an overview of the various debates in global governance, development and sustainability. Beyond exposing the student to the world outside the Philippines, it seeks to inculcate a sense of global citizenship and global ethical responsibility.

MathET141 Differential Calculus for BET (3 units)
This Differential Calculus for BET course for Engineering Technology explores fundamental calculus concepts essential for solving engineering problems. Topics cover functions, derivatives, rules of differentiation, and their applications in engineering scenarios. The course also includes an introduction to multivariable calculus, integration, and basic differential equations. The goal is to equip students with practical problem-solving skills, laying a foundation for success in their engineering careers and preparing them for advanced calculus studies

Second Year – First Semester Courses

ICET 241 - Fluid Mechanics & Heat Transfer(3 units)
This course explores the fundamental concepts of fluid mechanics and heat transfer, and their applications in engineering. The course begins by introducing analysis of static fluid bodies and then continues with fluid dynamics, principally the effects of viscous and thermal boundary layers. Fluid conservation equations are presented in detail. Fluid conveyancing through pipework and external flow analysis complete the coursework on fluids. The concept of boundary layer behavior is then extended to heat transfer. Conduction, convection are treated at a fundamental level, leading to analysis and design of heat exchangers. Finally, radiation heat transfer is presented in a wider context.

ICET 242 - Process Measurement (3 units)
This course explores properties and operation principles of sensors/transducers, measurement electronics, and instrumentation technologies. Measurement method and instrumentation of process variables (temperature, level, flow, and pressure) and other physical quantities (force, strain, displacement, acceleration, etc.) will be explored in depth. Industry standards related to key instrumentation topics will be introduced.

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MXET 241 - Electric Motors and Control (3 units)

This comprehensive course introduces engineering technology students to the fundamental principles of electric motors and controllers, covering DC motors, AC motors, and servo motors. Emphasis is placed on the selection, operation, and control of electric motors for diverse applications. Students will gain theoretical knowledge and practical skills, including hands-on experience in the laboratory. Additionally, the course integrates the application of Differential Calculus for BET to enhance the understanding of motor behavior and control mechanisms.

Litr 102 - ASEAN Literature (3 units)

This course introduces students to fundamental prose and poetry from across Asia. These literary works shape awareness and viewpoints among people in ASEAN. It orients the learners on the diverse culture the members' states have which nurture and build their identities as states and identity as a region as the learners find commonality in the diversity. More so, this course opens awareness of being part of a region to embrace the ASEAN identity through literature.

GEd 105 - Readings in Philippine History (3 units)

This course analyzes Philippines history from multiple perspectives through the lens of selected primary sources. Students are expected to do content and context analysis such as the author's background and main arguments, compare different points of view, identify biases and examine the evidence presented in the document. The discussion will tackle traditional topics in history and other interdisciplinary themes that will deepen and broaden the students' understanding of Philippine political, economic, cultural, social, scientific and religious history. The end goal is to develop the historical and critical consciousness of the students so that they will become versatile, articulate, broadminded, morally upright and responsible citizens.

MathET241 - Integral Calculus for BET (3 units)

This course in Integral Calculus for BET for Engineering Technology is designed to expand on the mathematical foundations established in Differential Calculus for BET, providing students with a deeper understanding of integral concepts and their applications in engineering contexts. Students will explore topics such as definite and indefinite integrals, the fundamental theorem of calculus, techniques of integration, and applications of integration in engineering, including areas under curves, volumes of solids of revolution, and work problems. The course aims to equip engineering technology students with the analytical tools necessary for solving complex engineering problems and making informed decisions in their future careers. Practical applications and real-world problem-solving will be emphasized throughout the course, ensuring students can apply Integral Calculus for BET effectively in engineering scenarios.

CpET140 - Computer Programming I (3 units)

C++ Programming is a course in the Bachelor of Computer Engineering Technology program, dedicated to introducing students to the powerful and versatile programming language, C++. This course covers a wide array of critical topics, including C++ syntax, data structures, object-oriented programming, and application development. The intended learning outcomes encompass the ability to comprehend C++ programming concepts, write and debug C++ code, design and implement C++ applications, and solve real-world problems using C++. By the end of this course, students will be well-prepared to leverage C++ for a variety of applications, making them proficient in roles related to software development, system programming, and algorithm design.

C++ Programming not only imparts technical skills but also cultivates problem-solving, critical thinking, and adaptability, vital for students seeking careers in the dynamic field of computer engineering technology. This course plays a pivotal role in preparing students to become adept programmers and problem solvers in today's technology-driven world, where C++ remains a fundamental and widely used language.

