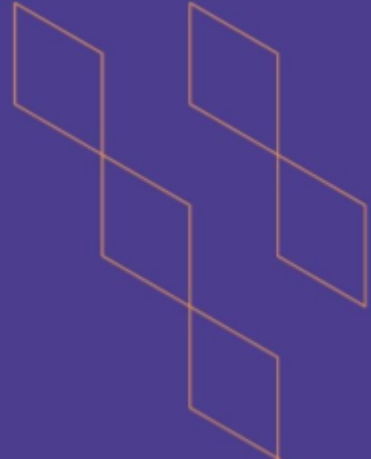


T4
2022



| |
|---|
| Course Title: Design and Analysis of Algorithms |
| Course Code: CS1506 |
| Program: Bachelor of Computer Science Program |
| Department: Computer Science |
| College: Computer Science and Information Technology |
| Institution: Al Baha University |
| Version: V1.0 |
| Last Revision Date: 3/4/2023 |

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A. General information about the course:

| Course Identification | |
|--|--|
| 1. Credit hours: | 3 hours |
| 2. Course type | |
| a | University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Track <input type="checkbox"/> Others <input type="checkbox"/> |
| b | Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/> |
| 3. Level/year at which this course is offered: | 8 th Level (3 rd Year) |
| 4. Course general Description | |
| 5. Pre-requirements for this course (if any): Software Engineering 2 (CS1503) | |
| 6. Co- requirements for this course (if any): None | |
| 7. Course Main Objective(s) | |

1. Teaching mode (mark all that apply)

| No | Mode of Instruction | Contact Hours | Percentage |
|----|--|----------------|------------|
| 1. | Traditional classroom | 3 hours / week | 100 % |
| 2. | E-learning | | |
| 3. | Hybrid <ul style="list-style-type: none"> • Traditional classroom • E-learning | | |
| 4. | Distance learning | | |

2. Contact Hours (based on the academic semester)

| No | Activity | Contact Hours |
|----|-------------------|------------------------|
| 1. | Lectures | (3 hours) x (11 weeks) |
| 2. | Laboratory/Studio | |
| 3. | Field | |
| 4. | Tutorial | |
| 5. | Others (specify) | |





Total

33 hours





B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

| Code | Course Learning Outcomes | Code of CLOs aligned with program | Teaching Strategies | Assessment Methods |
|------|---|-----------------------------------|-------------------------|---|
| 1.0 | Knowledge and understanding | | | |
| 1.1 | Define the concept of algorithms | K1 | Lectures Assignments | Homework Midterm Exam Quiz |
| 1.2 | Understand the relationship between data structures and algorithms | K2 | Lectures Assignments | Homework Midterm Quiz Final Exam |
| 1.3 | Understand approaches to algorithmic problem solving (brute force, divide and conquer, decrease and conquer, and transform and conquer, dynamic programming, greedy techniques) | K3 | Lectures Assignments | Homework Midterm Exam Quiz |
| 1.4 | Understand and learn how to compute the complexity of algorithms | K4 | Lectures Assignments | Homework Midterm Quiz Final Exam |
| 2.0 | Skills | | | |
| 2.1 | Define and analyze a problem and plan strategies for algorithm development | S1 | Lectures Assignments | Homework Midterm Quiz Final Exam |
| 2.2 | Ability to design algorithms for solving problems | S2 | Lectures Assignments | Homework Midterm Quiz Final Exam |
| 2.3 | Ability to design algorithms efficiently and accurately | S3 | Lectures Assignments | Homework Midterm Exam Quiz |
| 3.0 | Values, autonomy, and responsibility | | | |
| 3.1 | Work both independently and collaboratively | V1 | Assignments | Class Discussion |

