Faculty of Engineering
Department of Industrial Engineering

Quality Manual of Engineering Management Program
2024-2025

Development and Quality Committee

Spring 2024

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Declaration

We, the Engineering Management Program at University of Tabuk, hereby declare our commitment to upholding the highest standards and affirm our dedication to quality assurance. We strive to deliver an exceptional program that meets the needs and expectations of our stakeholders, while continuously improving and adapting to evolving demands of industry and society. We will establish and maintain robust quality assurance processes to monitor and evaluate our program's effectiveness and efficiency. Regular reviews, assessments, and audits will be conducted to ensure that our program meets or exceeds the established standards.

Definitions

Quality: is a measure of how well an object, product, service, or process meets or exceeds established standards, requirements, or expectations.

Academic quality: refers to the standard of excellence in educational institutions and programs. It encompasses various aspects related to the learning experience, curriculum, teaching methods, faculty, resources, and student outcomes.

Quality assurance: is a systematic and ongoing process that institutions and organizations implement to ensure and enhance the quality, effectiveness, and standards of education and related services provided to students.

Academic standards: refer to a set of criteria and benchmarks that define the expected level of knowledge, skills, and competencies that students should attain in a specific field or discipline within the context of higher education.

Quality system: refers to a comprehensive framework and a set of documented policies, procedures, processes, and resources that a program implements to ensure and manage the quality of their academic programs, teaching, research, and related activities.

Policies: are formal statements or guidelines that define an organization's principles, rules, and procedures. They serve as a framework for decision-making, governing various aspects of an organization's operations, behaviour, and interactions.

Procedures: are step-by-step instructions or guidelines that outline the specific actions and processes required to carry out a particular task or achieve a specific outcome within an organization.

Tasks and Activates: Tasks are typically specific, well-defined, and focused actions that can be completed within a relatively shorter timeframe. Activity typically refers to a broader, more encompassing unit of work. It represents a larger, more complex set of actions or operations that are performed to achieve a specific objective or goal.

Forms: refer to structured documents or templates used to collect, record, and organize information in a standardized format.

Records: refer to any documented information, data, or evidence that is created, received, maintained, and used by an individual, organization, or system as evidence of activities.

Course: is a structured educational program or unit of study offered by an educational institution.

Instructor: also known as a teacher or educator, is an individual responsible for facilitating the learning process and guiding students in their educational journey.

Course coordinator: also known as course manager, is an individual who oversees the planning, development, and overall management of a specific course or a group of related courses within an educational institution.

Program Committees are established to facilitate collaborative decision-making, address specific program-related issues, and ensure representation from relevant stakeholders.

Faculty Members: are responsible for delivering courses, designing curricula, and providing academic guidance to students. They contribute their expertise and knowledge to ensure high-quality teaching and learning within the program.

Abbreviations

To enhance readability and streamline the manual's content, we have included a list of commonly used abbreviations and their corresponding full forms in the following section.

UT: University of Tabuk.
FOE: Faculty of Engineering.
NCAAA: National Commission for Academic Accreditation and Assessment
NQF : National Qualification Framework.
AAQA: Academic Accreditation and Quality Assurance.
CES : Course Evaluation Survey
SWOT: Strength weakness opportunities and threats analysis.
SSRP: Self-evaluation Report for Programs.
KPI: Key Performance Indicators.
CR: Course Report.
APR: Annual Program Report.
CLOs: Course Learning Outcomes.
PLOs: Program Leaning Outcomes.
DQC: Development and Quality Committee.
PSPC: Program and Study Plans Committee.
IE: Industrial Engineering
EM: Engineering Management

1 Introduction

Purpose: This comprehensive quality manual serves as a guide to ensure the highest standards of quality in our program's activities, procedures, responsibilities, and reporting. By adhering to the guidelines outlined in this manual, we aim to achieve excellence, efficiency, and continuous improvement in all aspects of our program. This manual provides a clear framework and effective management for maintaining consistency, accountability, and transparency throughout the program's lifecycle.

The manual encompasses a wide range of essential components related to quality assurance. It outlines the various activities carried out within the program, including planning, implementation, monitoring, and evaluation. Additionally, it provides detailed procedures and protocols to follow to ensure the smooth execution of these activities. Clear roles, responsibilities, and accountabilities are assigned to different stakeholders involved in the program, fostering a collaborative and results-oriented approach. Moreover, the manual establishes comprehensive reporting mechanisms to track progress, identify areas for improvement, and communicate program outcomes to relevant stakeholders.

During the development of this manual, DQC prioritized adherence to the programmatic quality standards set by the National Center for Academic Accreditation and Evaluation system. The key requirements include:

1. Ensuring that the department's organizational chart and procedures align with the general policies and regulations governing Saudi universities, as well as the specific regulatory frameworks established by the University of Tabuk and the College of Engineering.
2. Consistence with the regulatory frameworks of the university and faculty is essential.
3. Implementing a comprehensive quality management system (planning - implementation - measurement - improvement) that encompasses all administrative and academic activities and operations of the program.
4. Involving active stakeholders such as students, graduates, faculty members, employees, employers, and individuals with direct and indirect connections to the university in the planning and evaluation processes. Continuous feedback, observations, and viewpoints are obtained and analyzed to ensure effective interaction.

The quality manual is approved by the department council. It undergoes a periodic review, incorporating any necessary amendments based on new data that are relevant to quality policies and objectives. Additionally, proposals for enhancing the work system put forward by faculty members are taken into consideration. The manual is then presented to the department's

management, as well as to experts and specialists in quality and academic accreditation, for thorough scrutiny and review of its components. DQC assumes responsibility for monitoring the amendments, disseminating the guide, and providing clarifications about its contents.

Scope: This manual applies to all personnel involved in the Engineering Management Program, including program chair, staff members, and relevant stakeholders. It encompasses all stages of the program, from planning and implementation to evaluation and improvement.

Document Control: This manual is version-controlled and maintained by the program administration office. Any revisions or updates to the manual will be documented version 1, 2, and so on, and the latest version will be made available to all relevant personnel.

1.1 About the Engineering Management Program

The Industrial Engineering (IE) Department was established in the Fall/Winter Semester of 2010-2011. The department currently offers two academic programs: the Bachelor of Science in Industrial Engineering and the Master of Engineering Management. The Master of Engineering Management is a two-year program (4 semesters) that started in academic year 2021-22. Details regarding the Master of Engineering Management Program are provided in Table 1.

Table 1: Details of Master of Engineering Management Program

The degree awarded by the program	Master of Engineering Management
Type of study in the program	Ordinary
Study Hours	Morning throughout the week, except the official holidays
Program language	English
Reasons for Establishing the Program	The Master of Engineering Management program is established to bridge the gap between technical expertise and managerial capabilities, equipping engineers with the skills needed to lead complex projects, drive innovation, and manage resources effectively. It responds to growing industry demand for professionals who can integrate engineering knowledge with strategic decision-making, project management, and leadership. By aligning with national development goals and supporting economic diversification, the program prepares graduates to contribute meaningfully to industrial growth and technological advancement. Additionally, it enhances career prospects for engineers, fosters interdisciplinary learning, and addresses critical skill gaps in today's evolving workforce.
Requirements for enrolling in the Program	1. Bachelor's Degree in any of following majors: a. Industrial Engineering b. Mechanical Engineering c. Electrical Engineering d. Civil Engineering e. Chemical Engineering f. Computer Engineering g. Mining Engineering h. Architecture Engineering i. Architecture and Planning Engineering 2. Overall Grard: Good 3. ILETS Score: >4 or STEP 60 and Above

	4. Passed the General Aptitude test for University Students
The study Plan	The courses are divided into four semesters. The courses are classified into two categories: core 71.42% and elective: 28.58 %.
Nature of the program	Study mode consists of courses and a graduation project/thesis, offered in four semesters, with a total number of courses is 14 (42 Credit Hours). To award the Master of Engineering Management degree, the GPA of the student should not be less than 3

1.2 Mission, Goals, and Learning Outcomes

1 The primary focus of the Engineering Management program is defined by its mission statement. The mission addresses instruction, research, and community service, also it explains the department's character, individuality and its harmony with the mission and of the University of Tabuk. The mission of the Engineering Management program propagates a message that resonates with students, faculty members and all stakeholders, in such a way that reflects the uniqueness of the Engineering Management program and provides a constant reminder to all the stakeholders of why the program is developed. The mission statement of Master of Engineering Management Program is as follows:

Master of Engineering Management program delivers interdisciplinary education combining engineering and management, supports applied research addressing industrial and societal problems, engages in community service, meet the need of society and promotes ethical leadership, innovation, and lifelong professional growth.

1.3 The program goals

PG1: Provide advanced education that integrates engineering and management, preparing graduates to lead and manage complex projects and teams.
PG2: Promote applied research that addresses practical challenges in industries and communities.
PG3: Encourage ethical leadership, innovation, and continuous professional growth among graduates to serve community.
PG4: Develop professional capabilities that enable graduates to contribute to the development of the local and global economy.

1.3.1 Mapping the goals and the mission of Master of Engineering Management

The goals of the Master of Engineering Management are formulated based on its mission, and the alignment between the program objectives and the mission is outlined in Table 2.

Table 2: Alignment between the program objectives and the mission

Program Goal (PG)	Alignment with Program Mission
PG1: Provide advanced education that integrates engineering and management, preparing graduates to lead and manage complex projects and teams.	Aligns with the mission's core focus on delivering interdisciplinary education that combines engineering and management to build leadership and managerial competencies.
PG2: Promote applied research that addresses practical challenges in industries and communities.	Supports the mission's commitment to applied research targeting industrial and societal problems.
PG3: Encourage ethical leadership, innovation, and continuous professional growth among graduates to serve community.	Reflects the mission's emphasis on promoting ethical leadership, innovation, and lifelong professional development.
PG4: Develop professional capabilities that enable graduates to contribute to the development of the local and global economy.	Supports the mission's broader objectives of addressing societal needs and preparing graduates to have an economic impact at both local and global levels.

1.3.2 Alignment of program goals with the University and College of Engineering

1.3.3 University Goals

UG1: To provide a distinguished university education that meets the needs of the labor market.

UG2: To support innovative research to contribute to building a knowledge economy.

UG3: To promote social responsibility and community partnership.

UG4: Sustainability of infrastructure and technology for an attractive educational environment.

UG5: Effective governance and management.

UG6: Diversify innovative financing sources and achieve expenditure efficiency.

1.3.4 Faculty of Engineering Goals

CG1: To deliver distinguished academic education that meets the needs of the labor market.

CG2: Providing creative research to contribute to building the knowledge economy of society.

CG3: Effective contribution to sustainable development and community service.

CG4: Offer a stimulating and attractive learning environment.

CG5: Develop an effective administrative and organizational environment in the college.

CG6: Providing innovative financing sources.

1.3.5 Alignment of the goals of the University of Tabuk with the Faculty of Engineering and Master of Engineering Management

Table 3 gives the alignment of the goals of the University of Tabuk with the Faculty of Engineering and Master of Engineering Management.

Table 3: Alignment of the goals of the University of Tabuk with the Faculty of Engineering and Master of Engineering Management.

Program Goals	Faculty of Engineering Goals						University of Tabuk Goals					
	CG1	CG2	CG3	CG4	CG5	CG6	UG1	UG2	UG3	UG4	UG5	UG6
PG1	✓			✓			✓			✓		
PG2		✓				✓		✓	✓			
PG3				✓	✓		✓		✓		✓	
PG4		✓	✓				✓	✓	✓			✓

1.4 The program learning outcomes:

Learning outcomes of the Engineering Management Program are specified clearly in the program specification using the National Qualification Framework (NQF) provides three learning domains. The Program Learning Outcomes are shown in Table 4.

Table 4: Program Learning Outcomes for Master of Engineering Management

Knowledge and understanding	
K1	An ability to demonstrate deep and advanced knowledge of engineering management concepts, techniques, and recent developments
Skills	
S1	An ability to identify, formulate, and solve complex and advanced problems by applying advanced knowledge of engineering, science, and mathematics.
S2	An ability to design an innovative engineering solution that meets specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors, while complying with relevant standards and design codes.
S3	An ability to develop and conduct advanced research or experimentation using specialized methodologies; and critically analyze data to generate valid, insightful conclusions relevant to industrial practice.

S4	An ability to communicate effectively in various forms to disseminate engineering knowledge, research results, and innovations to a range of audiences
S5	Create, select, use, and adapt advanced digital technology and ICT tools to support and enhance leading research and/or projects related to discipline, professional practice with understanding of the limitations.
S6	An ability to Identify and evaluate the issues and constraints of sustainability, economy, environment, politics, health and safety, and society that are relevant to professional solving of complex engineering problems.
Values	
V1	An ability to recognize ethical and professional responsibilities in engineering solutions and uphold academic and professional ethics, and norms of engineering and make informed judgements.
V2	An ability to collaborate and provide leadership on a team, preferably in a multidisciplinary setting, to manage and execute complex tasks, projects, or research with a high level of autonomy and responsibility
V3	An ability to acquire and apply new knowledge through advanced learning strategies and research.

