

**Course Learning Outcomes Assessment
Core COE Courses
Term 071**

Summary:

305: 2 sections (1,2)

360: 1 section (2)

341: 1 section (2)

400: 1 section (2)

485: 1 section (03) (incomplete: Only student evaluation was found)

Course Assessment Summary
COE 305 Microprocessor System Design (3-3-4)
Term 071

Course Learning Outcomes

1. Ability to apply knowledge of mathematics, probability and engineering in microprocessor system design.
2. Ability to design and conduct experiments related to microprocessor based system design and to analyze their outcome.
3. Ability to design, debug and test a small scale microprocessor based system.
4. Ability to function as an effective team member.
5. Ability to identify, formulate and solve engineering problems in microprocessor based system design.
6. Ability to use design tools for microprocessor system design, test and evaluation.
7. Ability to engage in self-learning for a small subset of the course.

Section#	Source of Outcome Data	O1	O2	O3	O4	O5	O6	O7
1	Instructor Evaluation	60%	78%	70%	74%	72%	86%	74%
	Student Survey	78%	85%	71%	85%	68%	78%	80%
2	Instructor Evaluation	85%	89%	85%	89%	87%	89%	86%
	Student Survey	85%	91%	93%	90%	90%	85%	85%
Overall	Assessment Rating	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved

Observations:

1. Minimum weight requirements were met for all learning outcomes except outcome 1.
2. Outcome 5 indicators do not represent course content covered. This resulted in a relatively lower score by the students.
3. Based on the recommendation made at the end of semester 062, the self learning assignment for section 1 was changed from individual to group-based assignment (3 students/group), and included both a report and a group presentation. This has proved more beneficial through increased student motivation, interaction and active learning practices, and enhancing team work, communication and presentation skills. The change has brought a marked improvement in student scores compared to last semester (58% to 74%).

4. Active/Cooperative Learning activities were introduced in section 2 this term in order to enhance the ability to identify, formulate, and solve engineering problems in microprocessor based system design. The class was divided into three groups/teams with one group having 4 students and remaining two groups having 3 students each. Team Roles for Cooperative Learning Activities – Captain, Recorder, Spokesperson, Optimist, Skeptic and Reflector were defined and assigned among the group members. Since the number of students in each group was small, some of the students (mainly team Captains) had to assume more than one role. Three Active/Cooperative Learning activities were given to the groups. Team captains conducted the Cooperative learning activities with lot of enthusiasm and kept the process enjoyable and rewarding for team members. They made sure that each member has a role and is performing within that role and ensured that all team members can articulate what has been learned. All the team members actively participated in the cooperative learning activities – discussed various issues, presented ideas, made oral presentation to the class. On the whole, students had very useful and fruitful cooperative learning sessions.

Recommendations:

1. Revise minimum weights for outcomes as follows:
 - O1: 5%
 - O2: 5%
 - O7: 5%
2. Rewrite outcome indicators for Outcome 5 to represent the actual coverage of this outcome in the course syllabus.

Course Assessment Summary
COE 360 Principles of VLSI Design (3-0-3)
Term 071

Course Learning Outcomes

1. Ability to apply knowledge of mathematics, science, and engineering in the design, analysis and modeling of digital integrated circuits.
2. Ability to design and conduct experiments using SPICE to characterize and optimize digital integrated circuits.
3. Ability to Design, Verify, Analyze and Evaluate the performance (speed, Power, Area, Noise margins) of different MOS digital integrated circuits for different design specifications
4. Ability to use CAD tools in the design and verification of digital integrated circuits.
5. Ability to function as an effective team member.
6. Ability to communicate effectively.

Section#	Source of Outcome Data	Outcome1	Outcome2	Outcome3	Outcome4	Outcome5	Outcome6
2	Instructor Evaluation	68%	73%	68%	79%	72%	72%
	Student Survey	86%	86%	66%	80%	84%	80%
Overall	Assessment Rating	Achieved	Achieved	Can be Improved further	Achieved	Achieved	Achieved

Observations:

1. Outcomes 5 and 6 are indirectly assessed through the course project and the final report.
2. All outcomes are considered achieved with satisfactory level, but Outcome 3 can be improved.

