



**2020-21 Program Assessment
Embedded Systems
Portland Metro, Wilsonville**

CST 162 Phong

PSLO	ESLO	2019-2020	2020-2021	2021-2022
(1) an ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve well-defined engineering problems appropriate to the discipline; (ESLO Inquiry and Analysis)	Inquiry and Analysis			CET/ESET: CST 133 (Kevin, Pramod) CET: CST 334, 442, 418 (Doug) ESET: CST 456
(2) an ability to design solutions for well-defined technical problems and assist with the engineering design of systems, components, or processes appropriate to the discipline;		CST 315 (Pramod, George) CST 473 (Kevin, Phong)		CST 315 (Pramod, George) CST 473 (Kevin, Phong)
(3) an ability to apply written, oral, and graphical communication in well-defined technical and non-technical environments; and an ability to identify and use appropriate technical literature; (ESLO Communication)	Communication	CST 371 (Mike, Phong) CST 473 (Kevin, Phong)		
(4) an ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results; (ESLO Quantitative Literacy)	Quantitative Literacy		ESLO CST 337 (Doug) CST 134 (George, Pramod)	
(5) an ability to function effectively as a member of a technical team. (ESLO Teamwork)	Teamwork	ESLO CST 371 (Mike, Phong)	CST 371 (Mike, Phong) CST 231 (Kevin, Pramod)	
N/A	Diverse Perspectives			CST 471 (Kevin, Phong)
N/A	Ethical Reasoning	-	-	-

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CST 473 Phong

Assessment Map and Measure

F – Foundation – introduction of the learning outcome, typically at the lower-division level,

P – Practicing – reinforcement and elaboration of the learning outcome, or

C – Capstone – demonstration of the learning outcome at the target level for the degree

For each outcome, programs should identify at least 2 direct measures (student work that provides evidence of their knowledge and skills), and 1 indirect measure (student self-assessment of their knowledge and skills) for each outcome.

For every program, data from the Student Exit Survey will be an indirect measure at the capstone level.

Term Name: Summer 2021

Course Code CST 162

1. An ability to apply knowledge, techniques, skills and modern tools of math, science, engineering and technology to solve well-defined engineering problems appropriate to the discipline;

Assignment Name: Full Adder HW/Quiz/Lab

Type: Direct Assessment

Created by: Phong Nguyen

Assessment Method:

Use rubric below to assess student full understanding of basic logic design from paper design to final design using Verilog on a DE10 Lite board

Assessment strategy for CST 162 Digital Logic]

Learning Objectives <i>What should students be able to do?</i>	Learning Activities <i>How will students learn (assimilate, interpret, practice, and demonstrate) what is necessary to succeed on the assessments?</i>	Assessments <i>What evidence would be acceptable to show that students have achieved the objectives?</i>	
		Formative Assessment	Summative Assessment
Use the Sum of Product (SOP) Digital Design process to design a Logic Diagram of a logic device using AND, OR and Inverter gates	On paper, begin with a block diagram with appropriate inputs and outputs for a logic device. Next on paper, provide the Truth Table (TT) for the block diagram. Next on paper, using K-Map, come up with a minimized SOP Boolean equation. Finally, on paper, transform the Boolean equation into a logic diagram using AND, OR and Inverters.	Students will show the paper design. Must be 85% correct on all steps of the design: block diagram, TT, K-Map, minimized Boolean equation, logic diagram. 85% of students must be able to do this	
From previous paper design, use Digital Design CAD software to simulate the FA	Download free Logisim or DigitalWorks.exe. Build the Logic Diagram of the design in paper design. Test every combination of inputs interactively as well as by timing diagram	Show the Logisim or DigitalWorks design to the instructor in-person or via Zoom live. All students must be able to simulate a logic design	Explain orally the Logisim or DigitalWorks design. Simulate every combination of inputs and explain why outputs are correct
From a simulated CAD design, design a FA using Verilog on a DE10 LITE board	Given a DE10 LITE board, build a logic device (FA) with three switches as inputs and two LED's as Cout and Sum outputs		Show the design on the board to the instructor and test every combination of inputs and explain why outputs are correct. 85% of students need to complete this

