

Princess Nourah bint Abdulrahman University

College of Engineering

Industrial and Systems Engineering Program

Program Quality Management System

ISE QMS 2023-2024



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1 Introduction

The Deanship of Quality Assurance and Accreditation (DQAA) at Princess Nourah bint Abdulrahman University (PNU) plays an essential role in maintaining quality standards. As part of its commitment to supporting the various aspects of quality within the academic environment, the DQAA has strategically adopted the facilitation of quality procedures and processes through its Quality Management System guidebook elaboration.

Based on this [PNU QMS guidebook](#) and the [College of Engineering QMS](#), a Quality manual for the Industrial Engineering Program has been drawn up. It provides comprehensive details about the quality practices of the ISE program, outlining work procedures, tasks, responsibilities, and the implemented practices in thorough detail.

Through this guide, the industrial and systems engineering program seeks to ensure the quality of the program outcomes. By aligning with the principles described in the PNU QMS guidebook, the aim is to unify efforts to facilitate quality cycle closure procedures in line with recognized quality standards and academic accreditation requirements. Additionally, the guide serves as a platform for formulating development and improvement plans tailored to enhance the program's overall quality.

It is important to note that this guide specifically addresses national accreditations, with all referenced forms being those designated by the National Center for Academic Accreditation and Assessment (NCAAA). This ensures a cohesive and standardized approach in meeting the rigorous criteria set forth by national accrediting bodies.

Within this guide, the PDCA (Plan-Do-Check-Act) approach is operationalized across pertinent chapters, ensuring a systematic and iterative methodology for continuous improvement and quality management.

2 Description of the PDCA cycle for the ISE program

2.1 Phase 1: Plan

The main objectives and practices of the planning phase could be summarized as follows:

- **Identify goals and objectives, Mission, Program Learning Outcomes and Graduate Attributes:** the program is committed to establishing its goals and objectives, aligning with the Department, College, and University Objectives. This commitment guarantees that Program Learning Outcomes (PLOs) and the graduate attributes (GA) are consistently aligned.
- **Analyze Processes:** Conduct a thorough analysis of the current program processes, including curriculum design, Teaching Methods, Assessment Strategies, and the program support services.
- **Develop Action Plans and Identify the areas for improvement:** based on the analysis, continuously develop action plans for improving the ISE program. This includes continuously revising the curriculum, introducing innovative teaching and assessment methods, enhancing faculty development, and strengthening student support services.

All the plans should be specific, measurable, achievable, relevant, and time-bound (SMART).

2.2 Phase 2: Do

The main objectives and practices of the second phase 'Do' could be summarized as follows:

- **Collecting data:** During the Do phase, all necessary data is collected, including course learning outcomes, program learning outcomes data, records of student and staff activities, and research activities.
 - Collecting feedback from students, faculty, and stakeholders through indirect assessment methods such as surveys.
 - Collecting data through direct assessment methods
- **Implement Changes:** Execute the action plans developed in the planning stage. This may involve curriculum revision, faculty training sessions, deployment of new teaching tools and technologies, and enhancements to student support services.
- **Engage Stakeholders:** Involve faculty, students, and administrative staff in the implementation process.

2.3 Phase 3: Check

This phase is where the effectiveness of actions taken during the 'Do' phase is measured against the objectives and standards set in the 'Plan' phase. The phase 'Check' is articulated around the trilogy: Assess, Monitor, and Evaluate and could be summarized as follow:

- **Assess:** Directly measure and assess the outcomes of the implemented actions against predefined criteria (target value). This involves collecting data on specific indicators related to program quality. The main practices are as follows:
 - Analyzing student outcomes, including Students grades during courses and capstone project.
 - Reviewing the assessments methods and peer reviews to gauge teaching effectiveness and engagement.
- **Monitor:** Continuously observe and track the progress of the implemented actions over time. Monitoring involves regularly setting up systems and processes to capture program operations and outcomes data.
 - ✓ The main practices applied are as follows:
 - Regularly collecting and reviewing data on the NCAAA KPI's and the Program KPI's
 - Detect any trends or changes in the KPI's values and highlight any deviations from target values and the internal and external benchmark.
 - Detect any trends or changes in the learning outcomes and Program outcomes results.
- **Evaluate:** analyze the data collected during the assessment and monitoring activities to determine the impact of the implemented actions. Evaluation focuses on understanding the effectiveness of these actions in achieving the program's quality objectives and identifying areas for further improvement.
 - ✓ The main practices applied are as follows:
 - Comparing the outcomes of the implemented actions against the target values and quality standards.
 - Identifying successes, failures, and areas where the expected outcomes were not achieved.

- Drawing insights and lessons learned from the evaluation process to inform future actions and improvements.

2.4 Phase 4: Act

'Act' represents the final step where the insights and findings from the "Check" phase are acted upon to achieve continuous improvement. This phase is about taking corrective actions, standardizing successful practices, and preparing for the next cycle of planning and implementation based on the evaluations conducted and aimed to close the loop.

- **Standardize Successful Practices:** For changes that have positively impacted on the program, standardize these practices and integrate them into the regular operations of the ISE program. This ensures that improvements are sustained over time.
- **Plan for Continuous Improvement:** Based on the evaluation, identify further areas for improvement and initiate the next cycle of PDCA. This involves revisiting the planning stage to set new objectives or adjust existing plans based on the lessons learned.

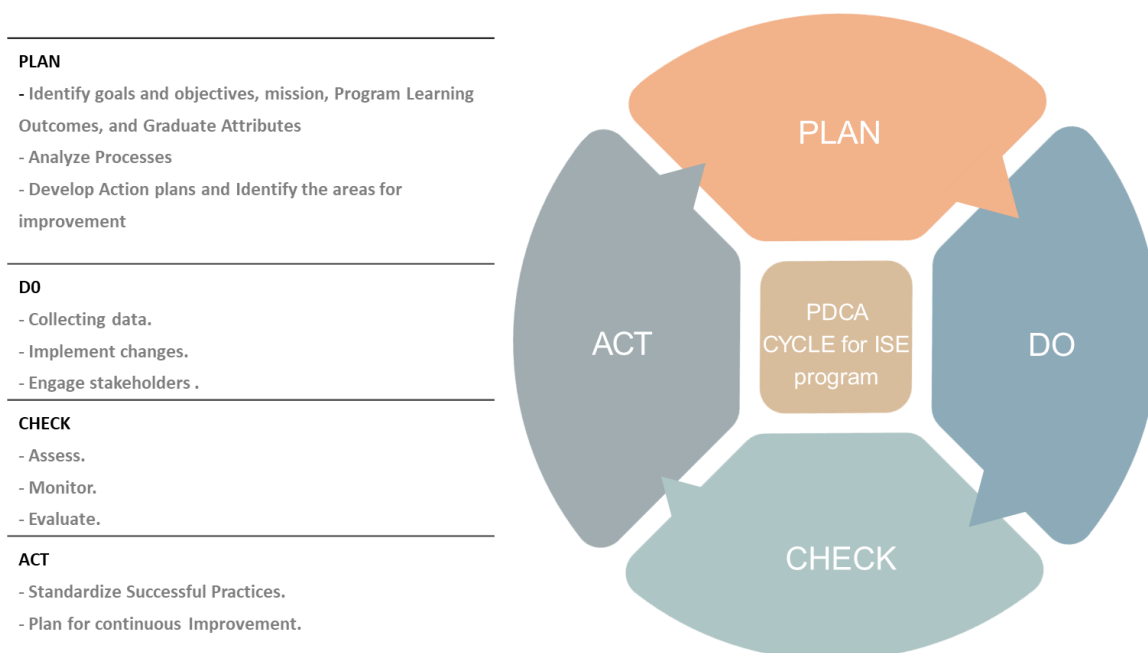


Figure 1 PDCA cycle for the Quality Management System of the ISE program



Section 1: Plan (Planning)

This chapter includes:

- 1- The ISE Program Mission**
- 2- The ISE Program goals**
- 3- The ISE graduate attributes.**
- 4- The Organizational Structure of the QMS in the Industrial and Systems Engineering Program**
- 5- Role and responsibilities of the Head of the department and the committees**

1 The ISE Program Mission

Qualifying industrial and systems female engineers, with high-level scientific, competitive, and professional competencies to meet labor market needs, and contribute to fostering innovation, scientific research, and community service, in line with national goals for sustainable development.

2 The ISE Program goals

- ✓ Promote educational excellence by integrating modern technologies in the field of industrial engineering and systems.
- ✓ Focus on identifying and solving problems to improve local processes in industry, business, and government sectors.
- ✓ Support research activities and innovation in industrial engineering and systems to community service.
- ✓ Encourage faculty and students to contribute to advancements in knowledge and technology, fostering a culture of continuous improvement and innovation.
- ✓ Cultivate a program-wide commitment to community service, sustainability, and social responsibility.
- ✓ Improve societal well-being and environmental stewardship through collaborative initiatives that extend the impact of industrial engineering and systems on the community.

