Actionable Program and Course Assessment Plan

Civil and Environmental Engineering Program

With Specific Course Assessment Plan for Foundation Engineering – SOU20161

1. Purpose

This plan establishes a practical, evidence-based assessment system for the Civil and Environmental Engineering Program at Soran University. It is designed to meet KAAE FC8 expectations by ensuring that the program has clear Program Educational Objectives, measurable Student Learning Outcomes, mapped assessment evidence, assigned responsibilities, timelines, documented results, and improvement actions.

The assessment system should not be treated as a paperwork exercise. Its main purpose is to answer four practical questions every year:

1. Are students achieving the intended learning outcomes?
2. Which outcomes are strong and which are weak?
3. What evidence proves this?
4. What improvement actions will the department take and reassess?

2. Evidence Base Used

The plan is based on the following uploaded evidence:

- The Faculty of Engineering PEOs, especially the Civil and Environmental Engineering PEOs covering professional practice, sustainable and climate-resilient infrastructure, ethics and public safety, lifelong learning, and multidisciplinary teamwork.
- The Civil and Environmental Engineering Program Catalogue, which provides the department mission, program learning outcomes, curriculum structure, and the Foundation Engineering module description.
- The Soran University Academic Program Assessment Plan aligned with KAAE FC8, which requires PEO–SLO mapping, data sources, data collection timeline, responsible individuals, required resources, evaluation timeline, and evaluation results.
- The Student Learning Outcomes document, used mainly as a reference for writing measurable outcomes and connecting outcomes with learning opportunities.

Part A: General Program Assessment Plan

3. Program Name

Civil and Environmental Engineering Program
Faculty of Engineering
Soran University

4. Program Educational Objectives

The program shall adopt the following PEOs from the Faculty of Engineering PEO document:

PEO	Program Educational Objective
PEO1	Graduates will practice civil and environmental engineering effectively in public and private sectors, applying engineering principles to design, construct, and manage infrastructure systems including structures, geotechnical works, transportation, water resources, and environmental systems.
PEO2	Graduates will contribute to the planning and implementation of sustainable, climate-resilient, and environmentally responsible infrastructure solutions that address local and regional development needs.
PEO3	Graduates will demonstrate ethical responsibility, professionalism, and commitment to public safety, environmental protection, and community welfare in engineering decision-making.
PEO4	Graduates will engage in lifelong learning, professional certification, postgraduate education, or innovative engineering practice to adapt to evolving technologies and societal challenges.
PEO5	Graduates will work effectively in multidisciplinary teams, communicating clearly with engineers, planners, policymakers, and stakeholders.

5. Proposed Program Student Learning Outcomes

The following SLOs are rewritten in measurable form based on the Civil and Environmental Engineering catalogue.

SLO	Student Learning Outcome
SLO1	Apply mathematics, science, engineering fundamentals, and civil/environmental engineering knowledge to solve engineering problems.
SLO2	Design and conduct experiments, field investigations, and data collection activities, and analyze and interpret technical data.
SLO3	Design civil and environmental engineering systems, components, or processes that meet technical, environmental, safety, economic, and societal requirements.

SLO	Student Learning Outcome
SLO4	Identify, formulate, analyze, and solve civil engineering problems using appropriate theories, methods, codes, and engineering judgment.
SLO5	Use modern engineering tools, software, laboratory techniques, and professional methods necessary for civil engineering practice.
SLO6	Communicate effectively through technical writing, drawings, calculations, reports, and oral presentations.
SLO7	Function effectively as an individual and as a member or leader of multidisciplinary teams.
SLO8	Demonstrate professional ethics, responsibility for public safety, environmental awareness, and commitment to lifelong learning.

