Faculty: Faculty of Information Technology
Department: Computer Science
Academic Year: 2017/2018
Semester: First

(Course Syllabus)

<table>
<thead>
<tr>
<th>Subject Name</th>
<th>Credit Hours</th>
<th>Course No.</th>
<th>Prerequisite</th>
<th>Concurrent course</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Structures and Algorithms</td>
<td>3</td>
<td>1301203</td>
<td>1301108 +</td>
<td>1301110</td>
</tr>
</tbody>
</table>

Coordinator Name: Mrs. Hebatullah Khattab
Lecturer/s: Mrs. Hebatullah Khattab
Room No.: 1G09
E-mail: h_awwad@asu.edu.jo
Course website: http://bio.asu.edu.jo/bio/index.jsp
Office Hours: Posted on office door

Course Description:
Upon completion of this course, students will have learned how to build OOP data structures such as arrays, linked lists, stacks, queues, binary trees, hash tables, and graphs using classes and templates. Famous data structures applications such as queues and stacks will also be covered. Also, they will learn basic searching and sorting techniques.

Course Aims:
This course covers the fundamental aspects of building data structures in Java.

ABET Student Outcomes
(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.
(d) An ability to function effectively on teams to accomplish a common goal.
(i) An ability to use current techniques, skills, and tools necessary for computing practice.
(j) An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.

Intended Learning Outcomes:
Following the successful completion of this course, the student should be able to:

A. Knowledge and Understanding:
A1. Define and describe common data structures and algorithms. ABET (b)
A2. Recognize the basic sorting and searching techniques. ABET (i)
A3. Identify the time complexity. ABET (j)

B. Subject Specific Skills:
B1. Write programs in Java with greater confidence. ABET (i)
B2. Use object oriented methods to code different data structures. ABET (i)
B3. Use data structures to build complex algorithms. ABET (j)

C. Cognitive and Intellectual Skills:
C1. Specify the most appropriate data structure for a particular problem. ABET (j)
C2. Identify a number of important computer algorithms that use those structures. ABET (j)
C3. Analyse an algorithm for time and space efficiency. ABET (i)
D. Transferable Skills:
D1. Solve problems using a variety of data structures and algorithms. ABET (d), (j)
D2. Employ different data structures and algorithms in programs design and implementation. ABET (b), (i)

Teaching and Learning Methods:

Development of ILOs is promoted through the following teaching and learning methods:

<table>
<thead>
<tr>
<th>ILOs</th>
<th>Learning Methods</th>
<th>Evaluation Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1 – A3</td>
<td>Lecturing and practical sessions</td>
<td>Exams and quizzes.</td>
</tr>
<tr>
<td>B1 – B3</td>
<td>Practical sessions, assignments and case studies.</td>
<td>Assignments and experiments in the lab.</td>
</tr>
<tr>
<td>C1 – C3</td>
<td>Lecturing and practical sessions.</td>
<td>Exams and experiments in lab.</td>
</tr>
<tr>
<td>D1 – D2</td>
<td>Practical sessions and assignments</td>
<td>Experiments in lab, assignments and quizzes</td>
</tr>
</tbody>
</table>

Learning skills:

Course Content:

