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# College of Engineering

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## Quality Assurance Manual

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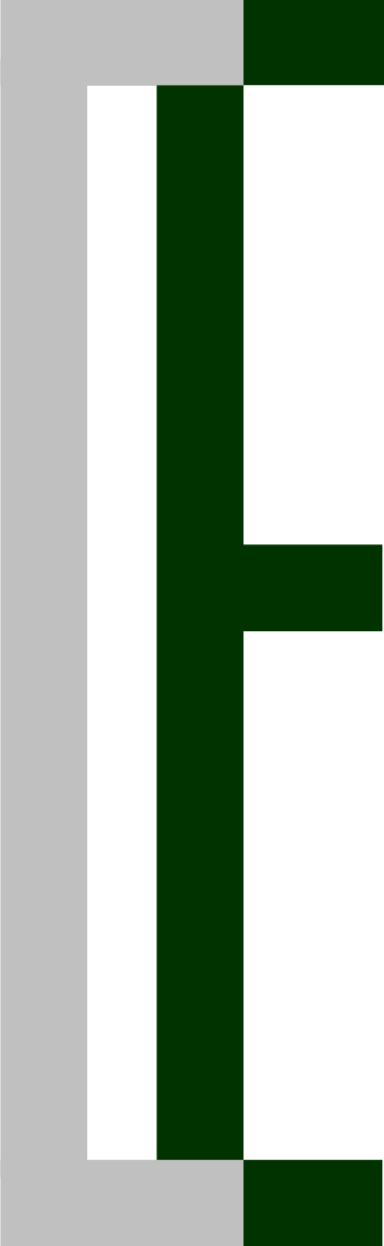
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“To be a pioneer in engineering education, innovative research and sustainable development of the community”

Kingdom of Saudi Arabia  
Ministry of Education  
King Khalid University



المملكة العربية السعودية  
وزارة التربية والتعليم  
جامعة الملك خالد



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# Introduction

The College of Engineering (COE) at King Khalid University is emerging as one of the top Engineering Colleges of Kingdom of Saudi Arabia. The College is committed to contribute significantly to achieving the vision and the mission of the King Khalid University and the Saudi vision 2030. Since its inception, COE has been evolving as a hub of knowledge to the community. It has ambitious leadership, state of the art facilities, and highly qualified faculty from different parts of the globe, making it a diversified platform for the sharing and transfer of knowledge. All the eligible engineering programs are accredited by ABET, and two programs are accredited by NCAAA. The quality assurance (QA) system of COE is twofold, the internal QA and the external QA. The internal QA system articulates the QA system developed by the Deanship of Quality & Development at King Khalid University while the external QA system aligns the programs with the academic accreditation standards, benchmarking and criteria recommended by accrediting organizations such as Accreditation Board for Engineering and Technology (ABET), National Commission for Academic Accreditation and Assessment (NCAAA).

This QA manual guides the academic programs at COE to develop, review and improve their QA systems and achieve national and international benchmarks.



## Significance of Quality Assurance

Quality is often described as the totality of features and characteristics of a service or product measured against standards. In higher education, evaluation of quality standard is based on the stated mission or purpose of the institution and how well goals and objectives are achieved. Quality in higher education is a multi-dimensional concept, which should embrace all its functions and activities: teaching and learning, learning resources, academic programs, research and development, faculty and staff development, equipment, and community service. Quality assurance should take the form of internal self-evaluation and external review, conducted openly by independent specialists, if possible with international expertise, which is vital for enhancing quality.

Quality assurance is both a process and a framework that leads to the achievement of excellence and transparency. The process will ensure quality in the attainment of the college's vision and mission leading to college performance aligned with its purpose. The goal is for all institutional functions to perform at an optimum level including academics (teaching, learning, curricula), student support services, physical plant (buildings, classroom environment), research, and service to community and region. With continuous evaluation for quality in all areas, the college will be well-positioned to adapt to changes and provide the highest quality education to students. Based on its desire to ensure a unique status at regional, national and international levels, College of Engineering, King Khalid University is striving to implement quality systems and processes in all of its units.

