Computer Science Department cs.salemstate.edu

CSC 105 Survey of Computer Science **4 cr.**

Instructor: TBA **Office:** location **Phone:** (978) 542-extension
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Section	Time	Room	Final Exam
nn	days and times	location	date and time

Catalog Description:

This introductory course provides a broad-based overview of the fundamental areas within the filed of Computer Science. The course specially designed for students with no prior knowledge in Computer Science by introducing central concepts using breadth-first approach that surveys the key points of computer sciences. The areas surveyed include the historical development of modern electronic computers, Algorithm Foundations, Hardware World, Computer Organization, Operating Systems, Programming Languages, Computer Network, Information Security, Simulation and Modeling, Artificial Intelligent, Computer Graphics, and the Social Issues in Computing. Four lecture hours per week.

Prerequisite: fulfillment of the Basic Mathematics Competency Based Skills requirement and ability to use standard computer software (e.g., operating system features, word processing, email, and web browsers).

Goals:

The aims of this course are to help the student to explores a variety of basic concepts and gain an appreciation for the breadth within the computer science field and to be better prepared for the technical treatments presented in later courses. Specifically, the goals are:

CG01: To understand the formal definition of computer science;
CG02: To provide a good knowledge of fundamental concepts in computer science;
CG03: To introduce key application areas of computer science;
CG04: To describe the purpose of computer application and apply it to real world applications

Objectives:

Upon completion of this course, students will have demonstrated the ability to:

CO01: Describe and define the fundamental concepts of computer science;
CO02: Understand the definition of term algorithm and use Pseudocode;
CO03: Explain how data is represented in a computer system and understanding the numbering systems;
CO04: Describe the relationship between Boolean logic and electronic gates;
CO05: Explain and compare different network terminologies and types;
CO06: Explain the difference between authentication and authorization;
CO07: Explain the importance of computer security for networked embedded systems
CO08: Describe the different generations of operating systems, their features;
CO09: Design solutions to problems from selected areas of artificial intelligence, computer graphics, and human-computer interaction;
CO010: Understand the issues involved in digitally sharing copywritten intellectual property.

Student Outcome (SO) vs. Course Objectives matrix

Student Outcome	CO01	CO02	CO03	CO04	CO05	CO06	CO07	CO08	CO09	CO10
SO-1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SO-2			✓							
SO-3										✓
SO-4										✓
SO-5							✓			
SO-6	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Notes:

SO-1: Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.

SO-2: Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.

SO-3: Communicate effectively in a variety of professional contexts.

SO-4: Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.

SO-5: Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline. Apply computer science theory and software development fundamentals to produce computing-based solutions.

SO-6: Apply computer science theory and software development fundamentals to produce computing-based solutions.

Topics:

- **Introduction** **SP1(1)**
  - Introduction to Computer Science
  - A Brief History of Computing
- **Algorithm Foundations of Computing** **AL1(1)**
  - Algorithm Discovery and Design
  - Algorithms/Pseudo code/Flowcharts
  - Basic Algorithm Analysis
  - Fundamental algorithm patterns: greedy, divide and conquer
- **The Hardware World** **AR2(2.5)**
  - Numbering System
  - Data Representation
  - Boolean logic and Gates
  - Building Computer Circuits
  - Basic Organization of the Von Neumann Machine
  - Fetch-Decode-Execute Cycle
- **Computer Networks** **NC1(2)**
  - Basic Networking Concepts **NC2(4)**
  - Communication Protocols **NC5(2)**
  - Network Services and Benefits **NC7(2)**
- **Information Security** **IAS1(2)**
  - Threats and Defense **IAS2(2)**
  - Encryption and Decryption **IAS3(2)**

Principles of Secure Design
Defensive Programming

- **Simulation and Modeling** **CN (3)**
  Computation Modeling
  Simulations as Dynamic Modeling
  Simulation Techniques and Tools
  Running the Model and Visualizing Results
- **Databases and Data Science** **IM1(0.5)**
  Conceptual vs. physical Organization of Data **IM2(1.5)**
  Databases, Database Systems, and Database Management

- **Artificial Intelligent** **IS1(2)**
  Overview of AI **IS1(1)**
  Turing Test
  Basic Knowledge Representation and Reasoning **IS3(2)**
  Problem spaces
  Forward and Backward Chaining
  Applications

- **Computer Graphics** **GV1(2)**
  Introduction to Rendering
  Computer Generated Imagery (CGI)
- **Social Issues in Computing** **SP1(4)**
  Appropriate vs. inappropriate o Professional Ethics **SP3(1.5)**
  Community values
  Professional certification, codes of ethics, conduct, and practice
  Accountability, responsibility and liability
  Ethical dissent and whistleblowing
  Dealing with harassment and discrimination
  Ergonomics and healthy computing environments
  Intellectual property standards **SP4(1.5)**
  Privacy and civil liberties **SP5(1)**
- **Human-Computer Interaction** **HCI1(2)**
  Foundations
  User interface
  Measures for evaluation ▪ Usability heuristics
  Cognitive models
  Social models
  Accessibility

Assignments:

Extensive reading assignments in one or more textbooks cover the fundamental vocabulary and descriptive material. Written assignments, both computational and analytical, are used to deepen the student's understanding of fundamental ideas. Each assignment has a specific due date, with a short grace period during which the assignment may be submitted for reduced credit. When the grace period has expired, the assignment will no longer be accepted, and a student who has failed to submit the assignment will have a penalty deducted from the term point total.