These goals are classified into three axes: Educational Excellence and Learning Outcomes, Research and Innovation Advancement and Community Service, Sustainability, and Social Responsibility.

3 The ISE graduate attributes.

The graduates of the Industrial and systems Engineering program will be able to:

- ✓ Apply modern knowledge and technologies in the fields of Industrial and systems Engineering to address challenges encountered in engineering careers.
- ✓ identify, formulate, and solve engineering problems to bolster the process of engineering decision-making using the appropriate methods.
- ✓ Develop creative and innovative solutions and conduct engineering judgment based on the critical thinking.
- ✓ possess skills in industrial engineering, including problem definition, formulation, design, and analysis.
- ✓ have the capability to advocate for engineering research activities, in accordance with both institutional and community needs.
- ✓ Demonstrate advanced communication skills and leadership abilities for effective performance in supervisory roles within the industry.
- ✓ Adhere to the ethical standards and integrity of the industrial and systems engineering profession.

- ✓ Demonstrate interest, motivation, and capability to engage in ongoing lifelong learning.
- ✓ Foster industrial engineering skills in a professional environment, including considerations of ethics and safety.

4 The Organizational Structure of the QMS in the Industrial and Systems Engineering Program

The organizational structure of the ISE department is presented in Figure 1. Directly beneath the Head of the Department, four pivotal entities operate, each with a distinct focus and critical role in the department's overall functionality:

- ✓ The Advisory Committee plays a vital role in providing strategic guidance and counsel.
- ✓ The Main Committee for ISE Program Quality Assurance Standards is dedicated to the accreditation, continuous improvement, and assurance of the educational program's quality.
- ✓ Academic Support Committees are tasked with offering comprehensive academic assistance and support for the usual academic endeavors.
- ✓ ISE Academic Program Committees focus on the meticulous planning and execution of the department's academic programs.
- ✓ Development and Social Committees foster growth and enhance the department's social environment.

This structure ensures a holistic approach to managing the department's operations, guaranteeing a high standard of education while promoting a supportive and vibrant academic environment.

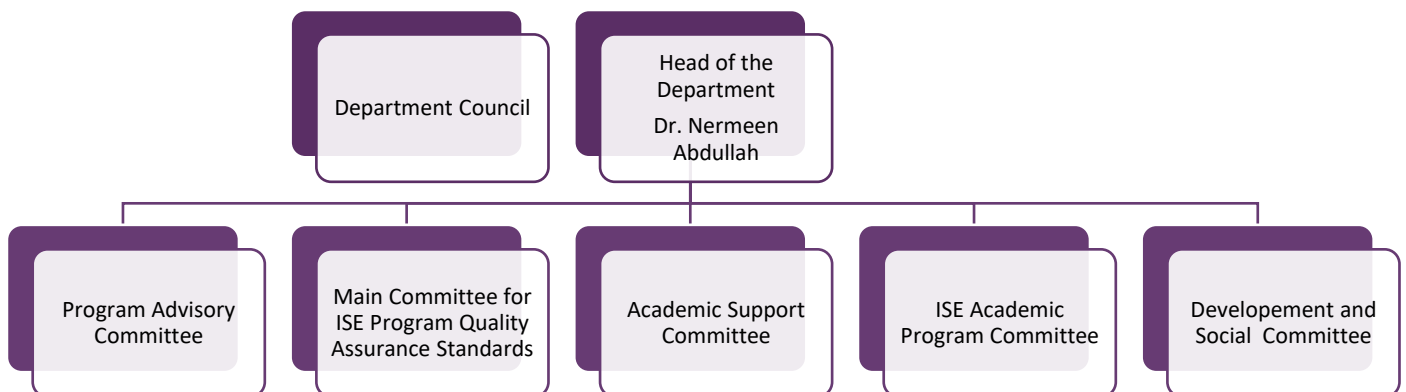


Figure 2 Organizational Structure of the ISE department

5 Role and responsibilities of the Head of the department and the committees

5.1 Head of the department

The following document specify the main tasks assigned to the head of the department [Responsibilities of the Dean and Head of department](#).

At the department level, the head of the department is responsible for managing the following entities:

Department Council

Every department in the colleges and institutes has a department council composed of its faculty members. Each department has authorities within the limits of the system and its regulations and is responsible for teaching the courses that fall under its jurisdiction after their approval by the university council.

The department council meets at least once a month, convened by its chair, and the meeting is valid only with the presence of two-thirds of its members. The council is chaired by the department chair, and its decisions are made by an absolute majority of the votes of the present members, with the chair having the casting vote in the event of a tie. The decisions of the council are considered effective unless objected to by the dean of the college or institute within fifteen days from the date they are received. If the council maintains its stance, the contested decision is referred to the college council, which has the authority to decide on it.

In cases where the topic of discussion pertains to the department chair or if they are unable to preside due to unforeseen circumstances, the dean of the college or one of the college's vice-deans will chair the session.

Tasks and authorities of the department council include:

Student Affairs:

- Proposing the number of students that can be admitted each academic year.
- Approving the re-enrollment of students based on the rules specified in Article 17 of the study and examination regulations and according to the established system and procedures.
- Approving a student's study of academic courses to improve their cumulative GPA if they have completed the required courses for graduation successfully and their GPA is below the required standard according to the system and procedures.
- Recommending giving a student a fourth opportunity to raise their cumulative GPA according to the system and procedures.
- Recommending granting a student an exceptional chance to complete graduation requirements within a maximum period not exceeding half of the original duration set for

graduation if the student has not completed the graduation requirements within a maximum of half of the prescribed period in addition to the program duration according to the system and procedures.

- Recommending giving a student dismissed due to exceeding twice the duration of the program an exceptional opportunity to complete their studies not exceeding two semesters according to the system and procedures.
- Recommending giving a student dismissed due to warnings for low cumulative GPA an exceptional opportunity to complete their studies not exceeding two semesters according to the system and procedures.
- Determining the grade of coursework for courses according to the system and procedures.
- Nominating a non-course instructor to create the final exam questions for some courses as needed, based on the recommendation of the department chair and according to the system and procedures.
- Assigning the correction of examinations to faculty members other than the course instructor as needed according to the system and procedures.
- Approving the equivalence of courses studied by a student outside the university according to the system and procedures.
- Approving study plans, curricula, prescribed books, references, and submitting them to the college council.
- Proposing admission and transfer regulations among departments according to the system and procedures.

Faculty Affairs

- Recommending the appointment of faculty members according to the system and procedures.
- Recommending the appointment of lecturers, teaching assistants, language teachers, and research assistants according to the system and procedures.
- Recommending appointments to the rank of assistant professor without the requirement of a Ph.D. in disciplines where a Ph.D. is not offered, according to the criteria established in the higher education system and regulations and according to the system and procedures.
- Recommending promotions of faculty members and equivalent positions according to the system and procedures.
- Recommending a change of specialization for teaching assistants and lecturers according to the system and procedures.



- Distributing lectures, exercises, and training activities among faculty members and equivalent positions, and organizing and coordinating department activities.
- Recommending exceptional leave and parental care leave for department faculty members according to the system and procedures.
- Recommending sabbatical leave for a faculty member for an academic year after five years of appointment or from enjoying a previous sabbatical, or for one semester after three years from appointment or from enjoying a previous sabbatical according to the system and procedures.
- Reviewing the report submitted about a faculty member's achievements during their sabbatical.
- Recommending approval for a faculty member to work as a part-time consultant in government agencies, the private sector, or regional or international organizations, based on the conditions in Article 66 of the regulations governing faculty affairs in Saudi universities according to the system and procedures.
- Recommending faculty members' attendance or participation in conferences, seminars, and training courses both within and outside the university according to the system and procedures.
- Recommending the secondment of faculty members and equivalent positions according to the system and procedures.
- Recommending the loan of faculty members and equivalent positions according to the system and procedures.
- Recommending sending a faculty member on a scientific mission outside the university headquarters according to the system and procedures.
- Recommending sending a faculty member to teach outside the Kingdom according to the system and procedures.
- Recommending allowing a faculty member to travel to conduct research at a university other than their own during the summer vacation according to the system and procedures.
- Recommending the transfer of faculty members and equivalent positions from one department to another within the same college according to the system and procedures.
- Recommending the transfer of a faculty member and equivalent positions from one college to another within the university according to the system and procedures.
- Recommending the transfer of a faculty member and equivalent positions to a position outside the university according to the system and procedures.
- Recommending the renewal of the contract for non-Saudi faculty members who have exceeded the maximum age limit according to the system and procedures.