Recommendations:

1. Add more emphasis on design aspects by giving more design examples and through the course project.

Course Assessment Summary
COE 341 Data and Computer Communications (3-0-3)
Term 071

Course Learning Outcomes

1. Ability to apply knowledge of mathematics to understand basic concepts in communication engineering.
2. Ability to design basic communication systems, components, and algorithms.
3. Ability to identify, formulate, analyze, and solve basic communication engineering problems.
4. Ability to use programming tools and skills for the simulation, analysis, and design of basic communication systems and components.
5. Ability to demonstrate self learning skills and aptitudes.

Section#	Source of Outcome Data	Outcome1	Outcome2	Outcome3	Outcome4	Outcome5
2	Instructor Evaluation	64%	67%	75%	66%	74%
	Student Survey	78%	78%	78%	75%	93%
??	Instructor Evaluation					
	Student Survey					
Overall	Assessment Rating	Needs Improvement	Achieved	Achieved	Achieved	Achieved

Observations:

1. Minimum weights were satisfied for all scores. Weight for outcome 1 was increased by including modulo 2 arithmetic for CRC codes.
2. Outcomes were achieved, with outcome 1 needing further improvement.
3. Section 2: Student achievements on the programming assignment were lower compared to term 062 as many have left it till the last minute.

Recommendations:

1. Section 2: Improve performance on outcome 1 through more emphasis on Fourier analysis and the decibel notation.

Course Assessment Summary Course Assessment Summary

COE 400 System Design Laboratory (1-6-3)

Term 071

Course Learning Outcomes

1. Ability to apply knowledge of mathematics, science and Engineering in design and analysis of different alternative implementations of a system's specification.
2. Ability to design and implement an embedded system starting from given specifications.
3. Ability to debug and test an embedded system.
4. Ability to identify, formulate, and solve engineering problems such as the selection of most appropriate solutions for solution criteria.
5. Ability to use tools to achieve design objectives.
6. Ability to function as an effective team member.
7. Ability to engage in self-learning.
8. Ability to communicate effectively.

Sec#	Source of Outcome Data	O1	O2	O3	O4	O5	O6	O7	O8
2	Instructor Evaluation	78%	70%	76%	92%	66%	70%	90%	88%
	Student Survey	75%	88%	88%	88%	56%	69%	81%	81%
??	Instructor Evaluation								
	Student Survey								
Overall	Assessment Rating	Achieved	Achieved	Achieved	Achieved	Needs Improvement	Achieved	Achieved	Achieved

Observations:

Sections 2:

1. Many of the outcomes have been achieved.
2. Outcome 4, related to teamwork, has been improved compared to last semester. This is because a higher percentage of the students were actually intensively involved in the project.
3. This course is designed to let students make specifications and then start designing according to the specifications. The confusion is that the specifications are technical requirements that can generate models in simulation to verify it. However, the students actually start from general requirements and are confused whether to come up with specifications or start directly designing. It is difficult to teach such concepts at this level because we need several iterations to arrive to satisfactory results.

4. The use of tools has been very satisfactory, as the students had to learn how to use:
 - a. Debugging tools like: meters and LEDs;
 - b. Software tools like:
 - i. Java software development tools (to build the GUI)
 - ii. Microcontroller development and debugging software tools
 - iii. WLAN setup and configuration tools
 - iv. Use of Matlab
 - v. Interfacing these tools to work together.
5. Outcome 7 was well achieved as the self-learning component was high within the use of tools.

Recommendations:

Course Assessment Summary

COE 485 Senior Design Project (1-6-3)

Term 062

Course Learning Outcomes

1. Ability to apply knowledge of mathematics, science, and engineering.
2. Ability to design and conduct experiments, as well as to analyze and interpret data.
3. Ability to design a system, component, or process to meet desired needs.
4. Ability to identify, formulate, and solve engineering problems.
5. Understanding of professional and ethical responsibility.
6. Ability to communicate effectively.
7. The broad education necessary to understand the impact of engineering solutions in a global and societal context
8. Recognition of the need for, and an ability to engage in life-long learning.
9. Knowledge of contemporary issues.
10. Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
11. Ability to function as an effective team member.

Sec#	Source of Outcome Data	O1	O2	O3	O4	O5	O6	O7	O8	O9	O10	O11
3	Instructor Evaluation											
	Student Survey	68%	93%	93%	90%	90%	98%	78%	78%	90%	83%	??
??	Instructor Evaluation											
	Student Survey											
Overall	Assessment Rating	Ach.	Ach.	Ach.	Ach.	Ach.	Achieved	Needs Improv.	Ach.	Ach.	Ach.	Needs Improv.

Observations:

Recommendations: