CURRICULUM PROPOSAL COVER SHEET
University-Wide Undergraduate Curriculum Committee

LSC Use Only		UWUCC Use Only
Number _____		Number _25 b_
Action _____		Action _____
Date _____		Date _____

I. TITLE/AUTHOR OF CHANGE

COURSE/PROGRAM TITLE _____ CO419 Software Development with Ada _____

DEPARTMENT _____ Computer Science _____

CONTACT PERSON _____ Dr. Katherine McKelvey x7994, x2524 _____

II. THIS COURSE IS BEING PROPOSED FOR:

__x__ Course Approval Only

_____ Course Approval and Liberal Studies Approval

_____ Liberal Studies Approval only (course previously has been approved by the University Senate)

III. APPROVALS

John A Cross
Department Curriculum Committee

Thomas P. Cunningham
Department Chairperson

Richard D. Roberts
College Curriculum Committee

William J Cale
College Dean*

not applicable
Director of Liberal Studies
(where applicable)

_____
Provost
(where applicable)

*College Dean must consult with Provost before approving curriculum changes. Approval by College Dean indicates that the proposed change is consistent with long range planning documents, that all requests for resources made as part of the proposal can be met, and that the proposal has the support of the university administration.

IV. TIMETABLE

Date Submitted
to LSC _____
to UWUCC January, 1990

Semester/Year to be
implemented _Fall 1990_

Date to be published
in Catalog _1990-91_

Revised 5/88

[Attach remaining parts of proposal to this form.]

Catalog Description

CD 419 Software Development with Ada

3c-01-3sh

Prerequisite: CD 310

Introduction to the Ada programming language as a tool of the software engineer. Projects will use the advanced programming constructs resident in Ada, including packages, multi-tasking, generic units, exception handlers and concurrent programming.

<center>COURSE SYLLABUS</center>

I. CATALOG DESCRIPTION

CO 419 Software Development with Ada   3c-01-3sh

Prerequisite: Co 310

        Introduction to the Ada programming language as a tool of the software engineer. Projects will use the advanced programming constructs resident in Ada, including packages, multi-tasking, generic units, exception handlers and concurrent programming.

II. COURSE OBJECTIVES

1. Students should know the role of Ada within software engineering.
2. Students should know how to use Ada packages to create abstract data types.
3. Students should know how to use generic program units to create reusable software components.
4. Students should understand the problems related to concurrent processes and how to control them with Ada tasks.

III. COURSE OUTLINE

Topic	Hours
1. Introduction to Ada's development and application	3
2. Standard data types and control structures	4
3. Blocks and subprograms	3
4. Packages	4
5. Exception handling	2
6. File handling packages	4
7. Library Units	2
8. Access Types and Dynamic Structures	3
9. Generic Program Units	4
10. Tasks	
a. Concurrent Processes	2
b. Synchronization and Communication	4
c. Examples	3
11. Ada Programming Support Environment	2

IV. EVALUATION METHODS

The final grade for the course will be determined as follows:

    50% Tests. At least two tests consisting of short essay questions and programming questions.

    50% Homework and Projects. At least six computer projects will be assigned. Projects will be graded on output and style. Short homework papers from the textbook problem sets will also be assigned.

V.   REQUIRED TEXTBOOKS, SUPPLEMENTAL BOOKS AND READINGS

Textbook: Watt, David A., Brian A. Wichmann and William Findlay, _Ada Language and Methodology_, Prentice-Hall, Englewood Cliffs, New Jersey, 1987.

Supplemental Book: _Reference Manual for the Ada Programming Language_, ANS1/MIL-STD-1815A-1983, United States Department of Defense, Washington, D. C., 1983.

VI.   SPECIAL RESOURCE REQUIREMENTS

No extra resources are necessary. The students will use the Ada compiler and the language sensitive editor now available on the VAX system. In the future, as more APSE tools are developed, it is recommended that additional software should be acquired. IUP should also obtain the Undergraduate Ada artifact from the Software Engineering Institute when it becomes available.

VII. BIBLIOGRAPHY

Beauman, Captain Roger and ILT Anthony Dominice, _Introduction to Software Engineering with Ada_, Ada Joint Program Office. Ada Software Engineering Education and Training Team.

