1) List course outcomes, and describe how each outcome was assessed. Attach supporting student work and surveys.

See attached table.

2) Discuss incorporation of action items from the last cycle of in-course assessment.
   - The change back to Kuo text was implemented.
   - The decision to focus on interpretation of Bode plots rather than on their construction by hand was implemented.

3) Discuss plans for subsequent offerings of this course based on assessment results.
   - No major changes recommended.

4) Describe any modifications to the outcomes – deletions, additions, and revisions.
   none

5) Comment on student evaluations (attach, if appropriate, copies of student evaluation forms).
   - All of the students completed a self-assessment pertaining to the course outcomes. Complete results are included as an attachment. No action items are implied from these survey results.

6) Are assessment methods appropriate for gauging student achievement of outcomes and objectives? Describe recommended changes.
   Yes.

7) Comment on linkages between course and program outcomes. Should specific linkages be added or deleted?
   The linkages described in the attached table are appropriate.

8) State whether the course has significant design content. If so, state what percentage of student grade is assigned to design-related material. Describe the project(s), including how the project addresses economic, environmental, sustainability, manufacturability, ethical, health and safety, social, and political considerations. Also, state whether and to what extent teamwork and communication were addressed.

   - The course is an introduction to control systems, and thus needs to introduce new concepts and analysis techniques before design can be started. Some of the assigned homework problems, and parts of the two projects addressed design and
simulation issues. Overall, I would say that the course included a 15-20% design emphasis.

- Two projects were assigned, both of which required formal written reports. The first asked students to model an automotive suspension system, simulate it, and discuss how system parameters should be altered to result in a better ride. This was an individual project.
- The second project was a case study of a printwheel from a computer printer. Most students worked in teams of two or three to complete this project. The project involved choosing system parameters that would achieve stability, steady-state accuracy. It also asked students to derive a second order approximation to a higher order system, and to compare the steady-state and transient response of the higher order system with its second order approximation.

Attachments:

1) Course Outcome and Assessment Table
2) Detailed Assessment Discussion
3) Listing of ECE Program Outcomes
4) Post-Course Survey Results
5) Syllabus
6) Homework assignments, project descriptions, exams, surveys/questionnaires (link each to relevant course outcomes)
7) Representative student work
<table>
<thead>
<tr>
<th>Course Outcomes</th>
<th>ECE Criteria Addressed</th>
<th>Assessment</th>
<th>Student Performance (0-5 scale)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Identify control system types and components, and advantages/disadvantages of different strategies.</td>
<td>A</td>
<td>Final Exam, end-of-course survey</td>
<td>4.5</td>
</tr>
<tr>
<td>2. Use Laplace transforms to solve differential equations of systems with non-zero initial conditions</td>
<td>A, e</td>
<td>Quiz #1, Final Exam, end-of-course survey</td>
<td>4</td>
</tr>
<tr>
<td>3. Reduce a block diagram of multiple subsystems to a single block representing the transfer function from input to output. (Signal flow graphs, Mason's gain rule)</td>
<td>E</td>
<td>Quiz #2, Project #2, Exam #2, Final Exam, end-of-course survey</td>
<td>4</td>
</tr>
<tr>
<td>4. Derive transfer functions for linear electrical networks, and linear mechanical translational and rotational systems.</td>
<td>A, e</td>
<td>Project #1, Exam #1, Final Exam, end-of-course survey</td>
<td>4</td>
</tr>
<tr>
<td>5. Determine and describe quantitatively the transient response characteristics of first and second order linear systems.</td>
<td>A, e</td>
<td>Quiz #4, Project #1, Project #2, Exam #1, Final Exam, end-of-course survey</td>
<td>4.5</td>
</tr>
<tr>
<td>6. Determine the stability and steady-state error of a system from its transfer function and choose system parameters to achieve performance specifications.</td>
<td>A, c, e</td>
<td>Quiz #3, Quiz #4, Project #2, Exam #1, Exam #2, Final Exam, end-of-course survey</td>
<td>4</td>
</tr>
<tr>
<td>7. Use time and frequency domain techniques (root locus, Bode plot) to analyze and design linear control systems.</td>
<td>A, c, e, k</td>
<td>Project #2, Exam #2, Final Exam, end-of-course survey</td>
<td>4</td>
</tr>
<tr>
<td>8. Use MATLAB/SIMULINK for the analysis and design of control systems.</td>
<td>C, k</td>
<td>Project #1, Project #2, end-of-course survey</td>
<td>4</td>
</tr>
</tbody>
</table>