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Lecture number</th>
<th>Topic’s Details</th>
<th>Exams/ /quizes/ holidays</th>
<th>Main Reference (chapter)</th>
<th>ILOs achieved</th>
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<tr>
<td>1</td>
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<td>Classes, Objects</td>
<td>Chapter 1</td>
<td>B1, B2</td>
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<td>2</td>
<td>15/10/17</td>
<td>3</td>
<td>Basic Structuring Mechanisms</td>
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<td>A1, B2</td>
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<td>17/10/17</td>
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<td>Abstract Data Types</td>
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<td>B1, B2</td>
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<td>3</td>
<td>22/10/17</td>
<td>5</td>
<td>Lists: Arrays</td>
<td>Chapter 1, 6</td>
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<tr>
<td></td>
<td>24/10/17</td>
<td>6</td>
<td>Lists: Introduction to Linked Lists</td>
<td>Chapter 6, 7</td>
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<td>7</td>
<td>Types and Operation of Linked List</td>
<td>Chapter 6, 7</td>
<td>A3, B1, B2</td>
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<td>8</td>
<td>Formal Specification and Reference-based Implementation of a Linked List</td>
<td>Chapter 6, 7</td>
<td>B1-B3, C1, C2, D1, D2</td>
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<tr>
<td>6</td>
<td>12/11/17</td>
<td>11</td>
<td>Doubly Linked List</td>
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<td>A1, A3, B1-B3</td>
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<tr>
<td></td>
<td>14/11/17</td>
<td>12</td>
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<td>FIRST EXAM</td>
<td>B1, B2, C1, C2, D1, D2</td>
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<tr>
<td>7</td>
<td>19/11/17</td>
<td>13</td>
<td>Stack: uses and formal specification of the stack</td>
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<td></td>
<td>21/11/17</td>
<td>14</td>
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<td>26/11/17</td>
<td>15</td>
<td>Linked Stack interface, class</td>
<td>Chapter 3</td>
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<tr>
<td>Date</td>
<td>Assignment</td>
<td>Chapter</td>
<td>Example</td>
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<td>Chapter 5</td>
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<td>Linked Queue interface, class, and operations</td>
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<td>Chapter 5</td>
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<td>Chapter 5</td>
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<tr>
<td>17/12/17</td>
<td>Recursion definition and example</td>
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<td>Trees: definition and traverse</td>
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<td>26/12/17</td>
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<td>Graphs: definition and examples</td>
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<td>Quiz</td>
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<td>Graphs: more examples</td>
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<td>9/01/18</td>
<td>Linear and Binary Search algorithms</td>
<td>10</td>
<td>Chapter 10</td>
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<td>14/01/18</td>
<td>Sorting definition and major algorithms</td>
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<td>Chapter 10</td>
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<tr>
<td>16/01/18</td>
<td>Bubble and Selection Sort algorithms</td>
<td>10</td>
<td>Chapter 10</td>
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<tr>
<td>21/01/18</td>
<td>FINAL EXAM</td>
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<td>32</td>
<td>FINAL EXAM</td>
<td>12</td>
<td></td>
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</table>

**Grade Distribution:**

Your course grade will be determined by the following:

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<thead>
<tr>
<th>Assessment Method</th>
<th>% of Final Grade</th>
<th>Due Date</th>
</tr>
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<tbody>
<tr>
<td>- First Exam</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>- Second Exam</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>- Lab (Assignments, Quizzes, Tutorials, ....)</td>
<td>15%</td>
<td>Final lab</td>
</tr>
<tr>
<td>- Final Examination</td>
<td>30%</td>
<td>Project &amp; HW (15%)</td>
</tr>
</tbody>
</table>

*Distribution of examination material (may vary depending on material included)
Course Policies:

A. Attendance policies:
   Attendance: Mandatory.
   First warning – with ___5_____ absences
   Last warning – with ___7_____ absences
   Failing in the subject – with ___8_____ absences

B. Absences from exams and handing in assignments on time:
   Will result in zero achievement unless health report or other significant excuse is documented.

C. Health and safety procedures:

D. Honesty policy regarding cheating, plagiarism, misbehavior:
   The participation, the commitment of cheating will lead to applying one or more of the following penalties together:
   1. Failing the subject he/she cheated at
   2. Failing the other subjects taken in the same course
   3. Not allowed to register for the next semester. The summer semester is not considered as a semester

E. Grading policy:
   Exams and Quizzes.
   First Exam: ___20_____ points
   Second Exam: ___20_____ points
   Assignments/quizzes + Final Lab: ___15 +15_____ points
   Final Exam: ___30_____ points
   Total: ___100_____ points

F. Available university services that support achievement in the course:

Required Equipment and Tools:

Make-up Exam Policy:
Make-up exams will be offered for valid reasons. They may be different from regular exams in content and format.

Textbooks information:

Main Reference:
http://bio.asu.edu.jo/bio/index.jsp

Other References:
4. Handouts and slides to be distributed by lecturers.

Additional information:
   No side talks during lecture
   No mobile phones during lecture
   Entering the lecture theatre after the instructor is not permitted.

   Homework should be done by students independently and will be asked at the exams
Course Material and Announcements:
Students need to use the e-learning page at the ASU website in order to get all lecture handouts and guidelines which will be uploaded there.
In addition, course related announcements and exam results will be posted on the e-learning page and is the responsibility of each student to check the site regularly.

Name of Course Coordinator: Mrs. Hebatullah Khattab
Signature: __________________ Date: __________________

Head of curriculum committee: Dr. Nedhal AlSaiyd
Signature: __________________ Date: __________________

Head of Department: Dr. Fadi Almasalha
Signature: __________________ Date: __________________

Dean: Dr. Mohammed Hijawi
Signature: __________________ Date: __________________

Copy to:
Head of Department
Head of curriculum committee
Course File

C 26
Faculty: Faculty of Information Technology  
Department: Computer Science  
Academic Year: 2017/2018  
Semester: First  

(Course Syllabus)

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Mrs. Hebatullah Khattab  
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Intended Learning Outcomes:
Following the successful completion of this course, the student should be able to:

