**ABET ASSESSMENT**

**Department of Materials Science and Engineering**

#### **Guidelines for Instructors**

We must collect ABET assessment data on a two-year cycle for all of our undergraduate courses except MSE 200, 201 and 203. This data takes the form of selected homework and exam questions for lecture courses and completion of the lab report assessment rubric for lab courses. *Please note that this data must be collected* ***for every student during the semester*** *before homework/exam/lab reports are returned to the students. Unless you plan to keep a copy of everything your students turn in, this cannot be done retroactively at the end of the semester.*

Assessment data must be collected for the following courses:

**Fall semester: MSE 300, 301, 320, 335, 420, 423, 440, 445, 460**

**Spring semester: MSE 255, 260, 270, 355, 360, 370, 380, 455, 456, 470, 480**

*Please collect your assessment data during the first year of each 2-year cycle.* Your assessment data must address the program learning outcomes for your course(s), which are listed on the following pages. These have been recently revised to be consistent with the new MSE curriculum. Please follow the guidelines below and record your data in the Excel spreadsheet templates which are posted on the MSE website for lecture and lab courses. Email the completed spreadsheets to me at the end of the semester (balik@ncsu.edu). I am available to answer any questions.

We need everyone’s participation in this process to receive ABET accreditation for our program. Thanks in advance for doing your part by completing the assessment data collection in a timely manner.

*Collection of assessment data for lecture courses:*

Use the Excel template for lecture courses. Find your course in the table on page 3 of this document and determine which MSE learning outcome(s) are addressed by your course. Note that some courses address more than one outcome. *Prepare a separate spreadsheet for each outcome, and put these spreadsheets in a single Excel workbook for each course.* Please select a total of 5 to 10 homework and/or exam problems that address each outcome. Use more problems if you have a small class (< 10 students). Summarize the topic addressed by each problem in the first column of the spreadsheet. Give each student a 1 if they have the problem essentially correct, and a 0 if it isn’t correct. Students that don’t complete an assignment shouldn’t be counted (leave that box blank). The percent correct is automatically calculated on the spreadsheet.

*Collection of assessment data for lab courses:*

Use the lab report rubric on the MSE website to evaluate lab reports. This one rubric covers all the outcomes for any lab course. All MSE lab reports should use a common format containing an Abstract, Introduction, Experimental, Results, Discussion and Conclusions sections. Each lab report should be rated according to the rubric with a 1, 2, 3 or 4 in each category. This can be done by the TA assigned to each lab course. Use the Excel lab template provided on the MSE website to record the data. This template has 10 spreadsheets to accomodate up to 10 lab reports.

*Collection of assessment data for MSE 270, 423, 470:*

These courses utilize other assessment methods. Please record your data in spreadsheet format.

MSE PROGRAM LEARNING OUTCOMES

1. By graduation, students will be able to apply the basic mathematical skills needed to solve routine problems within the discipline of MSE.

2. By graduation, students will be able to identify the structure-property-processing-performance relationships for metallic, ceramic, polymeric and electronic materials.

3. By graduation, students will be able to demonstrate knowledge of thermodynamics and kinetics relevant to MSE.

4. By graduation, students will be able to apply computer modeling programs and other computer-based tools to solve materials-related problems.

5. By graduation, students will be able to select an appropriate material for a given application.

6. By graduation, students will be able to apply basic microscopy, diffraction and spectroscopy methods for analysis of the structure of materials at various size scales.

7. By graduation, students will demonstrate familiarity with methods used to analyze mechanical, thermal, electrical and magnetic properties of materials.

8. By graduation, students will be able to articulate the basic processing methods for selected classes of materials that interest them, and explain how processing parameters can affect structure and properties.

9. By graduation, students will be able to demonstrate team-oriented skills.

10. By graduation, students will be able to communicate orally with others within the discipline of MSE.

11. By graduation, students will be able to communicate through writing with others within the discipline of MSE.

12. By graduation, students will develop an appreciation for contemporary issues.

13. By graduation, students will develop an appreciation for professional and ethical responsibility.

14. By graduation, students will develop an appreciation of the impact of engineering solutions on society and the environment in a global context.

15. By graduation, students will develop an appreciation for the importance of life-long learning.

16. By graduation, students who desire to attend graduate school will be accepted into reputable MSE graduate programs.

**Learning outcomes addressed by each MSE course**

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| --- | --- | --- |
| **MSE course** | **Outcome(s) addressed** | **Assessment method to use** |
| 255 | 6, 11 | lab report rubric |
| 260 | 1, 4 | selected homework and exam problems |
| 270 | 10, 11, 12 | other |
| 300 | 2 | selected homework and exam problems |
| 301 | 3 | selected homework and exam problems |
| 320 | 2 | selected homework and exam problems |
| 335 | 7, 11 | lab report rubric |
| 355 | 2 | selected homework and exam problems |
| 360 | 1, 3 | selected homework and exam problems |
| 370 | 2 | selected homework and exam problems |
| 380 | 2 | selected homework and exam problems |
| 420 | 2 | selected homework and exam problems |
| 423 | 5, 9, 10, 11 | other |
| 440 | 8 | selected homework and exam problems |
| 445 | 8 | selected homework and exam problems |
| 455 | 8 | selected homework and exam problems |
| 456 | 8 | selected homework and exam problems |
| 460 | 8 | selected homework and exam problems |
| 470 | 9, 10, 11 | other |
| 480 | 2, 3 | selected homework and exam problems |