PATHFit 3 - Team Sports (Basketball and Volleyball) (2 units)
(Name of activity) is a (nature of the activity/game objective). It involves the fundamental techniques that include _____. Through skills training, exercise drills, game play and independent or self-directed PAs, fitness levels will be enhanced. In conjunction with this, fitness levels, PA participation and dietary/eating patterns are evaluated to monitor one's progress and achievement of personal fitness and dietary goals.

Second Year – Second Semester Courses

MXET 242 - Electro-Pneumatics and Electro-Hydraulics (3 units)
This course covers the principles of electro-pneumatics and electro-hydraulics, which are the integration of electrical, pneumatic, and hydraulic systems. Students will learn how to design and implement electro-pneumatic and electro-hydraulic circuits for a variety of applications. They will also gain hands-on experience in the laboratory.

ELXET 242 - Analog and Digital Signal Analysis (3 units)
This course offers a comprehensive exploration of the fundamental principles underlying Analog and Digital Signal Analysis. Students will delve into the basic concepts of analog signal generation and shaping, emphasizing the theoretical foundations and practical applications. The curriculum includes a detailed study of data converters, discrete time transforms, and digital filter design.

GAD 101 - Gender and Society (3 units)
This three-unit course focuses into the concepts, principles, and approaches related to understanding gender as a social construction. It explores the multifaceted role of gender across various aspects of societal life. Topics include gender inequality, gender mainstreaming, and their impact on our country's social fabric. By examining these critical issues, students gain insights into fostering an effective gender-responsive society

BET 241 - Materials Selection & Testing (3 units)
BET 241 is a comprehensive course that delves into the principles and practices of materials selection and testing within the field of engineering technology. Students will explore the critical processes involved in choosing materials for engineering applications and gain hands-on experience in testing and evaluating the mechanical properties of materials. The course emphasizes the integration of theoretical knowledge with practical skills to equip students with the expertise needed for informed materials decision-making.

GEd 106 - Purposive Communication (3 units)
Purposive Communication develops students' communicative competence and enhances their cultural and intercultural awareness through multimodal tasks. These provide them opportunities for communicating effectively and appropriately to a multicultural audience in a local or global context, in a physical or virtual environment. It equips students with tools for critical evaluation

of a variety of texts and focuses on the power of language and the impact of images to emphasize the importance of conveying messages responsibly. The knowledge, skills, and insights that students gain from this course may be used in their other academic endeavors, their chosen disciplines, and their future careers as they compose and produce relevant oral, written, audio-visual and/or web-based output for various purposes.

MathET242 - Probability and Statistics (3 units)

This course is designed to provide engineering technology students with essential tools for effective decision-making and problem-solving in engineering applications. Covering probability theory, descriptive statistics, inferential statistics, and regression analysis, the course emphasizes practical applications in areas such as quality control, experimental design, and reliability analysis. Students will learn to analyze and interpret data, make informed decisions based on statistical insights, and communicate findings effectively. Through a variety of instructional methods, this course prepares engineering technology students to apply probability and statistics in real-world engineering scenarios, laying the groundwork for more advanced studies in the field.

PATHFit 4 - Team Sports (Basketball and Volleyball) (2 units)

(Name of activity) is a (nature of the activity/game objective). It involves the fundamental techniques that include _____. Through skills training, exercise drills, game play and independent or self-directed PAs, fitness levels will be enhanced. In conjunction with this, fitness levels, PA participation and dietary/eating patterns are evaluated to monitor one's progress and achievement of personal fitness and dietary goals.

Third Year – First Semester Courses

ICET 341 - Industrial Networks (3 units)

This course focuses on the study of data communications methods and networks in industrial applications. Based on the OSI 7-layer model, typical communication interfaces, protocols, and networks will be explored. SCADA systems and industrial control systems security will be introduced.

ICET 342 - Analytical Instrumentation (3 units)

This course provides instruction and practice in a variety of analytical methods in areas, such as gas analyzers, pH, electrical conductivity, thermal conductivity, infrared and ultraviolet analysis and gas chromatography. Through the laboratory content of this course students are given hands-on training in calibration and operation of various types of analytical instruments. Instructions on the safe use of equipment is also emphasized.

ICET 343 - Instrumentation PLC (3 units)

This course introduces Programmable Logic Controllers (PLC). Students explore fundamental elements of PLC hardware and interconnection, using simulations software and real hardware. Students gain experience in programming a PLC, including Ladder Logic. Students translate and implement control requirements into PLC programs. Knowledge and skills are developed through a mix of theory and lab components. This course also gives emphasis on analog input instruments specifically on instrumentation 4-20 mA signal standard.