Organizational Structure of the EM Program

2 Organizational structure of the EM Program

The EM Program has a well-designed organizational structure of tracking and reporting, on its operational objectives and it establishes mechanisms for academic governance and decision-making within the program and clearly defines the roles and responsibilities of faculty members, administrators, and staff within the program. Figure 1 shows the EM program organizational structure. The organizational structure of the EM program has been developed through collaboration with relevant stakeholders, including faculty members, students, alumni, and industry representatives.

The program organizational structure aligns with the overall vision, mission and strategic goals of the University of Tabuk, and supports and contributes to accomplishing its objectives.

The standards followed by the EM program in building its organizational structure are:

1) Alignment with College Mission and Strategic Goals.
2) Adherence to institutional policies.
3) Alignment with Accreditation standards and Quality Assurance.
4) Support the EM program's mission,
5) Enhance the intended outcomes.
6) Responsive to the stakeholders needs.
7) Clarity of Roles, Responsibilities and Accountabilities.
8) Flexibility and Adaptability to the changing needs.

The establishment of the organizational structure of the EM Program went through multiple steps, including identifying program components and outcomes. Identify the number and qualifications and the expertise of faculty members. Consult all relevant internal and external stakeholders. Identify the support services required for the program, such as program context committee, academic advising committee, development and quality committee, scientific committee, academic affairs committee and more. Determine the committees required for program governance and decision-making and clearly define the responsibilities of each committee. The Program Chair is advised by eight permanent department committees on all matters affecting the department. The organizational structure of the EM program is shown in Figure 1.

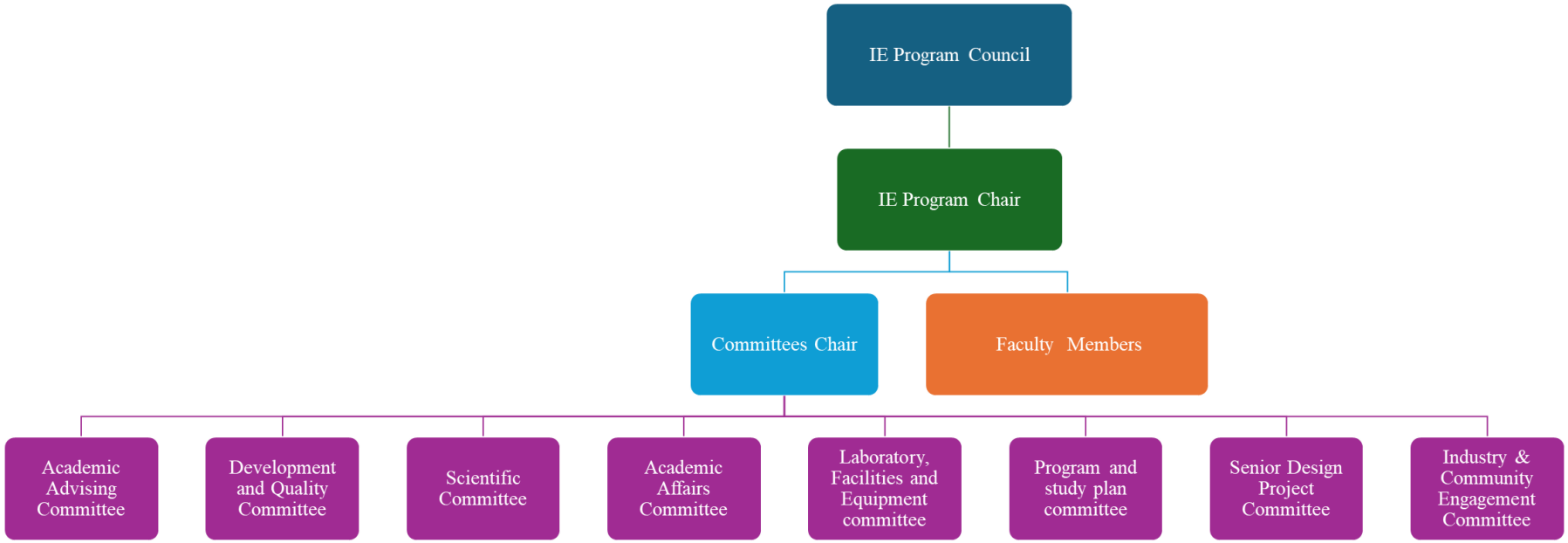

Figure 1: Organisational structure of Engineering Management Program

2.1 The Department Council

The department council is headed by the program chair and have a goal to study and discuss matters that concern the work of the department, such as recommending to the Faculty Council the decisions and procedures required for the progress of work. The members of this council are the all-faculty members in the IE department. The responsibilities of the departmental council are as follows:

1. Propose to the Faculty Council the study plan, curriculum, prescribed textbooks, and references.
2. Recommending the appointment and promotion of faculty members, lecturers, and teaching assistants.
3. Study scientific research projects, encourage faculty to conduct research, and assist in publishing their research work.
4. Distributing lectures and tutorials to faculty members and teaching assistants.
5. Proposing the necessary plans for postgraduate programs and the conditions for accepting students into them.
6. Forming permanent and temporary committees from the program's faculty members.
7. Considering any topic referred to by the Dean, Faculty council, or Faculty Vice Deans.

Administrative positions such as program chair and course coordinator responsibilities and their roles are provided in Table 5.

Table5: Roles and responsibilities of various administrative positions

Job Title	Program Chair	Course coordinator	Academic advisor
Organizational Relationship	**Dean of the College**	**Program Chair**	**Program Chair**
Goal	Supervise academic, financial and administrative matters in the department. Implementing the system, regulations	Support and assist the department's Development and Quality Committee in ensuring the management of the	Support and assist the Academic Affairs and Student advising Committees in ensuring the management of the quality of teaching.

	and the decisions issued by the Higher Education Council.	quality of prescribed teaching.	
Responsibilities	**1.** Distribution of the academic load among faculty members. **2.** Assigning mentors and academics. **3.** Assign a course coordinator for each course taught in the academic program. **4.** Approval of grades. **5.** Prepare faculty members performance reports. **6.** Promote the department employees to attend training programs inside and outside the university. **7.** Carry out any additional tasks within the authority of the	-Prepare the course description file. -Support new faculty members in preparing the course report and documenting all the components of the course binder. -Follow up the progress of the educational process and the faculty members' commitment to teaching strategies and course evaluation. -Prepare the combined report for the course division. -Coordinate the meetings with course instructors to discuss issues related to course regarding quality assurance management.	-Support the students academically -Identify the student's interests and assist them in refining their skills by recommending them for various relevant programs offered by the department academic advising, as well as the faculty academic affairs committee. - Identify the problems of struggling students and support them academically by nominating them for the various programs in this regard provided by the academic advising, as well as the faculty academic affairs committee.

	Chair as assigned by the Dean **8.** Supervise the achievement of quality and academic accreditation requirements.		
Audit and Documentation	Reports-Correspondence-Data.	Prepare meeting minutes and maintain records for both struggling and gifted students.	Prepare meeting minutes and maintain records for both struggling and gifted students.

2.2 The Department Permanent Committees and their Responsibilities

The Industrial Engineering Department consists of eight permanent committees to perform several activities to meet the EM program goals. The responsibilities of each committee are provided as follows:

2.2.1 Academic Advising Committee

1. Supervise the process of providing comprehensive academic, professional, psychological, and social guidance and counselling services to students through qualified and adequate staff.
2. Supervise and monitor the performance of academic advisors, develop an annual academic guidance plan, and address academic issues raised by advisors in coordination with department administration.
3. Implement mechanisms to identify and support gifted, creative, talented, and underachieving students within the program, offering tailored programs to nurture each group.
4. Build a database of talented and struggling students in the department and develop specialized programs for them.
5. Monitor student absences in the department and identify students with high absenteeism in coordination with academic advisors.
6. Integrate students with special needs into activities and provide appropriate support in coordination with specialized faculty units.
7. Supervise the process of providing comprehensive academic, professional, psychological, and social guidance and counseling services to students through qualified and adequate staff.

2.2.2 Development and Quality Committee

1. Supervise the implementation of quality assurance measures and ensure compliance with institutional policies.
2. Monitor alignment with NCAAA standards, the National Qualifications Framework, and accreditation requirements.
3. Oversee the preparation and submission of accreditation documents, including self-study reports.
4. Define, align, and regularly update program learning outcomes (PLOs) and course learning outcomes (CLOs).
5. Develop and implement mechanisms for assessing learning outcomes and verifying achievement against benchmarks.

6. Identify areas for improvement based on assessment results, stakeholder feedback, and accreditation requirements.
7. Develop, implement, and monitor comprehensive improvement plans based on key performance indicators and assessments.
8. Manage data collection, analysis, and reporting to ensure continuous improvement and informed decision-making.
9. Prepare and present reports, including the Annual Program Report and survey report, to department leadership and stakeholders.
10. Develop and maintain the Master of Engineering Management program operational plan outlining strategic initiatives, operational goals, and Key Performance Indicators (KPIs) closely aligned with each program goal.
11. Ensure program alignment with the institution's mission, conduct periodic evaluations, and track improvement initiatives.
12. Prepare follow-up reports on the implementation of actions derived from survey findings and other data analyses, ensuring accountability and effectiveness in addressing identified areas for improvement.

2.2.3 Scientific Research Committee

1. Participate in the preparation, implementation, tracking, and monitoring of operational plan initiatives for the program, focusing specifically on scientific research.
2. Promotes academic integrity by ensuring adherence to values such as intellectual property rights, ethical practices, and proper conduct in research activities.
3. Encourages teaching staff to participate efficiently in academic, research, and scientific production activities and maintain the academic integrity in research.
4. Oversees teaching staff participate in professional and academic development programs, aligning these with staff needs and performance development.
5. Ensures compliance with regulations and guidelines related to research activities within the department.
6. Assesses faculty research output and provides feedback to enhance the quality and impact of their work.
7. Promotes collaboration between faculty members, external research institutions, and industry partners.
8. Reviews promotion requests from faculty members according to university scientific Council rules.
9. Evaluates faculty requests to attend scientific seminars and conferences based on scientific Council rules.

10. Identifies needs for faculty and similar positions, considering applicants for departmental roles in collaboration with relevant committees, using performance indicators.
11. Creates and updates a database of research groups, published research, projects, and scientific supervision by faculty members.
12. Organizes and coordinates conferences, workshops, seminars, scientific and cultural events, and scientific competitions within the department, overseeing their execution.

2.2.4 Academic Affairs Committee

1. Participate in the preparation, implementation, tracking, and monitoring of operational plan initiatives for the program, focusing particularly on introducing necessary workshops for students at program level.
2. Ensure the program has enough qualified staff to perform its administrative, professional, and technical tasks, with defined tasks and authorities.
3. Implement clear and publicized procedures to verify the quality and validity of assessment methods and ensure the level of student achievement.
4. Implement effective procedures to ensure academic integrity at the program level, verifying the authenticity of students' work and assignments.
5. Supervise the process of providing comprehensive information to students at the beginning of each course, including learning outcomes, teaching and learning strategies, assessment methods and dates, and expectations for student performance, with continuous feedback throughout the course.
6. Offer extracurricular activities across various fields to enhance students' abilities, skills, and encourage their active participation and development.
7. Provide students with regular education and training on academic integrity, including workshops, seminars, and resources on how to avoid plagiarism and uphold ethical standards.
8. Supervise the process of preparing and reviewing academic schedules, identifying course and section needs, managing student registration and add-drop procedures, and overseeing the examination process, including handling excuses and developing invigilation schedules.
9. Implement mechanisms to identify and support gifted, creative, talented, and underachieving students within the program, offering tailored programs to nurture each group.

10. Implement effective mechanisms to evaluate the adequacy and quality of services provided to students and measure their satisfaction, using the results for continuous improvement.
11. Develops mechanisms to support excellence in teaching, encouraging creativity and innovation among teaching staff.
12. The Academic Affairs committee will oversee and support the implementation of recommended improvements from different stakeholders, ensuring that they align with academic policies and quality standards. Their role includes reviewing proposed measures, coordinating training initiatives, and monitoring the effectiveness of implemented actions.

2.2.5 Laboratory, Facilities and Equipment committee

1. Assess and ensure the adequacy and appropriateness of learning resources and services according to the program's needs and student numbers.

2. Periodically submit proposals to the department council for updating learning resources and services to meet current academic standards and requirements.

3. Organize and provide appropriate orientation sessions for teaching staff, students, and employees on the effective use of resources and learning tools, offering technical training and support as needed.