6. PEO–SLO Mapping Matrix

PEO / SLO	SLO1	SLO2	SLO3	SLO4	SLO5	SLO6	SLO7	SLO8
PEO1 Professional engineering practice	✓	✓	✓	✓	✓	✓		
PEO2 Sustainable and climate-resilient infrastructure	✓	✓	✓	✓	✓	✓	✓	✓
PEO3 Ethics, safety, environment, community welfare			✓	✓		✓	✓	✓
PEO4 Lifelong learning and adaptation	✓	✓		✓	✓	✓		✓
PEO5 Teamwork and stakeholder communication			✓			✓	✓	✓

7. Program-Level Assessment Strategy

The program should use both direct and indirect evidence.

7.1 Direct Assessment Evidence

Evidence Source	Main Use
Selected final exam questions	Measures technical knowledge, analysis, and problem-solving
Course projects and design assignments	Measures design, application, judgment, and communication

Evidence Source	Main Use
Laboratory and field reports	Measures investigation, data analysis, safety, and reporting
Capstone/graduation project	Measures integrated design, research, teamwork, and communication
Oral presentations	Measures communication and professional defense
Internship or field training evaluation, where available	Measures practical readiness and professional behavior
Portfolio of selected student work	Provides cumulative evidence across the program

7.2 Indirect Assessment Evidence

Evidence Source	Main Use
Course evaluation survey	Student perception of learning and workload
Exit survey	Graduating student perception of readiness
Alumni survey every two years	Graduate achievement and relevance of curriculum
Employer/stakeholder survey every two years	Market relevance and professional performance
Advisory board feedback	External review of curriculum, skills, and employability

8. Performance Targets

The following minimum targets are recommended:

Assessment Level	Target
Course-level CLO achievement	At least 70% of students score 70% or higher on the selected assessment items for each CLO.
Program-level SLO achievement	At least 70% of assessed students meet the expected performance level for each SLO.
Project/design rubric	At least 70% of students achieve “satisfactory” or higher.
Exit survey	Mean score of at least 3.5 out of 5 for each SLO-related item.
Employer/alumni survey	Mean score of at least 3.5 out of 5 for professional readiness indicators.

9. Program Assessment Matrix

SLO	Key Courses / Evidence Points	Data Source	Timing	Responsible Person	Target
SLO1	Calculus, Engineering Mathematics, Statics, Soil Mechanics, Foundation Engineering	Selected exam questions	Every semester	Course instructor	70% of students score 70%+
SLO2	Soil Mechanics, Hydrology, Materials, Graduation Project	Lab reports, field reports, project data	Every year	Course instructor + lab staff	70% meet rubric level
SLO3	Foundation Engineering, RC Design, Steel Design, Water Resources Design, Graduation Project	Design project, capstone rubric	Semesters 7–8	Course instructor + project committee	70% satisfactory or higher
SLO4	Core engineering courses	Problem-solving exam questions and assignments	Every semester	Course instructor	70% score 70%+
SLO5	Engineering Analysis, CAD, Foundation Engineering, Graduation Project	Software/ spreadsheet tasks, design calculations	Every year	Course instructor	70% satisfactory or higher
SLO6	Academic Debate, reports, presentations, Graduation Project	Technical report and presentation rubrics	Every year	Course instructor + project committee	70% satisfactory or higher
SLO7	Design projects, graduation project, field work	Teamwork rubric and peer evaluation	Every year	Course instructor	70% satisfactory or higher
SLO8	Sustainability, Foundation Engineering, Graduation Project	Ethics/safety/ reflection questions, project rubric	Every year	Course instructor + assessment lead	70% satisfactory or higher

10. Annual Program Assessment Cycle

Stage	Timing	Action	Responsible
1. Planning	Beginning of academic year	Confirm SLOs, courses selected for assessment, rubrics, and templates	Department chair + assessment committee
2. Course-level collection	During each semester	Collect selected exam questions, projects, reports, rubrics, and samples	Course instructors
3. Submission	Within 2 weeks after final results	Submit course assessment report and evidence folder	Course instructors
4. Compilation	Within 4 weeks after semester	Compile CLO/SLO results into program assessment spreadsheet	Department assessment lead
5. Review	End of academic year	Discuss strengths, weaknesses, and causes	Department council + assessment committee
6. Action planning	Before next academic year	Approve improvement actions, assign responsible persons, and set deadlines	Department chair
7. Follow-up	Following semester/year	Check whether actions were implemented and reassess weak outcomes	Assessment committee + QA

