

CASPER: A Hypermedia Departmental Information System

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ABSTRACT:

In this paper we discuss the design and development of CASPER (Computer Assisted Studies Planning and Educational Resources). CASPER is a hypermedia information system which allows students to find up to date information on courses, instructors, announcements, transfer credit, and frequently asked questions. One of the most important features of CASPER is its capability to assist students in planning their course selections for future terms.

Because CASPER is an on-line system, additional human counselors are free to deal personally with students on less routine matters.

1 Introduction

It is important for university students to have information on their department. This information should be up to date, and easily accessible and digestible. When students have a question, they should have the means to find their own answers.

Printed material such as the Schedule of Classes describing when and where courses will be taught this term and the Course Bulletin describing all the courses offered by the department are very useful, but are only updated once a term, or once a year. Augmenting this printed material with an interactive computerized information system allows the student to get up to date information, not only about the current term, but about current plans for future terms. The information system can also provide current information on each of the instructors, and current information about courses at other universities which can transfer credit to the department. With all this information available, the computerized information system can assist the student in planning their course selections for future terms.

As well as information on courses and instructors, the students need a central location to find information about activities in the department such as speakers, presentations, and events. This allows the student to become more actively involved in the department.

Making all this information available on line saves on printing costs, and frees up the human counselors to deal with less routine matters. We want to stress that CASPER is not meant to replace human counselors, but to augment them. CASPER allows a counselor to assist students beyond their office door and beyond their work day.

To satisfy this need in our department we designed and implemented a hypermedia [2][4][6] information system called CASPER [3]. CASPER stands for "Computer Assisted Studies Planning and Educational Resources" and has been implemented on a Macintosh computer using an Oracle database and a Hypercard interface.

Section 2 discusses our implementation of CASPER. Section 3 discusses the interfaces to CASPER. Section 4 discusses the reactions to CASPER. Section 5 discusses our planned enhancements to CASPER. Finally, Section 6 gives our conclusions.

2 Implementation

CASPER can assist a student in finding the following information:

- Courses - when and where each course is being taught, a sample syllabus for the course, and who the instructors will be for the next several semesters.
- Instructors - where their office is located, their phone number, their research interests, what courses they are teaching, and video of the faculty members introducing themselves.
- Announcements - when and where events will be taking place in the department.
- Departmental Map - where all the offices and labs are located.
- Frequently Asked Questions - answers to those questions the students most commonly ask the counselor.
- Equivalent Courses - information on courses offered at other schools that can be transferred to our department.
- Plan of Work - tools to help a student plan which courses they will take for the next several semesters.

CASPER can assist the faculty and staff by acting as a central storage location for the following information:

- Upcoming Courses - when and where each course will be taught and who will be teaching the course for the next several semesters.
- Equivalent Courses - information on courses offered at other schools that can be transferred to the department, making future decisions on new equivalent courses easier.

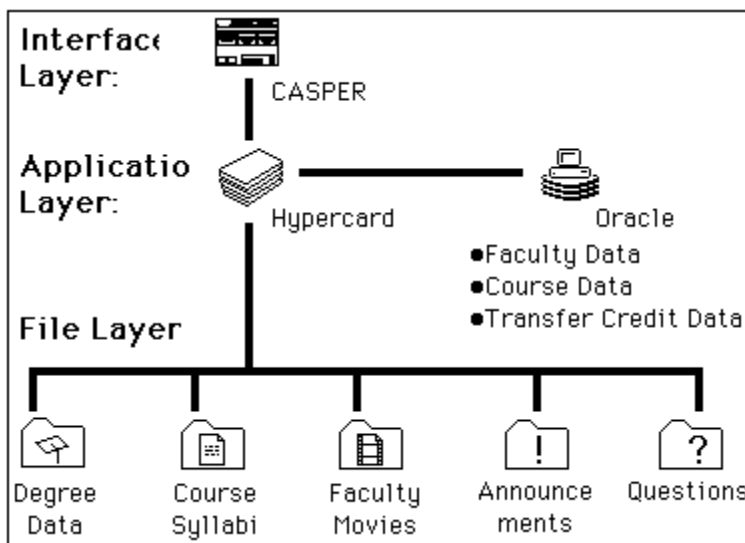


Figure 1: CASPER Overview

The CASPER software includes an Oracle database [5], a Hypercard [1][7] interface, and Quicktime movies as shown in Figure 1. The CASPER hardware includes a Macintosh IIfx with a 13" colour monitor, a mouse and a laser printer.

