

*Republic of Iraq  
Ministry of Higher Education & Scientific Research  
Supervision and Scientific Evaluation Directorate  
Quality Assurance and Academic Accreditation  
International Accreditation Dept.*

## *Academic Program Specification Form For The Academic*

*University: of Baghdad  
College : AlKhwazizmi College of Engineering  
Number Of Departments In The College :  
Date Of Form Completion :*

*Dean's Name*

*Date : / /*

*Signature*

*Dean's Assistant For  
Scientific Affairs*

*Date : / /*

*Signature*

*The College Quality Assurance  
And University Performance  
Manager*

*Date : / /*

*Signature*

*Quality Assurance And University Performance Manager*

*Date : / /*

*Signature*

# TEMPLATE FOR PROGRAMME SPECIFICATION

## HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

### PROGRAMME SPECIFICATION

This Programme Specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It is supported by a specification for each course that contributes to the programme.

1. Teaching Institution	University of Baghdad/Al_Khwarizmi College of Engineering
2. University Department/Centre	Information and Communication Engineering
3. Programme Title	Computer Algorithms
4. Title of Final Award	BSc degree in Information and Communication Engineering
5. Modes of Attendance offered	Attendance is mandatory according to the university rules in 2021-2022
6. Accreditation	Abet
7. Other external influences	
8. Date of production/revision of this specification	2023
9. Aims of the Programme	
<ol style="list-style-type: none"><li>1) Analyze the asymptotic performance of algorithms.</li><li>2) Apply important algorithmic design paradigms and methods of analysis.</li><li>3) Study different sorting, searching, graph and tree algorithms.</li></ol>	

## 10. Learning Outcomes, Teaching, Learning and Assessment Methods

### A. Cognitive goals

At the completion of the course, students will be able to...

A1. Be able to analyze the space and time efficiency of most algorithms.

A2. Be able to design new algorithms or modify existing ones for new applications and reason about the efficiency of the result.

A3. Demonstrate skills in tracing, analyzing, and designing recursive algorithms and recursive methods.

### B. The skills goals special to the programme .

In addition to the measurable student learning outcomes listed above, students enrolled in Computer Algorithm Course will be required to demonstrate their more in-depth knowledge of the course material by

B1. Take real-life software and apply the analysis and performance measure methods as well as choosing the proper data structure and algorithm design technique for the each programming task.

## Teaching and Learning Methods

Lectures, Presentations, Recitation and Documentations

## Assessment methods

homework 10%

quizzes - 10%

midterm -20%

laboratory-10%

final - 50%

C. Affective and value goals

C1. Ability to analyse any problem and choose the correct algorithm design to it.

C2. Formulate the time order analysis for an algorithm.

C3. Formulate the space needs for the implementation of an algorithm.

C4. Identify the complexity of problems.

Teaching and Learning Methods

Lectures, Presentations, Recitation and Documentations

Assessment methods

homework 10%

quizzes - 10%

midterm -20%

laboratory-10%

final - 50%

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Essential in any academic work in the direction of computer science and engineering and Network algorithms.

D2. Essential for any software development.

Teaching and Learning Methods

Lectures, Presentations, Recitation and Documentations

Assessment methods

homework 10%  
 quizzes - 10%  
 midterm -20%  
 laboratory-10%  
 final - 50%

11. Programme Structure				12. Awards and Credits
Level/Year	Course or Module Code	Course or Module Title	Credit rating	
3 <sup>rd</sup> class		Computer Algorithms	4	Bachelor Degree Requires ( x ) credits

### 13. Personal Development Planning

- Implement the algorithms using different OOP languages like (Java).
- Apply different applications using studied data structures.

### 14. Admission criteria .

According to the rules of Ministry of Higher Education and Scientific Research in Iraq.

## 15. Key sources of information about the programme

1. Books
2. Trusted Internet sources related to the Program
3. Papers.



# TEMPLATE FOR COURSE SPECIFICATION

## HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

### COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	University of Baghdad/Al_Khwarizmi College of Engineering
2. University Department/Centre	University of Baghdad/Al_Khwarizmi College of Engineering
3. Course title/code	Computer Algorithms
4. Modes of Attendance offered	attendance is mandatory according to the university rules in 2021-2022
5. Semester/Year	1 <sup>st</sup> semester/ 3 <sup>rd</sup> year
6. Number of hours tuition (total)	75
7. Date of production/revision of this specification	2023
8. Aims of the Course	<ol style="list-style-type: none"><li>1) Analyze the asymptotic performance of algorithms.</li><li>2) Apply important algorithmic design paradigms and methods of analysis.</li><li>3) Study different sorting, searching, graph and tree algorithms.</li></ol>



## 9- Learning Outcomes, Teaching ,Learning and Assessment Methode

### A- Knowledge and Understanding

At the completion of the course, students will be able to...

