Assessment Plan for Continuous Program Improvement
Electrical Engineering Program

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1. Assessment Plan for Continuous Program Improvement

The Electrical Engineering Curriculum Committee (ECC) has developed a comprehensive assessment plan for continuous program improvement of the Electrical Engineering program. Figure 1 highlights this plan.

The first step in the assessment plan is to develop educational objectives for the Electrical Engineering program, which fulfill the needs of our constituencies that are consistent with the mission of the College and ABET Criteria. This is done with the direct input from our constituencies. The ECC then establishes the program outcomes (learning outcomes) that ensure the achievement of the educational objectives of the Electrical Engineering program that are also consistent with the mission of the College and ABET Criteria.

1.1 Program Educational Objectives

The program educational objectives are established with the direct input from the Industrial Advisory Board (IAB), alumni, and students. The educational objectives are consistent with the mission of the College and ABET Criteria. They are published in the brochure of Electrical Engineering program as well as on the departmental web site at http://csivc.csi.cuny.edu/engsci/files/csiengdp/startpg/index.html. The overall objective of the four-year Electrical Engineering curriculum is to prepare graduates for a successful entry into the engineering profession. Specifically:

1. Make career advancements into the engineering profession by applying the common fundamentals of electrical engineering and related sciences.

2. Be engaged in developing creative solutions and designs for contemporary electrical engineering problems.

3. Be engaged in electrical engineering practices centered on innovation through effective communication and collaboration with academia and industry, fellow engineers, and the community at large.

4. Be engaged in engineering practices grounded in the ethical, social, and moral responsibilities of the profession and ongoing professional development, including the promotion of professional licensing.

5. Be engaged in engineering practices centered on experimentation and analysis of data in the context of economic, social and other realistic design constraints.
Figure 1: Assessment plan for continuous program improvement.
1.2 Review of the Program Educational Objectives

Evaluations and Assessment Committee (EAC) is responsible for coordinating with the IAB the review of the program educational objectives. The degree of achievement of educational objectives is periodically reviewed by the IAB. The program educational objectives must be reviewed at least once every three years by using at least one of the following tools:

1. Industrial Advisory Board meeting
2. Focus group sessions with alumni and/or recent graduates
3. Exit interviews with recent graduates
4. Alumni and/or employer surveys

The following deadlines should be observed by EAC when using any of the tools mentioned above:

1. Industrial Advisory Board meeting must be held before October 15th of each year.
2. Focus group session must be held before October 15th of each year.
3. Surveys must be sent out by June 15th of each year.
4. Exit Interviews must be held before December 15th and/or May 15th of each year.

Deadlines of October 15th for the IAB meeting and focus group, and June 15th for the surveys ensure that there is enough time for the any curriculum changes to go through the due process at the College by December of that year and are likely to appear in the next year’s College catalog. December 15th and May 15th requirements for exit interviews ensure that most of the graduating students will be available for exit interviews.

Table 1: Our 12-year assessment plan for reviewing the Program Educational Objectives.

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<tbody>
<tr>
<td>Make career advancements into the engineering profession by applying the common fundamentals of electrical engineering and related sciences.</td>
<td>✔</td>
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<td>Be engaged in developing creative solutions and designs for contemporary electrical engineering problems.</td>
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<tr>
<td>Be engaged in electrical engineering practices centered on innovation through effective communication and collaboration with academia and industry, fellow engineers, and the community at large.</td>
<td>✔</td>
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<td>✔</td>
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</tr>
<tr>
<td>Be engaged in engineering practices grounded in the ethical, social, and moral responsibilities of the profession and ongoing professional development, including the promotion of professional licensing.</td>
<td>✔</td>
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<tr>
<td>Be engaged in engineering practices centered on experimentation and analysis of data in the context of economic, social and other realistic design constraints.</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
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</table>
1.3 Program Outcomes

The engineering curriculum committee has established twelve program outcomes that are important to the objectives of the Electrical Engineering program as well as fully complying with the mission of the College of Staten Island. There is one-to-one correspondence between program outcomes 1 through 11 of the Electrical Engineering program and outcomes requirements of ABET criterion 3, a through k, mentioned in section 3.1. Furthermore, program outcome 12 is also related to outcome requirement “i” of ABET criterion 3. Achievement of each program outcome listed below ensures the compliance of the Electrical Engineering program with ABET criterion 3 as well as a high degree of achievement of the program educational objectives mentioned in section 2. All Electrical Engineering faculty members are expected to become familiar with the program outcomes and outcomes requirements of ABET criterion 3. The Electrical Engineering Curriculum prepares our students to achieve the program outcomes, which require that our graduates demonstrate that:

1. They are prepared for entrance into the engineering profession with a solid foundation in the fundamentals of mathematics, science, and engineering that apply to the field of electrical engineering.

2. They have the ability to interpret and compare theoretical simulation results with actual experimental results.

3. They have the ability to design an engineering system subject to realistic constraints including, but not limited to constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.

4. They have the ability to work on multidisciplinary teams and/or projects.

5. They have developed problem-solving skills and have the ability to use engineering judgment necessary to solve real-life engineering problems.

6. They have an understanding of their professional and ethical responsibilities.

7. They have the ability to communicate effectively, focusing on written and oral presentation skills.

8. They are exposed to a broad education that enables them to understand the impact of engineering solutions in a global and social context.

9. They are prepared for life-long learning by establishing a process of critical and creative thinking.

10. They are prepared for a role in society that goes beyond being engineering professionals.

11. They have the ability to use the techniques, skills and modern engineering tools necessary for the practice of engineering.

12. They have an awareness of the need for continuous professional development.

Table 2 shows the relationship between program educational objectives and program outcomes. The sample performance criteria for each program outcome are given in Appendix III. Appendix IV shows the outcome assessment matrices.
Table 2: Relationship between program educational objectives and program outcomes (PO and EO stand for program outcome and educational objective, respectively).

