CSI 112 Artificial Intelligence Literacy ()

Student Learning Outcomes

Students will:

1. Understand the technical developments and historical context that led to the current state of Artificial Intelligence.
2. Understand the role of machine learning and generative AI.
3. Understand the implications of AI on society including ethical impacts, and the concept of responsible AI.

Course Topics

CSI 131 Computational Thinking (2)

An introduction to computational thinking. Topics to be discussed include computational thinking, algorithm development, problem solving, and professional disciplines in computing. Students will use flowcharts, code tracing, and control structures to implement algorithmic solutions to problems. Prerequisite of high school algebra proficiency, or a co-requisite of MTH 131, 133, or 210.

Student Learning Outcomes

Students will:

1. Understand computer hardware components and how they interact
2. Understand algorithmic design concepts
3. Understand the three Control Structures
4. Understand basic constructs of the C++ programming language
5. Understand the various career fields in computing
6. Understand foundational concepts in computing
7. Use the 5 steps of problem solving to provide an algorithmic solution.
8. Write flow charts for algorithms
9. Write programs using the C++ programming language
10. Hand trace algorithms and C++ code.
11. Distinguish between structured and non-structured algorithms and programs
12. Implement the three control structures in flowchart and C++

Course Topics

CSI 132 Introduction to Programming (3)

An introduction to programming and problem solving. This course is a continuation of CSI 131. Topics to be discussed include more problem-solving strategies, programming, and software design techniques. Students will be introduced to arrays, functions, structs, external files, and searching and sorting strategies. Prerequisite: CSI 131.

Student Learning Outcomes

Students will:

1. Understand algorithmic design concepts[3]
2. Understand structured programming techniques[4]
3. Understand foundational concepts in computing[3]
4. Use top-down design techniques effectively[4]
5. Write flowcharts for algorithms[6]
6. Write efficient structured programs using the C++ programming language[6]
7. Distinguish between structured and non-structured algorithms and programs[5]
8. Use arrays, structs, functions, and control structures[5]
    a. Superscripts are Bloom's levels

Course Topics

CSI 205 Data Visualization ()

Student Learning Outcomes

Students will:

1. Understand basic descriptive statistics,
2. Understand the information conveyed in various chart types,
3. Understand the use of color, shapes, text, and basic design principles in creating data visualizations.
4. Be able to create, worksheets, dashboards and stories in Tableau,
5. Be able to implement parameters, calculated fields, table calculations, and actions in Tableau.
6. Be able to create interactive dashboards.

Course Topics

CSI 215 Introduction to Databases (3)

This course covers the relational model, relational algebra, and SQL. In addition, the course covers relational design principles based on dependencies and normal forms. Additional database topics from the design and application-building perspective will also be covered. Prerequisite: CSI 132.

Student Learning Outcomes

Students will:

1. Develop an understanding of DBMS
2. Develop an understanding of core database design methodology
3. Develop an understanding of linking requirements to the design of a database

Course Topics

CSI 300 Computer Organization and Architecture (3)

This course concentrates on the relationship between computing hardware and machine language instruction sets as well as introductory digital electronics. The course examines logic gates, machine language, and assembly language. Students will also study digital electronics and computer circuit design with small and medium scale integrated circuits. Several computer systems and microprocessors are used as examples. Prerequisite: CSI 230.

Student Learning Outcomes

Students will:

1. Demonstrate an understanding of applying Boolean algebra, logic gates and flip-flops to computer circuit design.
2. Demonstrate an understanding of different storage devices (registers, static and dynamic RAM, external devices), their relationship to each other and storage techniques used by computers.
3. Demonstrate an understanding of technologies applied to CPU design.
4. Demonstrate an understanding of the relationship between different components that make up a computer (including but not limited to buses, IO devices, storage technologies, CPU design and instruction sets).