## Relationship of Quality Assurance to Accreditation

Quality assurance is a continuous process of monitoring outcomes and ensuring quality in all college endeavors. If done correctly, departments will continuously evolve and adapt to changing environmental and societal needs. Accreditation is based on an evaluation done at a specific point in time, highlighting institutional quality and outcomes that demonstrate alignment of purpose with performance. As such quality assurance can be considered as a prerequisite for accreditation, it is an ongoing process whereas accreditation is a snapshot of this activity. Accreditation, at the institutional or program level through NCAAA, or through a specialty accreditor such as ABET usually leads to the awarding of certificate or recognition that the institution or program meets specific standards. Once accrediting, the quality assurance should be the guarantee that the standard measurement in the accreditation process can support in the long term. Therefore, accreditation cannot be said to be complete unless steps are enacted to ensure that the process is continuous and ongoing.

## Quality Assurance Committees at the College Level

College of Engineering control quality assurance activities through vice dean, academic development, and quality. Each program has a quality committee to supervise and execute quality activities in their departments. The vice deanship of academic development and quality plays the pivotal role of ensuring the consistency of the system and processes in all departments. The vice deanship will receive from QA units a set of reports, requirements, KPIs and benchmarks for review by the concerned committees before further submission.

**Purpose:** The QA committees aim to apply the principles and methods of continuous quality management and contribute to quality enhancement in a dynamic academic context in each department. QA committees of all departments should follow the same guidelines and principles regardless of whether they deliver programs accredited by NCAAA or other accrediting bodies.



**The scope of QA committees includes the following:**

- Apply the principles of quality assurance based on the appropriate national accreditation bodies' standards (e.g., NCAAA, ABET) in different academic programs.
- Ensure that the requirements for program accreditation met in a timely manner.
- Assure a systematic implementation of the curriculum or programs, best utilization of learning resources, optimal educational management, and monitor the outcomes of the academic programs.
- Ensure the implementation of a quality program against the appropriate national and international accreditation standards.
- Prepare applications for accreditation.
- Identify gaps in the program, curriculum, assessment, and evaluation to suggest the necessary improvement plans to QA committee.
- Ensure and enforce the presence of quality culture.

# The Quality Assurance System at College of Engineering

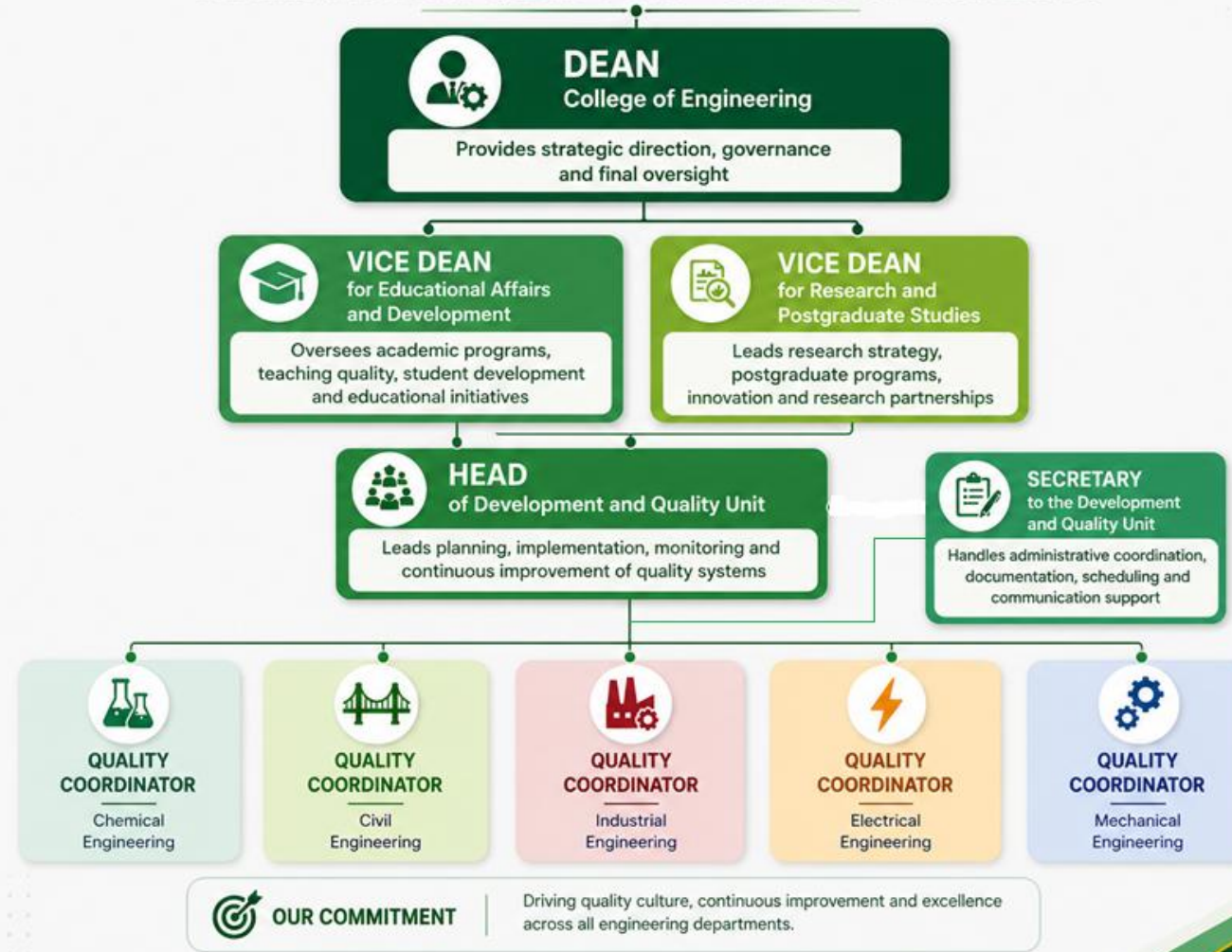
With the active support and commitment of the Dean of the College and the Vice dean for academic development and quality, the deanship operates as the center for quality assurance for the university. As such, the deanship task with leading the institution in quality assurance activities and infusing a culture of quality in all practices based on the college mission of providing high-quality learning environments, innovative research, and valuable community service.