GEd 107 - Ethics (3 units)

Ethics deals with principles of ethical behavior in modern society at the new level of the person, society, and in interaction with the environment and other shared resources (CMO 20 s 2013).

Morality pertains to the standards of right and wrong that an individual originally picks up from the community. The course discusses the context and principles of ethical behavior in modern society at the level of individual, society, and in interaction with the environment and other shared resources. The course also teaches students to make moral decisions by using dominant moral frameworks and by applying a seven-step moral reasoning model to analyze and solve moral dilemmas.

GEd 108 - Art Appreciation (3 units)

The course aims to provide students the opportunity to observe, participate in, or otherwise experience works of art in order to appreciate their role and purpose in life. Students will be exposed to various works of art, ranging from the classical art forms to modern art installations, performance art, indie films, enhanced e-books and multimedia aesthetics. These works of art will be examined from an aesthetic point of view and also as reflections or critiques of the societies that produced them. The course will thus build upon and hone the skills of understanding, critical appreciation and expression of one's views. The course Art Appreciation (under the new GE Curriculum) is aimed at further strengthening the youth's awareness and deep appreciation for the arts. The course shall serve as a continuation of the Subject Contemporary Arts which was already taken in Senior High School. Apart from focusing on Philippine Arts, this course shall further try to situate the local arts in the global perspective and compare its status to standard of arts in the global arena.

BET 341 - Quality Control and Assurance (3 units)

This course is a comprehensive course designed for Engineering Technology students, focusing on the principles and practices of Quality Control and Assurance (QA/QC) within various engineering disciplines. This course equips students with the knowledge and skills necessary to ensure and enhance the quality of products and processes in engineering applications. Emphasis is placed on understanding quality standards, implementing control measures, and establishing assurance protocols to meet industry and regulatory requirements.

BET 342 - Technopreneurship for BET (3 units)

Creating a new business is a challenging and complex task most especially to the industrial technology graduates. The road to entrepreneurial success is long, winding and strewn with pitfalls, obstacles and blind turns. The risks of starting a new business are high, as illustrated by the high failure rates for new ventures. However, as is always the case, the rewards are commensurate with the risk: in addition to the psychic rewards of starting a business. Future technologists should be guided through understanding the process, challenges, risks and rewards of starting up a new business.

BET 343 - Technology Capstone Project 1 (3 units)

This course is designed to provide a sound foundation in research and development methodologies, emphasizing their significance in both industrial settings and academia. As higher education institutions adapt to the dynamic changes of the times, this course addresses the evolving needs of business and industry. The university is committed to cultivating a learning environment where technologists are not only skilled practitioners but also adept researchers.

This course empowers students with the knowledge and skills essential for conducting impactful research in the realm of technology. By incorporating probability and statistics, students gain a robust foundation for making data-driven decisions and enhancing the overall quality and reliability of their research. Through the Technology Capstone Project, students apply their learning to address real-world challenges, bridging the gap between academia and industry needs.

Third Year – Second Semester Courses

ICET 344 - Process Control Application (3 units)
This course examines the different systems considered in controlling the process industry, the knowledge and concepts to be learned starts from the utility systems, its sources and distribution, Reactor system, extrusion, and distillation. Applications of technology are substantial also in investigating the elements needed in plastic system, material handling, transporting liquid, solid and gas, and lastly Process operating system covers commissioning, start ups and shutdown. Learners are expected to analyze and diagnose possible problems that may arise in operation and suggest corrective measures. This also involves various critical elements to ensure the effective implementation of control systems in industrial processes. Students will also learn about various manufacturing techniques, process selection, and quality control. Troubleshooting and maintenance of manufacturing systems are also addressed.

ICET 345 - Distributed Control Systems (3 units)
In this course, students connect, configure, and integrate various hardware and software elements of modern hierarchical Supervisory Control and Data Acquisition Systems (SCADA) or Distributed Control System (DCS). Human Machine Interfaces (HMI) are configured, including trends, displays, alarms, logging, and operator control functions. Students connect a supervisory computer to a variety of equipment (PID Controllers, PLCs, Smart Instruments, etc.) and configure the appropriate control devices and communication interfaces.

GEd 109 - Science, Technology and Society (3 units)
Science and technology are amongst the most powerful forces operating in contemporary society. Yet, citizens of contemporary societies have little or no opportunity to learn how to question the power embedded in techno-scientific systems. A formal course is needed for the citizens to do such action. This course presents the analysis from historic and futuristic perspectives of the nature and role of science and technology in society and of the socio-cultural and politico-economic factors affecting the development of science and technology. This course will also introduce to the students the multiple ways in which science and technology, individuals and institutions mutually shape one another to the benefit and sometimes detriment of society. All of the topics in this course are geared toward the appreciation of the key role of science and technology in national development and the important policy issues in the scientific and technological development of the Philippines.

