

Assessment Reporting

AY 2008/09

As you now know an interim report on the assessment of student learning is due to WASC in fall of 2010. We have been asked to demonstrate that we are using assessment data to improve student learning (i.e., “closing the assessment loop”) and that the assessment process is sustainable. To that end, we are asking programs to report on their most complete student learning outcome (SLO) during this reporting cycle. Please identify your selected SLO in the box below and provide the requested information.

Degree Program:	BSAE	Academic Year:	2008 - 2009
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BSAE Student Learning Outcome (SLO) #1

Ability to apply knowledge of mathematics, science, and engineering to identify, formulate, and solve aerospace engineering problems.

1.1 Data Collection:

[FALL 2008 / SPRING 2009] – For this assessment cycle, how were the data collected and what were the results?

Students were tested in their ability to apply prerequisite knowledge of engineering science (fluid mechanics for AE162 and AE164, thermodynamics for AE164) at the beginning of the term. Subsequently students were tested in current material presented in each course throughout the semester and their performance was analyzed.

Students were found deficient in both thermodynamics and fluid mechanics at the beginning of each course. Their deficiency in prerequisite fluid mechanics knowledge was at unacceptable levels. In particular, students scored on average from 10%– 30% on the Fluids Concept Inventory (a nationally developed test for basic fluid mechanics) indicating lack of working knowledge of the material. In particular, students scored on average 5% on Boundary Layer concepts making it impossible to teach calculation of aerodynamic drag in AE162. It is noteworthy that several of the low-performing students had earned high grades in ME111. Students were also found deficient in fundamental linear algebra concepts in AE169.

Assessment data have identified deficiencies in fluid mechanics and linear algebra concepts in the AE curriculum continuously in the last three years, hence, the findings in AY 08-09 are not new.

1.2 What have you learned about this Student Learning Outcome?

[FALL 2008 / SPRING 2009] – Based on the results in part 1.1 above, briefly summarize the discussion surrounding this outcome, i.e., what does the faculty conclude about student learning for this SLO?

The AE faculty have concluded that lack of prerequisite knowledge (in particular in fluid mechanics) has a detrimental effect in student performance in AE162, AE164, and AE169. Hence, a 1st-semester aerodynamics course is needed to

address the deficiencies mentioned above as well as to meet additional needs of the BSAE curriculum, which have been discussed extensively at the department and college level. Similar effects have been measured in AE169 due to lack of basic knowledge in linear algebra. Overall, AE student performance in this outcome is satisfactory for all students who earn passing grades, however, material that should be included in AE core courses is currently left out because of lack of preparation of students in ME prerequisite courses.

1.3 Action Items(s) (if necessary):

[FALL 2008 / SPRING 2009] – Based on the discussion in part 1.2 above, what actions will the department take to improve student learning, e.g., program changes, changes in pedagogy, process changes, resources requests, etc?

The AE faculty have proposed:

(a) A new permanent course AE160 – Aerodynamics I in the BSAE curriculum to replace ME111 and the renaming of AE162 into Aerodynamics II as a way of (i) addressing the aforementioned lack of prerequisite knowledge, (ii) introducing additional aerodynamics experiments, and (iii) introducing additional aerodynamics content (high-speed aerodynamics), which is essential for aerospace engineers.

(b) Math 129 – Linear Algebra to be a required course in the BSAE curriculum in lieu of ME130 – Applied Engineering Analysis.

1.4 Results of Action Items

[FALL 2008 / SPRING 2009] – What does assessment of student learning show after implementation of any action items? What, if anything, is planned next?

Neither proposal has been implemented.

The proposal for AE160 was approved by the MAE Curriculum Committee in Fall 2008 and (following a re-structuring of all departmental committees) approved again in Spring 2009. It has not yet been implemented as it awaits review a college level review in Fall 2009.

The proposal to replace ME130 with Math 129A was submitted to the MAE Department on March 22, 2007, approved by the MAE Department Curriculum Committee on April 10, 2007, vetoed by the MAE Department Chair on April 26,

2007, discussed with Dean Wei on September 25, 2007, re-discussed in the Department in November 2007, re-discussed and re-approved by the MAE Curriculum Committee in Spring 2009. Hence, this proposal has also not yet been implemented, as it awaits a college level review in Fall 2009.