To coordinate these processes in all college activities, quality centers have been established in all programs. This structure allows for all college units, whether large or small, to participate in the planning, assessment, and review, and improvement process, and provide standard reports to academic development and quality unit. For the academic process, reporting is done through course specifications, course reports, surveys, and feedback. Academic programs utilize the National Qualifications Framework for identifying significant learning outcomes by level and discipline. These included in the course and program specifications which. These become the basis for measuring learning outcomes and success of a course or program.

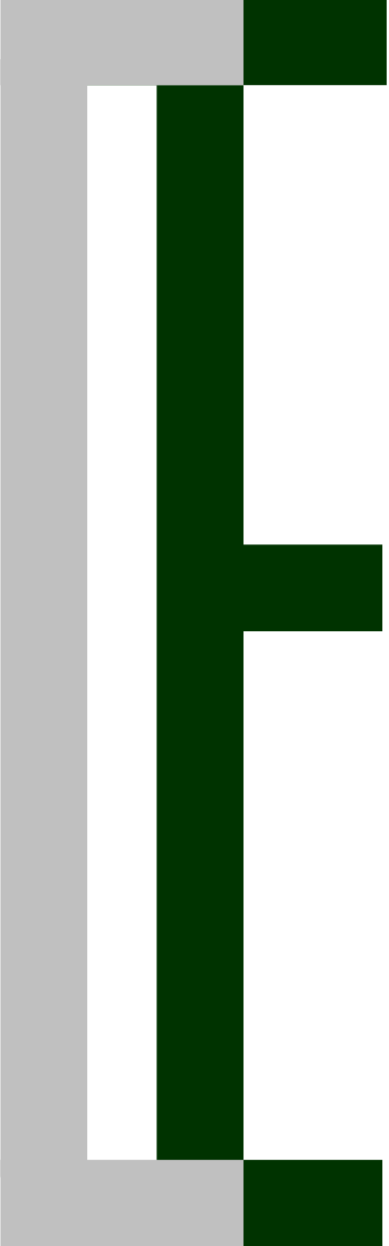
The quality assurance system at College of Engineering, King Khalid University conforms to standards set out by NCAAA with the emphasis on a cycle of planning, review, and implementing changes for improvement as illustrated in the figure below. With proper planning aligned with community needs or national strategic directions new undergraduate and post-graduate programs, research centers, and community partnerships may be developed or existing ones expanded.