- A1. Be able to analyze the space and time efficiency of most algorithms.
- A2. Be able to design new algorithms or modify existing ones for new applications and reason about the efficiency of the result.
- A3. Demonstrate skills in tracing, analyzing, and designing recursive algorithms and recursive methods.

### B. Subject-specific skills

In addition to the measurable student learning outcomes listed above, students enrolled in Computer Algorithm Course will be required to demonstrate their more in-depth knowledge of the course material by

- B1. Take real-life software and apply the analysis and performance measure methods as well as choosing the proper data structure and algorithm design technique for the each programming task.

### Teaching and Learning Methods

Lectures, Presentations, Recitation and Documentations

### Assessment methods

homework 10%  
quizzes - 10%  
midterm -20%  
laboratory-10%

final - 50%

C. Thinking Skills

C1. Ability to analyse any problem and choose the correct algorithm design to it.

C2. Formulate the time order analysis for an algorithm.

C3. Formulate the space needs for the implementation of an algorithm.

C4. Identify the complexity of problems.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Essential in any academic work in the direction of computer science and engineering and Network algorithms.

D2. Essential for any software development.

## 10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	5		Introduction to Algorithms	Classroom with whiteboard and Lab	Quizzes
2	5		asymptotic algorithm analysis	Classroom with whiteboard and Lab	Quizzes
3	5		asymptotic algorithm analysis	Classroom with whiteboard and Lab	Quizzes
4	5		Searching	Classroom with whiteboard and Lab	Quizzes
5	5		Sorting - Quadratic Sorting Algorithms -	Classroom with whiteboard and Lab	Quizzes
6	5		Sorting – Divide and conquer Sorting Algorithm -	Classroom with whiteboard and Lab	Quizzes
7	5		Sorting – Divide and conquer Sorting Algorithm -	Classroom with whiteboard and Lab	Quizzes
8	5		Sorting- Shell Sort- Radix and Bucket Sorting -	Classroom with whiteboard and Lab	Quizzes
9	5		Algorithm Design Techniques	Classroom with whiteboard and Lab	Quizzes
10	5		Greedy algorithms.	-	-
11	5		Divide and Conquer Algorithms. Dynamic Programming.	Classroom with whiteboard and Lab	Quizzes
12	5		Backtracking Algorithms.	Classroom with whiteboard and Lab	Quizzes
13	5		Randomized Algorithms.	Classroom with whiteboard and Lab	Quizzes
14	5		Graph Algorithms – Shortest Path and Minimum Spanning Tree.	Classroom with whiteboard and Lab	Quizzes
15	5		Balanced Search Tree ( Complexity) Recursive Analysis	Classroom with whiteboard and Lab	Quizzes

11. Infrastructure	
<p>1. Books Required reading:</p>	<p>Text book 1:” Data structures and other objects using C++” by Michael Main, Walter Savitch, Addison-Wesley, 4th ed, 2011.</p> <p>Text book2:” Data Structures and Algorithm Analysis”, by Clifford A. Shaffer, Virginia Tech, Dover Publications, Edition 3.2 (C++ Version), 2012.</p> <p>Text book3: “Data structures and algorithm analysis in C++”, by Mark Allen Weiss, Florida International University, Addison-Wesley, Fourth edition, 2014.</p> <p>Text book4: “Data Abstraction &amp; Problem Solving with C++”, by Frank M. Carrano and Timothy Henry , Pearson Education, Inc., publishing as Addison-Wesley, 6th edition, 2013.</p> <p>LAB : C++ IDE Software</p>
<p>2. Main references (sources)</p>	<p>Data Structures and Algorithm Analysis”, by Clifford A. Shaffer, Virginia Tech, Dover Publications, Edition 3.2 (C++ Version), 2012.</p>
<p>A- Recommended books and references (scientific journals, reports...).</p>	
<p>B-Electronic references, Internet sites...</p>	

## 12. The development of the curriculum plan