ES 101 - Environmental Science (3 units)
Through the integration of natural science, politics, culture, and economics with scientific principles, environmental science seeks to provide a thorough understanding of the subject. The understanding of the complex interactions that exist between people and their surroundings is a fundamental component of this course. The emphasis on environmental issues, their root causes, related hazards, and mitigation strategies is consistent with the engineering method of risk

assessment and management. Furthermore, the investigation of substitute solutions is consistent with the engineering dedication to novelty, motivating learners to contemplate sustainable technologies as feasible substitutes.

BET 344 - Engineering Technology Ethics (3 units)
This course provides engineering technology students with a comprehensive understanding of ethical principles, professional responsibilities, and the integration of engineering standards and codes within the technological landscape. This course addresses the ethical challenges faced by engineering technologists and emphasizes the importance of adhering to established standards to ensure the safety, integrity, and societal impact of engineering and technology.

BET 345 - Industrial Operation & Management Practices (3 units)
Industrial Operation and Management Practices is a 3-unit course in operations management with statistics. It covers the relevant concepts and theories of production and operations management as well as the quantitative tools for data analysis and business decision making. It also includes industrial tours to manufacturing, production or business sites to establish a link between theory taught in a classroom and actual practical concept thus contributing to the holistic learning development of students.

By the end of the semester, the student will understand the methods, models and techniques that are used to resolve organizational difficulties equipped with the analytical skills to determine and analyze the complexity of operational management challenges in business, combined with creative thinking to generate potential solutions.

BET 346 - Engineering Technology Management (3 units)
This course provides an in-depth exploration of the multifaceted aspects of leadership, strategic management, and innovation within the dynamic realms of engineering and technology. Aimed at equipping participants with a holistic understanding of effective management practices, this course encompasses a range of topics essential for steering successful engineering projects and navigating the evolving landscape of technology-driven industries.

BET 347 - Technology Capstone Project 2 (3 units)
Technology Capstone Project 2 builds upon the foundation established in Technology Capstone Project 1, providing students with an advanced opportunity to further develop their research, innovation, and problem-solving skills within the realm of technology. This course extends the commitment to preparing students for success in both industrial settings and academia by immersing them in an intensive and collaborative capstone project experience.

Technology Capstone Project 2 is designed to provide students with an immersive and challenging experience in advanced research and development, allowing them to contribute meaningful solutions to complex technological challenges. Through this course, students not only deepen their expertise in their chosen field but also refine their abilities to innovate, collaborate, and communicate effectively, preparing them for leadership roles in technology and research.

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Fourth Year – First Semester Courses

BET 441 – Supervised Industrial Training 1 (540 hrs) (6 units)
Supervised Industrial Training 1 (BET 441) is a hands-on way to learn new competencies and skills for a job in a genuine, or nearly actual, working environment.

Fourth Year – Second Semester Courses

BET 442 – Supervised Industrial Training 2 (540 hrs) (6 units)
Supervised Industrial Training 2 (BET 442) is a continuation of BET 441, which is a hands-on way to learn new competencies and skills for a job in a genuine, or nearly actual, working environment.

XVI. Program Advisory Council

1	**Engr. Jason A. Mendoza** **Manager, Reliability Department** **JG Summit Olefins Corporation**	Industry
2	**Apolo A. Tañedo III, RME, CICE, CICT** **Instrumentation Supervisor** **Universal Robina Corporation**	Industry
3	**Dr. Albert C. Villena** **Asst. Prof II** **BatStateU - Alangilan, CIT**	Faculty Stakeholder
4	**Mr. Vener C. Macatangay** Instructor I **BatStateU - Alangilan, CIT**	Faculty Stakeholder
5	**Mr.John Allan V. Plata** Instructor I **BatStateU - Alangilan, CIT**	Faculty Stakeholder
6	**Chuck G. Ebalo** **Chairperson for Technical and Certification Committees** **Philippine Instrumentation & Control Society**	APO
7	**Kurls Ryan Villareal** **3rd year BIT-ICT** **BatStateU - Alangilan, CIT**	Student Stakeholder
8	**Kyla Casao** **3rd year BIT-ICT** **BatStateU - Alangilan, CIT**	Student Stakeholder
9	**Engr. Teofilo De Sagun** **ANALYZER ENGINEER (Subject Matter Expert)** **BAHRAIN PETROLEUM COMPANY, B.S.C**	Alumni
10	**Engr. Chester Ivan Panopio** **Senior Service Engineer/Team Lead & Global Technical Trainer (Maritime)** **SICK Sensor Intelligence**	Alumni

