TENNESSEE STATE UNIVERSITY

COLLEGE OF ENGINEERING

DEPARTMENT OF COMPUTER SCIENCE

COMP 6400
AUTOMATA AND FORMAL LANGUAGES

INSTRUCTOR'S COURSE OUTCOMES ASSESSMENT REPORT

"CLOSING THE LOOP"

INSTRUCTOR: WEI CHEN
YEAR/SEMESTER: Fall 2019
IMPLEMENTATION DATE: December 6, 2019

CONTENTS

I. COURSE ASSESSMENT DATA

Summary of the Course Grades

	A	B	C	D	E	F	W	I	Total
Section 01	3	3							6

Summary of the Grade Evaluation Components

	Homework	Midterm Exam	Final Exam	Projects	Overall
Section 01	30%	25%	25%	20%	100%

Summary of Module Evaluation

Metric	*Student Outcomes*			
	1	2	3	4
Homework	3.50	3.50		
Project	3.60	3.60		
Midterm Exam	3.20	3.20		
Final Exam	3.10	3.10		
AVERAGE of Overall	3.35	3.35		
Course Outcome Assessment Survey	3.99	3.99		

II. RECOMMENDATIONS FROM STUDENT COURSE ASSESSMENT SURVEY

1. Good class
2. Everything in this course was fine

III. INSTRUCTOR'S RECOMMENDATIONS FOR CONTINUOUS IMPROVEMENT

The class was fine and doesn't need to change much in the next year. If the time is allowed, some new computation paradigms and applications such as quantum computing, block chain should be introduced.

APPENDIX-A

DETAILED ASSESSMENT AND EVALUATION

CRITERIA

The assessment is carried out by evaluating the students' performance on (1) Homework, (2) Course project & Midterm, (3) Final Exam, and (4) Student Course Outcome Assessment Survey. The criteria used to determine acceptable performance is that 80% students score 80% (B) or higher in homework, tests, final exam in each of two learning outcomes 1 & 2, and an average score of 3.0 or higher on a 4.0 scale in the student course outcome assessment survey.

1. **Assessment and evaluation of learning outcome 1:** "Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions."

   1.1. Evaluation
   This outcome is assessed with (1) homework 1-6, (2) midterm exam (course project), (3) final exam, and (4) student course outcome assessment survey. (1) On the average 83% of the students scored 80% or more in homework. It achieves the established criteria. (2) On the average 100% of the students scored 80% or more in the midterm exam (course project). It achieves the established criteria. (3) On the average 83% of the students scored 80% or more in final exam. It achieves the established criteria. The overall result of outcome from (1) – (3) is 3.35 and achieves the established criteria.
   (4) The result of the student course outcome assessment survey is 3.99 out of 4.00. It achieves the established criteria

   1.2. Recommendation for improvement:
   The class was fine and doesn't need to change much in the next year. If the time allowed, some new computation paradigm and applications such as quantum computing, block chain should be introduced.

2. **Assessment and evaluation of learning outcome 2:** "Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements with the focus of their concentrations."

   2.1. Evaluation
   This outcome is assessed with (1) homework 1-6, (2) midterm exam (course project), (3) final exam, and (4) student course outcome assessment survey. (1) On the average 83% of the students scored 80% or more in homework. It achieves the established criteria. (2) On the average 100% of the students scored 80% or more in the midterm exam (course project). It achieves the established criteria. (3) On the average 83% of the students scored 80% or more in final exam. It achieves the established criteria. The overall result of outcome from (1) – (3) is 3.35 and achieves the established criteria.
   (4) The result of the student course outcome assessment survey is 3.99 out of 4.00. It achieves the established criteria.

   2.2. Recommendation for Improvement
   Same as Section 1.2

METRICS TO ASSESS COURSE OUTCOMES

Describe categories of tools that were used to measure success in each learning outcome.

Homework, lab work, midterm test, final exam and student course outcome assessment survey were used to cover all the topics in the lectures and determine competencies in outcomes a, b, j.