<table>
<thead>
<tr>
<th>EO</th>
<th>PO</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
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<tbody>
<tr>
<td>Make career advancements into the engineering profession by applying the common fundamentals of electrical engineering and related sciences.</td>
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<td>✓</td>
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<td>✓</td>
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<td>✓</td>
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<tr>
<td>Be engaged in developing creative solutions and designs for contemporary electrical engineering problems.</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Be engaged in electrical engineering practices centered on innovation through effective communication and collaboration with academia and industry, fellow engineers, and the community at large.</td>
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<td></td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
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<tr>
<td>Be engaged in engineering practices grounded in the ethical, social, and moral responsibilities of the profession and ongoing professional development, including the promotion of professional licensing.</td>
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<td>✓</td>
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<tr>
<td>Be engaged in engineering practices centered on experimentation and analysis of data in the context of economic, social and other realistic design constraints.</td>
<td>✓</td>
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</tbody>
</table>
1.3.1 Outcome Requirement of ABET Criterion 3
- An ability to apply knowledge of mathematics, science, and engineering (part a)
- An ability to design and conduct experiments, as well as to analyze and interpret data (part b)
- An ability to design an engineering system subject to realistic constraints including, but not limited to constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability. (part c)
- An ability to function on multi-disciplinary teams (part d)
- An ability to identify, to formulate, and solve engineering problems (part e)
- An understanding of professional and ethical responsibility (part f)
- An ability to communicate effectively (part g)
- The broad education necessary to understand the impact of engineering solutions in a global and social context (part h)
- A recognition of the need for, and an ability to engage in life-long learning (part i)
- A knowledge of contemporary issues (part j)
- An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice (part k)

1.4 Outcome Assessment
Evaluations and Assessment Committee is responsible for overseeing the assessment process of program outcomes. The program outcomes must be assessed at least once a year using the primary outcome assessment tool and at least one of the secondary outcome assessment tools.

1.4.1 Primary Tool for Outcome Assessment
The primary tool used for outcome assessment is students’ work that demonstrates the achievement of a program outcome. Each Electrical Engineering course prepares the students to meet the objectives of certain program outcomes. Table 3 shows the relationship of each required Electrical Engineering course to the program outcomes, which may be learned and/or assessed in that course, as well as to the outcome requirements of ABET criterion 3. Note that Table 3 serves as a guide and not all of the listed program outcomes associated with a particular course may be learned and/or assessed in that course in a given academic year. However, all program outcomes must be learned and/or assessed at least once in a required course in any given academic year. Each program outcome must be assessed at least once a year using a required Electrical Engineering course whenever possible.

1.4.2 Guidelines for Reporting Assessment Results
Engineering faculty members teaching the required Electrical Engineering courses should follow the following guidelines while reporting outcome assessment results:

1. All tests or projects should be developed focusing on designated program outcomes for that particular course.
2. While evaluating (grading) tests or projects, tests or projects should be divided in different parts based on the program outcomes.
3. Establish a passing score for each part (e.g. 60% of the maximum allocated points for that part).

4. Report outcome assessment result for each outcome (part) as a percentage of students passing that part.

5. The following rating system will be used for outcome assessment:

<table>
<thead>
<tr>
<th>Percentage of students satisfying an outcome</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>95+</td>
<td>Exceptional</td>
</tr>
<tr>
<td>91-95</td>
<td>Excellent</td>
</tr>
<tr>
<td>81-90</td>
<td>Good (meeting expectations)</td>
</tr>
<tr>
<td>71-80</td>
<td>Above Satisfactory</td>
</tr>
<tr>
<td>61-70</td>
<td>Satisfactory</td>
</tr>
<tr>
<td>50-60</td>
<td>Unsatisfactory</td>
</tr>
<tr>
<td>Below 50</td>
<td>Poor</td>
</tr>
</tbody>
</table>

The following outcomes will also be learned through invited lectures and assessed by a follow-up survey of the students.

Program outcomes 6, 8, 9, and 12 (corresponding ABET criterion 3 outcomes are: f, h, and i).

1.4.3 Secondary Tools for Outcome Assessment

The program outcomes must be assessed using at least one of the following secondary tools in addition to the primary tool mentioned in section 1.4.1.

1. Focus group sessions with alumni and/or recent graduates
2. Exit interviews with recent graduates
3. Alumni and/or employer surveys

The following deadlines should be observed by EAC when using any of the tools mentioned above:

1. Focus Group session must be held before May 15th of the year.
2. Surveys must be sent out by March 15th of the year.
3. Exit Interviews must be held before December 15th and/or May 15th of each year.

Rationale for these deadlines is the same as mentioned in section 1.2.
1.4.4 Guidelines for Focus Group Session

An Electrical Engineering faculty member, designated by the department chairperson, will coordinate the focus group session for outcome assessment. Therefore, all Electrical Engineering faculty members are expected to become thoroughly familiar with these guidelines. The discussion guide and worksheets for the focus group session are given in Appendix I and II, respectively.

1.4.5 Guidelines for Exit Interviews

An Electrical Engineering faculty member, designated by the department chairperson, will conduct the exit interviews for outcome assessment. Therefore, all Electrical Engineering faculty members are expected to become thoroughly familiar with these guidelines. The worksheets for the exit interviews are given in Appendix II.

The degree of achievement of the program outcome should be evaluated based on a rating system on a scale of 1 to 5 with the following interpretations of the scores:

<table>
<thead>
<tr>
<th>Score</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Exceptional</td>
</tr>
<tr>
<td>4</td>
<td>Good (meeting expectations)</td>
</tr>
<tr>
<td>3</td>
<td>Satisfactory</td>
</tr>
<tr>
<td>2</td>
<td>Unsatisfactory</td>
</tr>
<tr>
<td>1</td>
<td>Poor</td>
</tr>
</tbody>
</table>

In addition, the following interpretations should be used in case an exact score may not be assignable for certain items:

<table>
<thead>
<tr>
<th>Score</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between 4.5 and 5</td>
<td>Excellent</td>
</tr>
<tr>
<td>Between 4 and 4.5</td>
<td>Good (Exceeding expectations)</td>
</tr>
<tr>
<td>Between 3 and 4</td>
<td>Above satisfactory</td>
</tr>
<tr>
<td>Between 2 and 3</td>
<td>Below satisfactory</td>
</tr>
</tbody>
</table>
1.4.6 Program Improvement

EAC is expected to review and analyze the outcome assessment data obtained from the primary as well as secondary tool(s) before September 15\textsuperscript{th} of each year. For all program outcome assessments receiving a satisfactory designation, a summary of the assessment of that program outcome along with the EAC findings and recommendations to improve the level of achievement of those program outcomes should be recorded into assessment planning matrices.

