



COURSE SPECIFICATIONS (CS)

Course Specifications

Institution: NajranUniversity	Date: 27/11/2017
College/Department :	

A. Course Identification and General Information

1. Course title and code: Data Structures (212CSS-3)			
2. Credit hours: 3 (2,2,1)			
3. Program(s) in which the course is offered. (If general elective available in many programs indicate this rather than list programs) Computer Science			
4. Name of faculty member responsible for the course Soad Mohammed(Course Instructor) Dr. Khairan Rajab(Course Coordinator)			
5. Level/year at which this course is offered: Level 5 th /3 rd year including preparatory year.			
6. Pre-requisites for this course (if any): Programming Language 1 (111CSS-4)			
7. Co-requisites for this course (if any): N/A			
8. Location if not on main campus: Offered at Girls Campus			
9. Mode of Instruction (mark all that apply):			
a. traditional classroom	<input type="checkbox"/>	What percentage?	<input type="checkbox"/>
b. blended (traditional and online)	<input checked="" type="checkbox"/>	What percentage?	100
c. e-learning	<input type="checkbox"/>	What percentage?	<input type="checkbox"/>
d. correspondence	<input type="checkbox"/>	What percentage?	<input type="checkbox"/>
f. other	<input type="checkbox"/>	What percentage?	<input type="checkbox"/>
Comments:			
<ul style="list-style-type: none"> Showing and delivering PPT presentation in theclass. Explaining different data structures on white board to explain the solution in moredetail. Motivating students to be active during class by asking questionsregularly. Five minutes before the end of every lecture, I will bring one student in front of class to briefly explain what we learn in today's lecture. (this strategy will be very helpful to boost the studentconfidence) 			
Motivating students to work in home, to search from internet, to read related reference books by giving them assignments related to algorithm complexity and data structureimplementation.			

B Objectives

1. What is the main purpose for this course?

Upon the successful completion of this course, students will be able to:

- Describe basic ADTs (stack, queue, array, list, node list, priority queue, tree, map and dictionary) and their related data structure implementations (array, single linked structure, double linked structure, heap, hash table, binary search tree, AVLtree).
- Distinguish between Abstract Data Types (ADTs), data structures and algorithms.
- Calculate the costs (space/time) of data structures and their related algorithms, both source code and pseudo-code, using the asymptotic notation ($O()$).
- Recognize basic concepts and techniques (recursive, sorting, searching, graph) used in design of basic algorithms.
- Implement basic algorithms and ADTs using different data structures strategies.
- Decide which type of data structures and algorithms best suits the problem they are solving.

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)

- Teaching using multimedia presentation along with text and reference books.
- Conducting active participation of students during class by question/answer session using the board with detailed explanation.
- Initiating explanations/discussions of various data structures.
- In this semester virtual class will also be arranged for online students.
- Video lecturer will also be available for students through blackboard.

Contents are reviewed and revised after every two years.

C. Course Description (Note: General description in the form used in Bulletin or handbook)

Course Description:

Study of common Abstract Data Types (ADTs), basic data structures and design and analysis of algorithms. Common ADTs: stack, queue, list, tree, priority queue, map and dictionary. Basic Data structures include arrays, linked lists, heaps, hash tables, search trees. Basic design and analysis of algorithms covers asymptotic notation, recursive algorithms, searching and sorting, tree traversal, graph algorithms.

1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
Introduction to data structures and algorithms analysis	1	5
Algorithms Analysis (cont.)	1	5
Stacks and Queues	2	8
Single and Node (double linked) Lists	1	5
Trees	1	4
Binary Search Trees, AVL Tree	2	8
Priority Queues and Heaps	1	5
Sorting	2	8
Maps and Hashes	1	5
Introduction to data structures and algorithms analysis	2	8
Algorithms Analysis (cont.)	1	5

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

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other:	Total
Contact Hours	Planned	28	10	22			60
	Actual	28	10	22			60
Credit	Planned	2	1	1			3
	Actual	2	1	1			3

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

5

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

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. (Courses are not required to include learning outcomes from each domain.)

