



Course Guide Book for Electronics and Communication Engineering

1. GENERAL INFORMATION OF THE COURSE

Course Name:	Algorithm Analysis and design
Course Code:	CoSc 3121
Course Credits Points:	5 hrs
Contact Hours:	2 hrs lecture & 3 hrs Lab per week
Course Module:	Data Storage and Analysis
Course Category:	Major
Status of Course:	Compulsory
Pre-Requisites:	Fundamental of Programing CoEng 1112
Students' Department:	Computer Engineering
Degree Program:	BSc in Computer Engineering
Students' Admission:	Regular
Year of Study:	3
Semester:	Second Semester
Academic Year:	2021/2022
Course Duration:	From Jun. 2022 to August. 2022 [semester shift Due to covid-19]
Teaching & Learning Methods:	Lectures, Laboratory, Class Works,
Attendance Requirement:	Minimum 85% during lecture hours and 100% on practical work session
Course Chair:	DBMS and software engineering
Course Instructors:	Wubie. E, MSc in Computer Engineering Email: - wubieeng21@gmail.com , Office: - PhD Building. 002
Consultation:	Monday morning 10:00AM -11:00AM Thursday afternoon 2:00PM-3:30PM

2. OBJECTIVES and Descriptions OF THE COURSE

At the end of this course students should be able to:

1. Perform algorithm analysis using different techniques.
2. Demonstrate the use of algorithm design techniques
3. Understand the Basics of Computational complexity.
4. Understand various algorithms and their Computational complexity.

4. THE COURSE TIME SCHEDULE AND TEACHING AND LEARNING METHODOLOGY

The following topics will be covered in this course within this semester.

Table 1. Time Schedule and Teaching Methodology of the course

Time Schedule	Course Contents	Teaching and learning Methodology and References	Remark
Week 1	Basics of Algorithm analysis <ul style="list-style-type: none"> ✧ Introduction ✧ Characteristics of Algorithm ✧ Algorithm Complexity ✧ Algorithm Analysis ✧ Asymptotic Analysis ✧ Asymptotic Notations 	Text Book 1 Ref Lecture Laboratory	
Week 2	Recurrences <ul style="list-style-type: none"> ✧ Iteration Method ✧ Substitution Method ✧ Recursion Tree Method ✧ Master Method 	Lecture Laboratory	
Week 3	Analysis of sorting and searching algorithms <ul style="list-style-type: none"> ✧ Analysis of simple searching algorithms ✧ Analysis of simple sorting algorithms Analysis Advanced algorithms: - advanced trees (avl tree), heap sort, hash tables, merge sort, quick sort and shell sort	Text Book 1, Ref Lecture Laboratory	
	Mid Exam		
Week 4	Algorithm Design techniques <ul style="list-style-type: none"> ✧ Brute Force method ✧ Divide and conquer method ✧ Greedy algorithm ✧ Dynamic programming ✧ Back Tracking ✧ Branch and bound ✧ Amortized analysis 	Lecture Laboratory	
Week 5	Algorithm for graph problems <ul style="list-style-type: none"> ✧ Depth first search ✧ Connected Components ✧ Topological sort ✧ Shortest path ✧ Sets of strings ✧ Search trees, string sorting, binary search ✧ Exact string matching ✧ Finding a pattern (string) in a text (string) 	Text Book 1 Ref Lecture Laboratory	

	✧ Approximate string matching ✧ Finding in the text something that is similar to the pattern		
Week 6	Problem Complexity ✧ Algorithm Vs Problem Complexity ✧ The upper and lower bounds ✧ Open and Closed problems ✧ tractable and intractable problems	Lecture Laboratory Text Book 1 Ref	
Week 7	Final Exam		

Note:

- The actual time schedule for the mid and final exams will be set by the University Academic Calendar.
- The evaluation system may be not limited to the stated, but the instructors have freedom to change the weight and the number of assessments as per BDU legislation except mid and final exam.

5. ASSESSMENT AND EVALUATION

The courses include multiple type of continuous assessment and evaluation modality.

Home works, Assignments & project (30%): Assignments can be worked out together to conceptualize general approaches. However, unless otherwise specified for a particular assignment, the work you submit should be done completely on your own. The assignments and projects may include individual and group works. If a student submitted other student's work in individual assignment, both of them supposed to score zero mark. Every group member must participate equally in group works. Assignments and projects must be submitted on time and late submission doesn't have any grading. All assignments and projects will have oral exam, expecting every member must be prepared well for presentation. The instructor has the right to give additional assignments or tasks to the students when it is important.