# ORGANIZATIONAL STRUCTURE

## DEVELOPMENT AND QUALITY UNIT – COLLEGE OF ENGINEERING



**Quality Assurance Framework at College of Engineering, King Khalid University**



Background data and information from the environmental scan permits the college and academic programs to begin a planning cycle by defining and reviewing goals and objectives. It leads to the development of an operational plan that conforms at the unit level with strategies identified in the college strategic plan. Next, the unit plan will implement and goals and objectives will be monitored based on agreed-upon metrics. The deanship is actively involved in this stage of the cycle as it provides data and information for assessment based on stakeholder feedback in the form of surveys and evaluations. These results are summarized and provided for the college departments for use in their plans. Academic units also rely on the deanship for student academic measures of quality to include student progress and success, time to degree, and student to faculty ratio. Both the direct and indirect measures of quality are incorporated into KPIs and delivered to clients. Many KPIs are defined by NCAAA, whereas college and programs develop others.

In addition to the internal use of KPIs for planning and outcomes measurement, they are also utilized by the deanship in providing data and information externally on college's performance. Datasets are provided annually to some university ranking organizations, notably QS World University Rankings, U.S. News & World Report, Webometrics Rankings of World Universities, and Times Higher Education World University Rankings. The cycle of planning, setting goals and objectives, defining measurements, analyzing the results, and making changes in the academic or non-academic unit follows an annual cycle. For NCAAA accreditation, once accredited programs are required to submit a self-study every five years based on this planning and analysis cycle. The programs engage external reviews during the accreditation process but more frequently through the external advisory boards for academic programs. As the center for academic development and quality unit, the vice deanship actively guides unit -level planning and assessment process leading to continuous improvement. Finally, the vice deanship adheres to NCAAA quality criteria including commitment to quality improvement, achievement of quality standards, the effectiveness of services provided and consistency of best practices leading to attainment of all standards.



## About College of Engineering

The Royal Decree Order No. (7 / B / 4096) was issued on 14/03/1420 H to establish the College of Engineering. The establishment of this college was decided to keep pace with the renaissance of the Kingdom in many areas as the engineering is a profession that employs science to serve the welfare of society as well as to follow the scientific progress and technology in the twenty-first century, to meet the engineering labour market needs in the southern and south-western regions of the kingdom. The college started its activities and functions on the academic year 1422/1423 H where 110 students were accepted in the first semester, they were distributed in the departments of Mechanical Engineering and Industrial Engineering.

Aware of the university to keep up with the prospects of scientific and technical development and the contribution of the university in filling manpower needs in the fields of engineering with highly qualified engineering staff. Aligning with the development plans of the Kingdom. It has been approved in 08/05/1426 H to create the departments of Electrical Engineering, Chemical Engineering, Civil Engineering departments as well as the department of Architecture and Planning.

### **Vision**

To be a pioneer in engineering education, innovative research and sustainable development of the community.

### **Mission**

To achieve academic excellence by providing adequate teaching-learning resources, motivating scientific research, and bring forth qualified engineers to serve the community.



## Goals

1. Academic excellence through development of curriculum at par with national and international standards.
2. Collaboration with colleges / universities for knowledge sharing and benchmarking.
3. Support innovative research to contribute to achieving the vision of King Khalid University.
4. Interaction with industries to produce trained and skilled graduates, solve real-life problems and obtain feedback for continuous improvement.
5. Contribute to the sustainable development of the community by continuing education, training and consultancy services.
6. Improvement in financial resources.