4. Ensure the program has the appropriate technologies, services, and environment for courses offered through distance or e-learning, adhering to specific standards to maintain quality and effectiveness.

5. Regularly evaluate the effectiveness and efficiency of all types of learning resources and facilities.

6. Use the evaluation results to make continuous improvements in learning resources and facilities.

7. Monitor the accessibility of learning resources and facilities for all students, including those with disabilities.

8. Implement safety, environmental conservation, and hazardous waste disposal standards efficiently and effectively.

9. Ensure that all educational and research equipment and facilities are up-to-date and functioning properly.

10. Develop comprehensive plans for the acquisition, maintenance, and upgrading of laboratory devices, technical equipment, and facilities to support the program's academic and research activities effectively.

11. Inspect incoming devices and ensure they meet the specifications before accepting them.

12. Prepare the department's annual requests for devices and evaluate offers for laboratory equipment.

2.2.6 Program and study plan committee

1. Make sure about the application of the systems, regulations, and procedures approved by the institution/college, including those related to grievances, complaints, and disciplinary cases.
2. Develop the curriculum for programs in the department in accordance with the standards set by both the University and the Faculty of Engineering.
3. Conduct periodic evaluations of study plans, gathering comprehensive feedback and recommendations from stakeholders and reviewers. Implement appropriate suggestions and actions to ensure alignment with program goals, learning outcomes, and advancements in the field of specialization, encompassing educational, scientific, technical, and professional developments.
4. Review and update program and course specifications when necessary.
5. Review and update the course learning outcomes when necessary.
6. Develop and implement a clear and approved teaching, learning, and evaluation strategy that reflects the program's educational philosophy and ensures achievement of intended learning outcomes.
7. Establish and maintain a matrix for aligning learning outcomes of courses with program learning outcomes to ensure consistency and coherence across the curriculum.
8. Adapt teaching and learning strategies, as well as assessment methods, to the nature and level of the program, ensuring alignment with program learning outcomes and fostering effective learning experiences.
9. Monitor the commitment of the teaching staff to learning and teaching strategies and assessment methods included in the program and course specifications through specific mechanisms.

10. Implement and maintain a clear and approved teaching, learning, and evaluation strategy that reflects the program's educational philosophy and ensures the achievement of intended learning outcomes.

2.2.7 Senior Design Project Committee

1. Gathering Senior Design Project (SDP) proposals from faculty members.
2. Forming student teams and assigning them to faculty projects.
3. Creating forms to track and evaluate graduation project progress.
4. Preparing schedules for exams of graduation projects.
5. Developing guides and templates for the preparation of graduation project proposals, reports, and presentations.
6. Preparing the course binder for the graduation project.
7. Evaluating students' performance after exams and reporting grades to the department chair.
8. Assessing the learning outcomes related to the project.
9. Supervising the coordination of workshops and seminars aimed at enhancing students' professional skills.

2.2.8 Industry & Community Engagement Committee

1. Collaborate with industry partners to identify and secure training opportunities and placements for students and ensuring a match with their academic and career interests.
2. Organize orientation sessions to prepare students for field training, covering expectations, responsibilities, and professional conduct.
3. Provide continuous supervision and support to students during their field training, addressing any issues or concerns that may arise.
4. Develop and implement assessment tools to evaluate student performance during field training, including feedback from employers.
5. Collect, analyze, and evaluate feedback from students and industry partners, gathered through both discussions and surveys, to monitor, evaluate, and improve the effectiveness of field training and supervision..
6. Prepare comprehensive reports on field training activities, outcomes, and areas for improvement, and present these to the department council.

7. Organize workshops and seminars to enhance students' skills and readiness for field training.
8. Ensure that students are aware of and adhere to safety protocols and ethical standards during their field training.
9. Regularly review and update the field training program to reflect changes in industry practices and feedback from stakeholders.
10. Preparing a comprehensive field training guide, including course binders and student feedback surveys.
11. Participate in the preparation, implementation, tracking, and monitoring of operational plan initiatives for the program, focusing particularly on engaging students in Community Services.
12. Establish and maintain effective communication channels with alumni, involving them in program events and activities, seeking their feedback, and leveraging their expertise and support. Maintain updated and comprehensive databases about alumni. In other words (Actively engage with the alumni and develop an effective mechanism to benefit from their expertise.)
13. Facilitate interactions with the advisory board, including organizing meetings, setting agendas, preparing meeting minutes, and compiling a list of recommendations based on the advisory board's expertise to advise on program improvements and alignment with industry needs.
14. Organize and facilitate community partnership activities for teaching staff, integrating these engagements into their professional development and evaluation processes.

Kingdom of Saudi Arabia
University of Tabuk
Faculty of Engineering
Industrial Engineering
Department

المملكة العربية السعودية
جامعة تبوك
كلية الهندسة
قسم الهندسة الصناعية

Quality Management System for Engineering Management Program

3 Quality Management System

The Engineering Management Program employ a variety of assessment methods to comprehensively evaluate student progress and provide timely feedback for improvement. Additionally, the Engineering Management Program quality system includes a rigorous program evaluation process that allows it to continuously assess its effectiveness, make data-informed decisions, and implement enhancements to meet the evolving needs of the students as well as the industry demands. By following these steps, the quality loop can be effectively closed, ensuring that feedback is acknowledged, improvements are made, and the overall quality of the program is enhanced. This iterative process promotes continuous improvement and allows the program to adapt and meet the changing needs of its stakeholders.

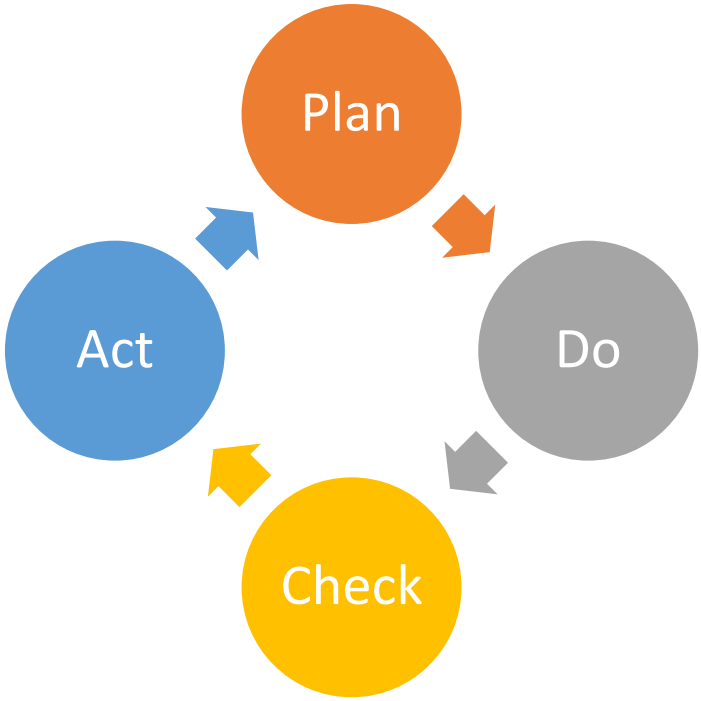

Figure 2: PDCA cycle for Quality Assurance

3.1 Closing the quality loop

The Engineering Management Program implements a comprehensive and robust quality system to ensure excellence in every aspect of the program. The Engineering Management Program quality system encompasses the development of clear Program Learning Outcomes

(PLOs), and Course Learning Outcomes (CLOs), that guide our curriculum design and delivery. Figure 2 shows the quality assurance cycle utilized by the Engineering Management Program to close the quality loop regarding all its activities.

3.1.1 Steps for closing the Quality Loop

Closing the quality loop involves a series of steps aimed at addressing feedback and improving the quality of a program. Here are the steps along with a detailed explanation of each:

Step 1: Planning

The first step is to gather feedback from stakeholders such as students, faculty members, and other relevant parties. This can be done through surveys such as feedback surveys filed by the students and student exit surveys and faculty members' suggestions from the course binders and course reports. After that, the feedback is comprehensively analyzed to identify common themes, strengths, weaknesses, and areas for improvement. Based on this analysis, specific improvement elements need to be identified. It could be related to curriculum, teaching methods, resources, support services, or any other aspect of the program. Further, an action plan should be developed to address the identified areas of improvement. It should be specific, measurable, achievable, relevant, and time-bound (SMART) to ensure effective implementation.

Step 2: Do

The next step is to implement the changes outlined in the action plan. This may involve revising the curriculum, providing additional training or support to faculty members, improving resources or facilities, or enhancing student services. The changes should be implemented systematically and monitored closely.

Step 3: Check

This stage monitors the progress and effectiveness of the modifications. Continuous assessment of the improvements helps determine if they are achieving the desired outcomes. This can be done through ongoing data collection, student feedback, performance indicators, or other evaluation methods.

Step 4: Act

Based on the evaluation in the previous stage, adjustments and refinements should be made. This step involves making modifications to the implemented changes or strategies to ensure continuous improvement. The modification may include revising/improving teaching methods

by selecting alternative teaching strategies, such as active and collaborative learning, and revising course content and course prerequisites.

3.2 Documentation, Reporting, and tools for Quality Assurance Continuous Improvement

To uphold and enhance the quality of the Master of Engineering Management Program, various tools and processes are utilized for documentation, reporting, and records management. These tools play a crucial role in monitoring, evaluating, and improving different aspects of the program, ensuring compliance with both internal and external standards. The key tools employed include:

3.2.1 Exam Cover Page

A standardized exam cover page has been developed and approved by the IE department which is utilized in the exams (Mid Term and Final Term). The standardized exam cover page includes essential details to ensure a structured and transparent assessment process. It lists the course learning outcomes (CLOs) being assessed and maps each exam question to specific CLOs, ensuring alignment with course objectives. The cover page also specifies the maximum score for each question, helping students understand the weight and instructors maintain grading consistency. After evaluation, instructors record the student's score for each question, facilitating accuracy in grading and providing a clear reference for performance review. Further, PLO is also mentioned on the exam cover page that facilitate the PLO assessment. This standardization ensures clarity and consistency in the assessment process.

3.2.2 CLO-PLO Mapping

CLOs are carefully developed for each course to align with the PLOs, ensuring a cohesive and structured educational framework. This mapping process establishes a clear connection between individual CLO and PLO. The CLOs and their corresponding mapping are reviewed and approved by the IE department, ensuring consistency and relevance to the program's academic and professional standards. Once approved, these CLOs are formally documented in the course specifications, providing a reference for instructors, students, and development of quality committee.

3.2.3 Assessment Excel File

A. **Excel for Direct PLO Assessment:** To enhance efficiency in calculating assessment results, the Master of Engineering ManagementProgram has developed a customized assessment tool using Microsoft Excel. This tool enables instructors to systematically

compute the attainment of PLOs for each course under evaluation. It processes data from the exam cover page, incorporating the question-to-CLO mapping along with the CLO-to-PLO alignment, to generate the percentage of PLO attainment. By automating these calculations, the tool ensures accuracy, consistency, and a streamlined approach to evaluating student performance across courses.

B. **Excel for Rubrics based PLO Assessment:** Some PLOs, such as those related to communication skills, ethical reasoning, teamwork, or lifelong learning are complex and not easily measured through conventional assessment methods like multiple-choice exams or quizzes. To assess these types of outcomes effectively, EM program uses rubrics. A rubric is a scoring guide that outlines specific criteria and describes levels of performance for each. Microsoft Excel based assessment is developed for managing rubrics-based PLO assessment.

3.2.4 Student Outcome Assessment Report (SOAR)

Course instructors included in the assessment process utilize data from the Excel assessment tool to prepare the SOAR form, which serves as the course-level evaluation of PLOs. The SOAR form captures essential details, including course information, a summary of assessment results, instructor comments on both the assessment process and student performance, and recommendations for improving student outcome attainment. Once completed, the SOAR form is added to the course binder, and its information is incorporated into the course report, ensuring a structured documentation process. This standardized approach simplifies data collection for the assessment committee, facilitating a comprehensive review of assessment results across courses.

3.2.5 Course Report

Course reports offer a thorough analysis of each course, addressing key aspects such as student performance, grade distribution, insights on student grades, CLOs, and the results of CLO assessments. Additionally, they include recommendations for improvement, topics that were not covered, and, if needed, a course improvement plan. This comprehensive documentation provides valuable insights into the effectiveness of course delivery and assessment, helping to identify both strengths and areas of improvement. By systematically reviewing these reports, instructors and administrators can implement the action plan to enhance the overall quality of the program.

3.2.6 PLO Assessment Report

The PLO assessment report functions as a tool for data aggregation, serving as the program-level evaluation of PLOs. This comprehensive report consolidates information from individual course assessments to provide a clear picture of the overall attainment of PLOs. It helps identify strengths and areas for improvement, offering valuable insights into the program's effectiveness in meeting its learning objectives. By reviewing this report, faculty and administrators can make informed decisions to enhance the program and ensure continuous improvement in student outcomes.

