Covenant University

B.Eng. Degree Programme in

Mechanical Engineering

Programme Outcomes (POs)/ Student Outcomes (SOs)

FOR

COMPLIANCE WITH THE ACCREDITATION OF ENGINEERING PROGRAMMES IN NIGERIAN UNIVERSITIES

by

COUNCIL FOR THE REGULATION OF ENGINEERING IN NIGERIA

Established by Decrees 55/70 and 27/92 (amendment) now the Engineers (Registration, etc.) Act, CAP E11, 2004

2022-2027 SESSION

Programme Outcomes (POs)/ Student Outcomes (SOs) of the Department Mechanical Engineering, Covenant University

The Programme Outcomes are presented in the Table 1.

Table 1: Programme Outcomes

Outcome	Description
PO1	**Engineering knowledge - Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of developmental and complex engineering problems**
PO1.1	Demonstrate ability to identify and apply knowledge and technics in mathematics, science, and engineering to solve engineering problems.
PO2	**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.**
PO2.1	Demonstrate ability to solve problems by concepts through the integration of mathematics, science and engineering.
PO2.2	Demonstrate skill in identifying vital information from resources in solving problems.
PO2.3	Demonstrate skill and appropriate technique and ingenuity in solving developmental or engineering problems.
PO3	**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**
PO3.1	Demonstrate understanding of the impact of engineering decisions and solutions to societal issues.
PO3.2	Demonstrate understanding of solutions to cultural diversity based on our local context in Nigeria.
PO3.3	Demonstrate knowledge of the implications of engineering designs and solutions to the public health and safety of all.
PO4	**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.**
PO4.1	Demonstrate ability to appropriately set-up and conduct experiment to understand and extract underlining and fundamental principles.
PO4.2	Demonstrate ability to apply statistical tools in designing and analyzing experiments.

Outcome	Description
PO4.3	Demonstrate skill in applying the appropriate research method in solving engineering problems.
PO5	**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.**
PO5.1	Demonstrate an understanding of the inherent limitations of software (application) tools, and analytical and numerical techniques.
PO5.2	Demonstrate ability to identify and apply appropriate technique in investigating and solving problems of engineering relevance.
PO5.3	Demonstrate capability and proficiency in using modern and ICT tools to solve engineering problems.
PO6	**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**
PO6.1	Demonstrate awareness of legal implications of professional engineering practice.
PO6.2	Demonstrate understanding of the required contribution of engineers to the society.
PO7	**Environment & Sustainability - Understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development**
PO7.1	Demonstrate an understanding of the impact of engineering solutions on the society and environment.
PO7.2	Demonstrate ability to recognize and evaluate the ethical dilemmas that may arise in the workplace.
PO8	**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.**
PO8.1	Demonstrate knowledge and understanding of the COREN Engineers Code of Conduct.
PO8.2	Demonstrate ability to apply professional responsibilities and norms of engineering practice.
PO8.3	Demonstrate understanding and appreciation of diversity.
PO9	**Individual & Team Work - Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.**

Outcome	Description
PO9.1	Demonstrate knowledge and understanding in completing set goals and plan tasks
PO9.2	Demonstrate understanding in apply, using skills acquired to examine and adopt ideas as a member or team lead
PO9.3	Demonstrate the ability to work with other engineering discipline or multi-disciplinary settings
PO10	**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.**
PO10.1	Demonstrate the skills to communicate within the engineering society and outside engineering profession
PO10.2	Demonstrate the ability to make presentations and be able to communicate the society at large
PO10.3	Demonstrate the ability to use appropriate presentation medium for proper communication and receive clear instructions
PO11	**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**
PO11.1	Demonstrate the ability to conduct, manager and execute projects in multi-disciplinary areas
PO11.2	Demonstrate the ability to work within the budget when executing a project for proper management
PO11.3	Demonstrate recognition or the skills needed for project management
PO12	**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**
PO12.1	Demonstrate the ability to learn new technology or techniques that will be used for solving life problems and professional development activities
PO12.2	Demonstrate the ability to apply knowledge acquired from teaching, professional journals and industry publications to improve processes and systems

Relationship of Student Outcomes to Program Educational Objectives:

It teaches the students the fundamental concepts of Mechanical Engineering with which they can build a career to the highest degree of professional competence;

It develops the students in the application of technical knowledge, sense of analysis, creative design abilities, innovation, adaptability, and leadership qualities;

It provides the students with the opportunity to develop, after a basic understanding of all areas of Mechanical Engineering practice, and other special areas of interest which include Heat Transfer, Engineering Vibration, Thermal Power Plant Engineering, Energy Management & Technology, Machine Design, Refrigeration & Air Conditioning Engineering, and Internal Combustion Engine.

It provides practical training in the industries and other Mechanical Engineering establishments in preparation for professional practice.

All the twelve student outcomes are coded O1 – O12 and used to map the program educational objectives coded OB1 – OB5. This is presented in Table 2. The student outcomes were developed to link that of the regulatory body for engineering education in Nigeria (COREN) and further tied to ABET's outcomes. Furthermore, these student outcomes have been adequately directed to achieve the desired impact of the curriculum in fulfilling the program educational objectives.

Table 2: Link between the Student Outcomes (SO) and the Program Educational Objectives (PEOs)

Program Educational Outcomes	OB1	OB2	OB3	OB4	OB5
O1: Engineering knowledge	•	•	•	•	•
O2: Problem Analysis	•	•	•		
O3: Design /development of solutions	•	•	•	•	•
O4: Investigation		•	•		
O5: Modern Tool Usage	•	•	•	•	•
O6: The Engineer and Society	•		•		
O7: Environment & Sustainability	•			•	•
O8: Ethics	•		•		

Program Educational Outcomes	OB1	OB2	OB3	OB4	OB5
O9: Individual and Team work	•			•	•
O10: Communication	•	•			
O11: Project Management and Finance	•	•		•	
O12: Lifelong learning		•		•	