# Mapping of University and College Mission

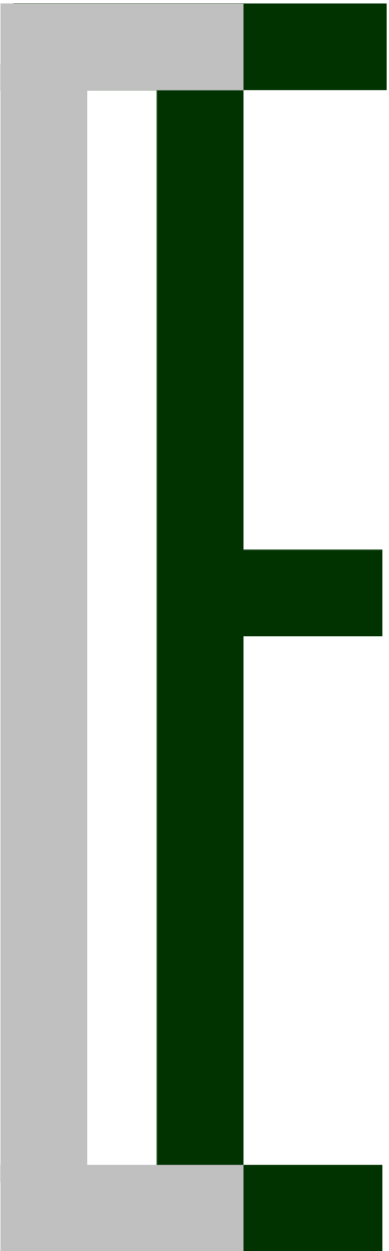


## The Dean, College of Engineering

The Dean, College of Engineering will provide strategic direction, academic planning leadership, and administrative oversight to achieve the highest standards in engineering education and research. Reporting to the Vice President of academic and educational affair, of the university, the Dean will encourage innovative approaches to program and professional training development and delivery, also increase research output and funding support. He will ensure sustainable growth and competitiveness, expand interdisciplinary research programs, and work collaboratively with other stakeholders such as academic, industry and public sector partners to further enhance its national and international stature.

Steadfast to the scholarly life of the faculty and equity, excellence, and diversity, the Dean, will play an important role in the achievement of college's objectives. He is expected to:

- Stimulate and support excellence and integrity in teaching, learning, research, and nurture an environment that encourages faculty/staffs and students to identify and pursue innovation in these activities.
- Lead the academic planning process of the college by initiating discussions, defining priorities, and developing and articulating its vision.
- Supervise and initiate and activities designed to improve teaching skills within the college and ensure that teaching methods are state-of-the-art.
- Provide a leadership in the development of research activity to capitalize the expertise, resources, and interests of the faculty accordance with the University's research strategy.

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- Actively play an essential role in raising funding support to the faculty through government, industry and other funding sources and work collaboratively with other stakeholders viz. academic, industry and public sector partners to further enhance the research profile of the faculty, and expand and improve its infrastructure.
  - Ensure effective communication and engagement with students, faculty and staff members.
  - Also ensure appropriate and efficient organization and assignment of faculty responsibilities, effective management, commitment to faculty development and administration of collective agreements and personnel policies.
  - Ensure recruitment and appointment processes effectively with the aim to attract the highest possible caliber of faculty and staffs and that the process itself is reflective of equity, diversity and University policy.
  - Participate in the development of college strategy and policy.
  - Supervise, monitor and control all academic, curricular, co-curricular, research and community service activities.

## Vice Dean for Educational Affairs and Development

The vice dean of academic and educational affairs is the assigned and administrative officer responsible for the effective and efficient operation of the engineering college within the policies, directions, and plans of the university as a whole. The Vice Dean establish and maintain a collegial work environment, support the academic unit towards improved productivity and relevancy, ensuring the academic integrity and curricular coherence of all programs embraced within it.

- To provide overall leadership, direction, advocacy, communication, coordination, and assessment of the academic unit as a whole, and of the sub-units (departments and programs) to it.
- To establish and maintain a cooperative, collegial work climate which enhances communication, trust, and productivity of and among faculty and administrative, secretarial staffs and students.
- To engage in such career counseling of faculty and staff which maintain morale, reward and foster competence and effort, and efficiently deal with problems and issues, which decrease faculty and staff performance.
- To serve as the mediator in resolving problems arising among faculty and their department chairs, faculty, staff and students.
- To ensure that efficient academic advising is provided to all students in their respective majors and within each of the sub-units.
- To ensure that a system of student observation and evaluation of faculty occurs effectively.

## Vice Dean for Research and Postgraduate Studies

The vice dean for graduate studies and research overseas promotes the establishment of graduate programs, their reviews and updates, the development of curriculum plans for graduate studies, the initiatives to achieve research goals, data analysis related to research, accreditation of graduate programs, etc. Typical duties include:

- Supervise graduate programs.
- Accreditation of the graduate programs.
- Contribute to the achievement of all college objectives relating to research.
- Work with teams to develop and refine KPIs at college and program level related to research.
- Provide support to all units under his administration.
- Review progress and evaluate the performance of the programs and college in research.
- Recommend awards for outstanding faculty and students in research.
- Initiate research proposals and supervise the research proposals offered by the university and ministry.
- Organize events to promote talent, innovation, and research.
- Supervise the Strategic Plan for the College.