3.2.7 Maear Plus Platform

The Maear Plus Platform is an integrated digital system to streamline the process of academic course reporting. Designed for both course coordinators and faculty members, the platform facilitates the structured preparation, review, and approval of course reports, contributing to the broader goal of closing the academic quality loop. It supports accurate documentation of course descriptions, teaching strategies, assessment methods, and student performance data.
One of the platform's key features is its focus on aligning CLOs with PLOs. Faculty members are required to report actual student performance for each CLO, compare it with target benchmarks, and reflect on whether the learning outcomes were achieved. The platform also provides structured fields for commenting on CLO achievement levels, suggesting improvements, and linking these insights to broader PLO attainment. This ensures coherence between course-level instruction and program-level goals, supporting continuous curriculum development and accreditation readiness. Maear Plus enhances transparency, consistency, and accountability in academic reporting, making it an essential tool for quality assurance in the department.

3.2.8 Annual Program Report

The annual program report consolidates data and evaluations to offer a comprehensive overview of the program's performance throughout the academic year. It includes various assessments, such as the program learning outcomes evaluation based on the PLO assessment plan, course evaluations, student feedback on program quality, and reports on scientific research and innovation during the year. The report also covers community partnerships, other relevant evaluations, program key performance indicators (KPIs), challenges faced, and a development plan for the program. This thorough documentation ensures that the program

remains dynamic and responsive, continually evolving to meet both academic and industry standards.

3.2.9 Improvement Plan

These reports track the implementation of operational plan initiatives, improvement plans from different components such as KPIs report, PLO assessment report, surveys analysis report, etc. Regular follow-up ensures that the plans are executed, and necessary adjustments are made promptly.

3.2.10 Surveys Analysis Reports

Surveys analysis a crucial role in collecting input from students, faculty, alumni, and employers to assess the effectiveness of the program. The gathered insights are systematically analyzed to generate detailed reports that highlight both strengths and areas for improvement. These reports serve as a basis for developing targeted action plans aimed at enhancing student experiences, aligning the curriculum with industry demands, and improving overall program quality. By integrating stakeholder feedback into continuous improvement efforts, the program ensures its long-term relevance and strengthens its reputation for producing successful graduates.

3.2.11 Key Performance Indicators (KPIs) Reports

Key Performance Indicators (KPIs) are critical metrics for assessing the program's performance against predefined targets, internal benchmarks, and external standards. These indicators encompass various aspects, ***NCAAA Program KPIs*** such as student learning experiences measured through course evaluations, program completion rates, and first-year student retention.

3.2.12 Self-Study Report

The Self-Study Report (SSR) is a comprehensive self-assessment of the Master of Engineering Management, designed to evaluate its strengths and weaknesses in relation to accreditation standards set by Accreditation agencies such as NCAAA and ABET. It provides a detailed analysis of how the program's mission, goals, curriculum, learning outcomes, and assessment methods collectively ensure a high-quality educational experience aligned with best practices in engineering education. By incorporating evidence-based data on student achievement,

faculty qualifications, and program processes, the SSR promotes transparency and accountability. This thorough evaluation enables NCAAA and ABET to assess the program's effectiveness in meeting its objectives and its dedication to continuous improvement.

3.3 Approval of adjustments or modifications

The approval of adjustments or modifications of any component in the program must adhere to the authority matrix presented in Table 6.

Table 6: The approval levels of modifications that take place within the University of Tabuk.

Intended curriculum changes	Final Level of Approval
Program Level	
Changes including a program's mission, objectives, title, program length (total number of years/levels/ hours), program learning outcomes, program specifications, study plan, and adding co-requisites or prerequisites	UT Standing committee of programs and study plans
Changes in ordering of PLOs, program KPIs, course code	Department Council & Faculty Council
Change in the facilities, operational plan, dropping program co-requisites or pre-requisites	Faculty Council
Course Level	
Changes in the title, credit hours, length of period for teaching, timing in the program plan, update of course specification affecting >25% of CLOs, language of teaching	Standing committee of programs and study plans in UT
Changes in course policies and regulations	Faculty council
Course teaching strategies, <25% change in CLOs, textbooks, reference materials, updates in Engineering knowledge in related topics, distribution of topics/weeks, methods for assessment; measurement and evaluation grading systems.	Department Council

3.4 The Engineering Management Program Review Cycles:

The Engineering Management Program goes through annual and comprehensive (once in three year) review cycles to make continuous improvement within the program. Figure 3 shows the program review cycle of the Engineering Management Program.

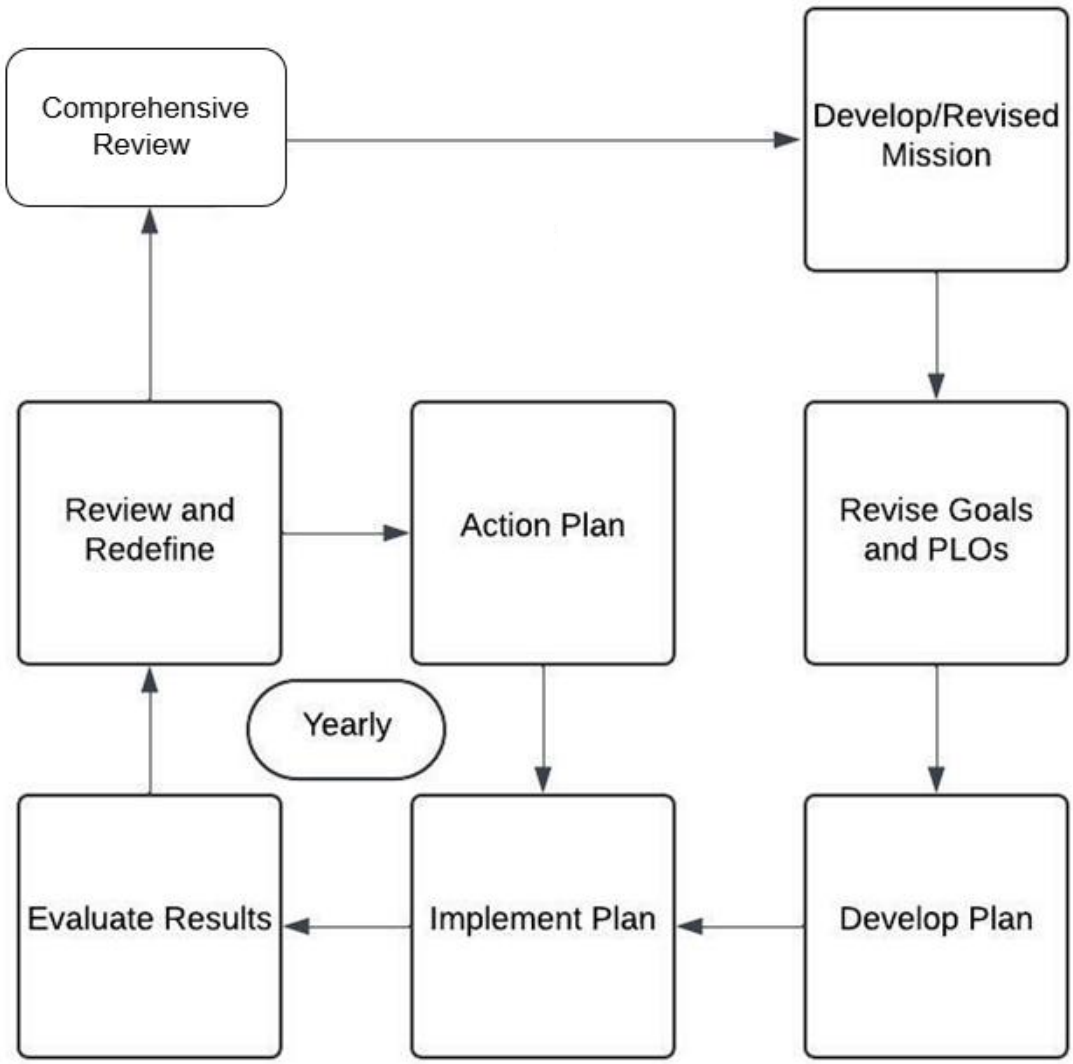

Figure 3: Engineering Management Program Review Cycles.

3.4.1 Annual Review Cycle

The annual program review is a key process in the Engineering Management Program to ensure continuous improvement and uphold academic excellence. The Engineering Management Program follows a structured approach to its annual review, ensuring quality through defined time frames and procedures. This cycle focuses on the regular monitoring and evaluation of KPIs, learning outcomes, and other essential metrics on a yearly basis. The annual review involves collecting data from course reports and surveys of students, graduates, faculty, staff, and employer are collected, analyzed, and documented. These data points are analyzed to identify trends, areas of success, and opportunities for improvement. The insights gathered from the annual review play a crucial role in shaping short-term action plans designed to address immediate concerns and strengthen the program's overall quality. These action plans focus on targeted improvements in curriculum, student support, faculty development, and resource allocation. By responding proactively to identify challenges, the program ensures continuous enhancement and alignment with academic and industry standards. This iterative approach fosters adaptability and sustained growth, ultimately benefiting students, faculty, and stakeholders.

It supports developing plans aligned with the program's mission and objectives, executing operations, and using data and activities to evaluate performance. The outcome is a periodic review and development of improvement plans to continually meet the program's mission and objectives. At the end of the year, the program chair submits the report to the Vice Dean of Postgraduate studies and Development, who ensures it meets the standards of the University of Tabuk and the NCAAA. Tables 7 and 8 show the quality assurance activities and time frame at the program level as well as the roles and responsibilities.

Table 7: The quality assurance procedures at the course and program levels.

Activity Name	End of Course	Annually	Responsibility
Course Evaluation Survey	√		Course coordinator & Course Instructor
Course Report finalization	√		Course coordinator
Course Binder preparation	√		Course coordinator & Course Instructor

Students' Evaluation of Quality of Learning Experience in the Program Survey		√	Development and Quality Committee
Evaluation of Vision, Mission, Program Objectives (POs), Curriculum, and Program Learning Outcomes Survey		√	Development and Quality Committee
Satisfaction of beneficiaries with the learning resources Survey		√	Development and Quality Committee
Employers' evaluation of the program graduates' proficiency Survey		√	Development and Quality Committee
Students' evaluation of the quality of the courses Survey		√	Development and Quality Committee
Students' satisfaction with the offered services Survey		√	Development and Quality Committee
Operational Plan report		√	Development and Quality Committee
KPI Analysis Report Preparation		√	Development and Quality Committee
Annual Program Report Preparation		√	Development and Quality Committee
Annual Program Report Revision		√	Deanship of Quality and Academic Accreditation (D Q&A)
APR and Course Reports Approval		√	Department Council
Actions Plan Preparation and Distribution		√	Development and Quality Committee
Actions Plan Execution Assessment		√	Department Council

Table 8: Time Frame of Program Evaluation

Activity Name	Monthly	Start of the Course	End of the Course/ Semester	Annually	Every 3 years
Units and committee meetings	√				
Departmental council meetings	√				
Faculty council Meeting	√				
Course Binders			√		
Course Evaluation Surveys			√		
Course Reports			√		
Teaching/training Plan and Schedules			√	√	
Exit Surveys				√	
Program KPI Report and Analysis				√	
Operational plan Report and Analysis				√	
Stakeholders' surveys Report and Analysis				√	

PLOs measurement, analysis, report finalization				√	
APR & the Improvement Plan				√	
Course reports and APR Revision/ Recommendation by Deanship of D&Q				√	
Improvement Plan Execution Assessment				√	
Advisory committee meetings and recommendations				√	
Program Self-Assessment Report (SSR)					√
Review of Program & course Specifications and PLOs and study plan					√
Program mission, goals, and operational plan					√
Program SWOT Analysis Preparation and Reporting					√

3.4.2 Comprehensive Review

The program conducts a comprehensive periodic assessment every three years after the completion of the program cycle and reports on the overall level of quality, identifying strengths and weaknesses. Plans for improvement, and follow-up on their implementation. This assessment includes all aspects of the Engineering Management Program, including the study plan, program learning outcomes, academic policies and procedures based on changes and stakeholder proposals.

The program conducts continuous quality audit and control based on the results of stakeholder surveys, operational plan reports and Advisory Committee recommendations and in accordance with the updated forms of the NQF while adhering to the authority matrix approved by the University. In parallel with the updating of the university strategic plan, the program revises its mission and goal every three years to ensure consistency with the faculty and university mission and goals and updates its operational plan. In order to maintain the quality of the Master of Engineering Management Program a self-evaluation of the program must be conducted every three years to ensure that it remains in compliance with the requirements for recertification. The self-evaluation process involves stepping back from the ongoing process and reviewing all areas of the program based on current developments over a specified period.