However, if the initial review of EAC determines that the objectives of a program outcome are not met satisfactorily (unsatisfactory assessment), the EAC should proceed with the analysis of the review along with outcome assessment data for that program outcome to identify the areas for improvement. Once the areas for improvement are identified, EAC should consider appropriate remedies to improve the identified areas. EAC must first determine:

1. If the identified areas for improvement require a change/revision of the curriculum. If so, EAC should prepare its recommendations in consultation with the appropriate Electrical Engineering faculty members.

2. If the identified areas for improvement require a change/upgrade or establishment of a new laboratory facility. If so, EAC should prepare its recommendations in consultation with the appropriate Electrical Engineering faculty members and laboratory staff.

For all other identified areas for improvement, EAC should issue a request for comments (RFC) to the Electrical Engineering faculty members or discuss the areas for improvement at the ECC meeting as appropriate. EAC then should proceed with the preparation of its recommendations for program improvement, taking into account the comments from the Electrical Engineering faculty members and any comments or recommendations by the IAB. EAC must present its recommendations to the department not later than October 15\textsuperscript{th} of that year. Appropriate corrective actions are then taken. All corrective actions should be recorded into assessment planning matrices whenever possible.
Table 3: Relationship of The Required Electrical Engineering Courses and Program Outcomes, which may be assessed in a particular course.

<table>
<thead>
<tr>
<th>Course</th>
<th>ENS 100</th>
<th>ENS 110</th>
<th>ENS 136</th>
<th>ENS 220</th>
<th>ENS 221</th>
<th>ENS 241</th>
<th>ENS 249</th>
<th>ENS 310</th>
<th>ENS 336</th>
<th>ENS 362</th>
<th>ENS 371</th>
<th>ENS 439</th>
<th>ENS 485</th>
<th>ENS 491/492</th>
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</thead>
<tbody>
<tr>
<td>1 (a)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>2 (b)</td>
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<td>✓</td>
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<tr>
<td>3 (c)</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td>5 (e)</td>
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<td>6 (f)</td>
<td>✓</td>
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<td>✓</td>
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<td>7 (g)</td>
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<td>✓</td>
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<td>8 (h)</td>
<td>✓</td>
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<td>✓</td>
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<td>9 (i)</td>
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<td>10 (j)</td>
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<td>✓</td>
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<tr>
<td>11 (k)</td>
<td>✓</td>
<td>✓</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>12 (i)</td>
<td>✓</td>
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<td>✓</td>
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</tbody>
</table>

* These outcomes are learned elsewhere but may be assessed in this course
Discussion Guide for Focus Group  
(For Program Outcome Assessment)

1. Warm-up Explanation of Focus Groups/Rules (10-12) minutes  
   a. Explanation of focus groups.
   b. There are no correct answers-only your opinion. You are speaking for many other people like yourself.
   c. Need to hear from everyone.
   d. Some of my associates are watching behind a mirror. They are very interested in your opinion (not applicable in our situation).
   e. Please-only one person speaks at a time. No side discussions-I do not want to miss any important comments.
   f. Don’t ask me questions because what I know and what I think are not important--it is what you think and how you feel that are important. That is why we are here.
   g. Do not feel bad if you do not know much about some of the things we will be talking about—that is okay because it is important for us to know. If your view is different from that of others in the group, that is important for us to know. Do not be afraid to be different. We are not looking for everyone to agree on something unless they really do.
   h. We need to cover a series of topics, so I will need to move the discussion along at times. Please do not be offended.
   i. Any questions?

2. First of all I am interested in your attitude toward Electrical Engineering Program at CSI. (15 minutes)

3. Now, I am going to discuss with you the twelve program outcomes that the Electrical Engineering Program or Department of Engineering Science and Physics has established. These outcomes state what the students of the Electrical Engineering Program are expected to know and are able to do by the time of graduation. I will provide you with a short summary to look at along with a short form in which you will be able to record your initial thoughts. After you have had time to review it, we will discuss it in more detail.

   a. DESCRIBE FIRST PROGRAM OUTCOME  
      i. HAVE THEM WRITE FIRST REACTION  
      ii. DISCUSSION  
         1. What was your first reaction to this program outcome? What, if anything, do you particularly think has helped you to achieve this program outcome? What, if anything, do you particularly think has not been helpful in achieving this program outcome? Why, Why Not? What, if anything should be done differently to achieve this program outcome.  
         2. Add anything you like here.
b. REPEAT FOR SECOND PROGRAM OUTCOME
c. REPEAT FOR THIRD PROGRAM OUTCOME
d. REPEAT FOR FOURTH PROGRAM OUTCOME
e. REPEAT FOR FIFTH PROGRAM OUTCOME
f. REPEAT FOR SIXTH PROGRAM OUTCOME
g. REPEAT FOR SEVENTH PROGRAM OUTCOME
h. REPEAT FOR EIGHTH PROGRAM OUTCOME
i. REPEAT FOR NINTH PROGRAM OUTCOME
j. REPEAT FOR TENTH PROGRAM OUTCOME
k. REPEAT FOR ELEVENTH PROGRAM OUTCOME
l. REPEAT FOR TWELVETH PROGRAM OUTCOME
m. REVIEW ALL PROGRAM OUTCOMES
   i. The objectives of which of these program outcomes, if any, have been achieved during your studies at CSI? Why?
   ii. The objectives of which of these program outcomes, if any, have not been (fully) achieved during your studies at CSI? Why?
Appendix II
Worksheets for Focus Group Session and Exit Interviews
(For Outcome Assessment)

Name_______________________________ Year of Graduation____________

The Electrical Engineering Curriculum prepares our students to achieve the following program outcomes. These program outcomes require that our graduates demonstrate that:

Program Outcome 1
They are prepared for entrance into the engineering profession with a solid foundation in the fundamentals of mathematics, science, and engineering that apply to the field of electrical engineering.

