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CURRICULUM PROPOSAL COVER SHEET
University-Wide Undergraduate Curriculum Committee

I. CONTACT

Contact Person Jim Wolfe Phone 7-6104

Department Computer Science

II. PROPOSAL TYPE (Check All Appropriate Lines)

X **COURSE** Internet Prog Java
Suggested 20 character title

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LIBERAL STUDIES
Rev.

X New Course* CO 304 Interactive Internet Programming with Java
Course Number and Full Title

____ Course Revision _____
Course Number and Full Title

____ Liberal Studies Approval+ for new or existing course _____
Course Number and Full Title

____ Course Deletion _____
Course Number and Full Title

____ Number and/or Title Change _____
Old Number and/or Full Old Title

_____
New Number and/or Full New Title

____ Course or Catalog Description Change _____
Course Number and Full Title

_____ **PROGRAM:** _____ Major _____ Minor _____ Track

____ New Program* _____
Program Name

____ Program Revision* _____
Program Name

____ Program Deletion* _____
Program Name

____ Title Change _____
Old Program Name

_____
New Program Name

III. Approvals (signatures and date)

Department Curriculum Committee — Department Chair

College Curriculum Committee — College Dean

+Director of Liberal Studies (where applicable) — *Provost (where applicable)

Interactive Internet Programming with Java

I. Course Description

CO 304 Interactive Internet Programming with Java 3c-0l-3sh

Prerequisites: CO110 or equivalent

An introduction to interactive Internet programming using Java. The focus is on writing platform independent multimedia applications that are useable across the Internet. Uses a write once, run anywhere approach while providing adequate security. Covers event based processing, multithreading, MIME file handling, exception handling, sandbox security, networking and component architectures.

II. Course Objectives

Students will:

1. Learn to program multithreaded applets to add functionality and interactivity to Web sites.
2. Discuss system and file security issues.
3. Explore event based processing models using the abstract windowing toolkit.
4. Develop and test reliable internet programs involving exception handling
5. Develop skill for managing packages and interfaces for networking and telephony

III. Course Outline

A. Introduction to Object Oriented Programming &Environment: 4 hours

- Overview of the language and environment.
- Installation of the Java Development Kit, an Integrated Development Environment and the code examples for the labs.
- Thinking in Objects: creating classes, attributes and methods: The API documentation
- How to Compile, Link and run simple programs and applets

B. Introduction to Java Basics. Review of Programming constructs. 8 hours

- Review of arithmetic operators, if statements, case statements and loops.
- Similarities and differences relative to C++ statements.
- Coverage of basics of inheritance and working with objects.
- Creating a simple class.
- Working with methods (functions). Syntax involved.
- Developing constructors.
- Use and need for overloading.
- Distinction between overloading and overriding.

C. Working with Java Applets, parameters, threads and sound. 5 hours

- Passing parameters to Applets;
- Use of threads to deal with parallel processors:
- Development of the start, stop, init, run, destroy methods
- Cover loading and manipulation of graphics files for animations.
- Techniques for reducing flicker; the use of double buffering

- Manipulating sound files, combining them with graphics

D. Managing simple events and interactivity: 4 hours

- The Event model.
- Dealing with mouse and keyboard events.
- Using a listener.

E. Creating User Interfaces with the AWT: 6 hours

- Overview of the AWT(Abstract Windowing Toolkit):
- Components: Buttons, checkboxes, pulldown lists, combos.
- Containers: Canvas, panels, Frames, Windows, Dialog boxes
- Layouts: managing components in containers.
- Handling interactions and events in multiple windows with Listeners.

F. The I/O Model- Streams and Pipes: 6 hours

- The I/O model and its 56 pipes.
- Security issues with file access.
- Opening files across the internet.
- Use of compression through jar files.
- Network classes -client server connections. E.g. Chat

G. Overview of Advanced Developments: Possible topics 6 hours

- Exception handling
- Java Beans: Component architecture model.
- Telephony
- JDBC (Java Data Base Connection)
- Swing set: standardized set of interface components

H. In-class Examinations 3 hours

IV. Evaluation Methods

1. Classroom and lab activities -30%. There will be weekly graded projects involving hands-on programming in Java in the lab or developing algorithms and pseudocode in the classroom. The points earned in these activities cannot be made up if the student misses the class. Outside class readings are required in association with these activities.

2. Homework: 30%. Students will have 5-6 programming assignments to complete outside of class time.

3. Quizzes and exams. 40%. Students will be evaluated on their understanding of the concepts presented using short essay questions on the readings and class material.

4. Grading Scale. The standard grading scale will be used.90%+ =A; 80-89%=B; 70-79%=C; 60-69%=D; <60%=F.

V. Required Textbook:

Lemay, Laura and Rogers Caldenhead. *Teach Yourself Java 1.2 in 21 Days*. Indianapolis, IN: Sams Net, 1996.