3.5 Responsibilities of Permanent Committees for each criterion of NCAAA

The responsibilities for the data collection and analysis and documentation are assigned to the respective departmental committees as shown in Table 9.

Table 9: Academic Accreditation Committees responsibilities.

Criteria No.	Description	Responsibility
1-1	**Program Management**	
1-1-1	The program's mission and goals are consistent with the mission of the institution/college and guide all its operations and activities.	Academic Affairs Committee
1-1-2	The program has a sufficient number of qualified staff members to perform its administrative, professional, and technical tasks with defined functions and powers. *	Academic Affairs Committee
1-1-3	The program provides an organizational climate and a supportive academic environment.	Academic Affairs Committee

1-1-4	The program management monitors the achievement of its goals and actions for improvement.	Academic Affairs Committee
1-1-5	The program management applies mechanisms ensuring integrity, fairness, and equality in all its academic and administrative practices, as well as between the male and female student sections and branches (if any).	Development and Quality Committee
1-1-6	The program builds on the views of professionals and experts in the program specialization, contributing to its evaluation, development, and performance improvement.	Academic Affairs Committee
1-1-7	The program management provides reliable and publicly disclosed information to the community about the program description, performance, and achievements that suit the needs of the stakeholders.	Industry & Community Engagement Committee
1-1-8	The program management is committed to activating the values of scientific integrity, intellectual property rights, rules of ethical practices, and proper conduct in all academic, research, administrative, and service fields and activities. *	Scientific Committee
1-1-9	The program management applies the systems, regulations, and procedures the institution/college approves, including those related to grievances, complaints, and disciplinary cases.	Academic Affairs Committee
1-2	**Program Quality Assurance**	
1-2-1	The program management implements an effective quality assurance and management system that is consistent with the institution's quality system.	Development and Quality Committee
1-2-2	The program analyzes the key performance indicators and the evaluation data annually and its results to be used in planning, development, and decision-making processes. *	Academic Affairs Committee
1-2-3	The program conducts a periodic, comprehensive evaluation, prepares improvement plans, and follows up on its implementation.	Academic Affairs Committee
2-1	Learning Outcomes	

2-1-1	The program identifies its intended learning outcomes that are consistent with its mission and the graduate attributes at the institutional level, which should be approved, publicly disclosed, and periodically reviewed.	Program and Study Plan Committee
2-1-2	The learning outcomes are consistent with the requirements of the National Qualifications Framework and labor market needs. *	Program and Study Plan Committee
2-1-3	The program identifies the learning outcomes for the different tracks (if any).	Program and Study Plan Committee
2-1-4	The program applies appropriate mechanisms and tools for measuring the learning outcomes and verifying their achievement according to specific performance levels and assessment plans. *	Program and Study Plan Committee
2-1-5	The program implements a clear and approved teaching, learning, and evaluation strategy that articulates its educational philosophy and ensures that the program's intended learning outcomes are achieved.	Program and Study Plan Committee
2-2	**Curriculum**	
2-2-1	The curriculum design considers fulfilling the program goals and learning outcomes and the educational, scientific, technical, and professional developments in the specialization field; it should be periodically reviewed. *	Program and Study Plan Committee
2-2-2	The study plan ensures the balance between the general and specialty requirements and between theoretical and applied aspects, and it considers the courses' sequencing and integration. *	Program and Study Plan Committee
2-2-3	The learning outcomes in the courses are aligned with the program learning outcomes (e.g., Matrix for aligning the learning outcomes of the courses with program learning outcomes).	Program and Study Plan Committee

2-2-4	The program ensures a unified application of its study plan and the program and the course specifications offered at more than one location (sections of male and female students). *	Program and Study Plan Committee
2-3	**Quality of Teaching and Students' Assessment**	
2-3-1	The program monitors the commitment of the teaching staff to the learning and teaching strategies and assessment methods included in the program and course specifications by specific mechanisms. *	Academic Affairs Committee
2-3-2	The program's teaching and learning strategies and assessment methods vary based on its nature and level and should be aligned with the program's learning outcomes.	Program and Study Plan Committee
2-3-3	The required training is provided for the teaching staff on learning and teaching strategies and assessment methods identified in the program and course specifications, along with the effective use of modern and advanced technology; their use is monitored.	Academic Affairs Committee
2-3-4	At the beginning of each course, students are provided with comprehensive information about the course, including learning outcomes, teaching and learning strategies, and assessment methods and dates, as well as what is expected from them during the study of the course and feedback on their performance is provided for them.	Program and Study Plan Committee
2-3-5	The program applies mechanisms to support and motivate excellence in teaching and encourages creativity and innovation of the teaching staff.	Academic Affairs Committee
2-3-6	The program implements clear and publicized procedures to verify the quality and validity of the assessment methods and ensure the students' achievement levels.	Development and Quality Committee

2-3-7	Effective procedures are used to control academic integrity at the program level to ensure that the works and assignments of students are of their output. *	Academic Affairs Committee
3-0-1	The program applies approved and disclosed criteria and requirements for the admission, registration, and graduation of students, the transition to another program, and the equivalent of what students have previously learned, commensurate with the nature of the program, and are applied fairly.	Academic Affairs Committee
3-0-2	The program provides essential information to students, such as study requirements, services, and financial fees (if any), through various means.	Academic Affairs Committee
3-0-3	Students are provided with effective academic, professional, psychological, and social guidance and counseling services through qualified and sufficient staff. *	Academic Advising Committee
3-0-4	Mechanisms are applied to identify gifted, creative, talented, and underachieving students in the program, and appropriate programs are available to care for, motivate, and support each group of them.	Academic Advising Committee
3-0-5	The program implements an effective mechanism to communicate with its alumni and involve them in its events and activities, explore their views, and benefit from their expertise and support; and also provides updated and comprehensive databases about them.	Industry & Community Engagement Committee
3-0-6	Effective mechanisms are applied to evaluate the adequacy and quality of services provided to students and measure their satisfaction with them, and the results are used for improvement. *	Development and Quality Committee
4-0-1	The program has adequate faculty members at all campuses where it is offered, and appropriate verification mechanisms are applied. *	Academic Affairs Committee
4-0-2	The teaching and adjunct staff in the professional programs include some experienced and highly skilled professionals in the program field.	Academic Affairs Committee
4-0-3	The teaching staff participates in academic, research, and scientific production activities efficiently and regularly, and their participation in these activities is	Program Chair

	considered one of the criteria for evaluation and promotion.	
4-0-4	Teaching staff participate in community partnership activities, and their participation in these activities is considered one of the criteria for evaluation and promotion.	Industry & Community Engagement Committee
4-0-5	The teaching staff participate in professional and academic development programs per a plan that meets their needs and contributes to their performance development.	Program chair
4-0-6	The performance of the teaching staff is regularly assessed according to specific and published criteria; feedback is provided to them, and the results are used to improve the performance.	Scientific Committee
5-0-1	The program ensures the adequacy and appropriateness of learning sources and services provided per its needs and student numbers and updates them periodically.	Program and Study Plan Committee
5-0-2	The program's teaching staff, students, and employees have the appropriate orientation, technical training, and support for the effective use of resources and means of learning.	Program Chair
5-0-3	Safety, environmental conservation, and hazardous waste disposal standards are applied efficiently and effectively, with all public and occupational health and safety requirements available in facilities and equipment, as well as educational and research activities. *	Laboratory, Facilities and Equipment Committee
5-0-4	The program has the appropriate technologies, services, and environment for courses offered through distance or e-learning according to their own specific standards.	Program chair
5-0-5	The program evaluates the effectiveness and efficiency of all types of learning resources, facilities, and equipment; the results are used for improvement.	Program and Study Plan Committee
6-0-1	The program follows the rates of its research activity in line with its role in the institutional research plan	Scientific Committee

	according to clear and specific performance indicators and works to develop its performance. *	
6-0-2	The program identifies research priorities in line with the institution's mission, national trends, and development plans.	Scientific Committee
6-0-3	A supportive and encouraging environment, financial support, and equipment for research activities are available in the program.	Scientific Committee
6-0-4	The program applies various mechanisms for developing its employees' research and dissemination skills, exchanges experiences and research results, and develops and improves such mechanisms.	Scientific Committee
6-0-5	The program applies various mechanisms to generate funding for research activities from donors and investment entities.	Scientific Committee
6-0-6	Specific academic and administrative procedures for approving scientific thesis and research projects are applied in the program within an appropriate time frame.	Scientific Committee
6-0-7	The program has clear, publicized, and available instructions and guidelines for preparing and evaluating research, thesis, and projects.	Scientific Committee
6-0-8	The program applies specific mechanisms to monitor the efficiency of academic supervision of thesis, research, and projects, and such mechanisms are evaluated and developed.	Scientific Committee
6-0-9	The program monitors the fairness, objectivity, and credibility of research evaluation and discussion of scientific thesis and their approval.	Scientific Committee
6-0-10	The program verifies the originality of research, knowledge enrichment, and innovation in its research activities in accordance with the level of qualification and international standards.	Scientific Committee
6-0-11	The program implements clear policies of ethics and regulations of research and verifies researchers' commitment to them according to appropriate mechanisms and develops them. *	Scientific Committee

4 Comprehensive Procedures for Quality Management Scheme

A Quality Management Scheme (QMS) ensures that a program maintains a consistent standard of quality, student services, and operational processes. This section outlines the comprehensive procedures for implementing effective QMS in an academic setting.

4.1 Misson and Goals Development and Modification

The mission statements and goals clearly provide a view of why the Engineering Management Program exists, where it wants to be, and they create a target for the operational planning of the program. The mission and goals of the Engineering Management Program were developed to motivate the efforts of the students, faculty members and all stakeholders and provide them with a clear direction to the future state of the program. The Engineering Management Program mission and goals are widely circulated among internal and external stakeholders to provide them with a clear direction to the future state of the program. The development procedure of Mission and program goals is as follows:

1. **Formation of Development and Quality Committee:** The committee for Mission development comprising representatives from the program is formed, and the head of the committee is appointed.

2. **Conduct internal and external analysis:**

a. SWOT Analysis: thorough analysis of the internal strengths, weaknesses, opportunities, and threats (SWOT) of the academic program is done by the committee.

b. Market Analysis: Analyze the market relevant to the program. Identify trends, emerging needs, and potential opportunities. Assess the competitive landscape and benchmark against similar programs to identify unique selling propositions and differentiation factors.

c. Stakeholder Analysis: The mission and goals working group conducts a workshop with stake holders (Students, Alumni, Employers, Faculty members, administrative staff) to understand their needs, expectations, and aspirations related to the program, and to gather their inputs and insights.

3. Draft Mission Statement: Based on the information gathered and analysis conducted, a preliminary mission statement and program goals have been drafted. The mission and goals working ensures alignment with the UT's mission and strategic priorities. Also, the mission statement should capture the program's unique contributions and aspirations.

4. Seek Feedback and Revision: The draft mission statement and goals with stakeholders, seeking their feedback, suggestions, and revisions.

5. Refine and Finalize: Based on the feedback, refine the mission statement to ensure it accurately represents the program's identity, purpose, and values. Ensure that the mission complies with specifications outlines previously.

6. Develop program Goals:

After finalizing the mission statement, the Development and Quality Committee identifies the specific goals that the IE intends to achieve in alignment with its mission.

- Ensure that the goals are measurable, achievable, relevant, and time-bound (SMART).
- Consider the Engineering Management Program's unique strengths, student needs, and evolving industry expectations.

7. Seek Feedback and Revision: The Development and Quality Committee shares the draft program goals with faculty, staff, and other relevant stakeholders for feedback and suggestions to refine the program goals.

8. Refine and Finalize Program Goals: Based on the feedback received, revise and refine the program goals to ensure they align with the program's mission, address student needs, and reflect current trends in the relevant field. Submit the finalized mission and goals to the program chair.

9. Approval from Relevant Authorities: The finalized mission statement and goals to the departmental council presented for approval. After the approval by the departmental council, the mission statement and goals go through the approval process according to the authority matric shown in table 4. At any stage of approval suggestions for further refinement of the mission and goals are carried out by the Development and Quality Committee.

10. Communicate Approved Mission and Goals: The Development and Quality Committee shares the approved mission statement and program goals with all relevant stakeholders, including faculty, students, staff, and external accrediting bodies. Ensure that everyone involved in the program is aware of the approved mission and goals and their significance for program direction and decision-making.

4.2 Program Learning Outcomes Development and Modification

Program learning outcomes statements are broad statements that describe the knowledge, skills, and abilities that students are expected to acquire upon completion of a program of study. These statements provide an overview of the overarching goals and outcomes of the program. The procedure for Program Learning Outcomes development and modification are as follows:

Assign responsibilities: The Programs and Study Plans Committee (PSPC) is responsible of overseeing the entire process for developing, modifying and approving the PLOs, and ensure collaboration and representation from different perspectives.