After completing the B.S. in Electrical Engineering at CSI:

➢ Did you feel that you have acquired sufficient depth of knowledge in the fundamentals in the three engineering fields mentioned above?

Yes___ No___

If yes, how would you rate your degree of achievement of this program outcome: (5 for excellent, 1 for poor)

5  4  3  2  1

➢ If YES, which part(s) of your studies (course work) do you think helped you achieve this outcome?

□ Laboratory experimentation
□ Hands-on experience on modern equipment in the laboratory
□ Computing facilities
□ Availability of modern engineering tools
□ Effective instructions (teaching)
□ These courses were helpful in achieving the objectives of this program outcome (please specify)

➢ If NO, what do you think was lacking in the studies (course work) that prevented you from developing this ability?

□ Lack of sufficient laboratory experimentation
□ Lack of equipment
□ Lack of computing facilities
□ Lack of effective instructions (teaching)
□ Unavailability of modern engineering tools

Additional Comments:
Program Outcome 2

They have the ability to interpret and compare the simulation results with actual experimental results.

After completing the B.S. in Electrical Engineering at CSI:

❖ Did you feel that you have the ability to interpret and compare the simulation results with reference to experimental results?

Yes___ No___

If yes, how would you rate your degree of achievement of this program outcome: (5 for excellent, 1 for poor)

5 4 3 2 1

➢ If YES, which part(s) of your studies (course work) do you think helped you achieve this?

☐ Laboratory experimentation
☐ Hands-on experience on modern equipment in the laboratory
☐ Computing facilities
☐ Availability of modern engineering tools
☐ Effective instructions
☐ Appropriate projects
☐ These courses were helpful in achieving the objectives of this program outcome (please specify)

➢ If NO, what do you think was lacking in the studies (course work) that prevented you from developing this ability?

☐ Lack of sufficient laboratory experimentation
☐ Lack of equipment
☐ Lack of computing facilities
☐ Lack of effective instructions
☐ Unavailability of modern engineering tools
☐ Inappropriate projects

Additional Comments:
Program Outcome 3
They have the ability to design an engineering system subject to realistic constraints including, but not limited to constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.

After completing the B.S. in Electrical Engineering at CSI:

Did you feel that you have the ability to design an engineering system subject to given constraints?

Yes___ No___

If yes, how would you rate your degree of achievement of this program outcome: (5 for excellent, 1 for poor)  

5  4  3  2  1

If YES, which part(s) of your studies (course work) do you think helped you achieve this?

☐ Availability of sufficient components
☐ Hands-on experience on modern equipment in the laboratory
☐ Computing facilities
☐ Availability of modern engineering tools
☐ Effective instructions
☐ Proper guidance from the instructor during the design (development) of the project
☐ Proper technical support from the CLT during the design (development) of the project
☐ These courses were helpful in achieving the objectives of this program outcome (please specify)

If NO, what do you think was lacking in the studies (course work) that prevented you from developing this ability?

☐ Lack of sufficient components
☐ Lack of equipment
☐ Lack of computing facilities
☐ Lack of effective instructions
☐ Unavailability of modern engineering tools
☐ Ineffective instructions
☐ Poor guidance from the instructor during the design (development) of the project
☐ Poor technical support from the CLT during the design (development) of the project

Additional Comments:
**Program Outcome 4**
They have the ability to work on multidisciplinary teams and/or projects.

After completing the B.S. in Electrical Engineering at CSI:

- Did you feel that you had the ability to work on multi-disciplinary projects (or teams)?
  - Yes___ No___

If yes, how would you rate your degree of achievement of this program outcome: (5 for excellent, 1 for poor)

- If YES, which part(s) of your studies (course work) do you think helped you achieve this?
  - □ Laboratory experimentation
  - □ Hands-on experience on modern equipment in the laboratory
  - □ Computing facilities
  - □ Availability of modern engineering tools
  - □ Effective instructions
  - □ Reasonable balance between topics covered in core courses from three areas of engineering
  - □ These courses were helpful in achieving the objectives of this program outcome (please specify)

- If NO, what do you think was lacking in the studies (course work) that prevented you from developing this ability?
  - □ Lack of sufficient laboratory experimentation
  - □ Lack of equipment
  - □ Lack of computing facilities
  - □ Lack of effective instructions
  - □ Unavailability of modern engineering tools
  - □ Lack of balance between topics covered in core courses from three areas of engineering

**Additional Comments:**
**Program Outcome 5**

They have developed problem-solving skills as well as learn to use engineering judgment necessary to solve real-life engineering problems.

After completing the B.S. in Electrical Engineering at CSI:

Did you feel that you have the ability to identify, formulate, and solve real-life engineering problems?

Yes___ No___

If yes, how would you rate your degree of achievement of this program outcome: (5 for excellent, 1 for poor)

5 4 3 2 1

➢ If YES, which part(s) of your studies (course work) do you think helped you achieve this?
  □ Examples from real-life applications given during instructions
  □ Hands-on experience on modern equipment in the laboratory
  □ Computing facilities
  □ Availability of modern engineering tools
  □ Challenging projects closely related to real-life engineering problems
  □ Effective instructions
  □ These courses were helpful in achieving the objectives of this program outcome (please specify)

➢ If NO, what do you think was lacking in the studies (course work) that prevented you from developing this ability?
  □ Lack of examples from real-life applications during instructions
  □ Lack of computing facilities
  □ Lack of effective instructions
  □ Unavailability of modern engineering tools
  □ Ineffective instructions
  □ Projects not related to real-life engineering problems

**Additional Comments:**
Program Outcome 6
They have an understanding of their professional and ethical responsibility.

After completing the B.S. in Electrical Engineering at CSI:

☒ Did you feel that you have an understanding of professional and ethical responsibility?

Yes___ No___

If no, please identify the reason:

☐ Nobody even mentioned anything about professional and ethical responsibility during my studies at CSI
☐ Professional and ethical responsibilities were mentioned probably once in a class but I couldn’t make much sense out of that.

Additional Comments:
Program Outcome 7
They have the ability to communicate effectively, focusing on written and oral presentation skills.

