

## Algorithm

Course Name	Course type (credit/hours)		Required course(3/3)		Course code	F132
	Target students Division/major/grade		Software and Computer Engineering/		Opening semester	2020 1ST SEMESTER
	Class time and classroom		Wed F(Pal325)Fri F(Pal325)		English Grade	A(100%English)
Reference to this course	Prerequisite courses		자료구조			
	Related basic courses		이산수학			
	Recommended concurrent courses		인공지능			
	Related advanced courses		계산이론			
Instructor	Name (title/division)		Yenewondim Biadgie.S(Assistant Professor, Software and Computer Engineering)			
	Office Room Number	팔달관 1011	Office phone Number	3857	e-mail	
	Office hours			Homepage address	biocomputing.ajou.ac.kr	
Teaching Assistant	Name (title/division)					
	Office Room Number		Office phone Number		e-mail	

### 1. Introduction

This course deals with principles and techniques for design and analysis of computer algorithms. The topics covered are mathematical induction, asymptotic analysis of algorithm efficiency, and algorithm design techniques including divide-and-conquer, dynamic programming, greedy method, branch-and-bound, backtracking, and iterative improvements. Elements of computational complexity theory, mostly on NP-completeness, is introduced and it is also discussed how to cope with computationally intractable problems.

### 2. Course Objectives

효율적인 알고리즘을 설계하고 분석할 수 있는 능력을 키운다.

### 3. Class types and activities

Mostly lectures.

Assignments consist of exercise problems on algorithm efficiency analysis, algorithm designs, and algorithm correctness. Students are supposed to invest considerable amount of time to understand course material and to solve assignment problems.

### 4. Teaching Method

- |  |   |
|--|---|
| <input checked="" type="checkbox"/> lecture                          | <input type="checkbox"/> discussion and debate              |
| <input type="checkbox"/> team project(presentation and case studies) | <input type="checkbox"/> experiments(role-playing,etc)      |
| <input type="checkbox"/> designing and production                    | <input type="checkbox"/> on-site learning(on-site training) |
| <input type="checkbox"/> others                                      |   |

### 5. Support Systems in Use

- |  |   |   |
|--|---|---|
| <input checked="" type="checkbox"/> AjouBb               | <input type="checkbox"/> automatic recording system | <input type="checkbox"/> web-based assignment |
| <input type="checkbox"/> cyber lecture                   | <input type="checkbox"/> online content             |   |
| <input type="checkbox"/> class behavior analyzing system | <input type="checkbox"/> others                     |   |

### 6. Teaching Tools

- |  |   |   |
|--|---|---|
| <input type="checkbox"/> PBL(Problem Based Learning) | <input type="checkbox"/> CBL(Case Based Learning) | <input type="checkbox"/> TBL(Team Based Learning)           |
| <input type="checkbox"/> UR(Undergraduate Research)  | <input type="checkbox"/> FL(Flipped Learning)     | <input type="checkbox"/> DSAL(Data Science Active Learning) |
| <input type="checkbox"/> others                      |   |   |

### 7. Knowledge and ability required for taking this course

prerequisite knowledge: computer programming, discrete mathematics, data structures

tools: C language, ability to read textbook written in English.

기초지식: 컴퓨터 프로그래밍, 이산수학, 자료구조

도구능력: C 언어, 영문 교재를 읽고 이해할 수 있는 능력

## 8. Method of Evaluation

Evaluation Item	The Number of Times	Evaluation Proportion	Remarks
Attendance		5	
midterm exam	1	35	
final exam	1	40%	
quiz			
presentation			
discussion			
homework	6	20%	
etc			
study hours			

## 9. Textbook and supplementary material

Main/Sub	Title (Web-site)	Writer	Publisher	Publication year
Main	Introduction to the Design and Analysis of Algorithms, 3rd Edition, Anomy Levitin	Richard Neapolitan	Jones & Bartlett	2015
	Foundations of Algorithms , 5th Edition, Richard Neapolitan			
	Foundations of Algorithms Using C++ pseudocode, 3rd Edition, Richard Neapolitan			

## 10. Class system and Class shedule

<p>In the beginning of the course, concepts of algorithms, mathematical induction, aymptotic analysis are taught. The algorithm design techniques follow including dive-and-conquer. dynamic programming, greedy method, and iterative improvements. Then the students will learn that there are probelms that do not have efficient algorithms, and how to cope with such problems.</p> <p>강의 초반에는 알고리즘의 정의, 수학적 귀납법, 알고리즘 효율성의 점근적 분석법 등을 배운다. 그 다음에는 분할정복, 동적 계획법, 그리디 방법, 퇴각검색, 분지한정 등의 알고리즘 설계 기법을 공부한다. 강의 후반에는 효율적인 알고리즘이 존재하지 않는 문제들이 있다는 사실을 배우고, 그러한 문제들을 다루는 방법에 대해서 공부한다.</p>
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\* language : K-korean, E-English

## < Class Schedule >

\* language : K-korean, E-English

Week s	Topics	lang uage	Instructor	Teaching Method	Evaluation Method	Matter to be prepared
1	Introduction : Algorithm of a problem, Parameters of a Problem and an Instance of a Problem		Yenewondim Biadgie.S	멀티미디어 활용 강의		
2	Analysis of Algorithm Efficiency: Time Complexity and Space Complexity		Yenewondim Biadgie.S	멀티미디어 활용 강의	보고서 평가	
3	Divide-and-Conquer Algorithm Design Methodology to Solve a Problem		Yenewondim Biadgie.S	멀티미디어 활용 강의		
4	Dynamic Programming Algorithm Design Methodology to Solve a Problem		Yenewondim Biadgie.S	멀티미디어 활용 강의	보고서 평가	
5	Dynamic Programming Algorithm Design Methodology to Solve a Problem		Yenewondim Biadgie.S	멀티미디어 활용 강의		
6	Greedy Algorithm Design Methodology to Solve a Problem		Yenewondim Biadgie.S	멀티미디어 활용 강의	보고서 평가	
7	Greedy Algorithm Design Methodology to Solve a Problem		Yenewondim Biadgie.S	멀티미디어 활용 강의		
8	Midterm Exam		Yenewondim Biadgie.S		중간지필평가	
9	Backtracking Algorithm Design Methodology to Solve a Problem		Yenewondim Biadgie.S	멀티미디어 활용 강의		
10	Backtracking Algorithm Design Method/Branch-and-Bound Algorithm Design Methodology		Yenewondim Biadgie.S	멀티미디어 활용 강의	보고서 평가	
11	Branch-and-Bound Algorithm Design Methodology to Solve a Problem		Yenewondim Biadgie.S	멀티미디어 활용 강의		
12	Lower Bounds of Sorting Problem by Comparison/ Distribution		Yenewondim Biadgie.S	멀티미디어 활용 강의	보고서 평가	
13	Lower Bounds of Selection Problem		Yenewondim Biadgie.S	멀티미디어 활용 강의		
14	Intractable Problems/NP-Hard Problems		Yenewondim Biadgie.S	멀티미디어 활용 강의	보고서 평가	
15	Handling NP-hard Problems		Yenewondim Biadgie.S	멀티미디어 활용 강의		
16	Final Exam		Yenewondim Biadgie.S		기말지필평가	

11. Other items of notification