Alternate texts:
Bruce Eckel. *Thinking in Java*: the definitive Introduction to Object Oriented Programming in the Language of the World Wide Web. Upper Saddle River, NJ: Prentice-Hall, 1998

Deitel and Deitel *Java: How to Program.* . Upper Saddle River, NJ: Prentice Hall, 1997

VI. Special Resource Requirements

Each student will be expected to supply two HD diskettes and to carry out their homework either on their own PC or in the public labs. A Zip disk will be recommended.

VII. Bibliography

Bishop, Judy. *Java Gently: Programming principles explained.* Reading, MA: Addison-Wesley, 1997
Courtois, Todd. *Java Networking and Communications.* Upper Saddle River, NJ: Prentice-Hall. 1998.
Deitel and Deitel. *Java How to Program with an Introduction to J++.* Upper Saddle River, NJ: Prentice-Hall, 1997
Enete, Noel. *Java Jump Start.* Upper Saddle River, NJ: Prentice Hall, 1997
Flanagan, David. Java in a Nutshell: a Desktop Quick Reference. 2nd edition. Cambridge, MA: O'Reilly Press, 1997.
Geary, David. *Graphic Java.* Palo Alto, CA: Sun Microsystems Press, 1997
Horton, Ivor. Beginning Java. Birmingham, UK: Wrox Press. 1998.
Hume, J.N. Patterson and Christine Stephenson. *Programming Concepts in Java* Toronto, Ontario: Holt Software Associates, 1998
Ince, Darrel and Adam Freeman. *Programming the Internet with Java.* Reading, MA: Addison-Wesley, 1997
Jackson, Jerry and Alan McClellan. *Java by example.* Palo Alto, CA: Sun Microsystems Press, 1998
Lewis, John and William Loftus. *Java Software Solutions.* Reading, MA: Addison-Wesley, 1998
Linden, Peter van der. *Just Java.* 3rd edition Palo Alto, CA: Sun Microsystems Press, 1997
Turner, E. Shane. *Java Programming Basics for the Internet.* Boston, MA: South-Western Educational Publishing, 1997

Web sites:

- The Original Sun Java site
- The Gamelan collection of Java applets
- University of Washington Java site
- Hidaho JAVA site
- C2 Java Scripts

Undergraduate Course Analysis Questionnaire:

Section A. Details of the Course

A1.How does this course fit into the programs of the Department? For what students is the course designed?

This course has been designed as a second-level programming course to expose our upper level students to developing Web-based interactive programs that address multimedia issues and utilize parallel processing. These topics are not covered in other courses. The students also need exposure to a language that that can be used to deliver interactive database content over the Web with reasonable security. This course is distinct from our two primary programming classes (CO 110 and CO 310) in terms of language and environment used and purpose of programs being written.

A2. Does this course require changes in the context of existing courses or requirements for a program?

This course does not require changes in the content of existing courses. Rather, it provides a different focus from the existing computer courses. As our discipline has evolved and Internet usage has exploded, our students are expected to program secure multimedia applications that can be delivered on the Internet across many platforms.

A3.Has this course ever been offered at IUP on a trial basis? If so explain the details of the offering.

This course has been offered as a special topics course in the Computer Science Department twice already with various modifications.

A4. Is this course to be a dual-level course?

Approval is being sought for dual listing CO 304 as CO 504 so that the course can also be offered in a proposed master's degree in technology management.

A5. If this course is being offered for variable credit, what criteria will be used to relate the credits to the learning experience of each student?

No variable credit listing is being sought.

A6. Do other higher education institutions currently offer this course? If so please list examples.

Other higher education institutions currently offer Java Programming. The use of Java is debated at SIGSE conferences sponsored by the Association of Computing Machinery. Courses are being offered by Washington University and University of Chicago among others.

A7. Is the content or are the skills of the proposed course, recommended or required by a professional society, accrediting authority, law or other external agency?

Not yet, although it is accepted as a language suitable for teaching Computer Programming courses.

Section B: Interdisciplinary Implications

B1.Will this course be taught by one instructor or will there be team teaching?

This course will not be team-taught. One instructor will teach each section.

B2.What is the relationship between the content of this course and the content of courses offered by other departments?

This course does not overlap with any other course being taught by other departments. Letters of support are attached from the MIS and Office Systems departments.

B3. Will seats in this course be made available to students in the School of Continuing Education?

Seats will be made available to Continuing Education depending on lab availability.

Section C. Resources

C1. Are faculty resources adequate?
No additional faculty are being requested. It is anticipated that this course will serve as an upper level elective. Course offerings of elective courses will be adjusted to accommodate sections of this course. It reflects the changing needs of our discipline.