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	Knowledge		
1.1	Describe basic ADTs (stack, queue, array, list, node		Following methods

	list, priority queue, tree, map and dictionary) and their related data structure implementations (array, single linked structure, double linked structure, heap, hash table, binary search tree, AVL tree).	<p>TS-1: Relate Course Learning Outcomes (CLOs) to the topics</p> <p>TS-2: Lectures: using PPT presentation to address verbally in front of students the concepts associated with examples with taking help of writing on the board as needed.</p>	<p>are used to assess student's knowledge acquire in this course.</p> <ul style="list-style-type: none"> • ClassQuizzes. • Assignments. • Midterm exams (Each exam consists of multiple choice questions, true/false, fill in the blanks, and theoretical questions.) • FinalExam
1.2	Distinguish between Abstract Data Types (ADTs), data structures and algorithms.	<p>TS-3: Motivating students to work in home, to search from internet, to read related reference books by giving them assignments related to analysis of algorithm and data structures.</p> <p>TS-4: Let students to solve the problems related to complexity of different algorithms in small groups and giving correction on their solution during class.</p>	

		TS-5: Motivating students to be active during class by asking questions regularly. Use of virtual class through blackboard collaborate. TS-6: Giving students' tutorials related to importance of data	
2.0	Cognitive Skills		
2.1	Following are the cognitive skills which are developed in this course: <ul style="list-style-type: none">Calculate the costs (space/time) of data structures and their related algorithms.	TS-1:lectures TS-2Giving students' tutorials related to importance of data	<ul style="list-style-type: none">Assignments.Midterm examsFinal Exam.Lab assessmentFinal lab
2.2	Decide which type of data structures and algorithms best suits the problem they are solving.		
	<ul style="list-style-type: none">Implement basic algorithms and ADTs using different data structuresstrategies.		
3.0	Interpersonal Skills & Responsibility		
3.1			
3.2			
4.0	Communication, Information Technology, Numerical		
4.1			
4.2			
5.0	Psychomotor		
5.1			
5.2			

5. Schedule of Assessment Tasks for Students During the Semester			
	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Quizzes (Quiz 01 and Quiz 02)	3 rd week and 7 th week	6%
2	Assignments (Two assignments)	6 th week and 9 th week	4%
3	Mid Term Exam-I	6 th week	15%

4	Mid Term Exam-II	10 th week	15%
5	Lab homework lab assessment	7 th wee	10%
6	Final Lab Exam		10%
7	Final Exam		40%

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 Required Textbooks

Data Structures and Algorithms in Java, 5th Edition, by Michael Goodrich and Roberto Tamassia

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

- Mark Allen Weiss: Data Structures and Algorithm Analysis in Java, 3rd Edition 2006.
- Robert Lafore, Data Structures & Algorithms in Java, Latest Edition.

Note: Handouts will also be distributed in class.

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.

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

Lecture Rooms with 20 seats with smart table, Mic, Speaker, PC, Auto Projector with Screen and a white board or a smart board (male Section).

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.) Desktop/ Laptop computer Multimedia Projector
2. Technology resources (AV, data show, Smart Board, software, etc.)
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 <ul style="list-style-type: none"> Online course survey: By the end of each semester, students give their opinions about many factors in the course. They give feedback about the teaching strategies, assessment methods, textbooks, instructor, etc. Feedback about Course Learning Outcomes (CLOs): A course survey is distributed to students to take their opinions about the CLOs.
2. Other Strategies for Evaluation of Teaching by the Instructor or by the Department <ul style="list-style-type: none"> Independent assessment of standard achieved by students Peer consultation on teaching Departmental council discussions Discussions within the group of faculty teaching the course
3. Processes for Improvement of Teaching <ul style="list-style-type: none"> Relate CLOs to assessment methods and teaching strategies Describe the relationships between the course's topics and CLOs. Course syllabus must be distributed in the first week. It should contain the necessary information about the course (CLOs, assessment methods, descriptions, etc. Learning best teaching methods from the best teacher amongst all faculty members Workshops to facilitate the exchange of experiences amongst faculty members
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) <ul style="list-style-type: none"> Getting feedback from the students who will pass the course and work in the practical field.

1. Course coordinator checks all exams and make sure that they are related to CLOs and appropriate for the course.
2. By the end of the semester, the curriculum committee review all courses and approve actions to be taken in the subsequent semester.
3. The vice dean and the dean of the college have to review and approve the final grades.
4. A list of staff members have to check the grades of each one of the students in all exams
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.
 - Preparing CourseReport
 - Planning to update Coursesyllabus
 - By the end of each semester, a course file containing all activities and samples must be prepared and submitted to the college.
 - Evaluation of CLOs can be used to compare the improvement from previous evaluation.
 - Improvement plan based on the online course survey must be prepared.
 - Using modern technologies in teaching.
 - Updating of the learning resources
 - Planning to update course syllabus every two years (the course coordinator are reviewing the courses and the references).
 - Curriculum committee updates the syllabus based on the student outcomes

Name of Course Instructor: Soad Mohammed

Signature: _____ Date Specification Completed: 27/11/2017

Program Coordinator: Dr. Abdulrahman Thaqfan

Signature: _____ Date Received: _____