

CSET-4250 Applied Programming Languages (3 semester credit hours) CSET Required  
IT Required

**Current Catalog Description:**

This course teaches methodologies to select the most appropriate language for a specific engineering technology application. Topics include comparison of programming languages by evolution, formal specifications, structures, features, application domains, programming paradigms, implementation of syntax, semantics and program run-time behavior.

Prerequisite: Junior standing

**Textbook:**

“Concepts of Programming languages,” 9<sup>th</sup> edition, Robert W. Sebesta, 2009. (ISBN: 0-13-607347-6)

**Related Program Outcomes:**

CSET Program Outcomes are (a, b, i and k)

IT Program Outcomes are (a, b and i)

**Course Objectives:**

After successful completion of this course, students will:

- Be able to explain and apply a broad range of concepts about programming languages.
- Be able to recognize, define, and make correct use of most common programming languages terminology.
- Design, implement, test, and debug simple programs in an object-oriented programming language, functional paradigm logical programming and scripting languages.
- Identify and describe the properties of a variable such as its associated address, value, scope, persistence, and size.

**Major topics covered in the course**

Topic	Lecture Hours
Introduction to Programming Languages	3
Attribute Grammar and Static Semantics	1.5
Describing Syntax and semantics	1.5
Parsing	1.5
Attributes of Variables, binding, scopes	3
Data Types	4.5
Perl Introduction	1.5
Expressions Statements	1.5
Statement-Level Control Structures	3
Subprograms	6
ADT and Encapsulation Constructs	1.5

Topic	Lecture Hours
Object Oriented Programming	3
Functional Programming Languages	3
Logic programming and Prolog	3
Concurrency, Exception	3
Advanced topics: Programming Language Design	3
Totals	43.5

### **Social and Ethical Issues**

Economic issues in computing (2 hours).

Philosophical frameworks (2 hours).

### **Theoretical Content**

- Computer programming paradigms.
- Formal methods for computer program language specifications.
- Computer programming planning and cost estimation.
- Computer program verification and testing methodologies.
- Context-free grammars and (E)BNF notations.
- Programming language semantics.
- Prolog resolution.

### **Program Analysis**

Analyze programming paradigms including imperative, functional, logic, object-oriented. Explore various programming languages and algorithm options for developing software applications.

### **Solution Design**

This course requires students to design and develop a number of computer programs using contemporary programming languages.

### **Course Coordinator**

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Modified by Hong Wang

7/13/08

Modified by Weiqing Sun (Weiqing.Sun@utoledo.edu)

02/24/11

## Syllabus: CSET 4250

CSET	CSET Student Outcomes:	Course Outcomes	Assessment Methods
a	An ability to select and apply knowledge of computing and mathematics appropriate to the discipline. More specifically, 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.	Implement applications using programming techniques learned from this course.	Evaluation of programming assignments.
b	An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.	Solve technical problems on concepts of programming languages.	Evaluation of examinations, homework and programming assignments.
c	An ability to design, implement and evaluate a computer-based system, process, component, or program to meet desired needs. More specifically, an ability to apply design and development principles in the construction of software systems of varying complexity.		
d	An ability to function effectively as a member or leader on technical teams to accomplish a common goal.		
e	An understanding of professional, ethical, legal, security and social issues and responsibilities including a respect for diversity.		
f	An ability to communicate effectively with a range of audiences using a range of modalities including written, oral and graphical.		
g	An ability to analyze the local and global impact of computing on individuals, organizations, and society.		
h	Recognition and understanding of the need for and an ability to engage in self-directed continuing professional development.		
i	An ability to select and apply current techniques, skills, and tools necessary for computing practice.	Understand a broad range of concepts about programming languages, and be able to critically analyze language design features.	Evaluation of examinations, and homework assignments.
j	An ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes.		
k	A commitment to quality, timeliness, and continuous improvement.	Submit reasonable homework and project assignments on time.	Evaluate students' efforts in meeting deadline and continuous improvement on the submissions.

## Syllabus: CSET 4250

IT	IT Student Outcomes:	Course Outcomes	Assessment Methods
a	An ability to select and apply knowledge of computing and mathematics appropriate to the discipline. Specifically, an ability to use and apply current technical concepts and practices in the core information technologies. [IT-j]	Implement applications using programming techniques learned from this course.	Evaluation of programming assignments.
b	An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.	Solve technical problems on concepts of programming languages.	Evaluation of examinations, homework and programming assignments.
c	An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs. And, an ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems. [IT-k]		
d	An ability to function effectively as a member or leader on technical teams to accomplish a common goal.		
e	An understanding of professional, ethical, legal, security and social issues and responsibilities including a respect for diversity.		
f	An ability to communicate effectively with a range of audiences using a range of modalities including written, oral and graphical.		
g	An ability to analyze the local and global impact of computing on individuals, organizations, and society.		
h	Recognition and understanding of the need for and an ability to engage in self-directed continuing professional development.		
i	An ability to select and apply current techniques, skills, and tools necessary for computing practice. And an ability to effectively integrate IT-based solutions into the user environment. [IT-l]	Understand a broad range of concepts about programming languages, and be able to critically analyze language design features.	Evaluation of examinations, and homework assignments.
j	An understanding of best practices and their application. [IT-m]		
k	An ability to assist in the creation of an effective project plan. [IT-n]		