- Recommending granting exceptional leave for contracted faculty members for a period not exceeding one semester due to circumstances assessed by the department according to the system and procedures.
- Recommending the use of specialists as visiting professors from Saudis and others according to the established rules.
- Recommending the acceptance of the resignation of faculty members and equivalent positions or their early retirement based on their request according to the system and procedures.
- Recommending the extension for Saudi faculty members after service termination according to the system and procedures.
- Recommending the use of retired professors on a contract basis for a period not exceeding two years, renewable according to the system and procedures.
- Recommending assigning additional teaching units beyond the prescribed load and issuing compensation for the teaching units exceeding the prescribed load to faculty members and equivalent positions.
- Proposing the use of distinguished Saudi talents to teach certain department courses as collaborators and submitting them to the college council according to the system and procedures.
- Recommending regarding the request of other government agencies to use faculty members and equivalent positions for teaching at those agencies according to the system and procedures.
- Approving the annual department report and submitting it to the college council.

Scholarship Affairs:

- Recommending the scholarship of teaching assistants and lecturers, their extensions, or the termination of their scholarships according to the system and procedures.
- Recommending approval for changing the scholar's specialization, university, or country of study according to the system and procedures.
- Recommending approval for the scholar's scientific trip according to the system and procedures.
- Recommending stopping the scholar's allowances in the following cases:
 - Obtaining the academic degree.
 - If the scholar changes their place of study, specialization, or university without the council's approval.

- Recommending terminating the scholarship based on Article 28 of the scholarship and training regulations for university personnel in the following cases:
- The scholar's inability to continue studies according to reports related to their academic progress.
- If the scholar requests to terminate the scholarship and return to the Kingdom.
- If the scholar violates the regulations or instructions or refuses to comply with them.
- If the scholar does not obtain the required qualification within the specified period.
- If it is proven that the scholar has ceased studying without an acceptable excuse.
- Approving a report on the status of struggling department scholars after half of the period has passed and submitting it to the college council.
- Reviewing the names of distinguished department scholars and their areas of excellence annually and submitting them to the college council.
- Approving a detailed annual report on the scholarship situation in the department and submitting it to the college council.

Graduate Studies Affairs

- Recommending approval for graduate programs after studying them and submitting them to the college council.
- Proposing the number of students to be admitted annually to graduate programs.
- Recommending changes in courses, program requirements, or admission conditions at the master's or doctoral levels according to the system and procedures.
- Recommending admitting a student to study for a master's or doctoral degree in a field other than her specialty according to the system and procedures.
- Recommending approval for postponing the admission of a graduate student, not to exceed two semesters, according to the system and procedures.
- Approving the conditions mentioned in Article 22 of the unified regulations for graduate studies.
- Approving a graduate student's deletion of all courses for the semester according to the system and procedures.
- Recommending cancellation of a student's registration in the cases mentioned in Article 26 of the unified regulations for graduate studies.
- Recommending re-registration of a student if her registration is canceled in cases of extreme necessity based on Article 27 of the unified regulations for graduate studies according to the system and procedures.



- Recommending granting a student one additional semester or two semesters at most if her cumulative GPA falls below "very good" in two consecutive semesters according to the system and procedures.
- Recommending granting a student an additional opportunity of up to two semesters based on the report of the supervisor of her university thesis if the student does not obtain the degree within the maximum period specified for obtaining it according to the system and procedures.
- Recommending accepting the transfer of a student to the university from another recognized university, considering the transfer conditions in Article 30 of the unified regulations for graduate studies in universities according to the system and procedures.
- Recommending transferring a student from one specialty to another within the university, taking into account the admission conditions in Article 31 of the unified regulations for graduate studies in universities and any other conditions deemed necessary by the department based on the recommendation of the transferred department council according to the system and procedures.
- Recommending approval for the courses required to obtain the diploma and the name of the certificate according to Article 32 of the unified regulations for graduate studies in universities according to the system and procedures.
- Recommending approval for alternative exams and courses that require more than one semester to study in graduate studies courses according to the system and procedures.
- Approving the assignment of a thesis supervisor and the assistant supervisor if any, or the names of the supervisory committee members with the designation of its chair based on the department's proposal according to the system and procedures.
- Recommending approval for writing university theses in a language other than Arabic in some specialties, providing a comprehensive summary in Arabic.
- Recommending that the supervision of scientific theses be conducted by supervisors with distinguished experience and scientific sufficiency in the research field from outside the university faculty.
- Recommending increasing the number of theses supervised by a faculty member to five in cases of extreme necessity according to the system and procedures.
- Approving an alternative supervisor on the thesis in case the supervisor is unable to continue supervising or ends his service at the university according to the system and procedures.
- Recommending approval for forming the discussion committee on scientific theses according to the system and procedures.

- Recommending proposing an alternative supervisor on the thesis in case the supervisor on the thesis is unable to participate in the discussion committee due to his death, end of service, or being on a long-term mission abroad according to the system and procedures.

5.2 Department Committees

The ISE department committees are classified within the following groups to ensure the performance of the ISE department's functions requirements.

5.2.1 Main Committee for ISE Program Quality Assurance Standards

The Main Committee for ISE Program Quality Assurance Standards is further divided into five subcommittees, each dedicated to a specific standard within the NCAAA program's quality framework. These subcommittees are as follows:

- ✓ Standard 1 Committee: Program Management
- ✓ Standard 2 Committee: Teaching and learning
- ✓ Standard 3 Committee: Students
- ✓ Standard 4 Committee: Faculty
- ✓ Standard 5 Committee: Learning resources, Facilities, and equipment

This hierarchical scheme is pivotal in ensuring the continuous enhancement and sustenance of the department's educational quality and standards, with each subcommittee focusing on an aspect of the NCAAA standard.

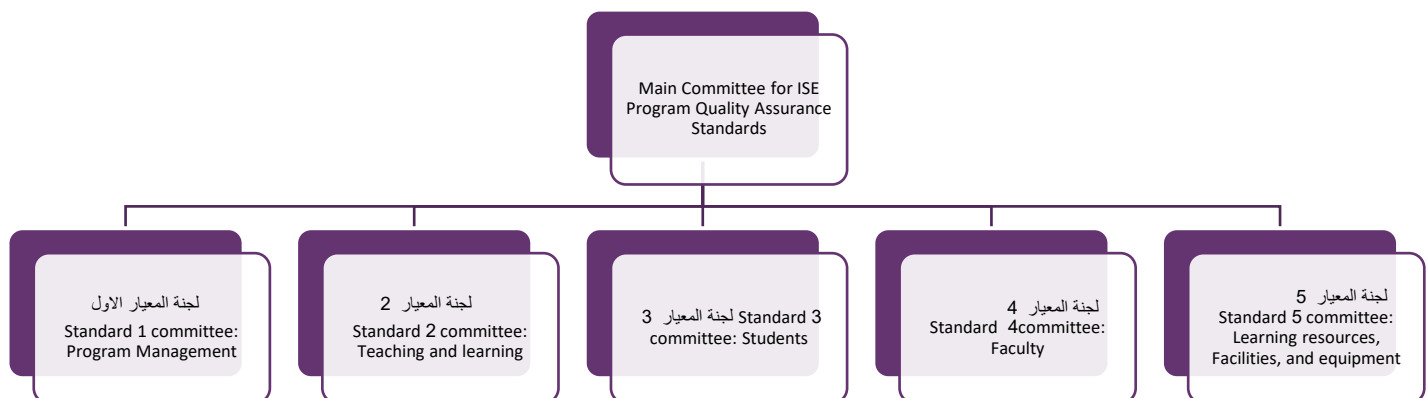


Figure 3 Main Committee for ISE Program Quality Assurance Standards

5.2.2 Academic Support Committee

The breakdown structure of the ‘Academic Support Committee’ is described in Figure 3.