Collect Data: The PSPC review the following:

- The program mission, goals.
- The previous PLOs.
- The NQF requirements for the relevant level.
- Benchmark national and international programs.
- The UT manual for programs and study plans.
- The new development in IE and its applications.

Conduct Needs Assessment: The Programs and study plans committee conduct a thorough needs assessment to:

- Identify the knowledge, skills, and competencies required for success in the program's field or discipline
- Review industry trends, professional standards, labour market demands and peer programs.

Draft the PLOs: Based on the conducted review and needs assessment, the PSPC articulate the first draft of the PLOs that are aligned with the learning activities, teaching strategies, and assessment methods.

Share with the department council: To ensure that the PLOs aligns with program mission, goals, the NQF requirements as well as stakeholders' expectations, the PSPC present the graduates attributes at the department council seeking their input and feedback to ensure their support. Based on the feedback from faculty members the PSPC revise and refine the PLOs.

Seek Stakeholder Feedback and Revision: The PSPC share the revised draft of the PLOs with the advisory committee and stakeholders, seeking their feedback and suggestions. Based

on the feedback from the advisory committee members and stakeholders the PSPC revise and refine the PLOs.

Feedback and Revision: The Program chair submits the revised draft of the PLOs to the faculty's programs and study plans committee, seeking their feedback and suggestions. Based on the feedback from the faculty's programs and study plans committee the PSPC revise and refine the PLOs. The revised draft will then be submitted to the FOS council, seeking their feedback and suggestions. Based on the feedback from faculty council the PSPC revise and refine the PLOs.

Seek UT Feedback and Revision: The revised draft of the study plan will then be submitted through UT's Bena electronic gate to the UT's deanship of academic affairs. The study plan will go through internal review by the deanship of academic affairs as well as an external reviewer. Based on the feedback from the deanship of academic affairs and the external reviewer the PSPC revise and refine the PLOs.

Obtain Approval: The final draft of the PLOs will then be approved by the department and faculty councils and submitted to the deanship of academic affairs for approval.

Communicate Approved PLOs: The approved PLOs is publicized to all stakeholders and included in the program specification as well as the departmental handbooks and website.

4.3 Program Study Plan Development and Modification

The Engineering Management Program has a detailed study plan showing the courses, their classification, their sequence, the number of accredited hours, their pre/corequisites, the classification of courses; required, elective and university/ college/department requirement. The study plan ensures the balance between the general and specialty requirements, and between theoretical and skill aspects; and it considers the sequencing and integration of the courses. The program study plan considers the adequate requirements in accordance with international practices and similar programs. The procedure for Program Study Plan development and modification are:

Assign tasks: The Program and Study Plan Committee (PSPC) is responsible of overseeing the entire process for developing, modifying, follow up on the approval the study plan, and ensure collaboration and representation from different stakeholders

Needs Assessment: The Program and study plan committee conduct a thorough needs assessment to:

- Identify the purpose of the study plan and the target audience.
- Conduct a needs assessment by analysing factors such as program requirements, industry trends, student interests, and feedback.
- Set clear goals and objectives for the study plan, aligning them with the program's mission and intended learning outcomes.

Curriculum Design and Course Selection: In designing the curriculum and identifying courses the Programs and study plans committee perform the following:

1. Review and analyse of the program's curriculum guidelines, accreditation requirements, and regulatory standards.
2. Determine the core courses, prerequisites, and elective options based on the program's objectives and the needs of the students.
3. Consider the logical sequencing of courses, ensuring a progressive development of knowledge and skills.
4. Explore opportunities for specialization or concentration areas within the study plan.

Share with the department council: To ensure that the study plan is comprehensive, actionable, and aligned with the program's objectives, the PSPC present the study to the department council seeking their input and feedback to ensure their support. Based on the feedback from faculty members the PSPC revise and refine the study plan.

Feedback and Revision: The PSPC share the revised draft of the study plan with the Advisory committee and stakeholders, seeking their feedback and suggestions. Based on the feedback from the Advisory committee members the PSPC revise and refine the study plan for the second time.

FOE's Feedback and Revision: The Program Chair submits the revised draft of the study plan to the FOE's Programs and study plans committee, seeking their feedback and suggestions. Based on the feedback from the FOE's Programs and study plans committee the PSPC revise and refine the study plan. The final revised draft will then be submitted to the FOE council, seeking their feedback and suggestions. Based on the feedback from faculty council the PSPC revise and refine the study plan.

UT Feedback and Revision: The final draft of the study plan will then be submitted to the UT's deanship of academic affairs. The study plan will then go through internal review by the deanship of academic affairs as well as an external reviewer. Based on the feedback from the

deanship of academic affairs and the external reviewer the PSPC revise and refine the study plan.

Obtain Approval: The final draft of the study plan will then be submitted to the deanship of academic affairs for approval.

Communicate Approved Study Plan: The approved study plan is publicized to all stakeholders and included in the program specification as well as the departmental handbooks and website.

4.4 Course Learning Outcomes Development and Modification

Course learning outcome statements provide a clear indication of the knowledge, skills, and abilities that students are expected to acquire or demonstrate by the end of the course. They serve as a guide for instructors and students, setting expectations and providing a framework for learning and assessment. Procedure for the development and modification of course learning outcomes:

Assign tasks: The PSPC holds a workshop to train faculty members in writing CLOs.

Collect Data and Review: The course coordinators review the following:

- The program mission, goals, PLOs and graduate attributes,
- The NQF requirement for the relevant level.
- The curriculum framework.
- The program's target audience, such as students' backgrounds, prior knowledge, and intended career paths.
- Benchmark national and international programs.
- The UT manual for programs and study plans.
- The new development in EM and its applications.

Conduct Needs Assessment: The course coordinators conduct a thorough needs assessment to identify the knowledge, skills, and competencies required for success in the program's field or discipline, and review industry trends, professional standards, labor market demands and peer programs.

Draft the CLOs: Based on the conducted review and needs assessment, the course coordinators articulate the first draft of the CLOs that are aligned with the learning activities, teaching strategies, and assessment methods, and submit them to the programs and study plans committee for review. Feedback from the SPSC is carried out by the course coordinators.

Stakeholder Feedback and Revision: The PSPC shares the revised draft of the PLOs together with the matrices of alignment of the CLOs with the PLOs as well as the teaching strategies and assessment methods, with the advisory committee and stakeholders, seeking their feedback and suggestions. Based on the feedback from the advisory committee members and stakeholders the course coordinators revise and refine the CLOs.

Share with the department council: The PSPC presents the revised CLOs and the alignment matrices at the department council seeking their input and feedback to ensure their support. Based on the feedback from faculty members the course coordinators revise and refine the CLOs.

Obtain Approval: The revised CLOs and the alignment matrices will then be submitted to the department and faculty councils for approval, and then to the UT's standing committee for programs and study plans for final approval. Audit report from the UT's standing committee for programs and study plans will be submitted to the program for further refinement. At any stage of the approval process, course coordinators are responsible of carrying out the recommended adjustments. The final draft of the CLOs and the alignment matrices will be submitted to the UT's standing committee for programs and study plans final approval.

Communicate Approved CLOs: The approved CLOs is publicized to all stakeholders, and included in the course's specifications, and all relevant guides.

4.5 Course Specification Development and Modification

The procedure for the development and modification of Course Specification as follows:

1. The PSPC is accountable for establishing a well-defined implementation timeline and ensuring the collection and upload of all relevant input documents to the department's electronic cloud. This facilitates the dissemination of information to all stakeholders involved in specifying requirements.
2. The PSPC organizes a training workshop aimed at providing clarity on how to complete the NCAAA course specification forms.
3. The course coordinators, appointed by the department council, carefully assess the inputs and develop a comprehensive description of the assigned course coordination.
4. The course coordinators complete the NCAAA course specification forms, with the option to modify or enhance the specifications.
5. If the necessary modifications to the specifications are not significant, they are presented to the department council for approval, following the program modification authority matrix.

6. If the modifications involve course changes or the addition of a new course, they are presented to the advisory committee for their input.
7. The course descriptions are revised based on the feedback received and then presented again to the department council.
8. Subsequently, the descriptions are submitted to the faculty's programs and plans committee for review.
9. The course specifications are adjusted based on the feedback provided by the Faculty's Programs and Plans Committee.
10. Once approved by the committee, the course specifications will be submitted to the faculty council for final approval.
11. After that, the course specifications will be forwarded to the University Vice Deanship for Academic Affairs.
12. The Vice Deanship for Academic Affairs reviews the course specifications and submits them to an external reviewer for further refinement.
13. Feedback from the Vice Deanship for Academic Affairs is shared with the Engineering Management Program to carry out the recommended modifications.
14. The course coordinators revise the course specifications in accordance with the feedback provided.
15. The revised course specifications are then approved by the department council.
16. Subsequently, they are submitted to the faculty council for approval.
17. Finally, the course specifications are submitted to the Vice Dean for Academic Affairs at the university to complete the necessary approval procedures. This process includes incorporating the modified study plan and integrating it into the admission and registration system.

4.6 Students Assessments procedure

The Students Assessments procedure are as follows:

1. Before the exam the academic affairs committee sends the exam blueprint to the course coordinators.
2. The Program Chair holds a meeting with the course instructors to determine the format of the exam, duration, number of questions, weightage, and any specific rules or policies to be followed during the exam and select appropriate exam questions that align with the

exam blueprint, course content, and learning objectives as well as level of difficulty, cognitive skills to be assessed.

3. The academic affairs committee holds meetings with course instructors, and review exams to ensure clarity, accuracy, and alignment with the course content and objectives, adherence to the policy of questions distribution over learning domains, and the adherence to the blueprint of the exam. The academic affairs committee shares feedback with the course instructors.
4. After the primary grader completes grading the exams, a sample of graded exams will be crossed checked by a faculty member who taught the same course before. The cross-checker verifies the accuracy and consistency of the primary grader's assessments. The primary grader and cross-checker engage in discussion and collaboration to address any discrepancies or disagreements. If necessary, they seek input from the subject matter experts. After discussion and consensus, the primary grader and cross-checker finalize the grades.
5. The finalized students' grades are entered in the departmental drive for the program chair for approval.
6. Further, the results are approved by the vice-dean and the grades are uploaded on the online portal (i.e. myUT portal) by the course instructor and are released to the students on their UT student's accounts.
7. Student is allowed to submit a formal request for a grading revision to the chairman of academic affairs committee. The chairman of academic affairs committee assigns a designated independent reviewer, to assess the complaint objectively. If necessary, the designated person consults with the original grader or instructor to discuss the grading decision.
8. The student request and the reviewer report are communicated to the Program Chair. If the complaint is valid and program chair, contact the primary grader to adjust the grade on the online portal accordingly. If the original grading decision was appropriate, a detailed explanation is provided to the student, addressing their concerns.
9. After the exams the examinations committee identifies areas for improvement in the exam design, content, or administration, and makes necessary adjustments for future exams or courses.
10. Course instructors are responsible for preparing course reports and submit it together with samples of students' work to the DQC.

11. The CLOs are measured by the course coordinator using an excel sheet designed by the measurement and evaluation coordinator where each CLOs is aligned with its relevant PLOs and hence the aligned PLOs can be measured accordingly.
12. The DQC follows up the preparation of course reports and all related evidence of students' work with instructors and course coordinators.
13. Based on the course reports, DQC prepares a list of recommendations and action plans for further improvements.
14. The final draft of course reports together with the list of recommendations and action plans for improvements are submitted to the Program Chair.
15. The DQC presents the final draft of course reports, the recommendations and action plans to the departmental council for discussion and approval.

4.7 Program Leaning Outcomes Assessments

The PLO Assessments Procedure are as follows:

1. DQC is responsible for the whole process of measuring and reporting on the PLOs.
2. Engineering Management Program PLOs are measured annually directly through measuring the achievement of the related CLOs in the courses in which practice (P) and mastery level (M) is achieved, as identified in the PLOs-courses mapping matrix.
3. Rubrics are used to assess complex or subjective learning outcomes, such as skills related to communication, teamwork, ethics, critical thinking, and lifelong learning, which are not easily measured through traditional exams
4. Engineering Management Program PLOs are measured annually indirectly using the Student Exit Survey and employer survey.
5. The CLOs are measured by the course coordinator using an excel sheet designed by the measurement and evaluation coordinator where each CLOs is aligned with its relevant PLOs and hence the aligned PLOs can be measured accordingly.
6. The PLO achievement is measured as per the set target. If the PLO is achieved, then DQC in consultation with the department council either set the new target or keep it same for the next academic year to make a sustainable improvement.
7. The program relies on both direct and indirect methods to measure the program learning outcomes. The direct assessment is based on the results of written exams conducted by students, as well as the use of rubrics to evaluate student activities. On the other hand, the indirect assessment using Student Exit Survey. Additionally, measurement indicators are

determined, and target values are set for each outcome based on the measurement results from previous semesters.