11. Required Documentation

Each academic year, the department should maintain a digital assessment folder containing:

1. Approved PEOs.
2. Approved SLOs.
3. PEO–SLO mapping matrix.
4. Course–SLO mapping matrix.
5. CLO–SLO mapping for assessed courses.
6. Assessment tools and rubrics.
7. Exam questions mapped to CLOs/SLOs.
8. Samples of student work: high, medium, and low performance.
9. Grade/achievement analysis spreadsheet.
10. Course assessment reports.
11. Annual program assessment report.
12. Department meeting minutes discussing results.
13. Corrective/improvement action log.
14. Evidence of reassessment in the next cycle.

12. Program Improvement Action Log Template

Year	SLO / Issue	Evidence	Decision	Action	Responsible	Deadline	Follow-up Result
2026–2027	SLO3 design weakness	Only 58% met design rubric	Not met	Add design tutorials and standard design template	Course instructors	Next semester	To be reassessed
2026–2027	SLO6 weak reporting	Reports lack technical structure	Partially met	Introduce report-writing rubric in all design courses	Assessment committee	Next academic year	To be checked
2026–2027	SLO5 software weakness	Limited use of Excel/ MATLAB	Not met	Require spreadsheet-based assignments in selected courses	Department chair	Next cycle	To be reassessed

Part B: Specific Course Assessment Plan

Foundation Engineering – SOU20161

13. Course Information

Item	Description
Course title	Foundation Engineering
Course code	SOU20161
ECTS	6
Program	Civil and Environmental Engineering
Course type	Core course
Semester	Semester 7
Prerequisite	Soil Mechanics

Item	Description
Catalogue description	The module applies the principles of mechanics and soil mechanics to safe design of different types of foundations. It covers site exploration, site characterization, and analysis and design of shallow foundations.

14. Course Role in the Program

Foundation Engineering is a key senior-level design course. It connects Soil Mechanics with professional geotechnical design practice. The course contributes strongly to program outcomes related to engineering knowledge, problem-solving, design, data interpretation, safety, ethics, communication, and use of engineering tools.

15. Proposed Course Learning Outcomes

By the end of Foundation Engineering, students should be able to:

CLO	Course Learning Outcome
CLO1	Explain the role of foundation engineering, site exploration, soil investigation, and site characterization in safe foundation design.
CLO2	Interpret soil investigation data, laboratory/field test results, groundwater conditions, and soil profiles to select appropriate geotechnical design parameters.
CLO3	Analyze bearing capacity of shallow foundations under different soil, loading, groundwater, and foundation geometry conditions.
CLO4	Estimate foundation settlement and evaluate serviceability requirements using appropriate soil mechanics principles.
CLO5	Design shallow foundations by selecting foundation dimensions, depth, allowable bearing pressure, and factor of safety while considering safety, economy, constructability, and local conditions.
CLO6	Prepare and communicate a clear foundation design solution using calculations, sketches, tables, technical judgment, and, where appropriate, spreadsheet/software tools.

16. CLO–SLO Mapping

CLO / Program SLO	SLO1 Knowledge	SLO2 Data	SLO3 Design	SLO4 Problem-solving	SLO5 Tools	SLO6 Communication	SLO8 Ethics/ Safety
CLO1 Site exploration concepts	✓	✓		✓		✓	✓

CLO / Program SLO	SLO1 Knowledge	SLO2 Data	SLO3 Design	SLO4 Problem-solving	SLO5 Tools	SLO6 Communication	SLO8 Ethics/ Safety
CLO2 Site characterization	✓	✓		✓	✓	✓	✓
CLO3 Bearing capacity analysis	✓		✓	✓	✓		✓
CLO4 Settlement analysis	✓		✓	✓	✓		✓
CLO5 Shallow foundation design	✓	✓	✓	✓	✓	✓	✓
CLO6 Technical communication			✓		✓	✓	✓