- ✓ Learning Committee
- ✓ Laboratory Committee
- ✓ Training and Industrial Relations Committee
- ✓ Academic Advising Committee
- ✓ Examination Committee
- ✓ Capstone Projects and COOP Training Committee
- ✓ Scheduling Committee

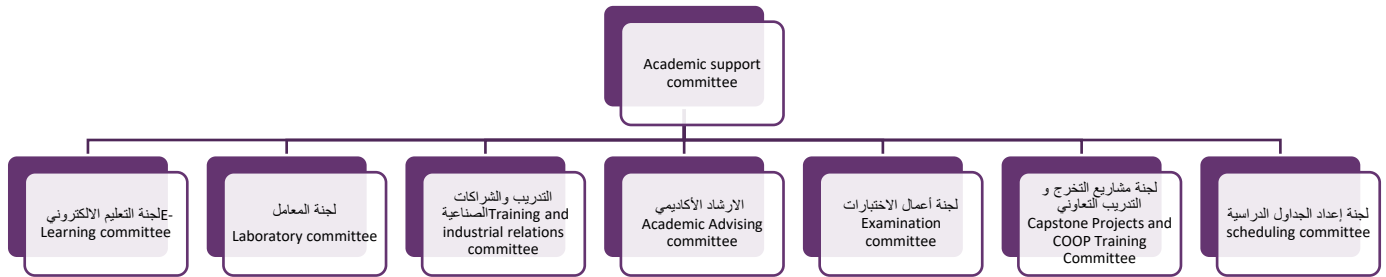


Figure 4 Academic Support Committee.

5.2.3 ISE Academic Program committee

The ISE Academic Program Committee is responsible for managing the ISE academic program (Figure 4). The main sub-committees under the ISE Academic Program Committee are as follows:

- ✓ Program Committee
- ✓ Surveys and Performance Indicators Committee
- ✓ Program Learning Outcomes Assessment & Measurement Committee
- ✓ Examination and Evaluation Committee

Each sub-committee is tasked with specific roles aimed at managing various aspects of the program. The main tasks of these committees are defined by the deanship of quality assurance and development and presented in the link below presenting their various functions and tasks.



Figure 5 ISE Academic Program committee.

5.2.4 Development and Social committee

The "Development and Social Committee" and its associated sub-committees are represented in Figure 5.

- ✓ Extracurricular Activities and Community Service Committee focuses on activities beyond the academic curriculum and community engagement.
- ✓ Faculty Development Committee
- ✓ Recruitment Committee
- ✓ Scientific Research Committee suggesting a focus on research activities within the organization.
- ✓ Impact of Artificial Intelligence on Academic Curricula Committee. This committee explores how AI influences educational programs.
- ✓ New Program Committee

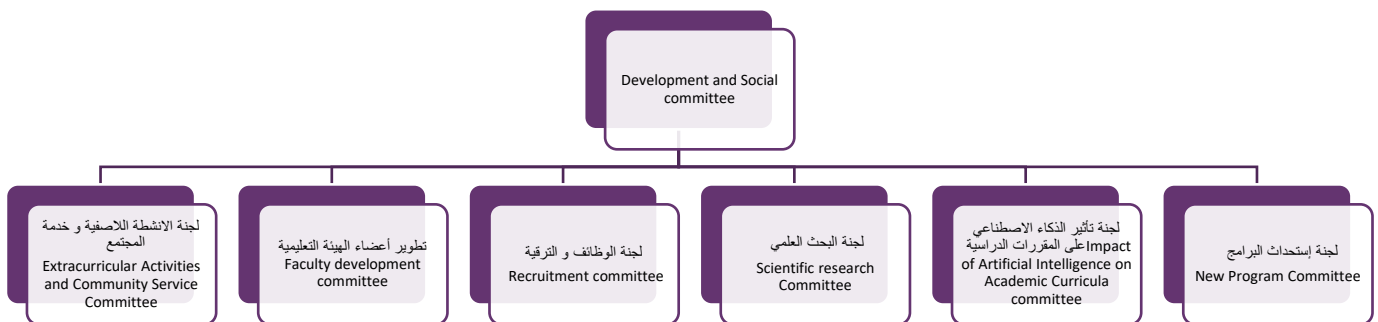


Figure 6 Development and Social Committee.



[Link to the Program committees](#)



Chapter 2: Do (Implementation)

This chapter includes:

- 1- Program Tree.**
- 2- Program Specification.**
- 3. Study Plan**
- 4. Course Specification.**
- 5. Field Experience Specification.**
- 6. Program & Course Rubrics (Learning Outcomes Measurement)**
- 7. Surveys.**
- 8. KPIs.**

1 Program Tree

The program tree is considered one of the most important pillars in developing an academic program and achieving quality assurance standards. It clarifies the connection between the program mission, objectives and learning outcomes, which is reflected in the course learning outcomes.

For the ISE program, the program tree is given in the figure below:

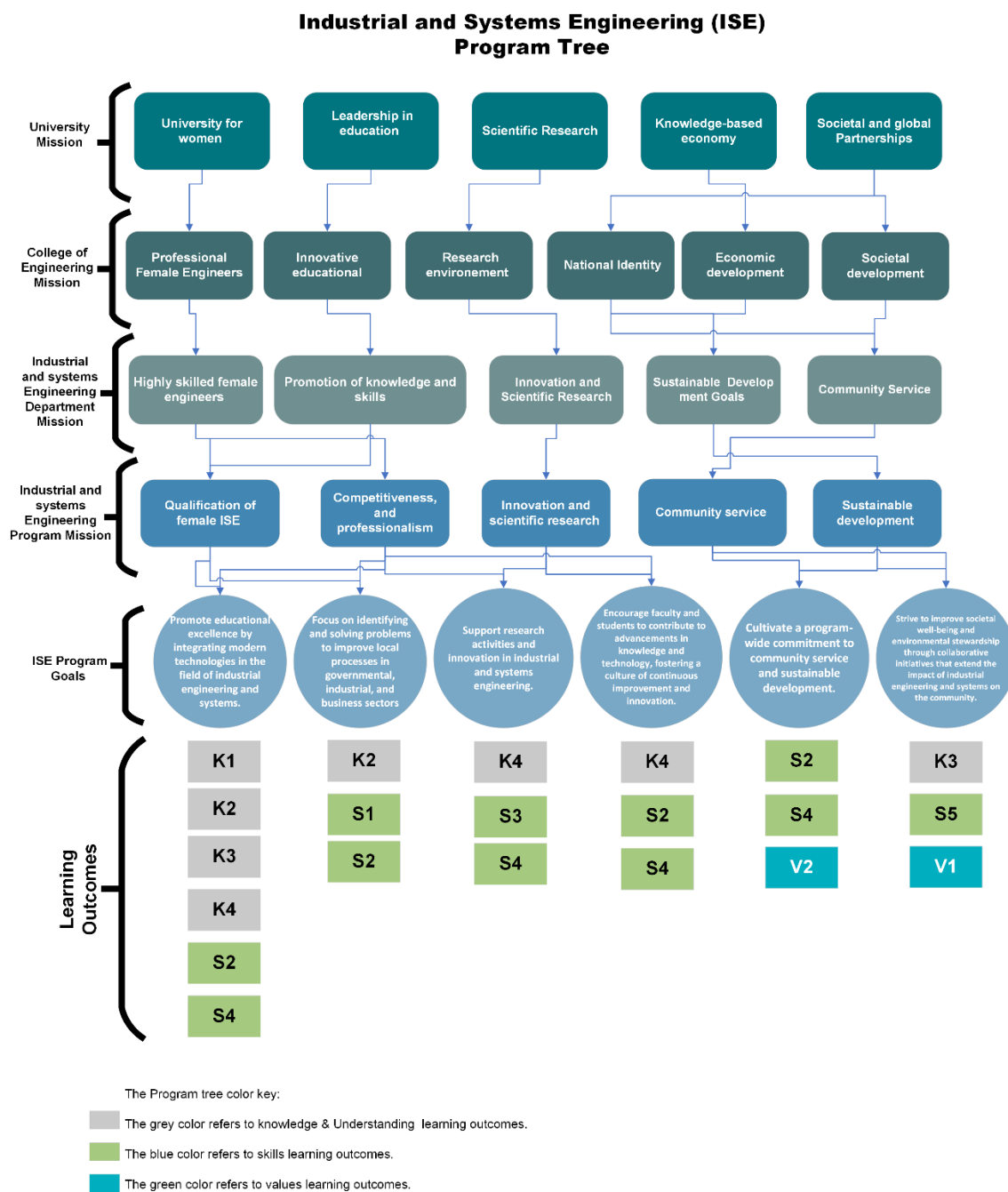


Figure 7 ISE program tree

2 Program Specification

2.1 Program learning outcomes.

The program learning outcomes of the ISE program are classified into three domains as required by the NCAAA. Each domain encompasses various learning outcomes that the ISE program might aim to achieve. PLOs are shown in table 1.