## Consultants and External Reviewers

Consultants and External Reviewers/Experts are engaged in some subject areas to complement the staff in the deanship of academic quality and development. Experts may have experience in the field of design, implementation, and review of quality assurance systems. Others may have broad experience in learning outcomes assessment, KPIs, deployment, and analysis of surveys and evaluations, strategic and operational planning, performance evaluations, environmental scanning and reporting, and assessment of non-academic units. Consultants are usually hired on an annual basis, as and when required.

## The Strategic Themes of the College of Engineering

Strategic Themes of the Engineering College are:

- Academic Excellence
- Support innovative research
- Interaction with industries and communities
- Development of professional skills and ethics
- Collaboration and benchmarking
- Accreditation and certification



# Tasks and Responsibilities of Development and Quality Unit

## Implementation of Quality Assurance

1. Spreading the culture of quality in the college by organizing training and awareness workshops.
2. Assist in functioning of External Advisory Boards.
3. Review of quality documents such as course reports, course specifications, annual program reports etc.
4. Supervise the programs to prepare Annual Reports, Course Reports, KPIs Analysis, PLO Assessment, Operational Plan Reports, and data related to the measurement of Institutional KPIs.
5. Support the Deanship of Academic Development and Quality in articulating the quality culture in different programs.

## Accreditation

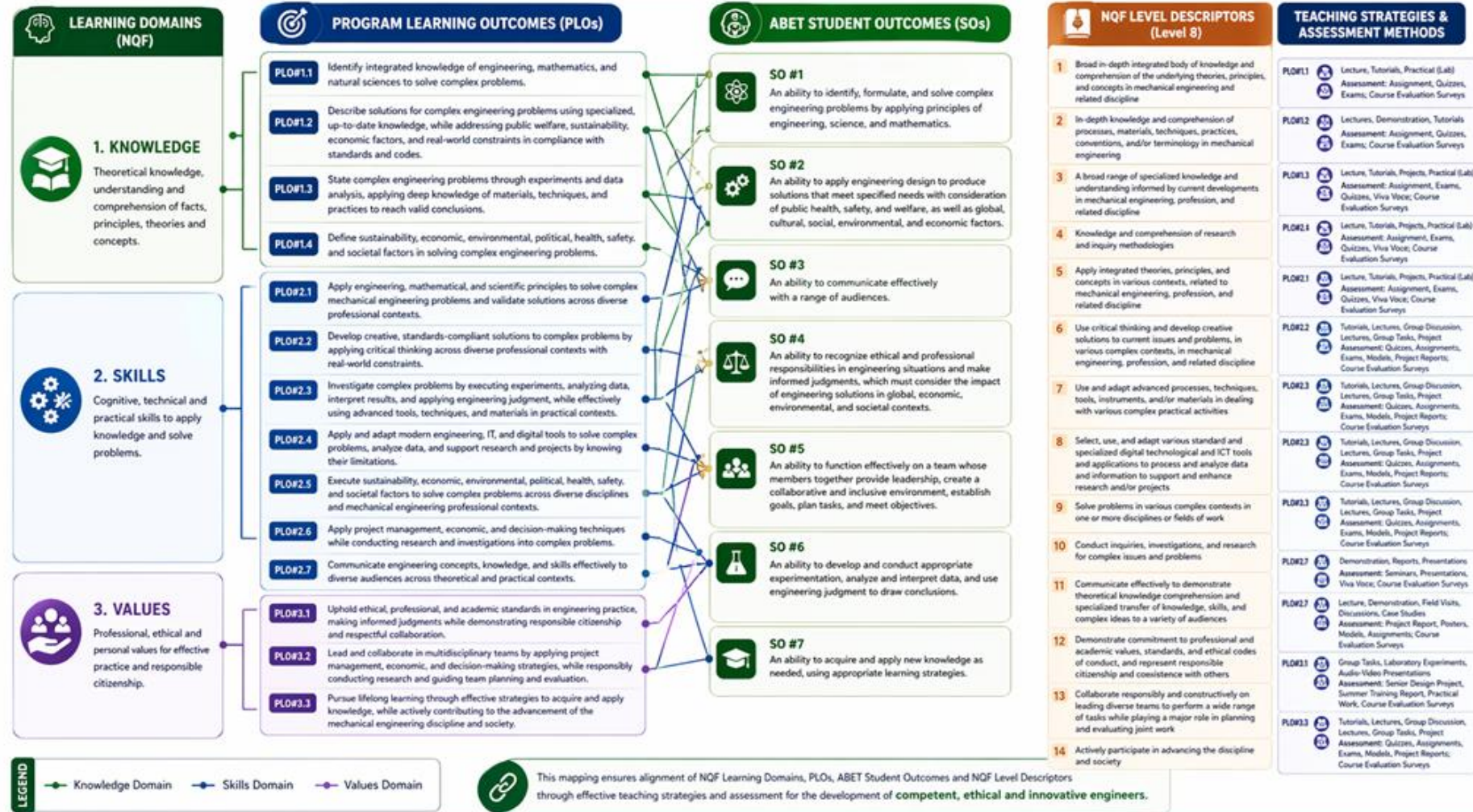
6. Apply the principles of quality assurance based on the standards of International/National Accreditation norms.
7. Prepare and submit applications for International/National Accreditations.
8. Ensure fulfillment of the requirements for the accreditation of programs.
9. Follow-up for pre and post accreditation communications with the Deanship of Quality.