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XVII. Profile of the Faculty

GUEST LECTURERS
Baja, Elbert O. Lecturer I Bachelor of Industrial Technology major in Instrumentation and Control Technology Master of Technology (18 units)
GENERAL EDUCATION
Bongares, Maricel B. Lecturer I Bachelor of Science in Chemical Engineering Master in Business Administration (39 units)
Calvelo, Shiela Marie P. Lecturer I Bachelor of Secondary Education major in MAPEH
Garcia, Jeremiah R. Lecturer I Bachelor of Science in Chemical Engineering Master in Business Administration
Macalinga, Angelica Mae C. Lecturer I Bachelor of Secondary Education major in Social Studies Master of Arts in Education major in Social Studies (9 units)
Perez, Gladys P. Lecturer I Bachelor of Science in Mathematics Master of Science in Mathematics (36 units)

XVIII. Program Administration

Batangas State University – Lipa Campus
College of Engineering Technology

Dr. TIRSO A. RONQUILLO
University President
(By virtue of BoR Resolution No.135, S. 2022)

Dr. EUFRONIA M. MAGUNDAYAO
Vice Chancellor for Academic Affairs

Dr. EUFRONIA M. MAGUNDAYAO
Dean, CET

Mr. PHILIP D. GENETA
Program Chair

XIX. Outcomes Mapping

1. RELATIONSHIP BETWEEN PEO AND MISSION STATEMENT

RELATIONSHIP BETWEEN PEO AND MISSION STATEMENT					
PEO1	**PEO STATEMENTS**	**Innovation**	**Multidisciplinary Research**	**Community & Industry Partnerships**	**Sustainable Development**
PEO1	Successful Professional Practice	x	x	x	
PEO2	Professionalism	x		x	x
PEO3	Technological Advancement	x	x		x

Rationale

The Program Educational Objectives (PEOs) define the desired outcomes of a program and guide program development, assessment, and improvement, while the mission statement defines the overall purpose of the program and how it aims to achieve it. The PEOs in this case are aligned with the program's mission statement, emphasizing innovation, multidisciplinary research, community and industry partnerships, professionalism, and sustainable development. Each PEO focuses on different aspects, including successful professional practice, professionalism, and technology advancement, all of which contribute to developing graduates who can positively impact society and the environment.

2. RELATIONSHIP BETWEEN SO AND PEO

RELATIONSHIP BETWEEN SO AND PEO				
SO	**SO STATEMENTS**	**Technologists**	**Professionalism**	**Technology Advancement**
		PEO1	**PEO2**	**PEO3**
SO1	Problem Analysis	x		x
SO2	Design/Development of Solutions	x		x
SO3	Communication		x	
SO4	Investigation	x		
SO5	Leadership and Teamwork	x		
SO6	Ethics and Professionalism		x	
SO7	Lifelong Learning		x	
SO8	Social and National Responsibility		x	

Rationale

The relationship between program educational objectives (PEOs) and student outcomes (SOs) is crucial to ensure that students acquire the necessary knowledge, skills, and competencies to succeed in their chosen profession. The alignment between PEOs and SOs is particularly important, as it specifies the desired outcomes of the program.

PEO 1 (Successful Professional Practice) aligns with SO1 (Problem Analysis), SO2 (Design/Development of Solutions), SO4 (Investigation), and SO5 (Leadership and Teamwork). PEO 2 (Professionalism) aligns with SO3 (Communication), SO6 (Evaluation of the Problem), and SO7 (Communication). PEO 3 (Technology Advancement) aligns with SO1 (Problem Analysis) and SO2 (Design/Development of Solutions).

This alignment implies that students who have mastered these SOs will be able to solve problems, design effective solutions, evaluate problems critically, communicate their ideas effectively, engage in lifelong learning, act ethically and professionally, and contribute to the betterment of society and the nation.