Table 1 Program learning outcomes

Domain 1: Knowledge and understanding	
Description: Outcomes in this domain ensure that students acquire a solid foundation in industrial and systems engineering concepts, theories, and methodologies. This includes understanding complex systems and engineering management.	
K1	Define theoretical concepts related to the industrial and systems engineering field.
K2	Associate industrial engineering theories and models to real problems using mathematical and basic sciences.
K3	Recognize the impact of industrial engineering solutions in a global, economic, environmental, and societal context.
K4	Recall the knowledge of industrial engineering methodologies and research for addressing topical problems.
Domain 2: Skills	
Description: Outcomes in this domain guarantee students excel in problem-solving, analysis, interpretation, using experiments and software, innovation, and communication. They're prepared for today and future challenges with ethical professionalism.	
S1	Employ engineering, scientific, and mathematical principles to analyze pertinent data while formulating industrial and systems engineering problems, to bolster the process of engineering decision-making.
S2	Examine modern engineering problems and trends, employing experiments and software tools to connect industrial engineering theories with real applications.
S3	Apply engineering design to produce solutions in industrial engineering field that meet specified needs with consideration of public health, safety, as well as social, environmental, and economic factors.
S4	Develop engineering interpretation and judgment skills using critical thinking and creative and innovative solutions in theoretical and experimental field of industrial and systems engineering.
S5	Communicate effectively with a range of audiences to build a relationship with industrial engineering community and to provide entrepreneurship.
Domain 3: Values, Autonomy, and Responsibility	
Description: Outcomes in this domain emphasizes the development of professional ethics, leadership qualities, and a deep understanding of the broader impacts of engineering solutions.	
V1	Support work teams providing leadership and creating a collaborative and inclusive environment while establishing goals to meet and planning tasks related to industrial and systems engineering field.
V2	Judge the impact of industrial engineering solutions in global, economic, environmental, and societal contexts while recognizing engineering ethical and professional responsibilities.

2.2 Teaching methods and Assessment strategies

Table 2 outlines the teaching strategies and assessment methods aligned with the program learning outcomes (PLOs) of an ISE program. The matrix categorizes them into three areas: Knowledge and Understanding, Skills, and Values. Teaching strategies include lectures, tutorials, research activities, case studies, group work, problem-based learning, computer simulations, virtual labs, and asynchronous learning approaches like flipped classrooms. Assessment methods span quizzes, midterms, final exams, projects, tutorials, homework, lab reports, lab exams, and presentations. These methods are designed to ensure that students achieve the PLOs, which include applying engineering principles, analyzing data, examining engineering problems, developing engineering interpretations, and communicating effectively.

Table2 Teaching methods and Assessment strategies.

Code	PLO	Teaching strategies	Assessment methods
Knowledge and understanding			
1.1	Define theoretical concepts related to the industrial and systems engineering field.	Lecture, Tutorial, Research activity, Case study	QUIZ, Midterm, Final Exam, Project, Homework
1.2	Associate industrial engineering theories and models to real problems using mathematical and basic sciences.	Lecture, Tutorial, Research activity, Case study	QUIZ, Midterm, Final Exam, Project, Homework
1.3	Recognize the impact of industrial engineering solutions in a global, economic, environmental and societal context.	Lecture, Tutorial, Research activity, Case study	QUIZ, Midterm, Final Exam, Project, Homework
1.4	Recall the knowledge of industrial engineering methodologies and research for addressing topical problems.	Lecture, Tutorial, Research activity, Case study	QUIZ, Midterm, Final Exam, Project, Homework
SKILLS			
2.1	Employ engineering, scientific, and mathematical principles to analyze pertinent data while formulating industrial and systems engineering problems, to bolster the process of engineering decision-making.	Lecture, Tutorial, Case study, Research activities, Group work or Group discussion, Computer simulation, Virtual Lab, Problem based learning (Problem solving, Case study, Project), Asynchronous Learning (Flipped classroom, Future X, Reverse classroom)	QUIZ, Midterm, Final Exam, Project, Homework, Lab Report, Lab Exam
2.2	Examine modern engineering problems and trends, employing experiments and software tools to connect industrial engineering theories with real applications.	Lecture, Tutorial, Case study, Research activities, Group work or Group discussion, Computer simulation, Virtual Lab, Problem based learning (Problem solving, Case study, Project), Asynchronous Learning (Flipped classroom, Future X, Reverse classroom)	QUIZ, Midterm, Final Exam, Project, Homework, Lab Report, Lab Exam

Code	PLO	Teaching strategies	Assessment methods
2.3	Apply engineering design to produce solutions in industrial engineering field that meet specified needs with consideration of public health, safety, as well as social, environmental, and economic factors.	Lecture, Tutorial, Case study, Research activities, Group work or Group discussion, Computer simulation, Virtual Lab, Problem based learning (Problem solving, Case study, Project), Asynchronous Learning (Flipped classroom, Future X, Reverse classroom)	QUIZ, Midterm, Final Exam, Project, Homework, Lab Report, Lab Exam,
2.4	Develop engineering interpretation and judgment skills using critical thinking and creative and innovative solutions in theoretical and experimental field of industrial and systems engineering.	Lecture, Tutorial, Case study, Research activities, Group work or Group discussion, Computer simulation, Virtual Lab, Problem based learning (Problem solving, Case study, Project), Asynchronous Learning (Flipped classroom, Future X, Reverse classroom)	QUIZ, Midterm, Final Exam, Project, Homework, Lab Report, Lab Exam
2.5	Communicate effectively with a range of audiences to build a relationship with industrial engineering community and to provide entrepreneurship.	Lecture, Tutorial, Case study, Research activities, Group work or Group discussion, Computer simulation, Virtual Lab, Problem based learning (Problem solving, Case study, Project), Asynchronous Learning (Flipped classroom, Future X, Reverse classroom)	QUIZ, Midterm, Final Exam, Project, Homework, Lab Report, Lab Exam
Values, Autonomy, and Responsibility			
3.1	Support work teams providing leadership and creating a collaborative and inclusive environment while establishing goals to meet and planning tasks related to industrial and systems engineering field.	Research activities, Workshops /Seminars, Group work or Group discussion, Problem based learning (Problem solving, Case study, Project), Asynchronous Learning (Flipped classroom, Future X, Reverse classroom)	Project, Lab Report, Presentation
3.2	Judge the impact of industrial engineering solutions in global, economic, environmental, and societal contexts while recognizing engineering ethical and professional responsibilities.	Research activities, Workshops /Seminars, Group work or Group discussion, Problem based learning (Problem solving, Case study, Project), Asynchronous Learning (Flipped classroom, Future X, Reverse classroom)	Project, Lab Report, Presentation

The consistency between the Program graduate attributes, PLOs is given in the following figure 8