Oracle is used to store information about the faculty members, courses, and transfer credits. CASPER was designed to be modular, with the data accessible from multiple machines. Using Oracle as the underlying database allows us to easily move the information between Oracle databases on multiple platforms. It also allows us to write interfaces to the database on multiple hardware platforms, each accessing the common Oracle database.

Hypercard is used to interlink, and display this information. Hypercard with full colour enhancements allows us to quickly and easily generate interfaces to the data, test them and make modifications. As quicktime, and a runtime version of hypercard are included with all new Macintoshes this software gives us a high degree of compatibility with little cost.

3 Interfaces

Separating the data and the interface allows us to write several interfaces to access and modify the data. We have currently created two interfaces, the student interface, and the department interface. Both interfaces were created using Hypercard with colour enhancements.

The student interface is broken into 6 interlinked primary areas:

- Courses
- Faculty
- Transfer Credit
- Plan of Work
- Departmental Information
- Frequently Asked Questions

We want CASPER to have a friendly interface that makes the system fun to use as well as informative, so the students are encouraged to explore what is available in CASPER. The student navigates through the information using the mouse only, no keyboard is necessary. Using colour in CASPER gives the student a simple rule for navigating through the system: "if its yellow, you can click on it."

The system features general help to get a new user started with the system, and optional context sensitive help, in the form of help balloons, to assist the user while they are working with the system. Each screen also has a tour guide informing the user what their options are on that screen.

3.1 Main Menu

The main menu is shown in Figure 4. From the main menu the student can move to one of the six primary areas of the information system. The student can also get general help on CASPER from here.

CASPER is designed to be left running constantly; so it includes a built in screen blanker which activates after 15 minutes of idle time. When a new user sits down at CASPER and moves the mouse, the system starts them at the main menu.

The following six sections (3.2 through 3.7.) discuss the information available to the student in each of the six primary areas of the system. Section 3.8 discusses the departmental interface to the data.

3.2 Courses

Information on an individual course is shown in Figure 5. General information on the course (from the Course Bulletin) is given. The times and instructors for the course in the current term (from the Schedule of Classes) and the next term are shown. The student can also see a sample syllabus for the course.

CASPER improves on the printed version by allowing links to other information. If the student wishes more information on the faculty member teaching the course, he can click on an instructor's name (e.g. Farshad Fotouhi) and see information on that instructor as shown in Figure 6. If the student wishes to see what other courses are offered in a particular term he can click on a term (e.g. Fall, 1993) and see a complete list of courses offered that term as shown in Figure 7.

Information on an individual term is shown in Figure 7. This screen gives all the information available in the Schedule of Classes for the courses offered by our department. This includes days, times, rooms, and instructors shown in the same form as in the printed document. CASPER improves on the printed version by allowing links to other information.

By clicking on a particular instructor more information about that person will be displayed as shown in Figure 6. By clicking on a particular course (e.g. CSC-203 Computer Science 2), more information about that course will be displayed as shown in Figure 5.

3.3 Faculty

A pictorial list of the instructors is shown in Figure 8. If the student wants information on a particular faculty member they can either find it based on that faculty member's name, or their face from a full colour picture. Similar information screens exist for the teaching assistants and the staff members.

Clicking on a faculty member (e.g. Fotouhi) brings up information on that faculty member as shown in Figure 6. This includes their name, title, phone number, office number, lab number, research interests, and teaching assignments for the current and future terms. The student can play a short full colour movie (10 to 15 seconds) of the faculty member giving a brief introduction and a short description of their research interests. This allows the student to see and hear the faculty member (albeit briefly.)

Faculty offices and research labs can be located by clicking on the faculty member's room number or lab number (e.g. 414.) A map of the department will then be displayed as shown in Figure 13.