## Documentation

10. Maintain Quality documentation and archives.

# MAPPING OF LEARNING DOMAINS, PLOs, ABET STUDENT OUTCOMES AND NQF LEVEL DESCRIPTORS

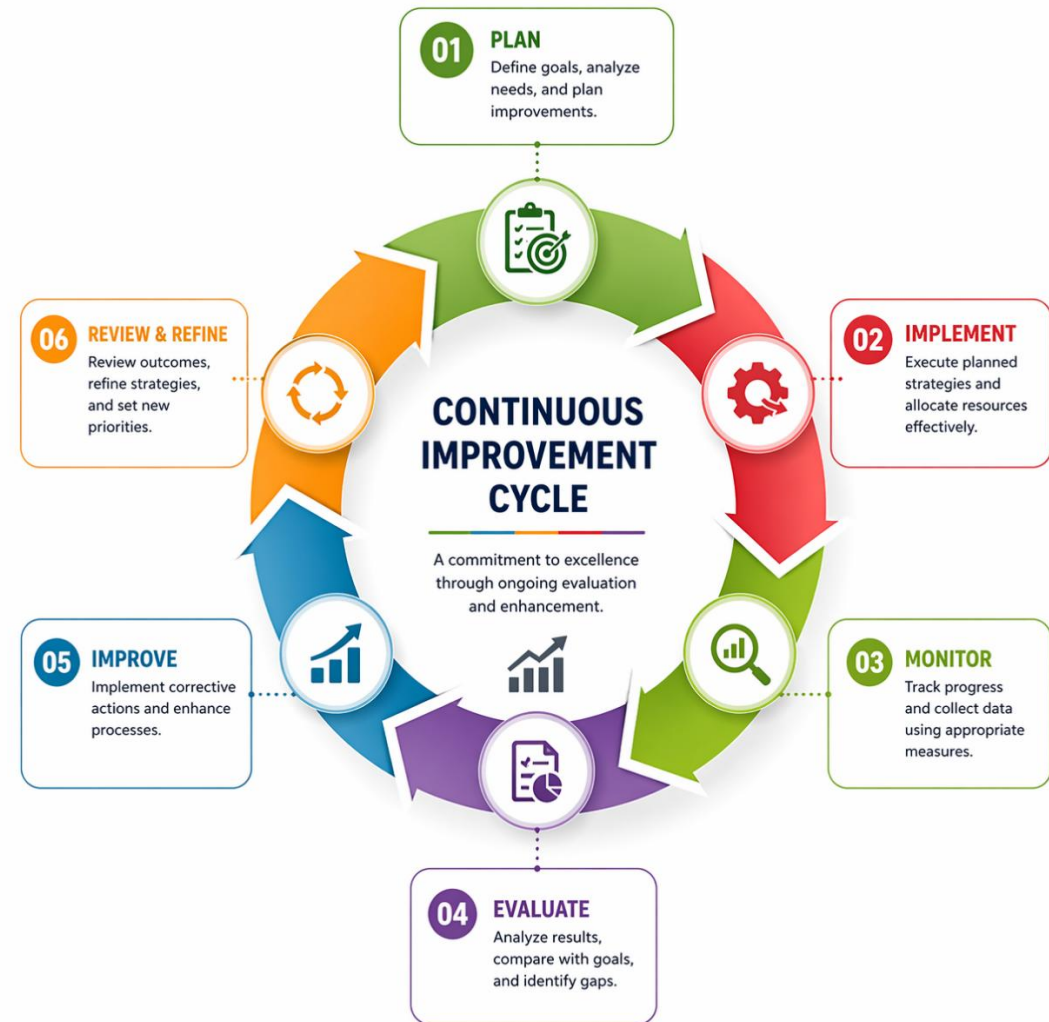
A CONNECTED PATH TO EXCELLENCE



## Student Outcomes (SOs) / Program Learning Outcomes (PLOs) Assessment

College faculty and staff work together to teach students how to think critically, communicate clearly and improve their lives and communities through the attainment of their educational goals. Student Outcomes (SOs) / Program Learning Outcomes (PLOs) Assessment is a central element in the overall quality of teaching. The above figure shows the process of development and assessment of the learning outcomes.

The measurement cycle of the learning outcomes is at least once in the duration of one cycle of the postgraduate programs and twice in the duration of the undergraduate programs. However, assessment of the learning outcomes once in an academic year is recommended as a good practice. The programs may map the ABET-SO with NCAAA-PLO or measure them separately using the PLO/SO-CLO mapping as per the PLO assessment plan. The programs may also assign appropriate weightage to the direct assessment and indirect assessment and collectively measure the learning outcomes or they may measure and analyze direct and indirect assessment of learning outcomes separately and discuss the strengths, areas of improvement and actions recommendations separately. The action recommendation of the learning outcome assessment reports should be appended to the program development plan of the Annual Program Reports and monitor the progress taken towards the actions during the next cycle through appropriate committee.





## **Assessment of Key Performance Indicators (KPIs)**

The programs have performance indicators (a) mandated by NCAAA and (b) to measure the achievement of program goals through operational plan KPIs. The measurement of KPIs is done through data collection, program statistics and surveys. External and internal benchmarking of the KPIs is done to compare the performance of the program with similar programs. A KPI report is prepared annually by each program. Results of the KPIs measurement and analysis are to be incorporated into the Annual Program Report (APR) and the improvement actions are appended to the program development plan of the APR.

## **Assessment of Surveys**

Surveys are important tools to get feedback and for performance evaluation through third party or independent opinion. The respondents of the surveys are the stakeholders of the programs namely, students, faculty, employers, alumni, advisory board members, etc. Results of the survey analysis are to be incorporated into the Annual Program Report (APR) and the improvement actions are appended to the program development plan of the APR.