4.7.1 Closing the Loop

The final step in the PLOs assessment plan is to develop proposals for appropriate improvement plans to improve students learning and guide the program to make the right decisions regarding:

- Revising the teaching and learning strategies and their alignment with the PLOs.
- Revising the courses assessments methods and their alignment with the PLOs.
- Revising the Program curriculum (after finishing the program cycle).

These decisions will then be considered in the program development plan and presented in the annual program report. Priorities for improvements will then be decided on and followed up through the action plans in order to close the quality loop. Figure 4 shows the PLOs assessment method, while Table 10 presents the PLOs assessment plan.

Figure 4: PLO Assessment Method

Table 10: The PLOs assessment plan.

PLOs		Direct Assessment	Indirect Assessment	Target Benchmark	Responsibility	Time of Assessment
Knowledge and Understanding						
K1	An ability to demonstrate deep and advanced knowledge of engineering management concepts, techniques, and recent developments	Exam Assignments	Students Survey, Exit Survey	80%	For Courses: Faculty members; For the Research project: Supervisor; For the Surveys: Development and Quality committee	Annually
Skills						
S1	An ability to identify, formulate, and solve complex and advanced problems by applying advanced knowledge of engineering, science, and mathematics.	Exam Assignments	Students Survey, Exit Survey	80%	For Courses: Faculty members; For the Research project: Supervisor; For the Surveys: Development and Quality committee	Annually

S2	An ability to design an innovative engineering solution that meets specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors, while complying with relevant standards and design codes.	Exam Assignments	Students Survey, Exit Survey	75%	For Courses: Faculty members; For the Research project: Supervisor; For the Surveys: Development and Quality committee	Annually
S3	An ability to develop and conduct advanced research or experimentation using specialized methodologie	Assignments, Project	Students Survey, Exit Survey	80%	For Courses: Faculty members; For the Research project: Supervisor; For the Surveys: Development	Annually

	s; and critically analyze data to generate valid, insightful conclusions relevant to industrial practice.				and Quality committee	
S4	An ability to communicate effectively in various forms to disseminate engineering knowledge, research results, and innovations to a range of audiences	Assignments, Projects	Students Survey, Exit Survey	80%	For Courses: Faculty members; For the Research project: Supervisor; For the Surveys: Development and Quality committee	Annually
S5	Create, select, use, and adapt advanced digital technology and ICT tools to support and enhance leading	Assignment, Project	Students Survey, Exit Survey	80%	For Courses: Faculty members; For the Research project: Supervisor; For the Surveys: Development and Quality committee	Annually

	research and/or projects related to discipline, professional practice with understanding of the limitations.					
S6	An ability to Identify and evaluate the issues and constraints of sustainability, economy, environment, politics, health and safety, and society that are relevant to professional solving of complex engineering problems.	Assignments, Project	Students Survey, Exit Survey	80%	For Courses: Faculty members; For the Research project: Supervisor; For the Surveys: Development and Quality committee	Annually
Values						
V1	An ability to recognize	Assignments, Projects	Students Survey, Exit Survey	80%	For Courses: Faculty members; For	Annually

	ethical and professional responsibilities in engineering solutions and uphold academic and professional ethics, and norms of engineering and make informed judgements.				the Research project: Supervisor; For the Surveys: Development and Quality committee	
V2	An ability to collaborate and provide leadership on a team, preferably in a multidisciplinary setting, to manage and execute complex tasks, projects, or research with a high level of autonomy	Assignments, Projects	Students Survey, Exit Survey	80%	For Courses: Faculty members; For the Research project: Supervisor; For the Surveys: Development and Quality committee	Annually

	and responsibility					
V3	An ability to acquire and apply new knowledge through advanced learning strategies and research.	Assignments, Projects	Students Survey, Exit Survey	80%	For Courses: Faculty members; For the Research project: Supervisor; For the Surveys: Development and Quality committee	Annually

4.8 Key Performance Indicators and Benchmarking

KPIs are specific forms of evidence used by the Engineering Management Program to provide evidence and assess the performance of the program. The utilization of KPIs is one of the most important prominent practices that contribute to data driven decision-making and follow-up processes that foster the program continuous development efforts. The NCAAA has identified 13 KPIs at the program level, all of which are in line with the evolving program accreditation standards. These indicators are the minimum to be periodically measured, and the academic program can use additional performance indicators if it believes they are necessary to ensure the quality of the program. The KPI measurement cycle is represented in Figure 6. The Program KPIs, description, responsibility and method of measuring are illustrated in Table 12. It is expected that the program measures the KPIs with benchmarking using appropriate tools, such as (Surveys, Statistical data, etc.).

NCAAA Program KPIs: The 13 NCAAA Program KPIs are measured annually using the KPI card. These eleven KPIs are mandatory to measure for the program to assess their performance. The KPI cards can be used as a tool to collect the data in a systematic order. A specific KPI card is used for each KPIs.

Table 11: KPI card

KPI-P-##						
EMP Goals	**Initiatives**	**Operational Goal**	**KPIs**	**Responsibility**	**Year**	
					Target	
					Achieved	
					Achievement rate (%)	
		Assessment with comments and remarks:				
•						
		Action plan recommendations:				
Action					**Responsible**	**Timescale**
1. 2. 3.						

These KPIs cards are used to systematically collect data and trace the performance of programs in more efficient ways. Based on the result, respective reasonable committees provide their comments and action plan for the non-achieved KPIs.

A report is prepared annually describing and analyzing the results of each KPIs with precise and objective identification of strengths and area of improvement. For each KPI, an acceptable target level to be achieved is set based on the program strategic goals, the comparative data of the internal and external benchmarking. Here are some important terminologies regarding the KPIs.

Actual KPI: Refers to the finding determined when the KPI is measured or calculated. It represents the actual reality of the present situation.

Internal KPI: Refer to benchmarks that are based on information from inside the program or institution. Trend data is an example of an internal benchmark.

External KPI: Refer to benchmarks from similar programs that are outside the institution, it refers to other institutions (national or international).

Targeted KPI: Refers to the anticipated performance level or desired outcome for a KPI. Is determined according to the KPIs measurements of the internal and external benchmarking. Hence, it is the new target KPI of the former academic year.

New target KPI: Is determined in consideration of the actual target benchmark.

KPI Analysis: Refers to a comparison and contrast of the benchmarks to determine strengths and recommendations for improvement.

Setting the New Target Benchmark

For the achieved target KPI level, a holding of the new targeted level is kept for an additional year to establish and maintain good practice before setting an increment of the new target KPI.

• A 5% growth rate is considered an acceptable improvement of the practice when setting a new target KPI level.

•If the target is not achieved, the previous target will be held as a new target for the year after, investigating the reasons and delineating a plan for improvement to reach the targeted performance.

The target of the KPI is determined based on the future for faculty strategic plan, internal and external benchmarking

Sources of data:

- The Engineering Management Program operational plan reports.
- Reports on stakeholder surveys
- Program evaluation survey (Survey 1)
- Courses' evaluation surveys (Survey 3, Course evaluation survey)
- Students experience survey (Survey 2).
- Academic Staff Survey (Survey 1, 6)

- Employer Evaluation survey (Survey 1, 4).
- Stakeholder satisfaction with learning resources report (Survey 1, 6)
- Official students' records obtained for the university secured internal system (e- register).
- Students' performance in competitive exams
- Engineering Management Program staff university records from human resources.
- Scopus and ISI databases

Figure 6: KPIs annual assessment cycle.

Table 12: NCAAA Program KPIs, description, measuring mechanism, output, timeframe, measuring responsibility and measurement tools

Code	KPI	Description	Output Type	Polarity	Time for Measurement	Responsibility	Measurement Tool
KPI-PG-1	Students' Evaluation of Quality of Learning Experience in the program	Average of overall rating of final year students for the quality of learning experience in the program.	Mean (5-point scale)	Higher	Annually	DQC	Program Evaluation Survey
KPI-PG-2	Students' evaluation of the quality of the courses	Average students' overall rating of the quality of courses in an annual survey.	Mean (5-point scale)	Higher	Annually	DQC	Course Evaluation Survey
KPI-PG-3	Students' evaluation of the quality of academic supervision	Average students' overall rating of the quality of scientific supervision in an annual survey.	Mean (5-point scale)	Higher	Annually	DQC	Academic Supervision Survey
KPI-PG-4	Average time for students' graduation	Average time (in semesters) students spend to graduate from the program.	Mean (Semesters)	Lower	Annually	DQC	Academic Records
KPI-PG-5	Rate of students dropping out of the program	Percentage of students who did not complete the program to the total number of students in the same cohort.	Percentage	Lower	Annually	DQC	Statistical Records
KPI-PG-6	Employers' evaluation of the program graduates' competency	Average of the overall rating of employers for the competency of the	Mean (5-point scale)	Higher	Annually	DQC	Employer Satisfaction Survey

		program graduates in an annual survey.					
KPI-PG-7	Students' satisfaction with services provided	The average of students' satisfaction rate with the various services provided by the program (food, transportation, sports facilities, academic advising, etc.) measured on a five-point scale in an annual survey.	Mean (5-point scale)	Higher	Annually	DQC	Student Services Survey
KPI-PG-8	Ratio of students to faculty members	The ratio of the total number of students to the total number of full-time and full- time equivalent faculty members participating in the program.	Ratio	Lower	Annually	DQC	Statistical Analysis
KPI-PG-9	Percentage of publications of faculty members	Percentage of faculty members participating in the program with at least one research publication during the year to total faculty members.	Percentage	Higher	Annually	Scientific Committee	Publication Records
KPI-PG-10	Rate of published research per faculty member	The average number of refereed and/or published research per faculty member participating in the program during the year. (Total number of refereed and/or published research to the total number of faculty members during the year)	Ratio	Higher	Annually	Scientific Committee	Research Output Data

KPI-PG-11	Citations rate in refereed journals per faculty member	The average number of citations in refereed journals from published research (total number of citations in refereed journals from published research for faculty members to the total published research).	Ratio	Higher	Annually	Scientific Committee	Citation Databases
KPI-PG-12	Percentage of students' publication	Percentage of students who: published their research in refereed journals. presented papers at conferences. to the total number of students in the program during the year.	Percentage	Higher	Annually	Scientific Committee	Student Publication Data
KPI-PG-13	Number of patents, innovative products, and awards of excellence	Number of: Patents and innovative products National and international excellence awards obtained annually by the students and staff of the program.	Count	Higher	Annually	Scientific Committee	Achievement Reports

4.9 Program Benchmarking and Improvement Cycle

Benchmarking is a systemic and continuous process for measuring program performance by comparing it to another program within or outside this university to identify the causes of the gap and work to address them and achieve the best performance. The Engineering Management Program offers numerous benefits and holds great importance in ensuring its continuous improvement and quality enhancement. Benchmarking also allows for a systematic comparison of the program's performance, practices, and outcomes against established standards, best practices, or similar programs in other institutions. This process provides valuable insights into areas of strength and areas that require improvement, paving the way for informed decision-making and targeted interventions**.** Benchmarking is a vital process for maintaining the high quality of performance of any program and ensuring continuous quality improvement. It allows for comparing the performance of various aspects of the program with respect to the good practices recommended by the NCAAA. The Benchmarking for continuous quality improvement is shown in figure 6.

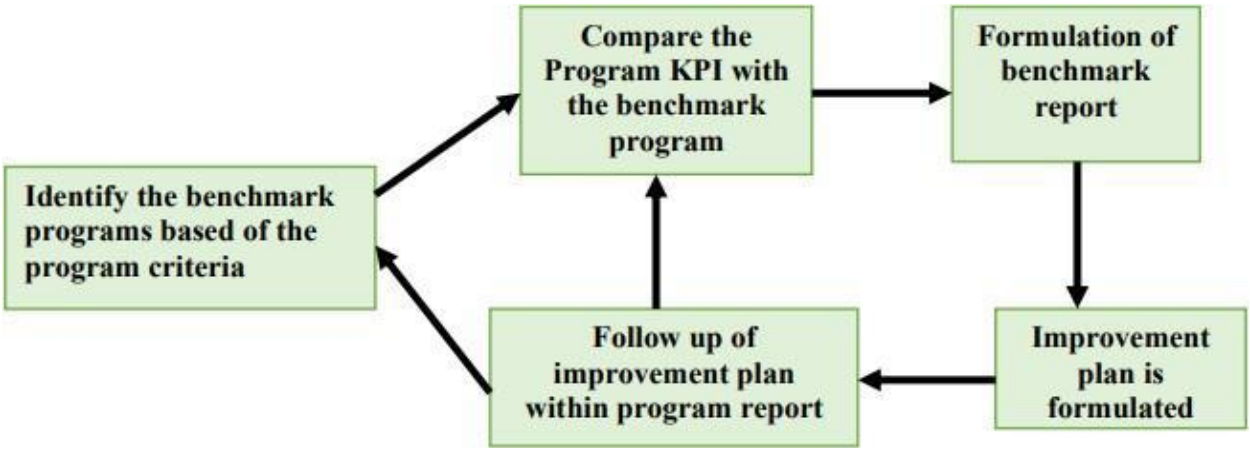

Figure 6: Benchmarking for continuous quality improvement

4.10 Procedure for preparing Performance Assessment Reports

The procedure for preparing the performance assessment report are as follows:

- The DQC is responsible for developing and updating an action plan for performance measurement within a defined timeframe, taking into account the deadlines for periodic evaluation reports.