Assessment strategy for CST 162 Digital Logic

Learning Objectives <i>What should students be able to do?</i>	Learning Activities <i>How will students learn (assimilate, interpret, practice, and demonstrate) what is necessary to succeed on the assessments?</i>	Assessments <i>What evidence would be acceptable to show that students have achieved the objectives?</i>	
		Formative Assessment	Summative Assessment
Use the Sum of Product (SOP) Digital Design process to design a Logic Diagram of a logic device using AND, OR and Inverter gates	Able to complete test which required paper design of a logic device beginning with block diagram progressing to Truth Table, Minterm Boolean Equation, minimized Boolean equation via Algebra and K-Map and finalized logic diagram	6 of 7 students satisfied requirements. That's 86%	
From previous paper design, use Digital Design CAD software to simulate the FA	Download free Logisim or DigitalWorks.exe. Build the Logic Diagram of the design in paper design. Test every combination of inputs interactively as well as by timing diagram	7 of 7 students were able to use DigitalWorks or Logisim to simulate. 100%	
From a simulated CAD design, design a FA using Verilog on a DE10 LITE board	Given a DE10 LITE board, build a logic device (FA) with three switches as inputs and two LED's as Cout and Sum outputs		6 of 7 students, 86%, were able to complete the lab building a Full Adder via DE10 Lite

Successful performance criteria. All steps of the design process were completed by 85% of students.

Term Name: Spring 2020

Course Code CST 473

4. An ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes;

Assignment Name: Lessons Learned Paper

Type: Direct Assessment

Created by: Phong Nguyen

Assessment Method:

Provide examples of failure in senior projects. Write about experiments, tests, analysis of failures. Wrote about how to improve processes so as to minimize same failure

Assessment	Metric	ESET	CET
Assignment score	Average score on assignment	45%	NA
Performance Criteria	70% students proficient or higher	56%	NA
			NA

Unsuccessful performance criteria: 56% (5 of 9) of students are able to get a grade of 80 out of 100 or higher. There were 4 Incompletes. All 4 were unable to complete paper. Covid had much to do with this as it brought all manners of issues which resulted in incomplete. Better to reassess in next cycle.

5. An ability to function effectively as a member on a technical team;	
Course/Event	CST 372/373
Legend	C- Capstone
Assessment Measure	Oral interview of team members and leaders in each quarter of the project. Interview based on effectiveness of individual member/leader and of the rest of the team members. Overall grade of project in CST 372/373
Criterion	No single team member is judged below 75% by professor according to rubric. A grade of B or above on the overall grade of the project in CST 372/373

Term Name: Winter and Spring 2020

Course Code CST 372 and CST 373

5. An ability to function effectively as a member or leader on a technical team;

Assignment Name:

Type: Direct Assessment

Created By Phong Nguyen

Assessment Method: Oral interview of team members and leaders in each quarter of the project. Interview based on effectiveness of individual member/leader and of the rest of the team members. Overall grade of project in CST 372/373

Below is the sample of the Student Evaluation used on interview

PEER EVALUATION

Team Name: XXXXXXXXXX

Evaluated name:

Each category is graded on a 10 point basis with 10 being the best grade.

<u>Category</u>	<u>Grade</u>
1. Attitude (Motivation toward project, team members, customers. Work ethics, positive/negative outlook on tasking)	_____

2. Teamwork (Assists others, accepts assistance, respects opinions, cooperates, resolves conflicts effectively, motivates others) _____

3. Workload (Assigned fair share, accomplishes assigned work, willing to take on extra work to accomplish tasks) _____

4. Work quality (Completed work is of highest standard) _____

5. Reliability (Accepts hard work, completes assigned work promptly and effectively, accepts responsibility for work quality) _____

6. Communication (Listens to others, establishes clear expectations of others, understand clearly written/verbal correspondence) _____

7. Time management (Attends all required functions, not procrastinate, schedules work effectively, multitasks effectively) _____

8. Technical proficiency (Utilizes prior knowledge to design effectively) _____

9. Ability to learn/improve/change/adapt _____

10. Ability to document work (paperwork) _____

TOTAL: _____

COMMENTS (use back of paper if need more room):

COMBINED DATA

Name/score						
	a	b	c	d	e	Average
Attitude	9	9	9	8	6	8.2
Teamwork	9	9	9	7	5	7.8
Workload	8	9	9	6	5	7.4
Work quality	8	8	9	4	4	6.6
Reliability	8	10	10	4	4	7.2
Communication	9	8	9	6	5	7.4
Time manage	7	7	9	4	4	6.2
Tech proficiency	8	9	8	7	7	7.8
Improve/adapt	8	8	8	5	6	7
Documentation	8	7	7	4	5	6.2
TOTAL	82	84	87	55	51	

OVERALL GRADE:

Team A – A

Team B – F

ANALYSIS OF RESULT:

This is NOT a representative year due to Covid. The lack of in-person meeting on top of the stress of all aspects of life for one team with two team members directly destroyed one team. Have to reassess this on a non_covid year.