17. Course Assessment Components

Assessment Component	Suggested Weight	Main CLOs Assessed	Evidence Produced
Quizzes / short diagnostic tests	10%	CLO1, CLO3, CLO4	Quiz papers and item analysis
Homework / problem sets	10%	CLO2, CLO3, CLO4	Solved assignments
Midterm exam	20%	CLO1, CLO2, CLO3	Exam questions mapped to CLOs
Site characterization assignment	15%	CLO2, CLO6	Interpreted borehole/soil profile report
Shallow foundation design project	20%	CLO2, CLO3, CLO4, CLO5, CLO6	Design report, calculations, rubric
Final exam	25%	CLO3, CLO4, CLO5	Final exam item analysis

18. CLO Assessment Matrix

CLO	Direct Assessment Method	Target	Timing	Responsible
CLO1	Quiz + midterm conceptual questions	70% of students score 70%+	Weeks 3–8	Course instructor
CLO2	Site characterization assignment	70% meet satisfactory rubric level	Weeks 6–10	Course instructor

CLO	Direct Assessment Method	Target	Timing	Responsible
CLO3	Midterm/final bearing capacity problems	70% score 70%+ on mapped questions	Weeks 8 and 15	Course instructor
CLO4	Final exam + homework settlement problems	70% score 70%+ on mapped questions	Weeks 10–15	Course instructor
CLO5	Shallow foundation design project	70% meet satisfactory rubric level	Weeks 11–14	Course instructor
CLO6	Project report and calculation presentation	70% meet satisfactory rubric level	Week 14	Course instructor

19. Suggested Weekly Assessment Schedule

Week	Assessment Action
Week 1	Explain CLOs, assessment methods, rubrics, and relation to program SLOs.
Week 2–3	Diagnostic quiz on Soil Mechanics prerequisites.
Week 4–5	Short quiz on site exploration and foundation selection.
Week 6	Release site characterization assignment using soil profile/borehole data.
Week 8	Midterm exam; include mapped questions for CLO1–CLO3.
Week 9	Analyze midterm results and identify weak areas.
Week 10	Return feedback and conduct remedial tutorial if CLO2 or CLO3 is weak.
Week 11	Release shallow foundation design project.
Week 13	Draft project feedback.
Week 14	Final project submission and rubric evaluation.
Week 15	Final exam; include mapped questions for CLO3–CLO5.
Within 2 weeks after results	Submit course assessment report to department assessment lead.

20. Foundation Design Project Rubric

Criterion	Weight	Excellent	Satisfactory	Weak
Site characterization	20%	Correctly interprets soil profile, groundwater, parameters, and uncertainties	Basic interpretation with minor gaps	Incorrect or incomplete interpretation

Criterion	Weight	Excellent	Satisfactory	Weak
Bearing capacity analysis	20%	Correct equations, assumptions, factors, and calculations	Mostly correct with minor errors	Major conceptual/ calculation errors
Settlement analysis	20%	Correctly evaluates serviceability and settlement risks	Basic settlement check included	Settlement ignored or incorrect
Design decision	20%	Provides safe, economical, and justified foundation dimensions/design values	Design acceptable but justification limited	Unsafe or unjustified design
Technical communication	10%	Clear report, tables, sketches, units, and calculation flow	Understandable but needs improvement	Poorly organized or unclear
Safety, ethics, and constructability	10%	Explicitly considers safety, uncertainty, local conditions, and constructability	Mentions safety but limited discussion	No meaningful safety or constructability consideration

21. Course-Level Evidence Folder

For KAAE readiness, the instructor should submit one course assessment folder containing:

1. Course syllabus/module description.
2. CLO list.
3. CLO–SLO mapping.
4. Assessment plan and grading distribution.
5. Copies of quizzes, midterm, final exam, assignments, and project brief.
6. Answer keys and marking schemes.
7. Project rubric.
8. Grade spreadsheet showing CLO achievement.
9. Three samples of student work: high, medium, low.
10. Course assessment report.
11. Improvement action plan for weak CLOs.
12. Evidence that improvement was implemented in the next offering.