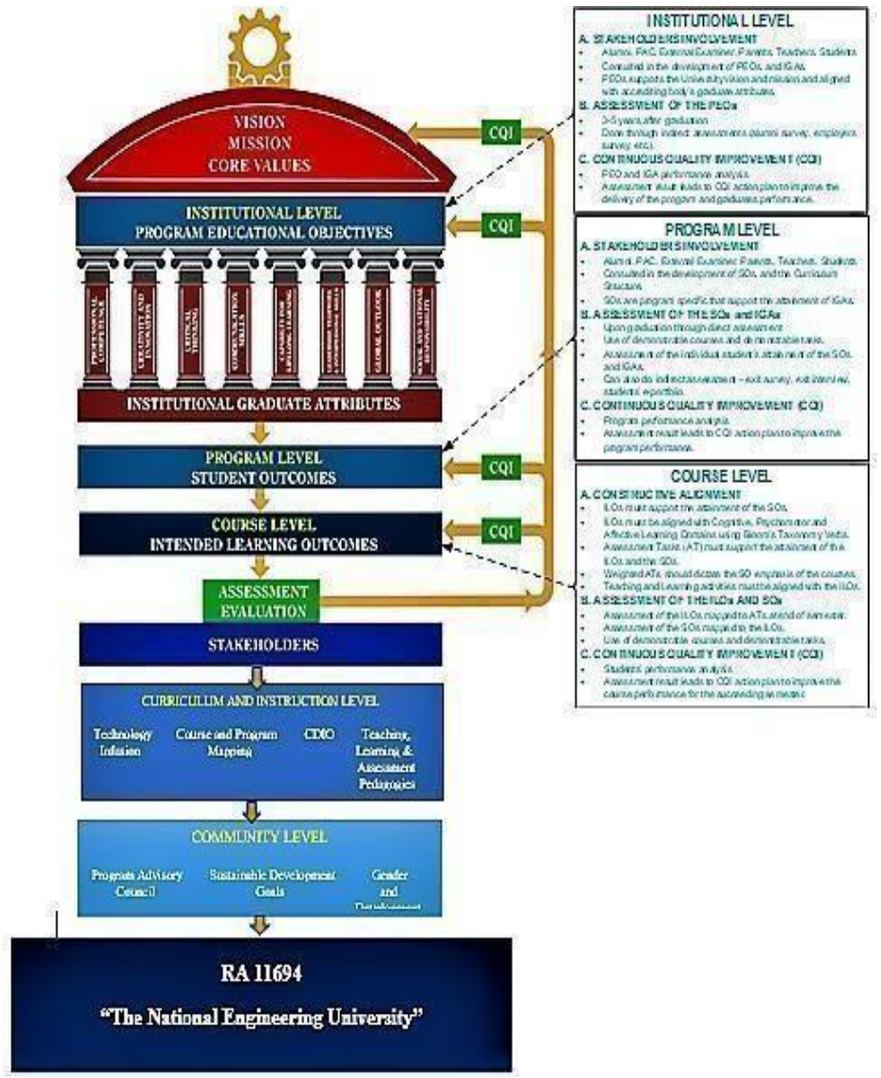
3. RELATIONSHIP BETWEEN SO AND IGA

RELATIONSHIP BETWEEN SO AND IGA									
SO	**SO STATEMENTS**	**Knowledge Competence**	**Creativity and Innovation**	**Critical and Systems Thinking**	**Communication**	**Lifelong Learning**	**Leadership, teamwork, and interpersonal skills**	**Global Outlook**	**Social and National Responsibility**
		IGA1	**IGA2**	**IGA3**	**IGA4**	**IGA5**	**IGA6**	**IGA7**	**IGA8**
SO1	Problem Analysis	x							
SO2	Design/Development of Solutions						x		
SO3	Communication				x				
SO4	Investigation		x						
SO5	Leadership and Teamwork			x					
SO6	Ethics and Professionalism					x			
SO7	Lifelong Learning								x
SO8	Social and National Responsibility							x	

Rationale

The process of mapping student outcomes to program educational objectives plays a crucial role in ensuring that the curriculum meets the needs of the industry and equips graduates with the necessary competencies required by employers. The student outcomes encompass a range of skills and knowledge, including technology problem analysis, design/development of solutions, communication, investigation, leadership and teamwork, ethics and professionalism, lifelong learning and social and national responsibility. These outcomes are then mapped to specific program educational objectives, such as knowledge competence, critical and system thinking, creativity and innovation, leadership, teamwork and interpersonal skills, communication, lifelong learning, ethics and professionalism, and global outlook. The mapping process ensures that each student outcome is aligned with a specific program educational objective and is covered in the curriculum, helping students to acquire a broad range of competencies and skills necessary for success in the workplace.