After completing the B.S. in Electrical Engineering at CSI:

Did you feel that you could communicate effectively, both verbally and in writing, with your fellow students, instructors, or employer?

Yes___ No___

If yes, how would you rate your degree of achievement of this program outcome: (5 for excellent, 1 for poor)

5  4  3  2  1

➢ If YES, which part(s) of your studies (course work) do you think helped you achieve this?

☐ Well-organized and well-written reports were required in all laboratory classes
☐ Well-organized and well-written reports were required in some laboratory classes
☐ Instructors did not accept poorly-written reports
☐ Instructors advised on good report writing skills
☐ Oral presentations were required in some laboratory courses
☐ These courses were helpful in achieving the objectives of this program outcome (please specify)

➢ If NO, what do you think was lacking in the studies (course work) that prevented you from developing this ability?

☐ Instructors did not insist on well-organized and well-written reports
☐ There was not enough advisement on how to write a good report
☐ Other (please specify)

Additional Comments:
Program Outcome 8
They are exposed to the broad education that enables them to understand the impact of engineering solutions in a global and social context.

After completing the B.S. in Electrical Engineering at CSI:

Did you feel that you have an understanding of the impact of engineering solutions in a global and social context?

Yes___ No___

If yes, how would you rate your degree of achievement of this program outcome: (5 for excellent, 1 for poor)

5 4 3 2 1

➢ If YES, which part(s) of your studies (course work) do you think helped you achieve this?
  □ Examples given in the class from real-life applications
  □ Some instructors discussed the impact of engineering solutions on society while discussing a design of a system (or project)
  □ Explicitly discussed as part of a course
  □ These courses were helpful in achieving the objectives of this program outcome (please specify)
  □ Other (please specify)

➢ If NO, what do you think was lacking in the studies (course work) that prevented you from developing this ability?

  □ Nobody ever discussed these issue in the classroom
  □ Other (please specify)

Additional Comments:
Program Outcome 9
They are prepared for life-long learning by establishing a process of critical and creative thinking.

After completing the B.S. in Electrical Engineering at CSI:

Did you feel that you recognize the need for, and have an ability to engage in life-long learning?
Yes___ No___

If yes, how would you rate your degree of achievement of this program outcome: (5 for excellent, 1 for poor)

If YES, which part(s) of your studies (course work) do you think helped you achieve this?

☐ Design projects were inspiring
☐ Instructors inspired me
☐ Instructors encouraged me to get involved in professional societies
☐ These courses were helpful in achieving the objectives of this program outcome (please specify)
☐ Other (please specify)

If NO, what do you think was lacking in the studies (course work) that prevented you from developing this ability?

☐ Coursework has been uninspiring
☐ Not enough opportunities were available for professional development
☐ Other (please specify)

Additional Comments:
Program Outcome 10
They are prepared for a role in society that goes beyond being engineering professionals.

After completing the B.S. in Electrical Engineering at CSI:
Did you feel that you have knowledge of contemporary issues and an understanding of how engineering solutions may have an impact on them?

Yes___ No___

If yes, how would you rate your degree of achievement of this program outcome: (5 for excellent, 1 for poor)

If YES, which part(s) of your studies (course work) do you think helped you achieve this?

- Design projects were discussed and assigned with the focus on solving real-life problems
- Some instructors discussed the contemporary issues in the context of how technology is driven by different forces in society
- Instructors encouraged me to develop a design project on solving a real-life problem
- These courses were helpful in achieving the objectives of this program outcome (please specify)
- Other (please specify)

If NO, what do you think was lacking in the studies (course work) that prevented you from developing this ability?

- Nothing in the coursework led to the discussion of contemporary issues
- Other (please specify)

Additional Comments:
Program Outcome 11
They have the ability to use the techniques, skills and modern engineering tools necessary for the practice of engineering.

After completing the B.S. in Electrical Engineering at CSI:

✓ Did you feel that you have the ability to use the techniques, skills, and modern engineering tools necessary for engineering practice?

Yes___ No___

If yes, how would you rate your degree of achievement of this program outcome: (5 for excellent, 1 for poor)

5 4 3 2 1

If YES, which part(s) of your studies (course work) do you think helped you achieve this?

☐ Laboratory experimentation
☐ Hands-on experience on modern equipment
☐ Computing facilities
☐ Availability of modern engineering tools
☐ Effective instructions
☐ Challenging projects
☐ These courses were helpful in achieving the objectives of this program outcome (please specify)

If NO, what do you think was lacking in the studies (course work) that prevented you from developing this ability?

☐ Lack of sufficient laboratory experimentation
☐ Lack of equipment
☐ Lack of computing facilities
☐ Lack of effective instructions
☐ Unavailability of modern engineering tools
☐ Lack of challenging projects

Additional Comments:
Program Outcome 12
They have the awareness of the need for continuous professional development.

After completing the B.S. in Electrical Engineering at CSI:

Did you feel that you recognize the need for continuous professional development?

Yes___ No___

If yes, how would you rate your degree of achievement of this program outcome: (5 for excellent, 1 for poor)

5  4  3  2  1

➢ If YES, which part(s) of your studies (course work) do you think helped you achieve this?
  □ Invited lectures from the guest speakers
  □ Student chapters of professional societies
  □ Instructors encouraged me to get involved in professional societies
  □ These courses were helpful in achieving the objectives of this program outcome (please specify)
  □ Other (please specify)

➢ If NO, what do you think was lacking in the studies (course work) that prevented you from developing this ability?

  □ Instructors did not encourage me to get involved in professional societies
  □ Not enough opportunities were available for professional development
  □ Other (please specify)

Additional Comments:
Appendix III
Performance Criteria for Program Outcomes

A list of sample performance criteria for each program outcome is given below. Faculty members may use the performance criteria provided or develop additional performance criteria, which are more appropriate to the coursework.

Learning Outcome 1:
They are prepared for entrance into the engineering profession with a solid foundation in the fundamentals of mathematics, science, and engineering that apply to the field of electrical engineering.