Metric	ABET Outcomes			
	1	2	5	6
Homework Module 2	x	x		
Homework Module 2	x	x		
Homework Module 3	x	x		
Homework Module 4	x	x		
Homework Module 5	x	x		
Homework Module 6	x	x		
Course Project	x	x		
Midterm exam	x	x		
Final Exam	x	x		
Student Course Outcome Assessment Survey	x	x		

MODULES FOR ASSESSMENT OF PROGRAM OUTPUT

OUTCOME#	OUTCOMES	EVALUATION TOOLS
1	Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.	Homework 1-6, project, midterm test, final exam, and student course outcome assessment survey
2	Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements with the focus of their concentrations.	Homework 1-6, project, midterm test, final exam, and student course outcome assessment survey

APPENDIX-B

UPDATED COURSE OUTLINE
COLLEGE OF ENGINEERING, TECHNOLOGY, AND COMPUTER SCIENCE
DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
TENNESSEE STATE UNIVERSITY

COURSE DESCRIPTION FOR COMP 6400
DISTRIBUTED ALGORITHM DESIGN AND DATA ANALYSIS

SEMESTER: Fall -2020 **PROFESSOR: Dr. Wei Chen**

CATALOG COURSE DESCRIPTION

COMP 6400 Distributed Algorithm Design and Data Analysis (3): The course introduces the computing models and algorithms of distribution systems. The course also exposes students to an array of big data analysis theories, techniques and practices in different fields of study using distributed models. The topics include distributed computing models, massage-passing and shared memory systems, design and analysis of synchronous and asynchronous algorithms, fault tolerance, and data distribution, collection, processing and analysis in distributed systems. This is a project-based course that provides students with hands-on experience on distributed computing with different data types. Prerequisite: COMP 5200 or equivalent.

COURSE OBJECTIVES

(1) Introduce the concepts, models and theory of distributed computing systems (PO 1 & PO 2).
(2) Design and analyze the algorithms for the fundamental problems in synchronous and asynchronous distributed computer networks (PO 1 & PO 2).
(3) Expose the important issues in the design and analysis such as resource allocation, synchronization, global/local clock, dead lock, fault tolerance, security, and etc in HPC, networked computers, wireless/sensor networks, IoTs, etc (PO 1 & PO 2).
(4) Project-based study centered on hands-on experiences with methods on different types of data and frameworks (PO 1 & PO 2).

PREREQUISITES

COMP 5200 Advanced Algorithms Design and Analysis and equivalent.

LEARNIN OUTCOMES

1. Understand the different types of distributed systems architectures (LO 1 & 2)
2. Understand the important issues such as synchronization, resource allocation and ect. in distributed systems (LO 1 & 2)
3. Ability to design algorithms for fundamental problems in synchronous/asynchronous networks (LO 1 & 2)
4. Ability to deal with the fault tolerance and security in distributed systems (LO 1 & 2)
5. Ability to use different available frameworks to do the computation and analyze data (LO 1 & 2)
6. Ability to solve real world problems based on above 1 – 5 (LO 1 & 2).

GENERAL INFORMATION

1. Number of Credit Hours: 3
2. Text Books & References
   (i) Title: Distributed Algorithms
   Author: Nancy A. Lynch
   Publisher: Morgan Kaufmann
   ISBN: 9781558603486
   (ii) Title: Distributed Algorithms: An Intuitive Approach.
   Authors: Wan Fokkink
   Publisher: The MIT Press (2013)
   Adoption: Required
   ISBN: 9780262026772
   (iii) Title: An Introduction to Parallel Programming
   Author: Peter S. Pacheco
   Publisher: MK
   ISBN: 978012374260-5
   (iv) Lecture notes

3. **Class Meetings:**
   Office Hours:
4. **Instructor:**

Name:	Dr. Wei Chen
Office Location:	05P
Telephone:	615-963-5878
Email:	
Tutoring Hours	
Office Hours:	
URL:	wchen@tnstate.edu/faculty/wchen

EVALUATION AND GRADING

Grade will be based on assignments, one in-class mid-term exam, one in-class final exam, one project and its associated report. The assignments, exams, project are not optional. Failure to attend or turn in without discussion with the instructor beforehand will result in an *F* in the class.