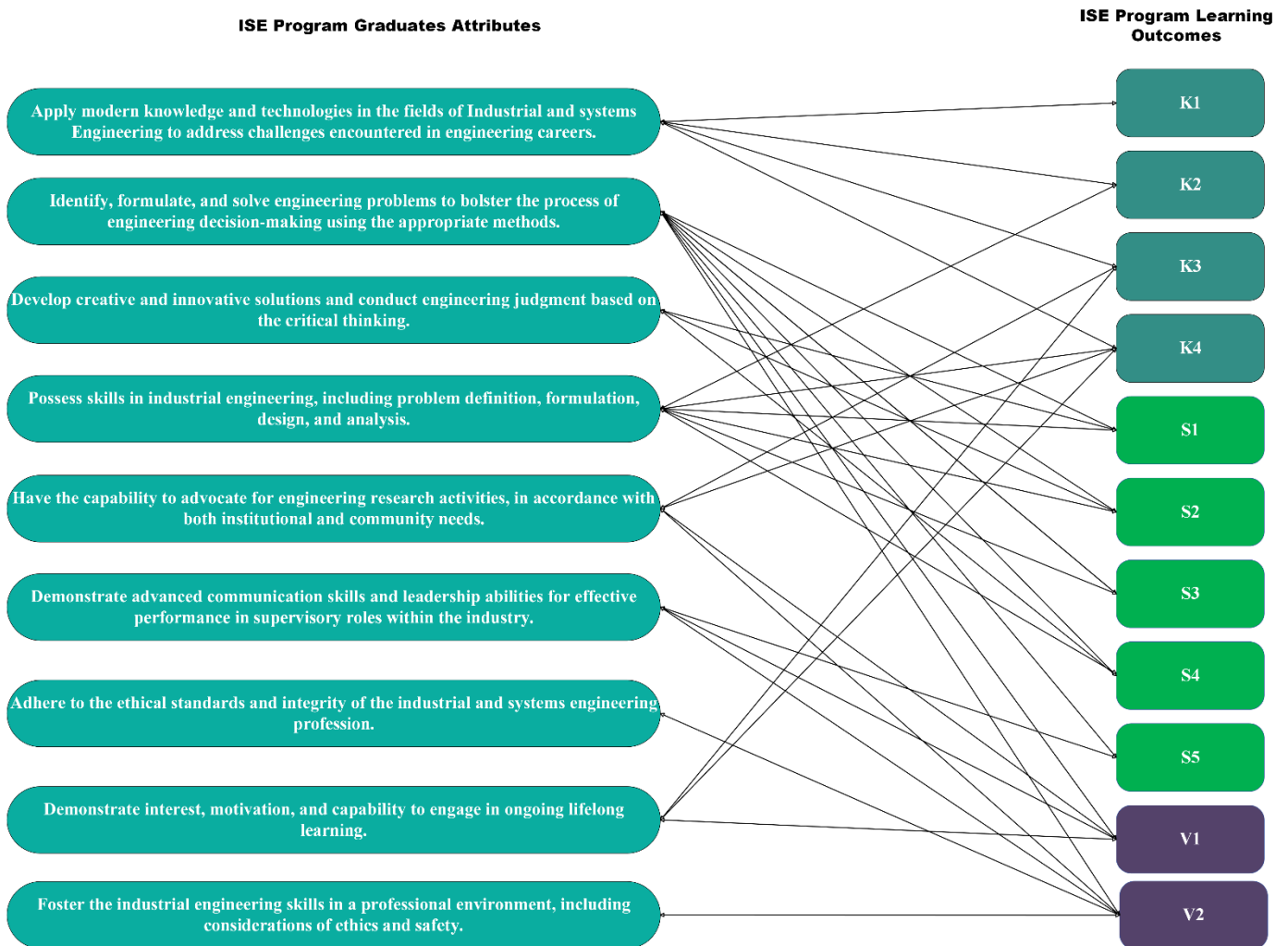


Figure 8 ISE graduate attributes vs ISE PLOs

2.3 Study plan

The ISE program study plan is described in the following link: [III-Study Plan](#) .

The ISE study plan offers a comprehensive and structured curriculum designed to equip students with the knowledge, skills, and competencies required for success in the field. The curriculum consists of a carefully crafted blend of university, college, core program, and elective courses, providing students with a well-rounded education that balances theoretical foundations with practical applications.

An illustrative figure of the ISE study plan is given in Figure 9 9. It outlines the course progression and prerequisites for the Industrial and Systems Engineering curriculum. Courses are structured to show the recommended sequence over the years, from Freshman to Senior year, including a potential fifth year. The lines connecting the courses indicate

prerequisites (solid lines for a strong prerequisite and dashed lines for a co-requisite). Different colors signify different types of courses, such as departmental, college, or elective courses.

General Structure of the program tree:

- ✓ The tree is organized by academic years, from the 1st year (Freshman) to the 5th year (Senior).
- ✓ Each year is divided into two semesters: First Semester and Second Semester.
- ✓ Courses are represented as blocks within each semester, with lines indicating the flow and prerequisites.
- ✓ The course codes starting with "ISE" and pertain to core Industrial and Systems Engineering courses.
- ✓ Other courses include foundational and complementary subjects such as general courses (Univ*), college requirements, and electives.

Color Coding:

- ✓ Courses are color-coded based on their category, such as department, college, or electives.
- ✓ The university's core requirements are indicated in yellow blocks.
- ✓ ISE prerequisite courses are in green blocks.
- ✓ Electives are in blue blocks, and there are placeholders for three electives in the 4th and 5th years.

Prerequisites and Co-requisites:

- ✓ Solid lines connecting courses indicate prerequisites that must be completed before taking a subsequent course.
- ✓ Dashed lines indicate co-requisites, which can be taken simultaneously with the connected course.
- ✓ Arrows led from prerequisites to the courses that required them.

Capstone and Co-op Training:

- ✓ The program culminates in the 5th year with capstone design projects (ISE 471 and ISE 472) and co-op training (ISE 473), indicating the program's hands-on, practical component.
- ✓ The capstone projects are labeled with the total credit requirement for starting them (139 CR for ISE 471 and 153 CR for ISE 473).

Special Notes:

- ✓ Some courses have multiple prerequisites, forming a web of requirements that ensure students build upon foundational knowledge.

- ✓ The program tree highlights the importance of planning the academic trajectory to meet all prerequisites in time for desired courses.

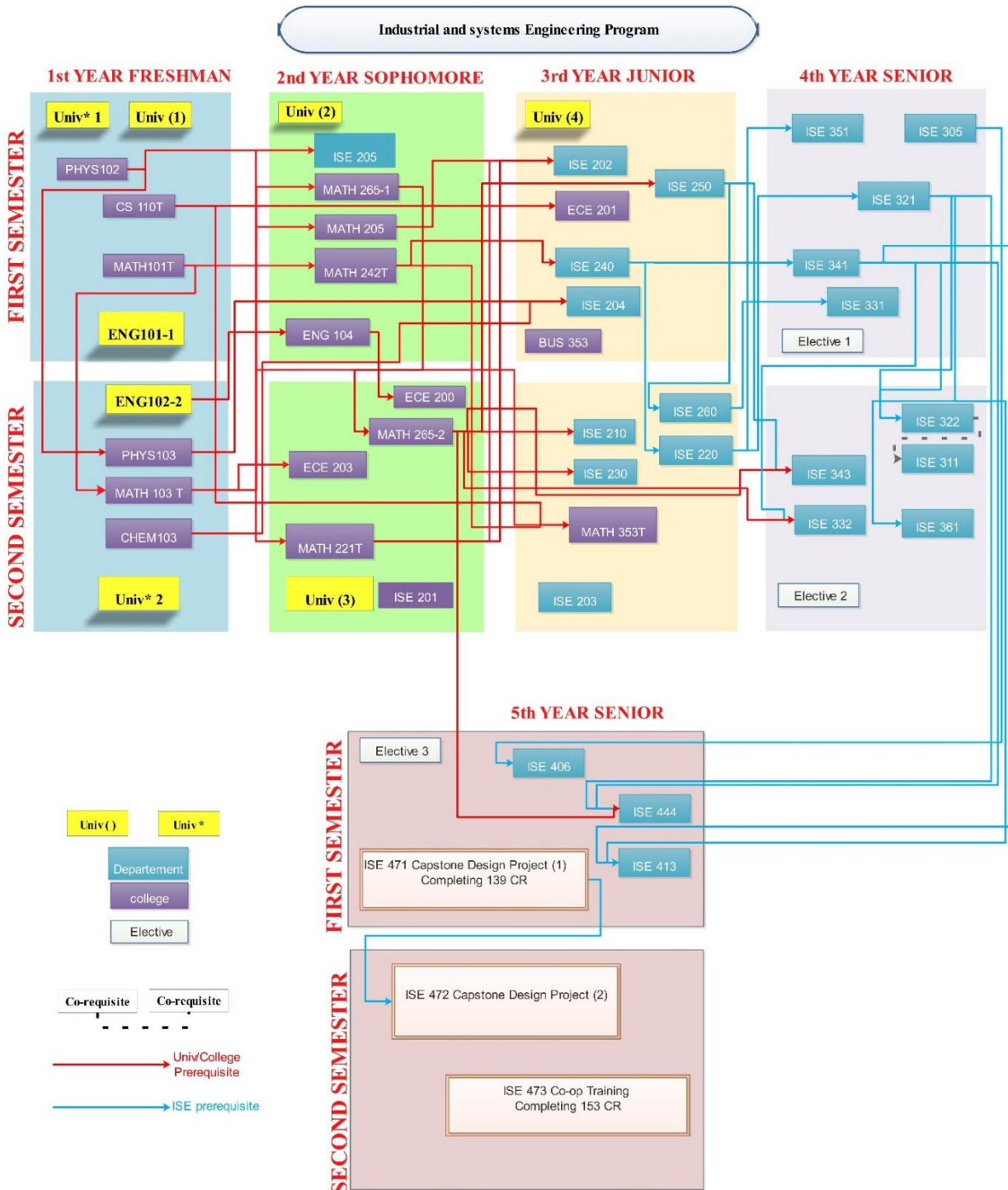


Figure 9 Program study plan sequencing

3 Study Plan



[ISE Study plan](#)

4 Course specification



[ISE course specification](#)

5 Field of Experience specification



[field of experience specification 1444H](#)

[Field of experience specification 1445H](#)

6 Learning Outcomes Measurement plan



[PLOs measurement plan](#)

7 Surveys



[Survey Reports](#)

8 KPIs



[KPIs Reports](#)



Chapter 3: Check (Examination)

This chapter includes:

1. Course Report.
2. Field Experience Report.
3. Annual Program Report,
4. Course File
5. Learning Outcomes Measurement Report.
6. KPIs Report.
7. Surveys Report

1 Course Report

The course report serves as the culmination of a comprehensive evaluation process, delineating student outcomes, assessments of learning objectives, and pertinent recommendations. It encompasses a meticulously devised course improvement plan delineating primary actions and strategies aimed at enhancing the course. The formulation of these strategies is intricately tied to the attainment of Course Learning Outcome (CLO) scores. The report, crafted according to the standardized NCAAA template (T7 for the Version 2020 and TP154 for the version 2023), plays a pivotal role in effectuating a continuous quality improvement loop. This loop is perpetuated through the diligent implementation and subsequent evaluation of the outlined strategies in the subsequent course session, thereby contributing to an iterative enhancement of educational quality.