Performance Criteria
1. Analyze an electrical engineering system (amplifiers, diodes etc.).
2. Demonstrate an ability to use the knowledge from mathematics and basic sciences to solve an electrical engineering problem.
3. Analyze and synthesize the analog and digital electrical circuits.
4. An ability to use calculus for the analysis of electrical systems.

Learning Outcome 2: They have the ability to interpret and compare theoretical simulation results with actual experimental results.

Performance Criteria
1. An ability to model an experiment using a simulation tool and compare the simulation results with experimental results.
2. Design an electrical engineering system or component with functionality verified using an engineering simulation and design tool (such as Matlab, Electronic Workbench etc.). Implement the design and compare with the simulation data.
   Examples: Digital filter, digital controller etc.

Learning Outcome 3: They have the ability to design an engineering system subject to realistic constraints including, but not limited to constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.

Performance Criteria
1. Design an analog or digital system under given constraints such as a filter for a given cutoff frequency and gain.
2. An ability to design an electrical engineering system subject to given constraints.
3. Design of a thermal system for electricity generation based on physical principles. For example, calculate the solar collector area as a function of the thermal efficiency and collector efficiency based on the second law of thermodynamics, subject to realistic constraints.

Learning Outcome 4: They have the ability to work on multidisciplinary teams and/or projects.
Performance Criteria
1. An ability to work on multidisciplinary teams or projects.
2. Work on a team to develop an experiment or project that requires the expertise from different areas such as electrical, mechanical, computer engineering, physics, etc.

Learning Outcome 5: They have developed problem-solving skills and have the ability to use engineering judgment necessary to solve real-life engineering problems.

Performance Criteria
1. An ability to use engineering judgment necessary to solve real-life engineering problems.
2. Demonstrate an ability to provide an adequate solution to an electrical engineering problem.

Learning Outcome 6: They have an understanding of their professional and ethical responsibilities.

Performance Criteria
1. Evidence of the exposure to a professional code of ethics.
2. An understanding of their professional and ethical responsibilities.
3. Discussion of ethical issues related to a proposed engineering solution.

Learning Outcome 7: They have the ability to communicate effectively, focusing on written and oral presentation skills.

Performance Criteria
1. Demonstrate communication skills through a project or laboratory report.
2. Satisfactory oral presentation of the term project or paper.
3. Participate in a group discussion on an engineering problem.

Learning Outcome 8: They are exposed to a broad education that enables them to understand the impact of engineering solutions in a global and social context.

Performance Criteria
1. Exposure to a broad education that enables them to understand the impact of engineering solutions in a global and social context.
2. Propose a solution for an electrical engineering problem. Discuss how the proposed solution can be adapted to solve a similar electrical engineering problem in a different geographical region under a different socio-economic environment.

Learning Outcome 9: They are prepared for life-long learning by establishing a process of critical and creative thinking.

Performance Criteria
1. Compiled data showing students’ attendance in a lecture covering the topic of need for life-long learning and students’ participation in a follow-up survey
assessing students’ understanding of the recognition for, the need for, and their ability to engage in life-long learning.

2. Compiled data showing how many students continued in a graduate program, completed professional courses, took the FE part of the PE exam, or continued their membership in a professional society.

3. An ability to learn and use new methodology in solving electrical engineering problems.

Learning Outcome 10: They are prepared for a role in society that goes beyond being engineering professionals.

Performance Criteria
1. Compiled data showing student’s attendance in a lecture that covered the role of an engineer in society that goes beyond being an engineering professional. A follow up survey will be given to assess the student’s understanding of an engineer’s role in society that goes beyond the engineering profession.
2. Propose a solution to an electrical engineering problem and discuss some of the following: the socio-economic impact, health and safety issues, and environmental issues.
3. Understanding the role of an engineer in society that goes beyond being an engineering professional.

Learning Outcome 11: They have the ability to use the techniques, skills and modern engineering tools necessary for the practice of engineering.

Performance Criteria
1. An ability to use some of the following engineering tools: LabView, AutoCad, Matlab, Electronics workbench, and VHDL.
2. Demonstrate the ability to use some of the following computer languages: C/C++, Visual Basic, and Java.
3. Demonstrate the ability to use the Internet.

Learning Outcome 12: They have an awareness of the need for continuous professional development.

Performance Criteria
1. An awareness of the need for continuous professional development.
2. Students’ attend invited lectures on professional development and Students’ involvement in professional societies.
Appendix IV
Assessment Planning Matrices
Learning Outcome 1: They are prepared for entrance into the engineering profession with a solid foundation in the fundamentals of mathematics, science, and engineering that apply to the field of electrical engineering.

<table>
<thead>
<tr>
<th>Performance Criteria</th>
<th>Strategy</th>
<th>Assessment Methods</th>
<th>Date of Assessment</th>
<th>Courses Examined</th>
<th>Observations/Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analyze an electrical engineering system (amplifier, diodes etc.).</td>
<td>Coursework</td>
<td>Locally developed tests*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demonstrate an ability to use the knowledge from mathematics and basic sciences to solve an electrical engineering problem.</td>
<td>Coursework</td>
<td>Locally developed tests</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analyze and synthesize the analog and digital electrical circuits.</td>
<td>Coursework</td>
<td>Locally developed tests</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>An ability to use calculus for the analysis of electrical systems.</td>
<td>Coursework</td>
<td>Locally developed tests Exit Interview/Questionnaire</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Locally developed tests include, but not limited to, class exams, class projects, term projects, homework assignments, take-home exams etc.
**Student Learning Outcome**  
**Assessment Planning Matrix II**

**Learning Outcome 1**: They are prepared for entrance into the engineering profession with a solid foundation in the fundamentals of mathematics, science, and engineering that apply to the field of electrical engineering.

<table>
<thead>
<tr>
<th>Performance Criteria</th>
<th>Recommend Actions</th>
<th>Actions Taken</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analyze an electrical engineering system (amplifier, diodes etc.).</td>
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<td>Demonstrate an ability to use the knowledge from mathematics and basic sciences to solve an electrical engineering problem.</td>
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<tr>
<td>An ability to use calculus for the analysis of electrical systems.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Learning Outcome 2: They have the ability to interpret and compare theoretical simulation results with actual experimental results.

