

**Course Learning Outcomes Assessment
Core COE Courses
Term 061**

Course Assessment Summary
COE 202 Fundamentals of Computer Engineering (3-0-3)
Term 061

Course Learning Outcomes

1. Ability to use math and Boolean algebra in performing computations in various number systems and simplification of Boolean algebraic expressions.
2. Ability to design efficient combinational and sequential logic circuit implementations from functional description of digital systems.
3. Ability to use CAD tools to simulate and verify logic circuits.

Section#	Source of Outcome Data	Outcome1	Outcome2	Outcome3
1 & 2	Instructor Evaluation	76%	44.1%	42.2%
	Student Survey	90.3%	66.56%	53.75%
3	Instructor Evaluation	60.8%	59.6	37.3
	Student Survey	73.75	66%	46.5%
4	Instructor Evaluation	68.2%	48.5%	25%
	Student Survey	76.9%	67.8%	53.3%
Overall	Assessment Rating	Achieved	Needs Improvement	Not Achieved

Observations:

1. Outcome 1 is achieved for all sections as assessed by both instructors & students
2. From students' perspective, outcome 2 is achieved. From instructors' perspective, O2 is marginally achieved with two sections. The main problem for students is the sequential logic part compared to combinational logic part (as shown by student survey of sections 1 & 2).
3. From students perspective, outcome 3 is marginally achieved. From instructors' perspective, O3 has not been achieved. Simulation tools were introduced late in the course, after sequential logic which did not allow proper mastering of the tools.

Recommendations:

1. More help sessions are needed for sequential logic. Introducing simulation tools earlier may help students better understand design of sequential logic
2. CAD tools should be introduced earlier, e.g. right after introducing Combinational logic.

Course Assessment Summary
COE 205 Computer Organization & Assembly Language (3-3-4)
Term 061

Course Learning Outcomes

1. Ability to analyze, design, implement, and test assembly language programs.
2. Ability to use tools and skills in analyzing and debugging assembly language programs.
3. Ability to design the datapath and control unit of a simple CPU.
4. Ability to demonstrate self-learning capability.
5. Ability to work in a team.

Section#	Source of Outcome Data	Outcome1	Outcome2	Outcome3	Outcome4	Outcome5
1	Instructor Evaluation	64.8%	48.2%	72.3%	62.8%	61.7%
	Student Survey	75%	65%	68.2%	73.3%	75%
2	Instructor Evaluation	77.8%	80.7%	70.1%	75.2%	75.2%
	Student Survey	88.25%	88.25%	69%	75%	86.8%
3	Instructor Evaluation	77.4%	86%	77.5%	78%	78.8%
	Student Survey	87%	79%	77.8%	81.5%	80.3%
Overall	Assessment Rating	Achieved	Needs Improvements	Needs Improvements	Achieved	Achieved

Observations:

1. Outcome 2 and Outcome 5 have not been assessed directly in Section II and Section III and the lab mark has been used.
2. Based on the overall assessment and instructors' feedback, it seems that Outcome 2 and Outcome 3 need improvement. All other outcomes are considered well-achieved.

Recommendations:

1. Outcome 2 needs more emphasis in the lab and should be directly assessed by lab instructors.
2. Outcome 3 can be improved by increasing the number of assignments on this part from one to two.

Course Assessment Summary
COE 305 Microprocessor System Design (3-3-4)
Term 061

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	72.13%	88.6 %	72.7 %	88.6 %	71.51%	88.6 %	68.75 %
	Student Survey	85.5 %	94.75 %	89.5 %	96.0 %	89.5 %	81.5 %	88.25 %
2	Instructor Evaluation	69.7 %	59.1 %	53.0 %	80.0 %	78.0 %	76.7 %	80.0 %
	Student Survey	82.8 %	75.0 %	68.75 %	68.75 %	75.0 %	87.5 %	81.2 %
Overall	Assessment Rating	Achieved	Needs Improvement	Needs Improvement	Achieved	Achieved	Achieved	Achieved

