



# Covenant University

## B.Eng Degree Programme in Chemical Engineering

Programme Outcomes (POs)  
Student Outcomes (SOs)

## **Programme Educational Objectives (PEOs)**

The Chemical Engineering Programme Educational Objectives (PEOs) describe the expectations of our graduates after a few years of work experience by contributing to the society through modern technologies and practices. It aims to enable suitably qualified graduates from a range of engineering backgrounds to:

**PEO1** - Develop knowledge, skills (including transferable skills, such as leadership, motivation, time management, prioritisation, delegation, listening, communication, analytics) and understanding, as well as awareness and “know how”, in the fields of engineering and its related disciplines so that as graduates they will be equipped to enter into self-employment and employment as professional engineers progressing on to Registered Engineer (or equivalent status) or a wide range of other professional careers.

**PEO2** - Prepare them to engage in life-long and critical enquiry with skills in research and knowledge acquisition and an appreciation of the value of education to the wider community.

**PEO3** - Provide them with internationally recognised qualifications which meet and exceed the requirements of the COREN Outcome-Based Education Benchmark for Engineering Programmes in Nigeria and international Benchmark Statements for Engineering for ABET, Engineering Council, UK, etc.

**PEO4** - Provide the engineering industry and profession in Nigeria and elsewhere, with ready employable and enterprising graduates prepared for the assumption of technical, managerial and financial responsibilities.

**PEO5** - Achieve the above in the contexts of the Covenant University Vision business plans, following the University’s policies and procedures and conforming to the relevant sections of the Quality and Academic Standards (QAS) guidelines.

Program Education Objectives (PEOs), Student Outcomes (SOs), annual student enrolment and graduation data are posted on the Covenant University website:

The requirement for the program educational objectives (PEO) for engineering programmes was embedded into the Benchmark for Minimum Academic Standard (BMAS) of the regulatory agency for engineering education in the year 2017, and subsequently the College of Engineering at Covenant University formulated hers and was approved by the University Senate. In existence prior to 2017, employer assessment was conducted once for a maximum period of 5 years. Focus from henceforth is to conduct survey of graduates/alumni and graduate/alumni-employer. A follow-up shall consist of discussion of a Faculty Committee or faculty members of the assessment criteria and results with the advisory board of the department on an annual basis. For the first 5 years, the survey shall be annually and later every 3 years for consistent follow-up.

Graduate/Alumni Follow-up Survey

This provides a means of alumni accessing how well the programme has prepared them for the industry based on the PEO's and Student Outcomes. In detail, their status in the industry or company shall be established, including general personal and employer information, and assessing the relevance and required update of the PEO's towards their professional development. A survey shall be prepared to meet this requirement.

#### Graduate/Alumni – Employer Follow-up Survey

The survey is essentially similar in attributes to the Graduate Follow-up Survey. It focuses on the activities of the graduate meeting the PEO's and Student Outcomes in an objective and unbiased manner as compared to the graduate survey.

#### Advisory Board Review

The meeting for deliberations and feedback of the survey is on an annual basis. Members of the board shall consist of individuals in various companies in the oil and gas, industrial chemicals, food and beverages, pulp and paper, leather and leather products that cover all the Chemical Engineering disciplines of reaction engineering, thermodynamics, design, renewable energy as well as professionals in emerging technologies application. Other members shall be alumni of the programme.

#### Programme Outcomes (POs)

The Programme Outcomes are presented in Table 2.1.

*Table 2.1: Programme Outcomes*

<b>PO1</b>	Engineering knowledge - Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of developmental and complex engineering problems
<b>PO1.1</b>	Demonstrate ability to identify and apply knowledge and techniques in mathematics, science, and engineering to solve engineering problems.
<b>PO2</b>	Problem Analysis – Identify, formulate, research literature and analyze developmental and complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
<b>PO2.1</b>	Demonstrate ability to solve problems by concepts through the integration of mathematics, science and engineering.
<b>PO2.2</b>	Demonstrate skill in identifying vital information from resources in solving problems.
<b>PO2.3</b>	Demonstrate skill and appropriate technique and ingenuity in solving developmental or engineering problems.

<b>PO3</b>	Design/Development of Solutions - Proffer solutions for developmental or complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal and environmental considerations
<b>PO3.1</b>	Demonstrate understanding of the impact of engineering decisions and solutions to societal issues.
<b>PO3.2</b>	Demonstrate understanding of solutions to cultural diversity based on our local context in Nigeria.
<b>PO3.3</b>	Demonstrate knowledge of the implications of engineering designs and solutions to the public health and safety of all.
<b>PO4</b>	Investigation - Conduct investigation into developmental or complex problems using research based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.
<b>PO4.1</b>	Demonstrate ability to appropriately set-up and conduct experiments to understand and extract underlining and fundamental principles.
<b>PO4.2</b>	Demonstrate ability to apply statistical tools in designing and analyzing experiments.
<b>PO4.3</b>	Demonstrate skill in applying the appropriate research method in solving engineering problems.
<b>PO5</b>	Modern Tools Usage - Create, select and apply appropriate techniques, resources and modern engineering and ICT tools, including prediction, modelling and optimization to developmental and complex engineering activities, with an understanding of the limitations.
<b>PO5.1</b>	Demonstrate an understanding of the inherent limitations of software (application) tools, and analytical and numerical techniques.
<b>PO5.2</b>	Demonstrate ability to identify and apply appropriate techniques in investigating and solving problems of engineering relevance.
<b>PO5.3</b>	Demonstrate capability and proficiency in using modern and ICT tools to solve engineering problems.
<b>PO6</b>	The Engineer and Society - Apply reasoning informed by contextual knowledge including Humanities and Social Sciences to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice
<b>PO6.1</b>	Demonstrate awareness of legal implications of professional engineering practice.
<b>PO6.2</b>	Demonstrate understanding of the required contribution of engineers to the society.
<b>PO7</b>	Environment & Sustainability - Understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development

<b>PO7.1</b>	Demonstrate an understanding of the impact of engineering solutions on the society and environment.
<b>PO7.2</b>	Demonstrate ability to recognize and evaluate the ethical dilemmas that may arise in the workplace.
<b>PO8</b>	Ethics - Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice, including adherence to the COREN Engineers Code of Conducts.
<b>PO8.1</b>	Demonstrate knowledge and understanding of the COREN Engineers Code of Conduct.
<b>PO8.2</b>	Demonstrate ability to apply professional responsibilities and norms of engineering practice.
<b>PO8.3</b>	Demonstrate understanding and appreciation of diversity.
<b>PO9</b>	Individual & Team Work - Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.
<b>PO9.1</b>	Demonstrate knowledge and understanding in completing set goals and plan tasks
<b>PO9.2</b>	Demonstrate understanding in apply, using skills acquired to examine and adopt ideas as a member or team lead
<b>PO9.3</b>	Demonstrate the ability to work with other engineering discipline or multi-disciplinary settings
<b>PO10</b>	Communication - Communicate effectively on developmental or complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
<b>PO10.1</b>	Demonstrate the skills to communicate within the engineering society and outside engineering profession
<b>PO10.2</b>	Demonstrate the ability to make presentations and be able to communicate the society at large
<b>PO10.3</b>	Demonstrate the ability to use appropriate presentation medium for proper communication and receive clear instructions
<b>PO11</b>	Project Management & Finance - Demonstrate knowledge and understanding of engineering, management and financial principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multi-disciplinary environments
<b>PO11.1</b>	Demonstrate the ability to conduct, manager and execute projects in multi-disciplinary areas
<b>PO11.2</b>	Demonstrate the ability to work within the budget when executing a project for proper management
<b>PO11.3</b>	Demonstrate recognition or the skills needed for project management

<b>PO12</b>	Lifelong Learning - Recognize the need for, and have the preparations and ability to engage in independent and lifelong learning in the broadest context of technological and social changes
<b>PO12.1</b>	Demonstrate the ability to learn new technology or techniques that will be used for solving life problems and professional development activities
<b>PO12.2</b>	Demonstrate the ability to apply knowledge acquired from teaching, professional journals and industry publications to improve processes and systems

All the twelve programme outcomes are coded PO1 – PO12 and were mapped to the programme educational objectives coded PEO1 – PEO5 in Table 2.2.

*Table 2.2: Link between the programme outcomes and the programme educational Objectives*

<b>Program Educational Outcomes</b>	<b>PEO1</b>	<b>PEO2</b>	<b>PEO3</b>	<b>PEO4</b>	<b>PEO5</b>
<b>O1: Engineering knowledge</b>	●	●	●	●	●
<b>O2: Problem Analysis</b>	●	●	●		
<b>O3: Design /development of solutions</b>	●	●	●	●	●
<b>O4: Investigation</b>		●	●		
<b>O5: Modern Tool Usage</b>	●	●	●	●	●
<b>O6: The Engineer and Society</b>	●		●		
<b>O7: Environment &amp; Sustainability</b>	●			●	●
<b>O8: Ethics</b>	●		●		
<b>O9: Individual and Team work</b>	●			●	●
<b>O10: Communication</b>	●	●			
<b>O11: Project Management and Finance</b>	●	●		●	
<b>O12: Lifelong learning</b>		●		●	