Kingdom of Saudi Arabia
National Commission for
Academic Accreditation & Assessment

المملكــة العربيــة السعوديــة
الهيئـــة الوطنيـــة للتقويــم
والاعــتـمــاد الأكـاديـمــي

ATTACHMENT 2 (e)

Course Specifications

Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

Course Specifications
(CS)

Kingdom of Saudi Arabia
National Commission for
Academic Accreditation & Assessment

المملكــة العربيــة السعوديــة
الهيئـــة الوطنيـــة للتقويـــم
والاعــتـمـــاد الأكـــاديـمـــي

Course Specifications

Institution	Date of Report 17 / 2 / 2015
Najran University	
College/Department : Faculty of Art and Science / Department of Computer Science	

A. Course Identification and General Information

1. Course title and code: Title: Data Structures   Code: 404 CS-3 (٤٠٤عال-٣)
2. Credit hours : **3**
3. Program(s) in which the course is offered. (If general elective available in many programs indicate this rather than list programs)   Computer Science program
4. Name of faculty member responsible for the course   Dr. Khaled Mohammed Alalayah.
5. Level/year at which this course is offered: Level 4 / Second Year
6. Pre-requisites for this course (if any)   303 CS-4 (object oriented programming using Java)
7. Co-requisites for this course (if any) Non
8. Location if not on main campus   Sharurah Campus (Male and Female Branches)
9. Mode of Instruction (mark all that apply)

    a. Traditional classroom ☑   What percentage? `100%`

    b. Blended (traditional and online) ☐   What percentage? ☐

    c. e-learning ☐   What percentage? ☐

    d. Correspondence ☐   What percentage? ☐

    f. Other ☐   What percentage? ☐

Comments:

We still teach this course using traditional methods but there is a plan to transform all course into electronic format using E-learning

Kingdom of Saudi Arabia
National Commission for
Academic Accreditation & Assessment

المملكــة العربيــة السعوديــة
الهيئــة الوطنيــة للتقويــم
والاعــتــمــاد الأكــاديــمــي

B Objectives

1. What is the main purpose for this course?
 	
   1- Memorize theoretical and practical basics related to data structures
 	
   2- Analyze real problems and develop appropriate solutions for them in the field of data structures.

2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field)

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

This course covers the following topics: Stacks and its implementation using arrays and functions. Queues and Circular queues and its implementation using arrays and functions. Structures and there usage to implement stacks and queues. Linked lists using pointers. Double linked lists, stacks and queues using linked lists. Graphs, Trees, Binary Trees and there applications.

1. Topics to be Covered		
List of Topics	No. of Weeks	Contact Hours
Review of C++ language	1	2
Type of Arrays (Static and Dynamic)	1	2
Introduction Stack and Queue.	1	2
Stack with array (pop - push) .	1	2
Stack by functions and (Postfix , Prefix Applications of Stack).	1	2
Queue with array (Add - Remove) Circular Queue (Add - Remove).	1	2
Structure (Declaration), Stack with Structure, Queue with Structure.	2	4
Pointers + Linked Lists, double linked list, Stack using linked lists, Queue using linked lists.	4	8
Graphs (Directed – undirected) Introduction to Tree, Binary Tree and its Applications.	3	6

Kingdom of Saudi Arabia
National Commission for
Academic Accreditation & Assessment

المملكــة العربيــة السعوديــة
الهيئــــة الوطنيــــة للتقويــم
والاعـتـمــاد الأكـاديـمــــي

1. Topics to be Covered in Lab		
List of Topics	No. of Weeks	Contact Hours

Review of C++ language basics
   1. Variables, Data types, input/output statements, Assignment, Arithmetic Expressions.
   2. Loops (For and While)
   3. Conditions using if and else
	1	2

Review of Advanced topics in C++ language
   1. One dimension arrays
   2. Functions
   3. Records
   4. Pointers.
	2	2

Stack with array (pop - push) .	1	2
Stack by functions and (Postfix , Prefix Applications of Stack).	1	2
Queue with array (Add - Remove) Circular Queue (Add - Remove).	1	2
Stack with Structure, Queue with Structure.	2	4
Pointers + Linked Lists, double linked list, Stack using linked lists, Queue using linked lists.	4	8
Graphs (Directed – undirected) Introduction to Tree, Binary Tree and its Applications.	2	4

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	30		30			60
Credit	30		15			45

3. Additional private study/learning hours expected for students per week.	2 hours

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

Kingdom of Saudi Arabia
National Commission for
Academic Accreditation & Assessment

المملكــة العربيــة السعوديــة
الهيئــــة الوطنيــــة للتقويـم
والاعـتـمـاد الأكـاديـمــي

Course Learning Outcomes, Assessment Methods, and Teaching Strategy work together and are aligned. They are joined together as one, coherent, unity that collectively articulate a consistent agreement between student learning, assessment, and teaching.

The *National Qualification Framework* provides five learning domains. Course learning outcomes are required. Normally a course has should not exceed eight learning outcomes which align with one or more of the five learning domains. Some courses have one or more program learning outcomes integrated into the course learning outcomes to demonstrate program learning outcome alignment. The program learning outcome matrix map identifies which program learning outcomes are incorporated into specific courses.

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and intended learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy ought to reasonably fit and flow together as an integrated learning and teaching process. **Fourth**, if any program learning outcomes are included in the course learning outcomes, place the @ symbol next to it.