C. Course Content

| No | List of Topics | Contact Hours |
|----|--|---------------|
| 1. | Fundamentals of the analysis of algorithm efficiency | 2 |
| 2. | Brute force | 2 |
| 3. | Divide and conquer | 5 |





| | | |
|-------|-----------------------------------|----|
| 4. | Decrease and conquer | 4 |
| 5. | Transform and conquer | 4 |
| 6. | Space and time trade-offs | 3 |
| 7. | Dynamic programming | 5 |
| 8. | Greedy technique | 4 |
| 9. | Iterative Improvement | 3 |
| 10. | Limitations of Algorithmic Power, | 2 |
| Total | | 33 |

D. Students Assessment Activities

| No | Assessment Activities * | Assessment timing (in week no) | Percentage of Total Assessment Score |
|----|-------------------------|--------------------------------|--------------------------------------|
| 1. | Homework | Weekly | 10% |
| 2. | Midterm | 6 | 20 % |
| 3. | Quiz | 8 | 10 % |
| 4. | Class Discussion | Weekly | 10 % |
| 5. | Final Exam | 12 | 50 % |

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities

1. References and Learning Resources

| | |
|--------------------------|---|
| Essential References | <ul style="list-style-type: none"> Introduction to Algorithms, Fourth Edition 2022 Cormen, Thomas H., et al. Introduction to algorithms. MIT press, 2022. (4th edition) |
| Supportive References | <ul style="list-style-type: none"> Sara Baase, Computer Algorithms: Introduction to Design and Analysis, Third Edition, Addison-Wesley, 2000. Data Structures and Problem Solving Using Java, 4th or 3rd Edition by Weiss |
| Electronic Materials | <ul style="list-style-type: none"> Khan Academy: https://www.khanacademy.org/computing/computer-science/algorithms?utm_account=Grant&utm_campaignname=D_SA_www_US_lowincomestates&gclid=Cj0KCQjwuLShBhC_ARIsAFod4fK5-7HhRH2P2AcimT5FpxYZAnst-rf7YwQdpyNRdEn5ossQ7ydR4FgaArcbEALw_wcB The course home page on Rafid. |
| Other Learning Materials | |



2. Required Facilities and equipment

| Items | Resources |
|--|--|
| facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.) | <ul style="list-style-type: none"> • A classroom or lecture hall with whiteboard for 25 students. |
| Technology equipment (projector, smart board, software) | <ul style="list-style-type: none"> • Projector • Updated version of subject syllabus is uploaded for student reference. • An instructor computer station with High-speed Internet connection • Power outlets for instructor's laptop plug-in |
| Other equipment (depending on the nature of the specialty) | None |

F. Assessment of Course Quality

| Assessment Areas/Issues | Assessor | Assessment Methods |
|--------------------------------------|---|--|
| Effectiveness of teaching | <ul style="list-style-type: none"> • Course Coordinator • Students • Program Chair • Peer Reviewers | <ul style="list-style-type: none"> • Survey (indirect) • Exam Review (direct) • Course evaluation by Peer Reviewers (indirect). • Comprehensive Course report (where we can find information about teaching difficulties and action plan, ...) |
| Effectiveness of students assessment | <ul style="list-style-type: none"> • Course Coordinator • Students • Program Chair • Peer Reviewers | <ul style="list-style-type: none"> • Survey (indirect) • Exam Review (direct) • Course evaluation by Peer Reviewers (indirect). • Comprehensive Course report (where we can find information about |



| Assessment Areas/Issues | Assessor | Assessment Methods |
|---|--|---|
| | | teaching difficulties and action plan, ...) |
| Quality of learning resources | <ul style="list-style-type: none"> • Faculty • Students | <ul style="list-style-type: none"> • Survey (indicator) |
| The extent to which CLOs have been achieved | <ul style="list-style-type: none"> • Faculty • Program Leaders • Course Coordinator | <ul style="list-style-type: none"> • Exam Exit Exam (direct) • Student Results (direct) • Comprehensive Course report (where we can find the CLO assessment results) |
| Other | | |

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

G. Specification Approval Data

| | |
|--------------------|--|
| COUNCIL /COMMITTEE | |
| REFERENCE NO. | |
| DATE | |