If the student wishes more information on the course that this faculty member is teaching she can click on a course (e.g. CSC-203) and see information on that course as shown in Figure 5. If the student wishes to see what other courses are offered in the current and future terms she can click on a term (e.g. Fall 1993) and see a complete list of courses offered that term as shown in Figure 7.

3.4 Transfer Credit

Information on transfer credit for equivalent courses is shown in Figures 9 and 10.

If a student wants to know which courses from a particular university transfer to this department she can select the university, and then the department in that university. This brings up a list of courses at that department that have been evaluated for transfer credit as shown in Figure 9. Clicking on one of these courses brings up information on that course from that university's Course Bulletin. This is useful for a student who is interested in transferring from another university. The student can select their previous university and department, and see which of their previous courses will transfer to this department, and what credit they will receive for them.

If a student wants to know which universities have a course equivalent to a course at this university he can select the local department and course. This brings up a list of equivalent courses at other universities as shown in Figure 10. Clicking on one of these courses brings up information on that course from that university's Course Bulletin. This is useful for a student who wants to take a certain course this term but finds our department is not offering the course this term, or they have a scheduling conflict. The student can use this equivalent course information to find an equivalent course at a another university that they may be able to attend this term instead.

3.5 Plan of Work

Using the information in the system about which courses will be offered in the upcoming terms, CASPER can aide the student in creating their plan of work for the next few terms. A student can enter information about the courses she has previously taken, and the grades she has received; CASPER will show the student what courses they are eligible to take in each future term. This allows a student to incrementally build up their plan of work based on actual information about courses being offered in future terms.

Information on past terms is entered and displayed as shown in Figure 11. All of the courses offered by the department are displayed graphically on the right. Introductory courses are shown at the top, more advanced courses towards the bottom. Connecting lines show which courses are prerequisites. The required courses for this student's selected degree are shown in red. Passed courses are shown in green (actually, the red is yellow-red, and the green is blue-green to allow colour blind users to work with the system.) As the student progresses through their degree requirements, his required courses will turn from red to green. All of the courses that a student is required to take are shown textually on the left. The student enters information on terms, years, and grades received via pop up menus so only the mouse is needed, and there is no possibility of typing mistakes.

Once the student has entered information on his past courses, CASPER can help him plan his future terms as shown in Figure 12. Using information on which courses the student has already taken, CASPER shows which courses remain to be scheduled. Using the information about which courses are going to be offered in future,

CASPER allows the student to move term by term into the future scheduling courses. The student can see which courses are going to be offered and what times they will be offered.

Once the student has created her plan of work, she can print it out and save it onto her floppy disc. She can show the printout to the counselors, and keep it as a permanent record of her decisions. With the floppy disc, the student can return to the system at a future date and update her plan of work starting from where she left off. For security reasons the student's data is not stored in CASPER. Each student keeps their own data on their own floppy disc. This way no student can access another student's information through CASPER.

3.6 Departmental Information

A map of the department is shown in Figure 13. This full colour map shows where all the offices and labs are located in relation to CASPER (the .) Clicking on an office or lab (e.g. 414) gives a list of the occupants of that room. Clicking on one of these instructors (e.g. Assistant Prof. Fotouhi) brings up information on that person as shown in Figure 6.

Other departmental information includes a list of phone numbers, FAX numbers and announcements about upcoming events.

3.7 Frequently Asked Questions

A list of frequently asked questions and their answers is maintained. These are the questions that are most often asked of our counselors, and the answers that they provide.

3.8 Department Interface

The department has a similar Hypercard interface to the database using both the mouse and keyboard. With this interface an authorized member of the department can enter, modify, delete, or print out entries in the Oracle database. This allows the staff to print out lists of faculty members and their offices and phone numbers, or a list of courses offered each term, or the list of courses that are equivalent to a given course. This interface is stored separate from the student interface, allowing the staff to modify each of them independently.

Information can either be entered through the keyboard for new information, or through a pop up menu of existing information. As the power of CASPER comes from the interlinking of the information it contains, it is very important that the entered information be correct. Minimizing data entry errors has been a major focus of our development efforts. One of the screens from the Department Interface is shown in Figure 14. The user is entering information on a new faculty member and is given a menu of titles to choose from.