XX. Batangas State University Enhanced OBE Framework



(Revised as of January 2023)

Attachments

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The National Engineering University
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Tel Nos.: (+63 43) 980-0385; 980-0387; 980-0392 to 94 local 3129
E-mail Address: cit.lipa@g.batstate-u.edu.ph | Website Address: http://www.batstate-u.edu.ph

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Comparison of PCS with CMO of the Program and ABET-ETAC

Specific Areas of the Program Curriculum				CMO No. 13 S.2023 BIndTech AT	BatStateU	ABET-ETAC		Remarks
					Proposed - BICET	General Criteria	Program Criteria (PC)	
Required General Education								
No.		**Course Code**	**Course Title**	**Units**	**Units**			
1		GEd 101	Understanding the Self	3	3			
2		GEd 102	Mathematics in the Modern World	3	3			
3		GEd 104	The Contemporary World	3	3			
4		GEd 105	Readings in Philippine History	3	3			
5		GEd 106	Purposive Communication	3	3			
6		GEd 107	Ethics	3	3			
7		GEd 108	Art Appreciation	3	3			
8		GEd 109	Science, Technology, and Society	3	3			
			Sub-total	**24**	**24**			
Mandated Courses								
1		GEd 103	Life and Works of Rizal	3	3			
			Sub-total	**3**	**3**			
Elective Course								
1		Litr102	ASEAN Literature	0	3			
2		GAD101	Gender and Society	0	3			
3		ES101	Environmental Science	0	3			
4		GE Elective 1	-	3	-			
5		GE Elective 2	-	3	-			
6		GE Elective 3	-	3	-			
			Sub-total	**9**	**9**			
PATHFit & NSTP								
1		PATHFit 1	Movement Competency Training	2	2			
2		PATHFit 2	Exercise-based Fitness Activities	2	2			
3		PATHFit 3	Traditional and Recreational Games	2	2			
4		PATHFit 4	Team Sports (Basketball and Volleyball)	2	2			
5		NSTP 111	National Service Training Program 1	3	3			
6		NSTP 121	National Service Training Program 2	3	3			
			Sub-total	**14**	**14**			

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Math and Sciences Courses								
1		MathET140	Comprehensive Math (Algebra, Trigonometry, Analytic Geometry)	5	0	**M.b**		
2		MathET141	Differential Calculus for BET	-	3	**M.b**		
3		MathET241	Integral Calculus for BET	-	3	**M.b**		
4		MathET242	Probability and Statistics	-	3	**M.b**		
5		SciET141	Chemistry	3	4	**PNS**		
6		SciET142	Physics	3	4	**PNS**		
			Sub-total	**11**	**17**			
Management and Tool Courses								
1		CpET140	Computer Programming	3	3	**DSC.b**	**PCA.a**	
2		BET141	Production Drawing	2	3	**DSC.d**		
3		BET142	Computer Aided Design	2	2	**DSC.b**		
4		BET143	Occupational Health and Industrial Safety Management	3	3	**DSC.d**		
5		BET 241	Materials Selection & Testing	0	3			
6		BET 341	Quality Control and Assurance	3	3	**DSC.d**	**PC.i**	
7		BET 342	Technopreneurship for BET	3	3			
8		BET344	Engineering Technology Ethics	0	3	**OC**		
9		BET 345	Industrial Operation & Management Practices	3	3	**DSC.d**	**PC.i**	
10		BET 346	Engineering Technology Management	-	3	**DSC.d**	**PC.i**	
11			Introduction to Information Technology	3	-			
12			Industrial Drawing	2	-			
13			Materials Technology Management	3	-			
14			Industrial Psychology	3	-			
15			Production Management	3	-			
16			Foreign Language	3	-			
			Sub-total	**29**	**29**			
Professional Courses						**DSC.a**	**DSC.c**	
1		ICET 141	Instrumentation Codes and Standards	0	2	**DSC.d**		
2		ELXET 142	Electronic Devices	3	3	**DSC.b**	**PC.b,PC.c,PC.e**	
3		ICET 142	Introduction to Electrical Power Distribution	3	3		**PC.c**	
4		ICET 143	AC/DC Circuits	3	4		**PC.c**	
5		ICET 144	Digital Electronics and Microprocessor	3	3		**PC.b,PC.c,PC.d**	
6		ICET 145	Instrumentation System Diagram and Process Equipment	3	3	**DSC.b,DSC.c**	**PC.b**	

