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LEARNING OUTCOMES	LEARNING ACTIVITIES	EVALUATION METHODS
3. Design programs that demonstrate an understanding of fundamental computing algorithms such as binary search trees, depth-first traversals and breadth-first traversals.	Lecture Discussion Hands-On Lab Exercises Homework Assignments Group Projects	Quizzes and Exams Hands-On Programming projects
4. Demonstrate fundamental algorithmic strategies such as brute-force divide and conquer, backtracking, branch-and-bound and pattern matching.	Lecture Discussion Hands-On Lab Exercises Homework Assignments Group Projects	Quizzes and Exams Programming Assignments
5. Use software validation and debugging methods including generating testing plans.	Lecture Discussion Hands-On Lab Exercises Homework Assignments Group Projects	Quizzes and Exams Programming Assignments

SEQUENCE OF TOPICS:

Review of Elementary Programming Concepts & Object-Oriented Design

Fundamental Data Structures

- Stack
- Queues
- Linked lists
- Hash tables
- Trees

Fundamental Computing Algorithms

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Recursion
- Fundamentals
- Recursive mathematical functions
- Recursive procedures
- Divide and conquer strategies
- Recursive backtracking

Algorithmic Analysis
- Asymptotic analysis of upper and average complexity bounds
- Identifying differences among best, average and worst case behaviors
-
- Empirical measurements of performance
- Time and space tradeoffs in algorithms
- Use of recurrence relations to analyze recursive algorithms

Algorithmic Strategies
- Brute-force
- Divide-and-conquer
- Backtracking
- Branch-and-bound
- Heuristics
- Pattern matching
- Numerical approximation

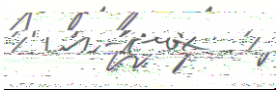
Software Engineering
- Software validation
- Test plan creation
- Test case generation
- Object-oriented testing

LEARNING MATERIALS:
Dale, Joyce, & Weems. *Object Oriented Data Structures Using Java, Third Edition*. Jones and Bartlett.

Other learning materials may be required and made available directly to the student and/or via the and/or course management system.

COURSE APPROVAL:

Prepared by:	Marie Hartlein	Date: 11/1995
Revised by:	Kendall Martin	Date: 4/2009
VPAA/Provost Compliance Verification:	Dr. John C. Flynn, Jr.	Date: 9/11/2009
Revised by: Kendall Martin		Date: 12/2012
VPAA/Provost or designee Compliance Verification:	Victoria L. Bastecki-Perez, Ed.D.	Date: 7/11/2013
Revised by: Patricia Rahmlow		Date: 5/2017
VPAA/Provost or designee Compliance Verification:		Date: 8/21/2017



. *It was developed, approved and will be delivered in full compliance with the policies and procedures established by the College.*