Course Topics

CSI 330 Data Structures and Algorithms (3)

A study of common and useful data structures such as lists, stacks, queues, trees, graphs, and variations of these structures along with the essential and necessary algorithms to manipulate these structures. Algorithms to be covered will include searching and sorting techniques, data traversals, graph algorithms, numerical algorithms, string algorithms, and hashing. Prerequisites: CSI 230 and CSI 235.

Student Learning Outcomes

Students will:

1. Write Recursive algorithms and programs
2. Write programs that utilize queues, stacks and heaps.
3. Write programs for searching and sorting using several different techniques
4. Assess the efficacy of an algorithm using analytic techniques
5. Understand abstract data types/data structures
    a. Queues
    b. Stacks
    c. Various types of trees
    d. Graphs
    e. Heaps
6. Understand algorithmic concepts
    a. Recursion
    b. Various sorting methods
    c. Hashing
    d. Searching
    E. algorithmic efficiency concepts (including the Big O notation)

Course Topics

CSI 434 Introduction Cryptographic Methods in Cybersecurity (3)

This course provides an introduction to cryptographic methods in cybersecurity, including the design and implementation of cryptographic systems. Topics covered include principles of cryptography, classical ciphers, simple cryptanalysis, symmetric primitives, asymmetric encryption and digital signatures, and protocol design and analysis. Prerequisites: CSI 230, 235, MTH 170.

Student Learning Outcomes

Students will:

1. Provide a brief history of Cybersecurity
2. Describe the purpose of cryptography and the ways it is used in data communications
3. Understand cipher, cryptanalysis, cryptographic algorithm, cryptology
4. Explain how public key infrastructure supports digital signing and encryption
5. Describe which cryptographic protocols, tools, and techniques are appropriate in a given situation.

Course Topics

CSI 440 Introduction to Artificial Intelligence (3)

A study of the techniques and issues related to the study of Artificial Intelligence. Software design techniques and algorithms specific to AI will be covered including neural networks, decision trees, game trees, probabilistic algorithms, rule-based systems, and search strategies. Applications are examined in game playing, pattern recognition, robotics, machine perception, expert systems, natural language understanding, and machine learning. Prerequisite: CSI 330.

Student Learning Outcomes

Students will:

1. Understand a brief history of AI
2. Understand various searching methods
3. Understand knowledge representation and reasoning
4. Understand non-deterministic reasoning and decision making
5. Understand learning
6. Understand natural language processing

Course Topics

CSI 445 Data Mining (3)

This course is an introduction to data mining. Data mining is concerned with the extraction of knowledge from large data sets. The field encompasses techniques from artificial intelligence, statistics, and databases. Students are introduced to the concepts, issues, tasks, and techniques of data mining. Topics include data preparation, exploratory data analysis, pattern recognition, machine learning, classification, clustering, evaluation and validation, scalability, and data mining applications. Prerequisites: CSI 230, MTH 170.

Student Learning Outcomes

Students will:

1. Demonstrate an understanding of data mining concepts, methodologies and strategies.
2. Demonstrate an understanding of different aspects of the data mining process.
3. Demonstrate an understanding of classification, association analysis, and clustering.
4. Be able to implement a number of techniques for classification, association analysis, and clustering.

Course Topics

CSI 467 Digital Forensics (3)

This course covers detection and prevention of intrusions and attacks, digital evidence collection and evaluation, automatic intrusion detection, pattern matching and statistical techniques, firewalls, and vulnerability scanning. Additionally, topics regarding seizure, chain of custody, and technical issues in acquiring computer evidence are covered. Prerequisite: CSI 369.

Student Learning Outcomes

Students will:

1. Demonstrate an understanding the digital forensics processes.
2. Demonstrate an understanding of the evidence collection.
3. Demonstrate an understanding of techniques of hiding and scrambling information.
4. Demonstrate an understanding of computer forensics including the examination process, live data collection techniques, physical and logical structures, and file systems.
5. Demonstrate an understanding of Windows, Linux, and Mac OS, email, and network forensics.

Course Topics