Grading	Score Range	Significance
A	90-100%	Outstanding Performance
B	80-89%	Above Average Performance
C	70-79%	Average Performance
D	60-69%	Passing, Below Average Performance
F	0-59%	Unsatisfactory Performance

Assignments	30%
Project	30%
Mid-term	20%
Final	20%

ASSIGNMENTS

1. Homework assignments are a means of practicing to learn the course topics. Submitting homework assignments is not the sufficient condition for passing the course. All homework assignments must be submitted by the due date/time.
2. Homework assignments can be worked out individually or collectively in small groups. However, copying other students' work is absolutely prohibited.
3. Written assignments must be submitted in readable and clean forms. NO CREDIT will be given for a non-readable work.
4. Programming assignments must be completely implemented and executable. Any program with syntax error(s) will be given a score of 0(zero). All pages of work, if any, and USB flash drives must be labeled properly. Student name, assignment number, course number and class section must be clearly indicated. A hard copy of each program must be submitted along with a USB flash drive.
5. No test will be repeated for students who miss tests, no matter what is the reason. However, if a student misses a test for a reason accepted and certified by Students Affair Office, then score of the following test will be recorded for the score of the missing test
6. Instructor reserves the right to modify the score weights.

E. DETAILED COURSE OUTLINE

Lectures	Date	Topics	Assignment /Project
1		Review of data structures, algorithms design and analysis	
2		**Introduction to distributed/parallel computing systems:** architectures, shared & distributed memory, computation & communication models, control/data/processes	Assignment 1
3		**Computing on shared memory in fixed-connection networks I:** PRAM computational models and algorithm design	Assignment 2
4		**Computing on shared memory in fixed-connection networks II:** OpenMP and GPU computing platforms	Project 1
5		**Computing on distributed memory in networks of computers/ wireless devices**: MPI/PVM computing platforms. Autonomy, synchronization, resource allocation, workload balance, robustness, and security.	Assignment 3
6		**Computing on synchronous computer networks I:** Synchronous network model; Algorithms of synchronized networks: Leader election in a synchronous ring and in general synchronous networks, Breadth-First search	
7		**Midterm Exam**	
8		**Computing on synchronous networks II:** Shortest path, Minimum spanning tree, Distributed consensus with link/process failures	Assignment 4
9		**Computing on asynchronous networks I:** Asynchronous network model: Send/Receive systems, Broadcast systems, Multicast system; Algorithms of synchronized networks: Leader election	
10		**Computing on asynchronous networks II:** Spanning tree, Breadth-First search; Synchronizers; Local time and global snapshots, Resource allocation, Deadlock and Dinner of philosophers problem	Assignment 5
11		**Security issues in distributed systems I**	

12		**Security issues in distributed system II**	Project 2 Assignment 6
13		**Applications in Distributed systems I**	
14		**Applications in Distributed systems II**	Assignment 7
15		**Course review**	

APPENDIX-C

TENNESSEE STATE UNIVERITY
DEPARTMENT OF COMPUTER SCIENCE
COMP 6400 – DISTRIBUTED ALGORITHM DESIGN AND DATA ANALYSIS
Fall 2019 – Dr. Wei Chen
STUDENT COURSE ASSESSMENT SURVEY

As a computer science graduate student in this class, we are requesting your evaluation of how this course has helped to prepare you to meet course educational objectives. The data is needed as part of our plan to continuously improve the quality of computer science education at Tennessee State University. Please rate how this course has contributed to preparing you with each of the outcomes using the following scale:

1. Strongly disagree 2. Disagree 3. Agree 4. Strongly Agree

Part A. Questions regarding your preparation		**Rating**				**Student Outcomes**	**Program outcomes**
		1	**2**	**3**	**4**		
1	I feel I had sufficient knowledge in prerequisites to be successful in the course. Ave: 3.83			1	5		
2	List any deficiencies you wish you did not have:						
Part B. Having taken this course, I can demonstrate the following:		**1**	**2**	**3**	**4**		
1	Classification of parallel and distributed systems. Ave: 4.0				6	**1, 2**	**1, 2**
2	Computation/communication models and time/communication complexity for distributed systems. Ave: 4.0				6	**1, 2**	**1, 2**
3	High performance computing using shared memory for multicore computer systems. Ave: 4.0				6	**1, 2**	**1, 2**
4	High performance computing using message passing for networked computers. Ave: 4.0				6	**1, 2**	**1, 2**
5	Fundamental algorithms for synchronous networks. Ave: 4.0				6	**1, 2**	**1, 2**
6	Fundamental algorithms for asynchronous networks. Ave: 3.83			1	5	**1, 2**	**1, 2**
7	Important issues such as logical clock, deadlock, snapshot in distributed systems. Ave: 4.0				6	**1, 2**	**1, 2**
8	Real world applications such as sensor/ad hoc/mobile networks, IoT, and etc. Ave: 4.0				6	**1, 2**	**1, 2**
8	Please provide recommendations for improving this course. • Good class • Everything in this course was fine						