Every course is not required to include learning outcomes from each domain.

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	Memorize principles, concepts and knowledge necessary in the field of data structures.	Lecture	Written Exam
2.0	**Cognitive Skills**		
2.1	Uses logical and independent thinking in the field of data structures.	Lecture Laboratory	Written Exam Lab Exam
2.2	Apply experiences and analyzes the results and develop appropriate solutions for them in the field of data structures.	Lecture Laboratory	Written Exam Lab Exam
3.0	**Interpersonal Skills & Responsibility**		
3.1			
4.0	**Communication, Information Technology, Numerical**		
4.1	Uses mathematical and statistical basics in the field of data structures.	Lecture Laboratory	Written Exam Lab Exam
4.2			
5.0	**Psychomotor mathematics**		
5.1			

Kingdom of Saudi Arabia
National Commission for
Academic Accreditation & Assessment

المملكــة العربيــة السعوديــة
الهيئــــة الوطنيــــة للتقويــم
والاعــتـمــاد الأكـاديـمــــي

Suggested Guidelines for Learning Outcome Verb, Assessment, and Teaching

NQF Learning Domains	Suggested Verbs
Knowledge	list, name, record, define, label, outline, state, describe, recall, memorize, reproduce, recognize, record, tell, write
Cognitive Skills	estimate, explain, summarize, write, compare, contrast, diagram, subdivide, differentiate, criticize, calculate, analyze, compose, develop, create, prepare, reconstruct, reorganize, summarize, explain, predict, justify, rate, evaluate, plan, design, measure, judge, justify, interpret, appraise
Interpersonal Skills & Responsibility	demonstrate, judge, choose, illustrate, modify, show, use, appraise, evaluate, justify, analyze, question, and write
Communication, Information Technology, Numerical	demonstrate, calculate, illustrate, interpret, research, question, operate, appraise, evaluate, assess, and criticize
Psychomotor	demonstrate, show, illustrate, perform, dramatize, employ, manipulate, operate, prepare, produce, draw, diagram, examine, construct, assemble, experiment, and reconstruct

Suggested _**verbs not to use**_ when writing measurable and assessable learning outcomes are as follows:

Consider	Maximize	Continue	Review	Ensure	Enlarge		Understand
Maintain	Reflect	Examine	Strengthen	Explore	Encourage		Deepen

Some of these verbs can be used if tied to specific actions or quantification.
Suggested assessment methods and teaching strategies are:

According to research and best practices, multiple and continuous assessment methods are required to verify student learning. Current trends incorporate a wide range of rubric assessment tools; including web-based student performance systems that apply rubrics, benchmarks, KPIs, and analysis. Rubrics are especially helpful for qualitative evaluation. Differentiated assessment strategies include: exams, portfolios, long and short essays, log books, analytical reports, individual and group presentations, posters, journals, case studies, lab manuals, video analysis, group reports, lab reports, debates, speeches, learning logs, peer evaluations, self-evaluations, videos, graphs, dramatic performances, tables, demonstrations, graphic organizers, discussion forums, interviews, learning contracts, antidotal notes, artwork, KWL charts, and concept mapping.

Differentiated teaching strategies should be selected to align with the curriculum taught, the needs of students, and the intended learning outcomes. Teaching methods include: lecture, debate, small group work, whole group and small group discussion, research activities, lab demonstrations, projects, debates, role playing, case studies, guest speakers, memorization, humor, individual presentation, brainstorming, and a wide variety of hands-on student learning activities.

Kingdom of Saudi Arabia
National Commission for
Academic Accreditation & Assessment

المملكــة العربيــة السعوديــة
الهيئــــة الوطنيــــة للتقويــم
والاعـتـمـاد الأكـاديـمــي

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Mid-term exam	8	15
2	Quizzes	During the semester	10
3	Mid-Tem Lab Assignments	10	10
	Assignments	During the semester	5
4	Final Lab Assignment	15	10
5	Final Exam	At the end of semester	40
6	Attendance	During the semester	10

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

E. Learning Resources

1. List of Required Textbooks
- Data Structurs , by prof. Alaa Alhamami, 2001.

2. List Essential References Materials (Journals, Reports, etc.)

3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)

4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.)

5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)

Classrooms for 20-30 students with data show
Laboratories 20-30 students with java software C++ Compiler

Kingdom of Saudi Arabia
National Commission for
Academic Accreditation & Assessment

المملكــة العربيــة السعوديــة
الهيئــة الوطنيــة للتقويــم
والاعـتـمـاد الأكـاديـمــي

2. Computing resources (AV, data show, Smart Board, software, etc.) Classrooms and laboratories should include data show.
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G   Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching: ✓ Distribution of a questionnaire for students to know how to achieve the goals in the theoretical and practical side.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor: ✓ Discussions with colleagues who specialize in teaching methods and means of learning. ✓ Self-evaluation of the performance of the teacher. ✓ Discussions with other colleagues who taught this course.
3 Processes for Improvement of Teaching ✓ Diagnose weaknesses and turn them into strengths. ✓ Discussions about the decision and methods of teaching ✓ Study the needs of the labor market of college graduates
4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

Faculty or Teaching Staff: Dr. Khaled Mohammed Abdullah Alalayah

Signature: _____   **Date Report Completed: 17 / 2 / 2015**

Received by: _____   **Dean/Department Head**

Signature: _____   **Date:** _____