E. Knowledge and Understanding:
E1. Define and describe common data structures and algorithms. ABET (b)
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E3. Identify the time complexity. ABET (j)

F. Subject Specific Skills:
F1. Write programs in Java with greater confidence. ABET (i)
F2. Use object oriented methods to code different data structures. ABET (i)
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G. Cognitive and Intellectual Skills:
G1. Specify the most appropriate data structure for a particular problem. ABET (j)
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H. Transferable Skills:
H1. Solve problems using a variety of data structures and algorithms. ABET (d), (j)
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</tr>
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<td>C1 – C3</td>
<td>Lecturing and practical sessions.</td>
<td>Exams and experiments in lab.</td>
</tr>
<tr>
<td>D1 – D2</td>
<td>Practical sessions and assignments</td>
<td>Experiments in lab, assignments and quizzes</td>
</tr>
</tbody>
</table>

Learning skills:

Course Content:

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Lecture number</th>
<th>Topic’s Details</th>
<th>Exams/ quizzes/holidays</th>
<th>Main Reference (chapter)</th>
<th>ILOs achieved</th>
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<tr>
<td>1</td>
<td>9/10/17</td>
<td>1</td>
<td>Classes, Objects</td>
<td>Chapter 1</td>
<td>B1, B2</td>
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<td>11/10/17</td>
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<td>Chapter 1</td>
<td>A1, B2</td>
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<tr>
<td>2</td>
<td>16/10/17</td>
<td>3</td>
<td>Basic Structuring Mechanisms</td>
<td>Chapter 1</td>
<td>A1, B2</td>
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<tr>
<td></td>
<td>18/10/17</td>
<td>4</td>
<td>Abstract Data Types</td>
<td>Chapter 2</td>
<td>B1, B2</td>
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<td>3</td>
<td>23/10/17</td>
<td>5</td>
<td>Lists: Arrays</td>
<td>Chapter 1, 6</td>
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<td>4</td>
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<td>7</td>
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<td>Chapter 6, 7</td>
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<tr>
<td>6</td>
<td>13/11/17</td>
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<td>Doubly Linked List</td>
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<td>15/11/17</td>
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<td>Doubly Linked List</td>
<td>FIRST EXAM</td>
<td>Chapter 7</td>
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<td>Chapter 3</td>
<td>B1, B2, C1, C2, D1, D2</td>
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<thead>
<tr>
<th>Assessment Method</th>
<th>% of Final Grade</th>
<th>Due Date</th>
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<tbody>
<tr>
<td>- First Exam</td>
<td>20%</td>
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<tr>
<td>- Second Exam</td>
<td>20%</td>
<td>As clarified above</td>
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<tr>
<td>- Lab (Assignments, Quizzes, Tutorials, ....)</td>
<td>Final lab</td>
<td>15%</td>
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<td>Project &amp; HW</td>
<td>15%</td>
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<td>- Final Examination</td>
<td>30%</td>
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G. Attendance policies:
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J. Honesty policy regarding cheating, plagiarism, misbehavior:
The participation, the commitment of cheating will lead to applying one or more of the following penalties together:
4. Failing the subject he/she cheated at
5. Failing the other subjects taken in the same course
6. Not allowed to register for the next semester. The summer semester is not considered as a semester

K. Grading policy:
Exams and Quizzes.
First Exam: ___20____ points
Second Exam: ___20____ points
Assignments/quizzes + Final Lab: ___15 +15____ points
Final Exam: ___30____ points
Total: ___100____ points

L. Available university services that support achievement in the course:

Required Equipment and Tools:

Make-up Exam Policy:
Make-up exams will be offered for valid reasons. They may be different from regular exams in content and format.

Textbooks information:

Main Reference:
http://bio.asu.edu.jo/bio/index.jsp

Other References:
8. Handouts and slides to be distributed by lecturers.

Additional information:
No side talks during lecture
No mobile phones during lecture
Entering the lecture theatre after the instructor is not permitted.

Homework should be done by students independently and will be asked at the exams
**Course Material and Announcements:**
Students need to use the e-learning page at the ASU website in order to get all lecture handouts and guidelines which will be uploaded there.
In addition, course related announcements and exam results will be posted on the e-learning page and is the responsibility of each student to check the site regularly.

Name of Course Coordinator:  Mrs. Hebatullah Khattab  
Head of curriculum committee: Dr. Nedhal AlSaiyd  
Head of Department: Dr. Fadi Almasalha  
Dean: Dr. Mohammed Hijawi

Signature:  
Date:  

Copy to:  
Head of Department  
Head of curriculum committee  
Course File

C 26