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7		ICET 241	Fluid Mechanics & Heat Transfer	3	3	**M.b,DSC.b**	**PC.g**	
8		ICET 242	Process Measurement	3	3	**DSC.c**	**PC.a, PC.b,PC.e**	
9		MXET 241	Electric Motors and Control	3	3	**M.b**	**PC.a,PC.c**	
10		MXET 242	Electro-Pneumatics and Electro-Hydraulics	3	3		**PC.a,PC.c,PC .g**	
11		ELXET 242	Analog and Digital Signal Analysis	3	3		**PC.b,PC.f**	
12		ICET 341	Industrial Networks	3	3		**PC.f**	
13		ICET 342	Analytical Instrumentation	3	3	**DSC.c**	**PC.a, PC.b,PC.c,PC. e**	
14		ICET 343	Instrumentation PLC	3	3	**DSC.c**	**PC.a,PC.d,P C.h**	
15		ICET 344	Process Control Application	3	3		**PC.a,PC.b,P C.g,PA.i**	
16		ICET 345	Distributed Control Systems	3	3		**PC.a,PC.d,P C.h**	
17		BET343	Technology Capstone Project 1	3	3	**IC**		
18		BET347	Technology Capstone Project 2	6	3	**IC**		
19		BET441	Supervised Industrial Training 1	6	6	**CE,DSC.e**		
20		BET442	Supervised Industrial Training 2	6	6	**CE,DSC.e**		
			Sub-total	**60**	**66**			
BIndTech Other Courses								
1			Foreign Language	3	0			
2			Introduction to Information Technology	3	0			
3			Industrial Psychology	3	0			
4			Production Management	3	0			
5			Materials Technology Management	3	0			
6			GE Elective 1	3	0			
7			GE Elective 2	3	0			
8			GE Elective 3	3	0			
			Sub-total	**24**	**0**			
			Grand Total	**155**	**162**			

Note: ABET-ETAC General Criteria	
Code	***Mathematics - The curriculum provides***
M.a	a. For an Associate program, the application of algebra and trigonometry appropriate to the student outcomes and the discipline.
M.b	b. For a Baccalaureate program, the application of integral and Differential Calculus for BET or other mathematics above the level of algebra and trigonometry appropriate to the student outcomes and the discipline.
	Discipline Specific Content (DSC) - The curriculum must focus on the applied aspects of science and engineering and must
DSC.a	a. Represent at least one-third, but no more than two-thirds of the total credit hours for the curriculum.
DSC.b	b. Include a technical core preparing students for increasingly complex technical specialties later in the curriculum.
DSC.c	c. Develop student competency in the discipline.
DSC.d	d. Include design; appropriate to the discipline such as: industry and engineering standards and codes; public safety and health; and local and global impact of engineering solutions on individuals, organizations and society.
DSC.e	e. Combine technical, professional, and general education components to prepare students for a career, further study, and lifelong professional development.
OC	Other Content - Include topics related to professional and ethical responsibilities, diversity and inclusion awareness,
PNS	Physical and Natural Science - The program provides physical or natural science content of the curriculum appropriate to the discipline and includes laboratory experiences.
IC	Integration of Content - Baccalaureate degree programs must provide a capstone or other integrating experiences that develop student competencies in applying both technical and nontechnical skills in problem solving.
CE	Cooperative Education - When used to satisfy prescribed elements of these criteria, cooperative internships or similar experiences must include an appropriate academic component evaluated by the program faculty.

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	Program Criteria (PC)
PC.a	(a) concepts of automatic control, including measurement, feedback and feedforward regulation for the operation of continuous and discrete systems;
PC.b	(b) design and implementation of systems utilizing analog and/or digital control devices;
PC.c	(c) concepts of chemistry, physics, and electricity/electronics to measurement and control systems;
PC.d	(d) concepts of digital and microprocessor systems and functionality of system components/devices for the automation of processes;
PC.e	(e) concepts of measurements and sensor selection;
PC.f	(f) communicating the technical details of control systems using current techniques and graphical standards;
PC.g	(g) concepts of mechanics, fluid mechanics, and heat transfer to the design of process control systems;
PC.h	(h) utilization of programmable logic controllers (PLC), distributed control systems (DCS) and supervisory control systems for control of manufacturing and processing systems; and
PC.i	(i) utilization of modern and effective management skills for performing investigation analysis, and synthesis in the implementation of automatic control systems.

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Student Outcomes Mapping

Proposed BET SO to BIndTech SO

No.		BIndTech SO							
		1	2	3	4	5	6	7	8
BET SO	1	✓							
	2		✓						
	3				✓				
	4			✓					
	5					✓			
	6						✓		
	7							✓	✓
	8		✓						

Proposed BET SO to ABET-ETAC SO

No.		ABET ETAC SO				
		1	2	3	4	5
BET SO	1	✓				
	2		✓			
	3			✓		
	4				✓	
	5					✓
	6		✓			
	7				✓	
	8		✓			