C2. What other resources will be needed to teach this course and how adequate are the current resources?
We expect to offer hands-on closed labs in this course; the lab to do this is available (Stright 220). The Java development kit needed for this language is available for free from Sun. The entire course can be taught with this tool and no other; copies of the kit need to be installed in public labs for students to access it. It is desirable to have a modern Integrated Development Environment. One can be purchased for $49 a copy; approximately 30 copies need to be purchased and installed in the public labs. (If two sections of the course are offered, 50 copies are needed.)

a) Access to Internet is being provided at no cost in all public labs on campus. An Internet browser is being supported by a site license by the TSC.

b) Students have access to the College lab in Stright 220 for the closed lab sessions.

C3. Are any of the resources for this course funded by a grant?
We have not obtained funding from a grant.

C4. How frequently do you expect this course to be offered?
We expect to offer one or two sections per year as demand warrants.

C5.How many students do you plan to accommodate in a section of this course? Is this planned number limited by the availability of any resources?
Class size will be limited due to the number of machines available in the labs and to make it possible to manage the hands-on and programming assignments.

C6. Does any professional society recommend enrollment limits for a course of this nature?
No professional society has set limits at this time.

Section D. Miscellaneous.

Rationale: Computing technology and the demands being made are changing rapidly. Programming languages have to evolve to stay current. Java is a modern programming language that uses object-oriented programming concepts and provides many new classes to cope with the Internet. We do not currently teach any courses about developing platform independence for the Internet or security or parallel processing. This course begins to meet these needs.

IUP

Indiana, Pennsylvania 15705

Date: December 16, 1998

Subject: Letter of Support for Computer Science Curriculum Proposals

To: Dr. William Oblitey, Chair, Computer Science Department
Mr. James Wolfe, Computer Science Department

From: Kenneth L. Shildt, Chair, MIS and Decision Sciences Department KLS
Elizabeth M. Pierce, MIS and Decision Sciences Department EMP

The MIS and Decision Sciences Department supports the course proposals for CO/IM 352 Local Area Networks Design and Installation as it is being proposed as a course for Computer Science, Office Systems, and MIS majors. This course, along with CO/IM 354 Local Area Networks Administration, will enable students majoring in the area of Information Technology to gain knowledge, which will undoubtedly enhance their professional career preparation.

The dual-listing of these courses demonstrates a spirit of cooperation in the planning and implementation of curriculum which should result in more efficient utilization of the University's resources as well as more flexibility in the scheduling of courses by the majors.

The ability to share the special purpose networking lab located in the Eberly College of Business has the full approval of the MIS Faculty and Dean Robert Camp. A scheduling model will be developed by the Departments to insure that each version of the proposed courses will be given equitable delivery.

The MIS and Decision Sciences Department also supports the course proposal for CO 304 Interactive Internet Programming in JAVA. This course will enable both MIS and Computer Science majors who have had the prerequisite CO110 to learn how to write applications for the Internet. Such skills are currently in high demand in the job market and the offering of this course will benefit both our students and the organizations that recruit our students.

In addition to the new courses listed above, the Computer Science Department listing of a revised set of courses which may be utilized as controlled electives by its majors is strongly supported by the MIS and Decision Sciences Department. The interaction of Computer Science and MIS majors in classes will provide for a continuing dialogue between the Departments and result in a stronger set of courses for both majors to schedule.

IUP

Indiana, Pennsylvania 15705

TO: William Oblitey, Chair
Computer Science Department

Jim Wolfe, Curriculum Committee Chair
Computer Science Department

FROM: Wayne Moore, Chair
Office Systems and Business Education Department

Cathleen Golden, Curriculum Committee Co-Chair
Office Systems and Business Education Department

DATE: December 15, 1998

SUBJECT: CO 304, CO/IM 352, and CO/IM 354 New Course Proposals

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The Office Systems and Business Education department faculty have reviewed the course proposals for CO 304, Interactive Internet Programming in JAVA, and CO/IM 352, LAN Design and Installation. CO/IM 354, Advanced Topics in Local Area Networks, is still under review. The following is a statement of our position.

The Office Systems and Business Education department supports CO 304 and CO/IM 352. We feel they are excellent courses and provide necessary coverage in the technology field. We would like our students to be able to take both courses. CO 304 is problematic in that regard since it has a prerequisite of CO 110 which our students are not likely to have taken. We ask, therefore, that the prerequisite be stated as CO 110 or equivalent to allow our students to enroll in the course.

The spirit of cooperation among the departments that led to the development of these courses strengthens our departments' programs. If you would like to discuss this further, please contact us.

c: Robert Camp, Dean, Eberly College of Business
Ken Shildt, Chair, MIS and Decision Sciences