Cleveland State University
Department of Electrical and Computer Engineering

CIS 265: Data Structures and Algorithms

Catalog Description: CIS 265 Data Structures and Algorithms (0-3-2)
Pre-requisite: CIS260/CIS500
This is a continuation of CIS 260/500. Programming and problem-solving skills are further developed by using language features to implement various data structures such as stacks, queues, linked lists, trees, and graphs. Topics include additional programming and problem-solving techniques, and sorting, searching, and hashing algorithms.


Book Resources: Many useful resources including: answers to Review Question, solution to Programming Exercises, source code for examples, Servlets, JSP, JSF, and Web Services in Chapters 39-42, links to download software, VideoNotes and Web Chapters, etc. are available at the publisher’s web site: http://www.cs.armstrong.edu/liang/intro9e/

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Expected Outcomes: At the end of this course, a student will be able to:
(1) apply computational reasoning skills in solving problems,
(2) understand code written by others,
(3) estimate the complexity of a problem and its solutions,
(4) design and write an effective computerized solution for a small problem,
(5) effectively test a program to assess its correctness,
(6) use recommended style and conventions when writing a program,
(7) use a computer system to edit, compile, and execute a program.

Fulfillment of CS Program Objectives, Outcomes and Characteristics:
Objectives: 1. Graduates will apply the concepts of the discipline including analysis, design, and implementation of information and computing systems.

Outcomes:
1) An ability to apply knowledge of computing and mathematics appropriate to the program’s student outcomes and to the discipline
2) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
6) 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.

Characteristics:

(a) An ability to apply knowledge of computing and mathematics appropriate to the program’s student outcomes and to the discipline
(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
(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.
(k) An ability to apply design and development principles in the construction of software systems of varying complexity.

Contribution of Course to Meeting the Professional Component:
Math & Basic Science: 2 credit;
Engineering Topics: 2 credits;
General Education: 0 credit

Prerequisites by Topic: Introduction to Programming(materials covered in CIS260/CIS500)

Topics:

1. Java Programming – Basic Concepts Review  8
2. Inheritance and Polymorphism  2
3. Exception Handling and Text I/O  2
4. Abstract Classes and Interfaces  2
5. Recursion  2
6. Generics  4
7. Java Collection Framework: Chp.22 – Lists, Stacks, Queues, and Priority Queues; Chp.23 – Sets and Maps  8
8. Developing Efficient Algorithms  4
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<td>9. Sorting</td>
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<td>10. Implementing Lists, Stacks, Queues, and Priority Queues</td>
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<td>11. Binary Search Trees and Hashing</td>
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<td>12. Graphs and Applications</td>
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<td>13. Weighted Graphs</td>
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<td>14. Multithreading</td>
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<td>15. GUI Basics</td>
<td>TBA</td>
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<td>16. Binary I/O</td>
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**Computer Usage:**

Daily use of a computer (preferable your own laptop customized to your own settings), Java language, Eclipse IDE, other (free) software resources to be announced.