Observations:

1. Section 1 and section 2 have slightly different results.
2. No instructor feedback is available.

Recommendations:

1. Outcomes 2 and 3 need to be better addressed in the lab.

Course Assessment Summary
COE 308 Computer Architecture (3-0-3)
Term 061

Course Learning Outcomes

1. Ability to apply knowledge of mathematics, probability, and statistics in computer analysis and design.
2. Ability to design the datapath and control of a processor.
3. Ability to identify, formulate, and solve computer architecture problems.
4. Ability to use simulator tools.
5. Ability to engage in self-learning.

Section#	Source of Outcome Data	Outcome1	Outcome2	Outcome3	Outcome4	Outcome5
2	Instructor Evaluation	63.7%	62.1%	59.5%	69.7%	69.7%
	Student Survey	85.6%	87%	79.7%	65.5%	88%
3	Instructor Evaluation	63.7%	69.5%	72.8%	56.1%	61.8%
	Student Survey	67.3%	78.8%	65.4%	38.45%	73%
Overall	Assessment Rating	Needs Improvement	Achieved	Needs Improvement	Needs Improvement	Achieved

Observations:

1. Outcome 1, 3, and 4 need improvement while other outcomes are satisfactory.

Recommendations:

1. In order to improve outcome 4, a set of Mini-Projects involving the use of Simulator Tools is to be adopted for all course sections. The simulator tools deal with developing some experience with MIPS assembly language as well as the design of a processor datapath using both single-cycle and multi-cycle designs. The mini-projects will be rated 25%, of which 5% for the use of tools, 15% for the design, and 5% for engaging in life-long learning. The students are provided guidance and need to learn on their own the use of the above tools.
2. In order to improve the achievement of outcome 1 and 3, it is decided to reinforce the use of math and probabilities in Computer Arithmetic and Computer Performance. Tradeoffs aspects needs to be emphasized more specially when dealing with problems that admit more than one solution like multiplier, divider, datapath design versus available resources, cache memory performance versus cold start, capacity, and conflict misses and corresponding approaches leading to some performance improvements.

Course Assessment Summary
COE 360 Principles of VLSI Design (3-0-3)
Term 061

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
1	Instructor Evaluation	Needs Improvement	Achieved	Achieved	Not Achieved	Not Achieved	Needs Improvement
	Student Survey	82.6%	75.6%	80.8%	77.4%	90.4%	87%
Overall	Assessment Rating	Needs Improvement	Achieved	Achieved	Not Achieved	Not Achieved	Needs Improvement

Observations:

1. Outcome 1 was marginally achieved due to the following reason: Students math abilities are very weak.
2. Outcome 4 was not achieved due to the following reason: Students are used to spoon feeding. Though they were given several tutorials on the CAD tools used in the course, they still could not master them and kept complaining about “needing someone to teach us these tools”.
3. Outcome 5 was not achieved due to the following reason: Students were not formally trained on team work. They tend to dysfunction in teams.
4. Outcome 6 was marginally achieved due to the following reason: Students’ composition skills are very weak! There is no room in this course to strengthen these skills. These skills should be sharpened in all courses that require students to write reports (i.e. labs).
5. Students’ perception of course outcomes achievement is very high. Students believed that the course outcomes were all achieved (minimum student score was 75.6%!). This is an indication of lack of understanding of what these outcomes mean.

Recommendations:

1. Next time an on-line math quiz will be administered in the first week of the semester to point out the basic math skills required by the students in this course
2. More emphasis in using CAD/Simulation/Analysis software tools should be included in lower courses. This will enhance the student's ability to learn new tools.
3. Next time a tutorial will be given on team work. It would also be much better if team work is stressed out through lab courses, which will eliminate the need for such tutorial.
4. The course outcomes need to be mapped to the taught topics much closer. Though this will increase the number of outcomes, but it will make it much easier to evaluate and assess. More importantly, it will make the students know exactly what they are expected to learn or achieve in this course.
5. Instructors need to talk with students about course learning outcomes and what they mean.