<table>
<thead>
<tr>
<th>Performance Criteria</th>
<th>Strategy</th>
<th>Assessment Methods</th>
<th>Date of Assessment</th>
<th>Courses Examined</th>
<th>Observations/Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>An ability to model an experiment using a simulation tool and compare the simulation results with experimental results.</td>
<td>Coursework</td>
<td>Locally developed tests Exit Interview</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design an electrical engineering system or component with functionality verified using an engineering simulation and design tool (such as Matlab, Electronic Workbench etc.). Implement the design and compare with the simulation data. <strong>Examples:</strong> Digital Filter, Digital Controller etc.</td>
<td>Coursework</td>
<td>Locally developed tests</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Student Learning Outcome**  
**Assessment Planning Matrix II**

**Learning Outcome 2:** They have the ability to interpret and compare theoretical simulation results with actual experimental results.

<table>
<thead>
<tr>
<th>Performance Criteria</th>
<th>Recommend Actions</th>
<th>Actions Taken</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model an experiment using a simulation tool and compare the simulation results with experimental data.</td>
<td></td>
<td></td>
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<tr>
<td>Design an electrical engineering system or component with functionality verified using an engineering simulation and design tool (such as Matlab, Electronic Workbench etc.). Implement the design and compare with the simulation data. <strong>Examples:</strong> Digital Filter, Digital Controller etc.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Learning Outcome 3: They have the ability to design an engineering system subject to realistic constraints including, but not limited to constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.

<table>
<thead>
<tr>
<th>Performance Criteria</th>
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<th>Date of Assessment</th>
<th>Courses Examined</th>
<th>Observations/Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design an analog or digital system under given constraints such as a filter for a</td>
<td>Coursework</td>
<td>Locally developed tests</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>given cut-off frequency and gain.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>An ability to design an electrical engineering system subject to given constraints.</td>
<td>Coursework</td>
<td>Exit Interview/Survey</td>
<td></td>
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</tr>
<tr>
<td>Design of a thermal system for electricity generation based on physical principles.</td>
<td>Coursework</td>
<td>Locally developed tests</td>
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<tr>
<td>For example, calculate the solar collector area as a function of the thermal</td>
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<tr>
<td>efficiency and collector efficiency based on the second law of thermodynamics,</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>subject to realistic constraints.</td>
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</table>
Learning Outcome 3: They have the ability to design an engineering system subject to realistic constraints including, but not limited to constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.

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<tr>
<td>Design an analog or digital system under given constraints (such as a filter for a</td>
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<tr>
<td>given cut-off frequency and gain).</td>
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<tr>
<td>An ability to design an electrical engineering system subject to given constraints.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design of a thermal system for electricity generation based on physical principles.</td>
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<td>For example, calculate the solar collector area as a function of the thermal</td>
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<tr>
<td>efficiency and collector efficiency based on the second law of thermodynamics,</td>
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<td></td>
</tr>
<tr>
<td>subject to realistic constraints.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Learning Outcome 4: They have the ability to work on multidisciplinary teams and/or projects.

<table>
<thead>
<tr>
<th>Performance Criteria</th>
<th>Strategy</th>
<th>Assessment Methods</th>
<th>Date of Assessment</th>
<th>Courses Examined</th>
<th>Observations/Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>An ability to work on a multidisciplinary team or projects.</td>
<td>Coursework</td>
<td>Locally developed tests</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work on a team to develop an experiment or project that requires the expertise from different areas such as electrical, mechanical, computer engineering, physics, etc.</td>
<td>Coursework</td>
<td>Locally developed tests</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Exit Interview</td>
<td></td>
<td></td>
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</tbody>
</table>
**Learning Outcome 4:** They have the ability to work on multidisciplinary teams and/or projects.

<table>
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<th>Performance Criteria</th>
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<tbody>
<tr>
<td>An ability to work on a multidisciplinary team or projects.</td>
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<tr>
<td>Work on a team to develop an experiment or project that requires the expertise from different areas such as electrical, mechanical, computer engineering, physics, etc.</td>
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</tr>
</tbody>
</table>
**Learning Outcome 5:** They have developed problem-solving skills and have the ability to use engineering judgment necessary to solve real-life engineering problems.

<table>
<thead>
<tr>
<th>Performance Criteria</th>
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<th>Assessment Methods</th>
<th>Date of Assessment</th>
<th>Courses Examined</th>
<th>Observations/Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>An ability to use engineering judgment necessary to solve real-life engineering problems.</td>
<td>Coursework</td>
<td>Exit Interview</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demonstrate an ability to provide an adequate solution to an engineering problem.</td>
<td>Coursework</td>
<td>Locally developed tests, Oral exam/Exit Interview</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Student Learning Outcome**
**Assessment Planning Matrix II**

**Learning Outcome 5:** They have developed problem-solving skills and have the ability to use engineering judgment necessary to solve real-life engineering problems.

<table>
<thead>
<tr>
<th>Performance Criteria</th>
<th>Recommend Actions</th>
<th>Actions Taken</th>
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</thead>
<tbody>
<tr>
<td>An ability to use engineering judgment necessary to solve real-life engineering problems.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demonstrate an ability to provide an adequate solution to an engineering problem.</td>
<td></td>
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</tr>
</tbody>
</table>
**Learning Outcome 6:** They have an understanding of their professional and ethical responsibilities.

<table>
<thead>
<tr>
<th>Performance Criteria</th>
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<th>Date of Assessment</th>
<th>Courses Examined</th>
<th>Observations/Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evidence of the exposure to a professional code of ethics.</td>
<td>Invited Lecture</td>
<td>Follow-up Survey</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>An understanding of their professional and ethical responsibilities.</td>
<td>Coursework</td>
<td>Exit Interview</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discussion of ethical issues related to a proposed engineering solution.</td>
<td>Coursework, Invited Lecture</td>
<td>Locally developed tests, Oral exam/Exit Interview, Focus group Session</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Learning Outcome 6: They have an understanding of their professional and ethical responsibilities.

<table>
<thead>
<tr>
<th>Performance Criteria</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Evidence of the exposure to a professional code of ethics.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>An understanding of their professional and ethical responsibilities.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discussion of ethical issues related to a proposed engineering solution.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Learning Outcome 7: They have the ability to communicate effectively, focusing on written and oral presentation skills.