Quizzes (20%): Quizzes will be given during the course work. The quizzes are intended to evaluate the up-to-date understanding of the students about the coursework. They are supposed to be carried out individually in class rooms after tutorial sessions in accordance with the schedule. There will be at least two quizzes in the course.

Mid Exam (%): No mid exam due to crashed schedule due to covid-19.

Final Exams (40%): All work on exams should be performed individually. The exam will be closed book. During exam all necessary materials will be provided by examiner.

Table 2. Summary of Assessments

S. No	Assessment type	Mark allotted	Content Coverage	Remark
1	Assignment 1	10	Chapter 1, 2, 3	
2	Assignment 2	5	Chapter 4, 5	
3	Lab exam	10	Lab 1-4	
4	Lab exam 2	5	Lab 5-6	
5	Mid exam	20%	Chapter 1,2,3	
6	Final Exam	50%	Chapter 4,5 &6	
	Total	100%		

6. LABORATORY/WORKSHOP/ SESSION

Summary of laboratory /Work shop/ session content and required material

7. COURSE POLICY

All students are expected to abide by the code of conduct of students (Senate Legislation of Bahir Dar University, May 2019) throughout this course. Academic dishonesty, including cheating, fabrication, and plagiarism **will not be tolerated and will be reported** to the concerned bodies for action.

While team work is highly encouraged, dependence and copying ones work and submitting others work is considered as serious act of cheating and shall be penalized.

Class teaching methodology will vary day to day, including reading, lectures, discussions, exercises, presentation etc. Students are expected to be actively participant in the course and ask questions and raise issues whenever you got confused. And, you are expected to do all the assignments and given tasks within a given deadline. If you are having problems with the assignments or tests, contact the instructor as soon as possible.

You are expected to attend class regularly and on time arrival. A student who misses more than 15% of the semester class is not eligible to sit for final exam. There will be record of attendance at each class. You are responsible for all class announcements and changes. A student who has missed more than 15% attendance shall be given a grade of “NG” (No Grade) and be required to provide acceptable reasons for failure to attend classes according to senate legislation, Art. 164.

If you bring a cell phone to class, make sure that it is absolutely silent and does not disturb anyone.

The teaching-learning process shall not be disrupted by any means.

All issues discussed in class or derived from other sources may be the subject of assignment or exam question items. Please follow the instructions indicated at each content of your course guidebook to complete all the assignments provided whether they are to be performed individually or in group.

Students are supposed to have full examination records. If a student fails to attend quiz or mid exam for invalid reason, the result of the student shall be recorded as zero. However, if a student fails to attend the final exam or to work on term paper/project for invalid reason, the instructor shall record “NG” according to senate legislation, Art. 161.

8. GRADING SYSTEM

The grading scale of the course is fixed scale according to senate legislation of Art. 167.

Table 3. Grading scale of the course

Raw Mark Interval (100%)	Corresponding Letter Grade	Corresponding Fixed Number Grade
$90 \leq x \leq 100$	A ⁺	4.0
$85 \leq x < 90$	A	4.0
$80 \leq x < 85$	A ⁻	3.75
$75 \leq x < 80$	B ⁺	3.50
$70 \leq x < 75$	B	3.00
$65 \leq x < 70$	B ⁻	2.75
$60 \leq x < 65$	C ⁺	2.50
$50 \leq x < 60$	C	2.00
$45 \leq x < 50$	C ⁻	1.75
$40 \leq x < 45$	D	1.00
$30 \leq x < 40$	F _x	0.00
<30	F	0.00

9. TEXT BOOKS

1. "Introduction to algorithms", by Thomas H. Cormen et al., MIT press, Mc-Graw Hill Book Company. 1990

10. REFERENCE BOOKS [APA]

1. "Introduction to Computing & Algorithms", by Russell L. Shackelford, Addison- Wesley Publishers.1998
2. Dasgupta, Papadimitriou, and Vazirani, Algorithms, McGraw-Hill, 2007.
3. Goodrich and Tamassia, Algorithm Design, Wiley, 2002.
4. Cormen, Leiserson, Rivest, and Stein, Introduction to Algorithms (2nd ed.), McGraw-Hill, 2001.
5. Baase, Van Gelder, Computer Algorithms (3rd ed.), Addison-Wesley, 2000.
6. Ellis Horowitz, SartajSahni, Fundamentals of Computer Algorithms, 1994

11. APPROVAL

The following bodies confirmed the course guidebook accordingly.

Position	Name	Signature:	Date
Course Instructors	Wubie Engdew		
Course Chair	Asaminew Gizaw		
Chair Holder	Molla Atanaw		
V/Dean			