[ISE course reports](#)

2 Field of Experience Report

The Field Experience Report is a direct result intricately connected to the guidelines outlined in TP155 Field Experiences, encapsulating crucial Course Learning Outcomes (CLOS) specific to the Bachelor of Science in Industrial and Systems Engineering. The CLOS associated with the field of experience delineates the transformation of theoretical knowledge acquired at advanced levels into concrete, practical skills. The Cooperative Training Coordinator bears the responsibility for preparing the field experience report, adhering to the prescribed directives in the NCAAA template (TP 156). This report functions as a tool for assessing the outcomes of cooperative training and directs the subsequent execution of an action plan geared towards continual enhancement in cooperative training practices.



[field of experience reports 1444H](#)

[Field of experience reports 1445H](#)

3 Annual Program Report

The program's director diligently compiles the annual report at the conclusion of both the first and second semesters of the academic year. This extensive document delineates the progression of the program over a span of five years and provides a summary of the graduating class. Moreover, it encapsulates student accomplishments across all academic levels for the current academic year. The report conducts a thorough examination of student evaluations, shedding light on teaching strategies, assessment methods, and the outcomes of learning objectives. Furthermore, the program report assesses performance indicators and puts forth proposals for improvement plans. The preparation of this annual report

strictly adheres to the NCAAA templates (version 2020 and version 2023), ensuring a standardized and comprehensive evaluation of program performance, thereby closing the quality cycle loop.



[Annual reports](#)

4 Course portfolios

The course file, also known as a course portfolio, serves as a repository of evidence documenting the activities undertaken in a particular course and is instrumental in the program review process. The course portfolio, Organized into N chapters, provides a comprehensive overview of the course's history across the year. These chapters encompass essential elements such as the course outline, professor's office hours, course approval document, course specification, course report, evidence of course specifications provided to students at the semester's commencement, copies of teaching materials, samples of assessment materials, copies of key answers, evaluations of exam papers, question banks, complete records of results for all assessments, reports of course evaluations by students, samples of student activities, multimedia examples, internal auditing reports for course specifications, and responses from the course coordinator. At the culmination of each semester, each course instructor is obligated to submit the course file to the program coordinator. Subsequently, the program coordinator disseminates all course files to the internal auditing committee for thorough examination and review.



[course portfolio](#)

5 ISE Program's Learning outcomes Report

The program is committed to ensuring that students attain the established learning outcomes through a comprehensive assessment system. This system employs diverse tools and mechanisms to gauge student learning and confirm their proficiency in essential competencies.

The measurement of the PLOs employs two methods: the direct method, which involves measuring CLOs results, and the indirect method, which involves different types of surveys (Course survey, Mid-program survey, final program survey, alumni survey, and employee and employers' surveys).

The process of PLOs measurement is presented in the following flowchart:

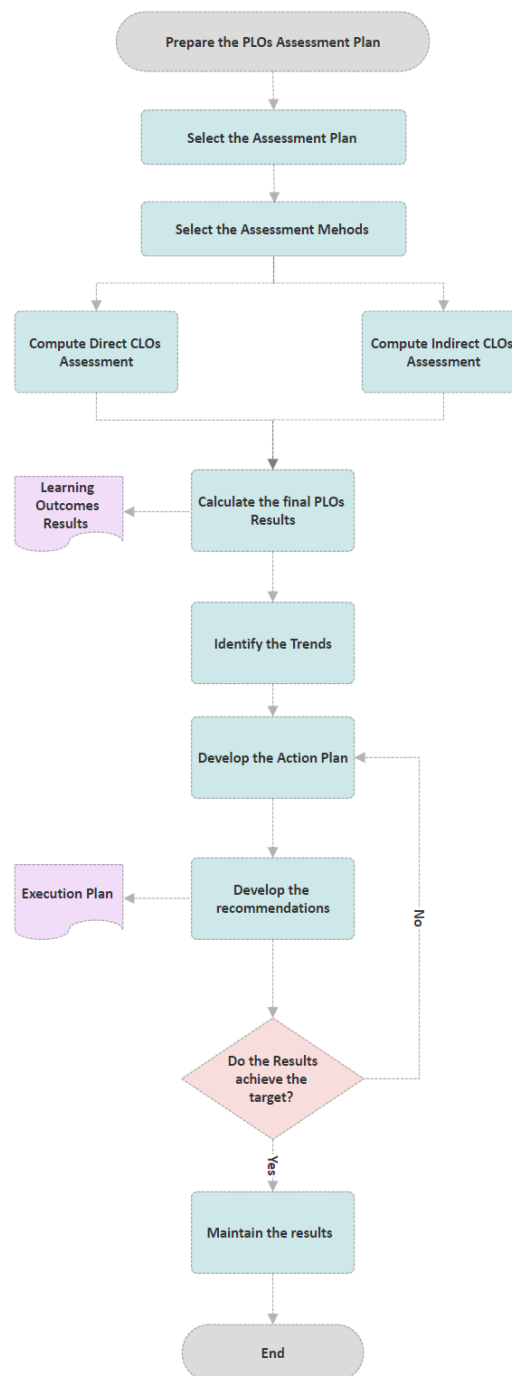


Figure 10 process of PLOs measurement

The direct measurement process tracks the following steps:

- ✓ A total of eleven courses based on course-level practiced (P) and Mastered (M) are selected for the assessment of the PLOs ([Assessment Plan 1444H Batch 1](#) and [Assessment Plan 1445H Batch 2](#)).
- ✓ Each Course Learning Outcome (CLO) within the mapped courses is assessed and contributes to the final value of the Program Learning Outcomes (PLOs) .

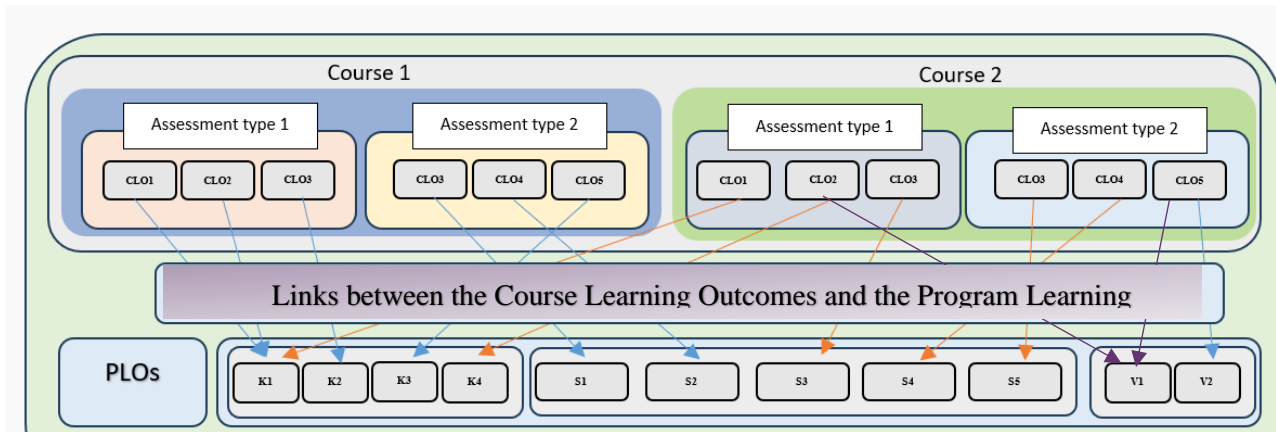


Figure 11 Process of PLOs assessment based on selected courses

A two-year measurement plan has been implemented. Results from the first batch were collected during 1443 and 1444H ([Assessment Report 1444H Batch 1](#)) while results for the second batch were gathered in 1444H and 1445H ([Assessment Report 1445H Batch 2](#)), continuing in this pattern. Assessments alternate between the first and second years to ensure all Program Learning Outcomes (PLOs) are covered by the end of the second year. This distribution across the two years is illustrated in figure 12 and the plan and the results were developed in the following evidence [VII-PLOs Assessment Plan+ Report](#)

During this period, the learning outcomes were assessed against their target levels, and recommendations for future cycles were formulated based on these evaluations.