## **Glossary**

In any discussion about quality assurance in higher education it is useful to define the terms and phrases that will be used. The following definitions are the commonly accepted ones and should be a useful point of reference for the manual.

**Accreditation** Accreditation in higher education is defined as a collegial process based on self- and peer assessment for public accountability and improvement of academic quality. Peers assess the quality of an institution or academic program and assist the faculty and staff leading to quality enhancement.

**Key Performance Indicator (KPI)** A key performance indicator (KPI) is a metric used to evaluate the success of an institution or one of its units in a particular activity in which it engages.

**Quality** In higher education, this is an ongoing process ensuring the delivery of agreed standards. These agreed standards should ensure that every educational institution where quality is assured has the potential to achieve a high level of quality.

**Quality Assessment** The process of evaluating the quality of educational experience in institutions, in particular, the quality of the student learning.

**Quality Assurance** The means by which an institution can guarantee with confidence and certainty that the standards and quality of its educational mission and vision are being achieved and enhanced.

**Quality Culture** The creation of a high level of internal institutional quality assessment mechanisms and the ongoing implementation of the results. Quality culture can be seen as the ability of the institution and program to develop quality assurance implicitly in the day to day work and marks a shift from periodic assessment to embedded quality assurance.

**Quality Improvement** The process of positively changing activities to provide for a continuous improvement in the quality of institutional provision.

**Standards** These describe levels of attainment against which performance may be measured. Attainment of a standard usually implies a measure of fitness for a defined purpose.



## **References**

The Quality Assurance Manual of College of Engineering has been prepared as per requirements and standards of NCAAA, ABET, and NQF. Following references have been used.

- Vision 2030, Kingdom of Saudi Arabia.
- National Qualifications Framework for Higher Education in Saudi Arabia, 2022
- NCAAA Forms 2025
- College of Engineering, KKU Strategic Plan.
- Quality Assurance Manual, King Khalid University.

