



CSTA Voice Article - *UNLV Takes Steps to Address Issues in CS Certification*

Detailed Course Description

### Course Catalog Description

CIT 751. Methods of Teaching Computer Science, 3 Credits

Study of research-based practices and methods in the teaching of computer science topics including algorithmic processes and their principles, object orientation and programming, elements of software design and usability, data abstraction and logic structures, and interface design. Emphasis is on project-based learning (PBL) strategies in a web-based development environment. Prerequisite: Consent of instructor.

### Revised Syllabus Description

The ACM K-12 CS Model Curriculum introduces four levels of student preparedness in Computer Science education. Level-I topics are geared to grade levels K-8, while level II, III, and IV topics are designed for grades 9-12. The present course has been expanded to align key topics from Levels I-IV into a single, comprehensive semester of study. Table-1 (see web reference-1) depicts the alignment of the ACM curriculum topics and labs to elements of the current and proposed methods course. The emphasis on Level II, III, and IV topics and labs is intentional since Level I topics are more widely distributed among other methods courses including the *Methods of Teaching Computer Applications*. Topics and labs currently covered by the *Methods of Teaching Computer Programming* course are shown in **bold blue** text. Topics and labs to be added to the proposed *Methods of Teaching Computer Science* course are shown in **bold orange** text:

### Syllabus topics

- The K-12 Computer Science Curriculum overview
- Language as a vehicle to model algorithms and algorithmic thinking
- Scope and sequence in teaching Computer Science
- Methods of teaching programming
- Methods of teaching algorithms
- Instructional management techniques
- Teaching language syntax
- Objects, properties and methods; and data abstraction in object orientation
- High-level languages and their object libraries
- Project-based learning (PBL) in Computer Science
- Using projects to teach control structures and compound conditions
- Elements of software design
- Recursion, searching and sorting algorithms
- Limitations in algorithmic computing, Big-Oh notation
- Topics in Computer Science

Course projects:

- Methods project in object-based data abstraction
- Methods project in interface design
- Methods project in PBL and control structures
- Methods project in software design specifications
- Research project for topics in Computer Science
- Research and analysis of current topics and trends in Computer Science using resources available in the CSTA web site
- Comparative analysis of textbook and online computer science instructional resources
- Online discussions and exercises

<sup>1</sup> Nevada Department of Education special endorsements in Computers:

<http://www.doe.nv.gov/licensing/endorsements/specialend/computers.attachment/attachment/computers.pdf>

<sup>2</sup>ACM K-12 Model Curriculum, <http://csta.acm.org/Curriculum/sub/ACMK12CSModel.html>