Exams and quizzes:

There will be periodic short quizzes, one mid-term exam and a comprehensive written two-hour final examination. No make-ups are given for missed quizzes or examinations.

Grading:

The course grade will be determined using the following approximate weights: Homework: 30%; Quizzes: 20%; Midterm Exam: 25%; Final Exam: 25%.

Course Objective / Assessment Mechanism matrix

	Written Homework	Quizzes	Examinations
CO01	✓	✓	✓
CO02	✓	✓	✓
CO03	✓	✓	✓
CO04	✓	✓	✓
CO05	✓	✓	✓
CO06	✓	✓	✓
CO07		✓	✓
CO08	✓	✓	✓
CO09	✓	✓	✓
CO010	✓	✓	✓

Bibliography:

- **Invitation to Computer Science**. G. Michael Schneider, Judith L. Gersting. **8th Edition.** Cengage.**2019**
- **Computer Science Illuminated**. Dale, Nell; Lewis, John. **Seventh Edition**. Jones & Bartlett,**2019**.
- **Computer Science Principles. Kevin P Hare and Pindar Van Arman. 2th Edition,2018**
- **Computer Networking: A Top-Down Approach**. **Seventh Edition**. Kurose, James and Ross, Keith. Pearson, **2016**.
- **Fundamentals of Computer Graphics. Fourth Edition**. Marschner, Steve and Shirley, Peter. CRC Press, **2015**.
- **Artificial intelligence in the 21st century**. Lucci, Stephan and Kopec, Danny. **Second Edition**. Mercury Learning & Information, **2015**.
- **Computer Science: An Overview**. Brookshear, J. Glenn. **12th Edition**. Addison-Wesley, **2014**.
- **Computer Networks.** Tanenbaum, S. Andrew and Wethrall, J. David. **Fifth Edition**. Pearson, **2010**.
- **Connecting with Computer Science.** Anderson, Greg; Ferro, David; Hilton, Robert. **Second Edition**. Thomson Course Technology, **2010**.
- **Artificial Intelligence: A Modern Approach.** Russell, Stuart and Norvig, Peter. **Third Edition**. Pearson, **2009**.
- **Fundamentals of Computer Science.** Andrew John Theodore Colin. Palgrave,**1980**.

Academic Integrity

Academic Integrity Statement:

Salem State University assumes that all students come to the University with serious educational intent and expects them to be mature, responsible individuals who will exhibit high standards of honesty and personal conduct in their academic life. All forms of academic dishonesty are considered to be serious offences against the University community. The University will apply sanctions when student conduct interferes with the University primary responsibility of ensuring its educational objectives." Consult the University catalog for further details on Academic Integrity Regulations and, in particular, the University definition of academic dishonesty.

The Academic Integrity Policy and Regulations can be found in the University Catalog and on the University website (http://catalog.salemstate.edu/content.php?catoid=13&navoid=1295#Academic_Integrity). The formal regulations are extensive and detailed - familiarize yourself with them if you have not previously done so. A concise summary of and direct quote from the regulations: "Materials (written or otherwise) submitted to fulfill academic requirements must represent a student's own efforts". *Submission of other's work as one's own without proper attribution is in direct violation of the University's Policy* and will be dealt with according to the University's formal Procedures. *Copying without attribution is considered cheating in an academic environment - simply put,* ***do not do it!***

University-Declared Critical Emergency Statement:

In the event of a university-declared emergency, Salem State University reserves the right to alter this course plan. Students should refer to www.salemstate.edu for further information and updates. The course attendance policy stays in effect until there is a university-declared critical emergency.

In the event of an emergency, please refer to the alternative educational plans for this course, which will be distributed via standing class communication protocols. Students should review the plans and act accordingly. Any required material that may be necessary will have been previously distributed to students electronically or will be made available as needed via email and/or Internet access.

Equal Access Statement:

"Salem State University is committed to providing equal access to the educational experience for all students in compliance with Section 504 of The Rehabilitation Act and The Americans with Disabilities Act and to providing all reasonable academic accommodations, aids and adjustments. **Any student who has a documented disability requiring an accommodation, aid or adjustment should speak with the instructor immediately.** Students with Disabilities who have not previously done so should provide documentation to and schedule an appointment with the Office for Students with Disabilities and obtain appropriate services."

Note: This syllabus represents the intended structure of the course for the semester. If changes are necessary, students will be notified in writing and via email.