Course Assessment Summary
COE 341 Data and Computer Communications (3-0-3)
Term 061

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
Dr. Radwan	Instructor Evaluation	64.8%	61.4%	63.3%	68%	74%
	Student Survey	65%	62.5%	62.5%	67.5%	75%
Dr. Marwan	Instructor Evaluation	40.8%	65.8%	71.4%	44.0%	84.0%
	Student Survey	63.5%	63.5%	67.25%	84.5%	82.75%
Dr. Ashraf	Instructor Evaluation	65.0%	62.3%	63.2%	82.8%	74.8%
	Student Survey	71.25%	81.25%	81.5%	81.25%	75%
Overall	Assessment Rating	Needs Improvement	Achieved	Achieved	Needs Improvement	Achieved

Observations:

1. Dr. Radwan Feedback:

Minimum weights were achieved for all outcomes and far exceeded for outcomes 2 and 3. Achievements in all outcomes are satisfactory (ranging from 61.4% to 74%). The term paper and programming assignments proved successful in motivating students for self learning, team working and enhancing their writing and presentation skills. It is suggested that outcome 1

indicators should be expanded to include the application of modulo 2 binary arithmetic to error detection codes.

2. Dr. Marwan Feedback:

* Need to improve outcome 1 by implementing the following suggestions:

1. Give the students an external math quiz to prepare them for the course.
2. Include additional examples.

* Need to improve outcome 4 by implementing the following suggestions:

1. Give the students more programming assignments.
2. Ask the students to verify their other assignments using the available tools.

3. Dr. Ashraf Feedback:

* Need to improve outcome 2 by implementing the following suggestions:

1. More emphasis on practical communication systems (HDLC, PCM, etc.) examples.
2. Perhaps integrate some material into experiments with software

* Need to improve outcome 3 by implementing the following suggestions:

1. Give the students more concrete examples of formulating and analyzing problems.
2. Again, attempt to integrate some material into experiments with software

Outcome 1 - Math skills - needs reinforcement.

Recommendations:

1. Outcome 1 indicators need to be revised.
2. Outcome 1 can be enhanced by giving more examples and more assignments.
3. Outcome 4 needs to be enhanced by giving more programming assignments using tools.
4. Outcome 2 and 3 can be improved further by giving more assignment using tools and giving more examples.

Course Assessment Summary Course Assessment Summary
COE 344 Computer Networks (3-3-4)
Term 061

Course Learning Outcomes

1. Ability to apply knowledge of mathematics, probability, and statistics to model and analyze some networking protocols.
2. Ability to design, implement, and analyze simple computer networks.
3. Ability to identify, formulate, and solve network engineering problems.
4. Knowledge of contemporary issues in computer networks.
5. Ability to use techniques, skills, and modern networking tools necessary for engineering practice.

Section#	Source of Outcome Data	Outcome1	Outcome2	Outcome3	Outcome4	Outcome5
3	Instructor Evaluation	46%	65%	60%	100%	66%
	Student Survey	78%	91.75%	88.25%	81%	87%
Overall	Assessment Rating	Not Achieved	Achieved	Needs Improvement	Achieved	Achieved

Observations:

1. Outcome 1 needs major improvement while outcome 3 needs more improvement.

Recommendations:

* Need to improve outcome 1 by implementing the following suggestions:

1. Give the students more examples and problems from computer networking field to enhance their ability to apply knowledge of Math and probability to model and analyze some networking protocols.
2. Move the course on Probability and statistic into COE department to enhance students' understanding and appreciation of applying knowledge of Probability and statistic for modeling and analyzing computer networking problems

* Need to improve outcome 3 by implementing the following suggestions:

1. Give the students more concrete examples of formulating and analyzing problems.