Booch, Grady, _Software Engineering with Ada_, 2nd Edition, Benjamin/Cummings Publishing Company, Inc., Menlo Park, CA, 1986.

Booch, Grady, _Software Components with Ada, Structure, Tools, and Subsystems_, Benjamin/Cummings Publishing Company, Inc., Menlo Park, CA, 1987.

Cohen, Norman H., _Ada as a Second Language_, McGraw-Hill Book Company, New York, New York, 1986.

Cook, Captain David and LCDR Melinda Moran, _Advanced Ada Topics: Tasking and Generics_, 3rd Annual ASEET Symposium, Denver, Colorado, 1988.

Freedman, Roy S., _Programming with APSE Software Tools_, Petrocelli Books, Princeton, NJ, 1985.

Ichbiah, Jean D., John G. P. Barnes, Robert Fieth, and Mike Woodger, _Rationale for the Design of the Ada Programming Language_, Honeywell Systems and Research Center, Minneapolis, MN, 1986.

Young, S. J., _An Introduction to Ada_, second Edition, Halstead Press, New York, New York, 1984.

COURSE ANALYSIS QUESTIONNAIRE

A.   DETAILS OF THE COURSE

A1.   This course is primarily intended as a senior elective for Computer Science majors or minors. This course is not being proposed for inclusion in the Liberal Studies course list.

A2.   This course does not require changes in the content of existing courses.

A3.   This course follows the traditional approach of lecture courses in the Computer Science Department. Lectures are used to cover the course concepts while homework and projects are used to provide practical experience.

A4.   This course was offered as a Special Topics course during the Fall, 1987 and Fall, 1988 semesters.

A5.   This is not a dual listed course.

A6.   This course may not be taken for variable credit.

A7.   About 180 colleges and universities in the United States offer courses in Ada. The eleven higher education institutions in Pennsylvania which currently offer Ada courses include the University of Pittsburgh, Pennsylvania State University, Cheyney University of Pennsylvania, and Slippery Rock University.

A8.   The Department of Defense Directive Number 3405.2, March 30, 1987, "establishes DOD policy and prescribes procedures for using the Ada programming language".

Although a brief introduction to the Ada programming language could be included in a modern programming languages course or a data structures course, students would not have the time necessary to develop skills using all of the new and enhanced features of the language.

B.   INTERDISCIPLINARY IMPLICATIONS

B1.   This course is designed to be taught by one instructor.

B2.   No additional or corollary courses are needed with this course.

B3.   There should be no major duplication between the content of this course and the content of courses from any other department. Ada has been used as one of several languages discussed in CO 420 Modern Programming Languages. However, this is the only course, devoted entirely to the Ada language, which has been offered at IUP.

B4.   This course would not be appropriate for students in the School of Continuing Education.

C. IMPLEMENTATION

C1. The following resources will be needed for this course.

a. Faculty

No new faculty will be required to teach this course; however, this course will create an additional load on the present computer science faculty.

b. Space

This course will not require additional space.

c. Equipment

This course will make use of the Academic VAX computer, the Ada compiler and the language sensitive editor which are now available at IUP.

In the future, as more APSE tools are developed, it is recommended that additional software should be acquired. IUP should also obtain the undergraduate Ada artifact from the Software Engineering Institute when it becomes available.

d. Laboratory Supplies and other Consumable Goods

Students will use the ISCC line printers (paper and ribbons) in conjunction with their project accounts. No other supplies will be required.

e. Library Materials

Needed library materials are currently available.

f. Travel Funds

In order to keep up-to-date with the changes in the Ada language, it is recommended that the professor of the course attend at least one national Ada meeting per year.

C2. None of the resources for this course are funded by a grant.

C3. This course will be offered at most, once every year.

C4. One section of this course should be sufficient in any single semester.

C5. Each section of this course will be limited to twenty-five students. This is the limit that is generally used in the senior elective courses in the department.

C6. The Computing Sciences Accreditation Board recommends that upper division class size should not exceed thirty students.

C7. This course will be an elective which can be included in a student's 30 credits toward his major. It will not affect the number of free electives available to majors nor will it increase the 124-credit program of students in the department.

D. MISCELLANEOUS

No additional information is necessary.