DIRECT AND INDIRECT MEASURES FOR COURSE OUTCOMES ASSESSMENT
Case study: Signals and Systems (EE 330)

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Agenda

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- Guidelines for course assessment
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- Planned Improvements
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Introduction

- ABET Criterion 3 requires each program to have student outcomes (SOs).

- Direct and indirect measures provide for student knowledge or skills against measurable course outcomes (COs).

- The knowledge and skills described by the COs are mapped to the SOs through specific problems on course works.

Introduction

- Throughout the semester, the instructor keeps track of the performance of each student on each CO.

- Each student receives a "score" on the scale of 1-to-5 for each CO indicating how well he achieved each outcome.

- The data (scores) coming from each course are used at the program level to assess the program outcomes.

Guidelines for course assessment

Judgment of the attainment of SOs

Exceeds Expectations (EE)	Meets Expectations (ME)	Progressing Towards Expectations (PE)	Does Not Meet Expectations (DNME)
Average grade (AG) is 90% or more	AG between 70% - 89%	AG between 60% - 69%	AG less than 60%

Guidelines for course assessment

- We must necessarily pay attention to the following cases:
  - DNME and PE in a specific outcome.
  - Important discrepancy (> 15%) between direct and indirect assessment.
  - Questions with Unsatisfactory or Developing in indirect assessment.

- The analysis of the results must be oriented towards:
  - Identifying the issues behind the non-attainment of a specific outcome.
  - Determining corrective actions to be taken in the following semester(s).

- At the end of each, an assessment meeting will be held. An improvement plan will result based on that assessment meeting.

Direct and Indirect Assessment

- EE 330 has 8 COs that mapped to 3 SOs.
  - SO (a): An ability to apply knowledge of mathematics, science, and engineering
  - SO (e): An ability to identify, formulate, and solve engineering problems
  - SO (k): An ability to use the techniques, skills, and modern engineering tools

	SO (a)	SO (e)	SO (k)
CO (1)	√		
CO (2)	√	√	
CO (3)	√	√	
CO (4)	√	√	
CO (5)	√	√	
CO (6)	√	√	
CO (7)	√	√	
CO (8)			√

Attainment of CO & SO through direct assessment

Mapping coursework to SOs

	SO (a)	SO (e)	SO (k)
Quiz 1		2.5	
Quiz 2		2.5	
Quiz 3	2.5		
Quiz 4	2.5		
Exam 1	8	12	
Exam 2	10	10	
Final Exam	15	15	
Project		8	12
Total	38	50	12

Summary of SOs attainment

	SO (a)	SO (e)	SO (k)
Planned	38.00	50.00	12.00
Avg Score	14.65	20.9125	8.4
AVG Score %	38.55%	41.83%	70.00%

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Learning Barriers and Issues

- The students have a very weak background in the prerequisites.

- The instructor believes that the student workload is excessive during the third year of the curriculum.

- The senior student who conducted the tutorial sessions noticed a very weak attendance to those sessions.

- The instructor believes that considering the students who did not pass the course to assess the COs is not appropriate.

- The students criticize the availability of learning resources in the library.

Planned Improvements

- Homework assignments may be handled next time given that a TA grader is available.

- A recommendation to the Math department should be raised to conduct tutorial sessions in calculus and differential equations to improve the student's skills.

- The students' study plan should be revised to distribute courses more evenly in the curriculum.

- Giving practical examples particularly when explaining difficult concepts in order to balance theory and practice.

- Increasing students participation in the classroom to engages them more and help clear their doubts.

Summary of Actions Taken

#	Suggested improvement actions from previous sem. Action	Implementation in Current sem. Yes(Evidence)	No(Action)	Status
1	The instructor will do his best to ensure the achievement of the ME status of SO (e) next time the course is taught, by giving tutorials and HWs.	Tutorials by senior students are conducted this term		Closed
2	The instructor will pay attention to the discrepancy between his opinion and the opinion of students. More specifically, holding tutorial sessions in complex analysis.	Two lectures in complex analysis were given by the instructor		Closed
3	Efforts will be redoubled to make sure student's achievement level in the course is improved.	More examples were solved in the class		Closed
4	The students' study plan should be revised so as to distribute courses more evenly in the curriculum.		Recommendation to the curriculum committee will be raised	Ongoing

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Conclusions

- An assessment approach has been presented for direct and indirect measurements of how well students achieve COs.

- In our case, class sizes are about 15-30 students thus making it easier to implement the described assessment approach.

- In larger classes, this approach may need to be further simplified. For example, a representative subset can be used.

- Finally, we are………………………………………………

Thanks

Q&A