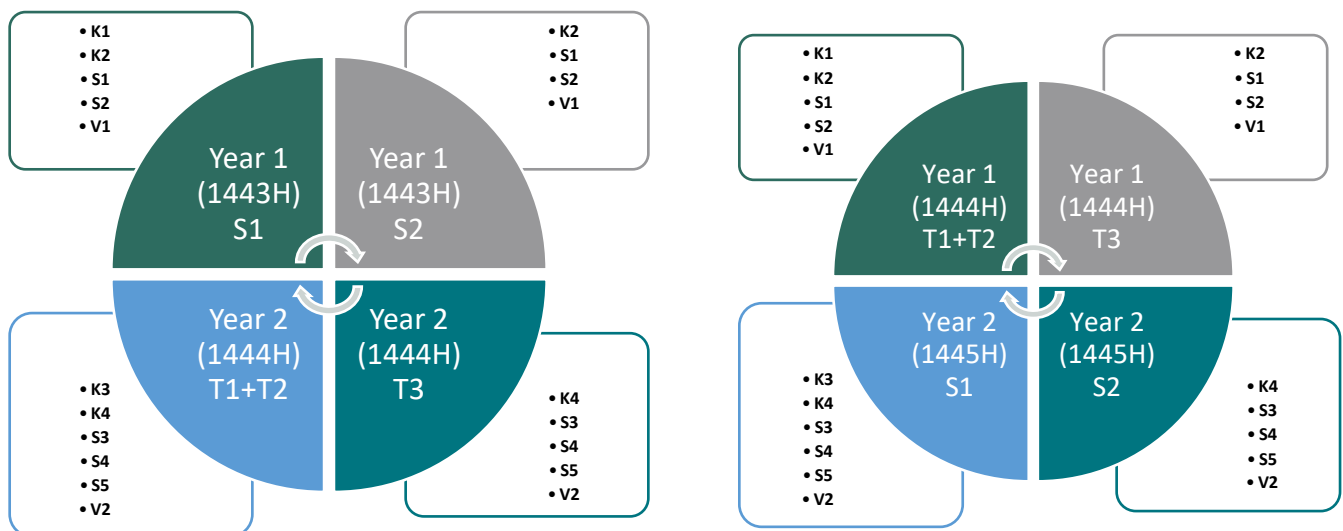


Figure 12 cycle of PLOs measurements

The Indirect methods

The indirect methods applied to measure the PLOs are as follow: CLOs survey, mid-program survey, Final program survey, alumni survey and employee surveys [IX-Surveys Report](#).

The PLOs target value is fixed according to a Program committee and the department conscious, and its periodically updated. Initially, the performance benchmark for achieving the PLOs was set at 75% (equivalent to 3.75 out of 5). Depending on the circumstances, there may be recommendations to either raise or maintain this target level.



[PLOs measurement reports](#)

6 ISE Program's Survey Report

The Program's Survey Report is a comprehensive document that not only acknowledges the indirect assessment nature of surveys for PLOs but also serves as a valuable tool in informing strategic decisions, fostering continuous improvement, and ensuring alignment with the quality management standards set by the PNU QMS.

The main surveys linked to the ISE program evaluate and measure the stakeholders' satisfaction with the quality of the educational process and the stakeholders' satisfaction with the university's services and environment.

The process of activating surveys and the methodology employed for survey calculations, as prescribed by the PNU QMS, lead to the formulation of an action plan. This plan aims to achieve the target benchmark established by the Survey and Key Performance Indicator (KPI) committee, ultimately facilitating the closure of the quality loop within the quality management framework.

The main surveys are as follows:

Survey name	Description (main objectives)	Periodicity
Alumni Evaluation Survey	Measuring the satisfaction of female students with the program	during the first academic year after their graduation
Employers ' Survey	Measuring the satisfaction of employers with the learning outcomes of female students	six months after their integration into the job market
Student Final level Evaluation Survey	Assessing and gauging students' satisfaction, experiences, and feedback regarding their academic experience	End of the Second semester for Level 10
Student Mid-program Evaluation Survey	evaluating and gathering feedback from students regarding their experiences, challenges, and satisfaction levels during the midpoint of their academic program	End of the Second semester for Level 6

Survey name	Description (main objectives)	Periodicity
Student Course Evaluation Survey	collecting feedback from students on specific courses, assessing their satisfaction, understanding of course materials, and overall learning experience	End of each semester
A questionnaire for evaluating the student's satisfaction with the services and environment of the university	gathering feedback and insights from students, aiming to assess their overall satisfaction with various university services and the campus environment	End of each year
Faculty Satisfaction Survey with the University Services and Environment	gathering feedback from faculty members, aiming to assess their overall satisfaction with various university services and the working environment	End of each year
Employees Satisfaction Survey with the University Services and Environment	collecting feedback from university staff, aiming to assess their overall satisfaction with various services and the working environment.	End of each year

The ISE program survey Report: [ISE program survey Report 1444h-1445H](#)

7 ISE Program's Key Performance Indicators Report

The ISE program key performance indicators report provides a detailed and insightful overview of the program's performance in key areas. It serves as a valuable tool for stakeholders, including faculty, students, administrators, and industry partners, offering a transparent and data-driven perspective on the program's effectiveness and impact.

This report provides a comprehensive analysis of the results obtained from the assessment of:

- the Key Performance Indicators (KPIs) established by the National Commission for Academic Accreditation and Assessment (NCAAA)
- the Industrial and Systems Engineering (ISE) KPIs, meticulously outlined in the ISE program operational plan



[KPIs Reports](#)



Chapter 4: Act (Improvement)

This chapter includes:

- The ISE program Executive Report
- The ISE program's Self-Study Report

1 The ISE Program Executive report

The ISE Program Executive Report provides a comprehensive overview of the development of the operational plan and evaluates the actions carried out. This detailed report outlines the key initiatives, achievements and challenges encountered during the implementation of the Operational Plan within the Industrial and Systems Engineering (ISE) program.

The executive report begins with a strategic analysis of the goals and objectives outlined in the operational plan. It delves into the specific actions taken to advance the program, highlighting how each initiative aligns with the broader vision for the ISE program.

In addition, the report provides a thorough assessment of the milestones achieved during the implementation of the Operational Plan. It highlights quantitative and qualitative indicators of success, such as improvements in student outcomes, faculty contributions, research efforts and program enhancement.

In addition to the successes, the report is candid about the challenges encountered throughout the implementation process. It discusses the strategies used to overcome obstacles by developing a risk plan (link) and adapting the plan to changing circumstances, demonstrating the resilience and adaptability of the program.

The Executive Report also includes a section on future directions, outlining the development plan that has emerged from the lessons learned during the implementation of the Operational Plan. It identifies areas for further improvement, strategic investments and initiatives that will drive the ISE program towards continued excellence.

By detailing the development plan resulting from the execution of the operational plan, the ISE Program Executive Report serves as a key document for program stakeholders, providing a transparent account of the program's progress, achievements, and strategic roadmap for future progress. It serves as a valuable tool for decision-makers, faculty, and other stakeholders involved in shaping the future of the Industrial and Systems Engineering program.

[ISE executive plan](#)



[ISE operational plan](#)

2 The ISE Program Self-study

A self-study of the Industrial and Systems Engineering (ISE) program involves a comprehensive evaluation of its quality. This examination meticulously assesses the program's mission, objectives, and the extent to which they align with the standards for quality assurance and accreditation set forth by the National Commission for Academic

Accreditation and Assessment (NCAAA). These standards are strategically crafted to facilitate continuous improvement while publicly acknowledging programs and institutions that meet the prescribed quality benchmarks.

The overarching goal is to ensure that the ISE program at our institution adheres to rigorous international standards. Monitoring the quality assurance of the program involves employing five standards evaluation scales. Beyond serving as an assessment tool, this document is instrumental for strategic planning, self-review processes, and supporting initiatives aimed at elevating the overall programmatic quality within Princess Nourah University.

This document provides Self-Evaluation Scales for programmatic quality assurance and academic accreditation standards, which include the following standards:

1. PROGRAM MANAGEMENT AND QUALITY ASSURANCE
2. TEACHING AND LEARNING
3. STUDENTS
4. FACULTY
5. LEARNING RESOURCES, FACILITIES, AND EQUIPMENT

The quality assurance and continuous improvement of the Industrial and Systems Engineering (ISE) program hinge on a thorough self-evaluation conducted by various committees within the program. This evaluation is systematically guided by established criteria for quality performance. Faculty and staff responsible for diverse activities within the program meticulously assess performance levels, meticulously examining each criterion and substantiating their assessments with pertinent evidence and proof.

To improve the evaluation process, performance indicators and benchmark comparisons against other industrial engineering programs are integral components. Furthermore, an external perspective is introduced through independent evaluators not affiliated with the institution to ensure credibility, objectivity, and precision in the evaluation. This external input serves to enhance the overall robustness and integrity of the evaluation process within the ISE program.



SSR report