- The DQC is responsible for reviewing the results of the annual program report and monitoring the effectiveness of the implementation of the improvement plan linked to the priorities for enhancing previous performance measurement reports.
- The DQC is also responsible for monitoring the implementation of measurement processes, collecting results, and prioritizing improvement actions from the relevant entities.
- The DQC holds discussions with the committees' chairmen to identify improvement priorities based on the aggregated results.
- The DQC is responsible for presenting the report results to the department council, stakeholders, and the advisory committee.
- The Quality Committee takes into account the feedback received from various entities surveyed.
- The report is forwarded to the department council for approval, incorporating the improvement priorities mentioned in it and utilizing them to enhance performance .

4.11 Procedure for Measuring the Program Goals

The procedure for measuring the program goals are:

Plan Development: The DQC will oversee the entire process for measuring program goals, and the development of the program goals measurement plan. The DQC measures the achievements in the Engineering Management Program goals through the achievements of the program's operational plan. Where the Engineering Management Program's operational plan includes specific KPIs to measure the operation goals against the target benchmarks that are connected to the program goals.

Monitor Progress: The DQC continuously monitors the progress of the operational plan against the established timelines and KPIs to track the implementation of the action plans, and hence provide a systematic way to measure the program goals. This tracking is done through the KPIs cards.

Evaluate Results: The DQC assesses the results and outcomes of the implemented action plans, compare the actual results against the established targets or benchmarks. This analysis helps assess whether the program is on track to achieve its goals and identifies areas that require improvement or further attention.

Report on the Outcomes: The DQC report on the progress made toward achieving the program goals and submits the report to the Program Chair.

Seek Feedback: The report will then be presented at the department council for discussion. Based on feedback, strategies, action plans, and resource allocation may be modified to address any identified issue or make necessary improvements for the succeeding year improvement cycle.

Final Approval of the Achievement Report: The final report will then be submitted to the vice dean of development and quality, and then to the department and faculty councils for final approval.

4.12 Program Specification Development and Modification

The procedure for the program specification and modification are as follows:

1. The PSPC is responsible for preparing the specified documents as inputs to this procedure.
2. A work plan is developed by the PSPC and approved by the program chair. The plan specifies role assignments, templates, and the timeline for implementation.
3. The PSPC completes the program specification using the NCAAA forms. Modifications of the program specification must adhere to the university authority matrix.
4. The PSPC presents and discusses the program specification in the department council.
5. The feedback received from the council is addressed and revised by the PSPC.
6. The revised program specification is then presented to the advisory committee.
7. Feedback from the advisory committee is addressed and revised.
8. The revised program specification is then presented to the department council.
9. The program specification is then submitted to the programs and study plan committee at the faculty for review.
10. The revised program specification is modified based on the committee's feedback.
11. The revised program specification is submitted to the faculty council for approval.
12. In the event of substantial modifications to the program specification, it will be submitted to the university's academic affairs agency.
13. Feedback is provided and sent to the external reviewer.
14. The feedback is sent to the program for further refinement.

15. The program specification is modified on the light of the feedback received. The final program specification is then approved by the department council, followed by the approval of the faculty council.
16. The program specification is then submitted to the university's academic affairs agency to complete the endorsement procedures, including updating the modified curriculum and ensuring its inclusion in the admission and registration system.

4.13 Course Report Preparation and Approval

The procedure for the course report preparation are as follows:
1. The instructors measure CLOs of their sections (using the provided excel sheet by the deanship of quality).
2. The instructors complete all the NCAAA course report sections which include, analysis of grade distribution, report on the previous year, improvement plan.
3. The Development and Quality committee collects and review the course report for all the sections and provide their feedback to the course instructor.
4. Based on the DQC feedback the course instructor carry out the proposed adjustments and submit the finalized report to the DQC. The DQC submits the reports to the program chair.
5. The program chair presents the collected reports together with the improvement plans to the departmental council for review and discussion.
6. The faculty vice deanship of development and quality review the reports. The DQC communicates the insight and feedback of the vice deanship of development and quality to the course instructor.
7. DQC submits the revised combined reports together with the improvement plans to the department council for approval.
8. The faculty council discusses and approves the reports in addition to the post course meeting minutes of the department. The combined reports and approval minutes of the department and faculty councils are then submitted to the Deanship of Quality and Development.
9. The Deanship of Quality and Academic Accreditation reviews whether the reports meet the academic accreditation requirements and submits the combined reports and the associated audit reports to the course instructors that are supposed to teach in the next semester.

4.14 Operational Plan Development

The Engineering Management Program operational plan defines the targets that need to be achieved in order to for the program execute its mission and goals. Their plan uses performance indicators to gauge the success of the Engineering Management Program in achieving its goals. The procedure for developing the operational plan is as follows:

Assign tasks: The DQC is responsible for overseeing the entire process for developing and approving the operational plan and ensuring collaboration and representation from different perspectives as well as monitor the progress of the program in achieving its target goals.

Review Program Data and Assessment Results: The DQC conducts a comprehensive review of the program data, including:

- Program Mission and Goals.
- College Strategic Plan.
- Improvement Priorities identified in previous Operational Plan Progress Reports.
- Improvement Plans associated with improvement priorities from various committees within the department.
- Improvement Plans and Improvement Priorities mentioned in the Annual Report and Course Reports.
- Improvement Priorities derived from Performance Indicators Reports and Benchmarking.
- Opinion Surveys Reports.
- Alumni Characteristics and Learning Outcomes Reports.
- Improvement Priorities mentioned in Self-Evaluation Standards and Self-Study Report.

Identify Areas for Improvement: Based on the review of program data and assessment results, the DQC analyses the data to identify areas that require improvement and potential areas for growth. This could include curriculum enhancements, faculty development, student support services, assessment practices, or any other relevant aspect.

Propose initiatives and operational goals:

- What do we want to achieve? The DQC establishes clear and measurable initiative with each program goals.
- Each identified initiative is translated to the operational goals.
- Develop KPIs to measure progress and performance for operational goals
- Draw initiatives, operational goals, and KPIs in the draft plan.

Share Improvement Objectives and Strategies: The DQC communicates the initiatives, operational goals, and KPI to the relevant committees.

Define Action Steps and Timelines: Each committee is responsible of:

- Breaking down each operational goals into actionable steps or tasks.
- Define specific timelines for implementing each action step to ensure progress and accountability.
- Assign responsibilities to individuals or teams for each action step or task to ensure accountability and effective implementation.
- Ensure that the allocated resources align with the identified objectives and strategies.
- Identify performance indicators and targets.

Draft the operational plan: The DQC combines improvement plans from all committees in the operational plan format.

Seek Feedback and Revision: To ensure that the Operational plan is comprehensive, actionable, and aligned with the program's objectives, the DQC present the Operational at the department council seeking their input and feedback to ensure their support.

Refine and Finalize: Based on the feedback from faculty members the DQC revise and refine the operational plan. The Program Chair submits the revised operational plan to the vice dean for development and quality for further review. Any suggestion from the vice dean for development and quality will be discussed and carried out by the DQC.

Obtain Approval from Relevant Authorities: The final draft of the operational plan will be submitted to the faculty council for approval.

Communicate Approved Operational Plan: The communication of the approved operational plan helps ensure that stakeholders are well-informed, aligned, and actively involved in the program's implementation of the operational plan.

4.15 Program Annual Program Report Preparation and Approval Procedure

The Annual Program Report is a comprehensive document that provides a detailed overview of the academic program's performance and progress over the course of a year. It serves as a valuable tool for program evaluation, accountability, and planning. The report includes information on student enrollment, curriculum updates, faculty contributions, assessment

results, student outcomes, program strengths and challenges. It highlights achievements, identifies areas for improvement, and outlines strategies for enhancing the program's quality and effectiveness. The Annual Program Report plays a crucial role in informing decision-making processes, facilitating accreditation reviews, and fostering continuous improvement in the academic program. The procedure for the development of the annual program report is as follows:

Assign tasks: The DQC is responsible for gathering relevant information writing and reviewing the draft report, checking for accuracy, coherence, and clarity of information and ensures that the report reflects an objective evaluation of the program's effectiveness

Data collection and Review: DQC gather all relevant program data and reports from all the committees and review the program assessment reports.

Draft the APR: Based on the gathered information and the conducted review the DQC articulate the first draft of the APR.

Share with the department council: To ensure that the APR reflects an objective evaluation of the program's effectiveness, the DQC present the APR at the department council seeking their input and feedback and approval.

Review and Refine: Based on the feedback from faculty members the DQC revise and refine the APR.

Obtain FOE Approval: The program chair submits the revised APR to the faculty vice deanship for development and quality for further review and refinement. The faculty vice deanship for development and quality submits the final revised APR to the faculty council seeking their approval.

Obtain UT Approval: The APR together with the approval minutes of the department and faculty councils are then submitted to the Deanship of Quality and Development. The deanship of development and quality revises the APR and ensures its fulfilment for the requirement of program accreditation and submits it to the higher standing committee of academic accreditation and quality assurance for final approval.

4.16 Upholding Academics and Ethical Standards Procedure

The Industrial Engineering (IE) program at the University of Tabuk is committed to fostering an environment where academic integrity, ethical research practices, and proper administrative conduct are paramount. Recognizing the value of original work and the importance of protecting intellectual property, the program has implemented a set of mechanisms based on established university guidelines and procedural manuals. These measures ensure that all academic, research, and administrative activities are conducted with the highest level of professionalism and accountability. For more information, please refer to the appendix, Procedure Manual for Upholding Academic and Ethical Standards, and Student Handbook

4.17 Stakeholders Surveys

The relationship between stakeholders' satisfaction and sustainable growth and success is investigated focusing on the importance of relationships with critical stakeholders that may lead to better performance, as program while integrating business and societal considerations create value for their stakeholders. However, it is of most importance that top management actively leads this approach and that the governance bodies of the organizations support and check that this really happens. There are different types of surveys for all program stakeholders.

4.17.1 Main Principles

There are several general principles that should be followed if student surveys are to be as useful as possible.

- It must be made clear to students that all survey responses are anonymous.
- Surveys should include common questions to enable them to be used for comparisons within departments and between courses.
- Some open-ended questions should be included to permit respondents to comment on additional matters of concern.
- In addition to several individual items relating to matters considered important, surveys can include one or two summary items that can be used as general quality indicators.
- To be used for benchmarking quality between programs the surveys should be distributed in similar ways and at similar times and comparisons should be made between comparable institutions.
- Questions should be consistent over time (normally at least three years) so that valid trend data can be obtained.

- The validity of responses depends on having a reasonable response rate. To encourage participation:
- Surveys should not be overused.
- Use should be made of the responses, and summary reports and indications of
- action taken in response made available.
- The surveys should not be too long (a maximum of 20 to 30 items plus a small number of open- ended items is usual).

4.17.2 Recommended Surveys

Students and staff are the principal customers of the education system and surveys of their opinions are one of the most important sources of evidence about quality in higher education. Other stakeholders should be considered; they can provide very good insight about the outcomes of the program. They can provide very useful suggestions for improvement that should be considered in the quality cycle for improvement as applied to individual courses, programs, and institutional planning. The stakeholders' survey plan is shown in Table 10.

Table 10: Stakeholders' Survey Plan.

Survey#	Survey Title	Mode of Survey	Desired Sample Size	Assessment Cycle
1	Evaluation of Vision, Mission, Program Objectives (POs), Curriculum, and Program Learning Outcomes	Online	25-100	Annual
2	Students' Evaluation of Quality of Learning Experience in the Program	Online	25-50	Annual
3	Students' evaluation of the quality of the courses	Online	25-50	Annual

4	Employers' evaluation of the program graduates' proficiency	Online	15-25	Annual
5	Students' satisfaction with the offered services	Online	50-100	Annual
6	Satisfaction of beneficiaries with the learning resources	Online	25-50	Annual
7	Satisfaction of alumni regarding the program	Online	15-25	Annual
8	Satisfaction of faculty member	Online	08-50	Annual
9	Students' evaluation of the quality of academic supervision	Online	15-25	Annual