



Curriculum Proposal

Please type or select the requested information. Print completed forms, add appropriate paper attachments, and route through MSU's curricular process for recommendations and decisions.

College: Science, Engineering and Technology		<input checked="" type="checkbox"/> Undergraduate		Proposal #	214
Department: Computer Science		<input type="checkbox"/> Graduate		Effective Date of Change:	
Program: Computer Science		CIP # 11.010104		Academic Year	16-07
(For Office Use Only)					
Type of Change	COURSE PROPOSALS		Course Designator and Number	Number of Credits	
Proposed:	New Course				
Title Current:					
Title Proposed:	Concepts of Programming Languages		CS 370	3	
24-Char. Abbrev:	Concepts Program Lang		(if applicable)		

Include a course or program description for the Bulletin (30-40 words maximum for courses, 100 for programs):

Fundamental concepts of programming languages, including principles of language design, language constructs, and comparison of major languages. Topics: formal methods of examining syntax and semantics of languages and lexical analysis of language components and constructs, and propositional and predicate calculi.

Pre: CS 210

Fall

Rationale or Justification for change:

This is part of the CS program redesign and includes some material from the original COMS 370.

For General Education or Cultural Diversity Courses Only

General Education Course:		Cultural Diversity Course:	
GE Category #	GE Category Name (Maximum of 3 Categories)	(Please check one.)	
N/A		<input type="checkbox"/> Core (At least 75% devoted to topics of race, gender, sexual orientation, age, class, and disabilities as they occur in United States Society.)	
N/A		<input type="checkbox"/> Related (At least 25% devoted to the above topics or to a global perspective on topics related to African American, Asian, Hispanic, and Native American inhabitants of the United States.)	
N/A			
<p>7 For Writing Intensive Courses, attach a description of the kind and quantity of writing.</p> <p>7 For Upper Division Courses, include a description of the respects in which it is broad and general rather than narrow and specific, and so suitable as GE.</p> <p>Attach paper copies of the following:</p> <ol style="list-style-type: none"> Syllabus or course outline. Course's student learning outcomes associated with each GE competency or CD designation. List of strategies to be used to assess students' achievement of each GE competency or CD designation. 			

For New Courses

(Check all that apply):	Instructional Type:	Lecture	Course will be offered:
<input type="checkbox"/> Course is an elective.	Grading Format:	<input checked="" type="checkbox"/> Grade <input type="checkbox"/> P/N	<input checked="" type="checkbox"/> Fall Semester
<input checked="" type="checkbox"/> Course is required for program	Computer Science		<input type="checkbox"/> Spring Semester
<input checked="" type="checkbox"/> Pre- or Co-requisites:	Prerequisites: CS 210		<input type="checkbox"/> Summer Session
<input type="checkbox"/> Other courses are being changed or eliminated. (Explain.)			
<input type="checkbox"/> Course content or title is similar to courses in other departments. (Attach copy of letter of agreement with other program(s) contacted. Indicate the nature of the discussions and/or resolution of differences or potential conflicts.)			
Attach paper copies of the following:			
<ol style="list-style-type: none"> Syllabus or course outline. Course's student learning outcomes. A list of resources required to offer and support this course. A description of how teaching this course will affect department staffing. If 400/500 level course, an explanation of added expectations of graduate students. 			



Minnesota State University, Mankato
Curriculum Proposal

Signature Page

Department

Recommended (Category/ies _____)
 Not Recommended (Category/ies _____)

David J. Apple 10/17/00
 Department Chair Date

Comments:

College Curriculum Committee

Recommended (Category/ies _____)
 Not Recommended (Category/ies _____)

Karen C. Chau 11/2/06
 Committee Chair Date

Comments:

College Dean

Recommended (Category/ies _____)
 Not Recommended (Category/ies _____)

[Signature] 11/6/06
 Dean Date

Comments:

General Education Subcommittee

Recommended (Category/ies _____)
 Not Recommended (Category/ies _____)

 General Education Subcommittee Chair Date

Comments:

Undergraduate Curriculum and Academic Policy Committee

Recommended (Category/ies _____)
 Not Recommended (Category/ies _____)

[Signature] 1-31-07
 UCAP Faculty Chair Date

Comments:

Faculty Association Graduate Committee

Recommended
 Not Recommended

 Faculty Association Graduate Chair Date

Comments:

Graduate Dean

Recommended
 Not Recommended

 Graduate Dean Date

Comments:

Academic Affairs Council

Recommended (Category/ies _____)
 Not Recommended (Category/ies _____)

David J. Flannery 2/9/07
 Assistant Vice President Date

Comments:

Senior Vice President and Vice President for Academic Affairs

Approved (Category/ies _____)
 Not Approved (Category/ies _____)

[Signature] 2/13/07
 Sr. Vice President / Vice-Pres. Academic Affairs Date

Comments:

CS 370: Concepts of Programming Languages (3 credits)

Course Description:

This course is a study of the fundamental concepts of programming languages, including the principles of language design, language constructs, and comparison of various major languages. The course stresses formal methods of examination of the syntax and semantics of programming languages and lexical analysis of language components and constructs. In addition, the course includes a discussion of the propositional and the predicate calculi as a background for a study of functional and logic programming languages, as well as for a basic understanding of formal methods of program specification.

3 lecture hours per week.

Prerequisites: CS 210

Proposed Text:

Concepts of Programming Languages, seventh edition, Robert W. Sebesta, Addison-Wesley.

Supplementary Reading:

- 1) *Concepts in Programming Languages*, John C Mitchell, Cambridge University Press, 2003.
- 2) *Programming Language Concepts*, Carlo Ghezzi, Mehdi Jazayeri, 3rd edition, ISBN 0-471-10426-4

Schedule of Topics:

- 1) Evolution of Programming Languages (~1 wk)
- 2) Describing Syntax and Semantics (~1 wk)
- 3) Lexical and Syntax Analysis (~1 wk)
- 4) Names, Bindings, Type Checking, and Scopes (~1 wk)
- 5) Data Types (~1 wk)
- 6) Expressions and Assignment Statements (~1 wk)
- 7) Statement-Level Control Structures (~1 wk)
- 8) Subprograms (~1 wk)
- 9) Abstract Data Types and Encapsulation Constructs (~1 wk)
- 10) Support for Object-Oriented Programming (~1 wk)
- 11) Concurrency (~1 wk)
- 12) Exception Handling and Event Handling (~1 wk)
- 13) Functional Programming Languages (~1 wk)
- 14) Logic Programming Languages (~1 wk)

Student Outcomes:

Students who complete this course will be able to:

- 1) Discuss and describe the fundamentals of computer language design.
- 2) Show knowledge of the history evolution of the most important programming, including but not limited to Fortran, COBOL, LISP, Prolog, Ada, C++, ALGOL, BASIC, PL/I, SIMULA, and Java.
- 3) Be able to apply BNF as a methodology for describing program grammar and grammar attributes.
- 4) Show knowledge of programming language semantics, namely: operational, axiomatic, and denotational.
- 5) Be able to apply lexical and syntax analysis.
- 6) Understand and describe names, bindings, type checking, and scopes in the context of programming languages.
- 7) Understand and be able to explain the data types and expressions used in programming languages.
- 8) Have knowledge of and be capable of analyzing statements and statement-level control structures.
- 9) Understand and be able to explain the various types of subprograms.

- 10) Have knowledge of abstract data types and be able to create ADTs.
- 11) Be able to define and describe object-oriented programming languages, namely: Smalltalk, Java, and C++.
- 12) Apply and have knowledge of exception handling in PL/I, Ada, C++, and Java.
- 13) Grasp and explains the essential elements of formal specifications.

Grades will be assigned based on exams and assignments.

Required Resources & Departmental Staffing:

Resources currently in place within the department, the college, and the university library will support this new course. No new resources are required.

There is no impact on staffing requirements.