<table>
<thead>
<tr>
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<th>Strategy</th>
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<th>Date of Assessment</th>
<th>Courses Examined</th>
<th>Observations/Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstrate communication skills through a project or laboratory report.</td>
<td>Coursework</td>
<td>Performance Appraisal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Satisfactory oral presentation of the term project or paper.</td>
<td>Coursework</td>
<td>Exit Interview</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participate in a group discussion of an engineering problem.</td>
<td>Coursework, Invited Lecture</td>
<td>Performance Appraisal, Focus Group Session</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Learning Outcome 7**: They have the ability to communicate effectively, focusing on written and oral presentation skills.

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</tbody>
</table>
**Student Learning Outcome**
**Assessment Planning Matrix I**

**Learning Outcome 8:** They are exposed to a broad education that enables them to understand the impact of engineering solutions in a global and social context.

<table>
<thead>
<tr>
<th>Performance Criteria</th>
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<th>Observations/Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposure to a broad education that enables them to understand the impact of engineering solutions in a global and social context.</td>
<td>Coursework</td>
<td>Exit Interview</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Propose a solution for an electrical engineering problem. Discuss how the proposed solution can be adapted to solve a similar electrical engineering problem in a different geographical region under a different socio-economic environment.</td>
<td>Coursework</td>
<td>Locally developed tests</td>
<td></td>
<td></td>
<td>Performance Appraisal</td>
</tr>
<tr>
<td></td>
<td>Invited Lecture</td>
<td>Performance Appraisal</td>
<td></td>
<td></td>
<td>Follow-up Survey</td>
</tr>
</tbody>
</table>
## Student Learning Outcome
### Assessment Planning Matrix II

**Learning Outcome 8:** They are exposed to a broad education that enables them to understand the impact of engineering solutions in a global and social context.

<table>
<thead>
<tr>
<th>Performance Criteria</th>
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<th>Actions Taken</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposure to a broad education that enables them to understand the impact of engineering solutions in a global and social context.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Propose a solution for an electrical engineering problem. Discuss how the proposed solution can be adapted to solve a similar electrical engineering problem in a different geographical region under a different socio-economic environment.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Learning Outcome 9: They are prepared for life-long learning by establishing a process of critical and creative thinking.

<table>
<thead>
<tr>
<th>Performance Criteria</th>
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<th>Date of Assessment</th>
<th>Courses Examined</th>
<th>Observations/Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compiled data showing students’ attendance in a lecture covering the topic of need for life-long learning and students’ participation in a follow-up survey assessing students’ understanding of the recognition for, the need for, and their ability to engage in life-long learning.</td>
<td>Invited Lecture</td>
<td>Follow-up Survey</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compiled data showing how many students continued in a graduate program, completed professional courses, took the FE part of the PE exam, or continued their membership in a professional society.</td>
<td>Open House Invited Lecture</td>
<td>Survey Focus Group Session</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>An ability to learn and use new methodology in solving electrical engineering problems.</td>
<td>Coursework Invited Lecture</td>
<td>Locally developed tests Exit Interview</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Learning Outcome 9:** They are prepared for life-long learning by establishing a process of critical and creative thinking.

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<tr>
<td>Compiled data showing students’ attendance in a lecture covering the topic of need for life-long learning and students’ participation in a follow-up survey assessing students’ understanding of the recognition for, the need for, and their ability to engage in life-long learning.</td>
<td></td>
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<tr>
<td>Compiled data showing how many students continued in a graduate program, completed professional courses, took the FE part of the PE exam, or continued their membership in a professional society.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demonstrate an ability to learn and use new methodology in solving electrical engineering problems.</td>
<td></td>
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</table>
Learning Outcome 10: They are prepared for a role in society that goes beyond being engineering professionals.

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</thead>
<tbody>
<tr>
<td>Compiled data showing student’s attendance in a lecture that covered the role of an engineer in society that goes beyond being an engineering professional. A follow up survey will be given to assess the student’s understanding of an engineer’s role in society that goes beyond the engineering profession.</td>
<td>Invited Lecture</td>
<td>Follow-up Survey</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Propose a solution to an electrical engineering problem and discuss some of the following: the socio-economic impact, health and safety issues, and environmental issues.</td>
<td>Coursework</td>
<td>Locally developed tests</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Understanding the role of an engineer in society that goes beyond being an engineering professional.</td>
<td>Coursework</td>
<td>Exit Interview</td>
<td></td>
<td></td>
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</tr>
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**Learning Outcome 10:** They are prepared for a role in society that goes beyond being engineering professionals.

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<th>Performance Criteria</th>
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<tbody>
<tr>
<td>Compiled data showing student’s attendance in a lecture that covered the role of an engineer in society that goes beyond being an engineering professional.</td>
<td></td>
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<tr>
<td>Propose a solution to an engineering problem and discuss some of the following: the socio-economic impact, health and safety issues, and environmental issues.</td>
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<td>Understanding the role of an engineer in society that goes beyond being an engineering professional.</td>
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Learning Outcome 11: They have the ability to use the techniques, skills and modern engineering tools necessary for the practice of engineering.

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>An ability to use some of the following engineering tools: LabView, AutoCad, Matlab, Electronics workbench, and VHDL.</td>
<td>Coursework</td>
<td>Locally developed tests</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Exit Interview</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Demonstrate the ability to use some of the following computer languages: C/C++, Visual Basic, and Java.</td>
<td>Coursework</td>
<td>Locally developed tests</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Exit Interview/Questionnaire</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demonstrate the ability to use the Internet.</td>
<td>Coursework</td>
<td>Locally developed tests</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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**Learning Outcome 12:** They have an awareness of the need for continuous professional development.

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</tr>
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<tbody>
<tr>
<td>An awareness of the need for continuous professional development.</td>
<td>Coursework</td>
<td>Exit Interview</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students’ attend invited lectures on professional development.</td>
<td>Invited Lecture</td>
<td>Exit Interview/Questionnaire</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students’ involvement in professional societies.</td>
<td></td>
<td>Follow-up Survey</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Focus Group Session</td>
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