22. Course Assessment Report Template

CLO	Assessment Tool	Target	Actual Result	Status	Interpretation	Action
CLO1	Quiz + midterm	70% students score 70%+	To be inserted	Met / Not met	To be inserted	Continue or improve
CLO2	Site characterization assignment	70% satisfactory	To be inserted	Met / Not met	To be inserted	Add tutorial / examples
CLO3	Bearing capacity problems	70% score 70%+	To be inserted	Met / Not met	To be inserted	Add problem-solving session
CLO4	Settlement problems	70% score 70%+	To be inserted	Met / Not met	To be inserted	Add settlement worksheet
CLO5	Design project	70% satisfactory	To be inserted	Met / Not met	To be inserted	Revise project instructions
CLO6	Report rubric	70% satisfactory	To be inserted	Met / Not met	To be inserted	Provide report template

23. Predefined Improvement Actions

The following actions should be used when CLO targets are not met:

Weak Area	Likely Cause	Improvement Action
CLO1 weak	Students lack prerequisite recall	Add diagnostic Soil Mechanics review in Week 1–2
CLO2 weak	Difficulty reading borehole logs and lab data	Provide guided site investigation example and parameter selection worksheet
CLO3 weak	Bearing capacity equations used mechanically without understanding	Add comparison table of bearing capacity cases and extra tutorial problems
CLO4 weak	Settlement concepts are abstract	Use step-by-step settlement example and spreadsheet exercise
CLO5 weak	Students cannot integrate data into design	Use staged design project with feedback before final submission

Weak Area	Likely Cause	Improvement Action
CLO6 weak	Poor technical reporting	Provide report template, sample calculation format, and rubric before submission

24. Responsibilities

Role	Responsibility
Course instructor	Prepare CLOs, collect evidence, assess student work, analyze CLO achievement, and submit course assessment report.
Department assessment lead	Compile course reports, verify CLO–SLO mapping, and prepare program-level summary.
Department chair	Ensure results are discussed in department council and improvement actions are implemented.
Faculty assessment committee	Review consistency of assessment methods and recommend improvements.
QA office	Check documentation completeness and alignment with KAAE FC8 requirements.
Institutional effectiveness unit	Link program assessment results to institutional reporting and continuous improvement.

25. Immediate Implementation Checklist

The department can implement this plan immediately using the following steps:

1. Approve the 8 proposed program SLOs.
2. Approve the PEO–SLO mapping matrix.
3. Select 4–6 key courses for annual SLO assessment, including Foundation Engineering.
4. Require every selected course to submit a CLO–SLO mapping table.
5. Standardize rubrics for design, laboratory/field reports, teamwork, and presentations.
6. Create a shared digital evidence repository.
7. Use the 70% achievement target consistently across courses.
8. Hold one annual assessment review meeting.
9. Record decisions in meeting minutes.
10. Track improvement actions and reassess weak outcomes in the next cycle.

26. Minimum Annual Deliverables for KAAE FC8

At the end of each academic year, the Civil and Environmental Engineering Department should be able to show:

- Approved PEOs.
- Approved measurable SLOs.
- PEO–SLO mapping.
- Course–SLO mapping.
- Course assessment reports.
- Direct evidence from selected courses.
- Indirect evidence from surveys or stakeholder feedback.
- Annual program assessment summary.
- Department meeting minutes.
- Improvement action log.
- Evidence of reassessment.

27. Conclusion

This plan provides a complete assessment structure from program level to course level. At program level, it connects the Civil and Environmental Engineering PEOs with measurable student learning outcomes and annual evidence collection. At course level, Foundation Engineering is used as a model for meaningful assessment because it directly tests students' ability to interpret geotechnical data, analyze bearing capacity, evaluate settlement, and design safe shallow foundations.

The most important requirement is closing the loop: results must lead to specific teaching, curriculum, assessment, or resource improvements, and these improvements must be checked again in the next assessment cycle.