Other information, such as the list of announcements, are stored in simple text files so that any member of the staff with simple word processing experience can update them. This helps get faculty and staff members involved in the CASPER development process, and in keeping CASPER's information current.

4 Reaction

In February, 1993 CASPER was placed in our department's main office and made available for student use. Anyone can sit down in front of CASPER and begin playing with it. CASPER is always left running.

Prior to the introduction of CASPER, a frequent complaint of the students was that they did not have adequate access to information about the department that they needed. Although much of this information was available in printed form on an information rack in the department, students did not often make use of this facility. Rather than search through a large collection of pamphlets and brochures to find what they needed, students would often prefer to wait in line to see the advisor. This was not an efficient use of the advisor's time, and resulted in a level of service to the students that was less than desirable. This problem has been significantly alleviated by the installation of two CASPER workstations in the departmental office.

In order to obtain some direct feedback from the students on the general usability and value of CASPER, a survey of the students in two introductory computer science classes was conducted. These 70 students were given a class assignment to explore CASPER for a half-hour session, using it for whatever purpose they chose. After completing their session, they were asked to answer two questions; one regarding the ease of use of CASPER, and another regarding its value to themselves personally. The students were given no instructions on the use of the system.

Student responses to the questions are shown in Figures [2](#) and [3](#).

65% CASPER is easy to learn how to use with no prior introduction
28% A brief introduction to CASPER would have been helpful
7% A prior training session is necessary

Figure 2: Ease of Use of CASPER

65% CASPER will be very helpful to me
35% CASPER will be somewhat helpful to me
0% CASPER will be of little or no help to me

Figure 3: Value of CASPER to the Student

An open discussion of the system was held in each class after all the students had completed their sessions. The clear message from the students was that the features provided by CASPER were ones that met some of their important information needs, and they were very pleased that the department was taking an innovative step in this direction. Students also gave many suggestions on how the system could be improved and expanded, and each will be considered for adoption in the near future.

Student reaction has been an important factor in the development of CASPER. Since CASPER was designed to help the students, they have been intimately involved in the development process. Early prototype versions of CASPER were constantly being used (and abused) by typical students to get their reactions, and comments. These comments were then used to make changes to the interface, and the process was repeated. We are still listening intently to the student's comments, and using them to plan future enhancements.

The use of CASPER for transfer credit evaluations has resulted in two important improvements. One is that the time required to respond to student requests for evaluation of transfer credits has been significantly reduced. Timing is often critical from the viewpoint of the student, particularly when decisions with regard to registration for classes have to be made. A second improvement is in relation to the appropriateness of the evaluation itself. A course taken at another educational institution cannot be evaluated in isolation, but must be looked at in the context of the entire curriculum of that institution. Having all the required information readily accessible on CASPER provides us with an effective tool for making the best evaluation possible.

5 Future Work

CASPER is a constantly evolving system. Currently we are working to expand access to CASPER. Now CASPER is a stand-alone, single user system. We are working on a local area network version of CASPER and a Netscape front end to the system. In the Internet version of CASPER, students can send email messages to the faculty and departmental advisors. We also intend to have courses taught on the Internet, in addition to current database of course syllabi.

6 Conclusions

The reactions of all those involved with CASPER has convinced us that this kind of accessible, easy to use, computerized information system can be a great benefit to the students, faculty, and staff of our department, and other departments. Compared to paper documents, it has made more information available, organized that

information more effectively, and presented it more conveniently.

Using a modular approach with Oracle as the underlying database has allowed us great flexibility in designing the current interfaces, and gives us many possibilities for future enhancements. Using Hypercard as our interface has allowed us to create a very convenient interface that can be easily modified to take advantage of user's suggested improvements.

Involving students early in the development process allowed us to create an easy to use system that truly addressed their information needs. We believe this is the major reason for the success of CASPER.

Acknowledgments

We would like to thank the students who participated in the evaluation of CASPER. We would also like to thank the reviewers for their valuable comments.

References

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- 3 A. Johnson, F. Fotouhi, N. Goel, R. Weinand, and J. Lechvar. ``CASPER: A hypermedia departmental information system." In *Proceedings of ED-MEDIA 94*, Vancouver, Canada (June 1994), 658.
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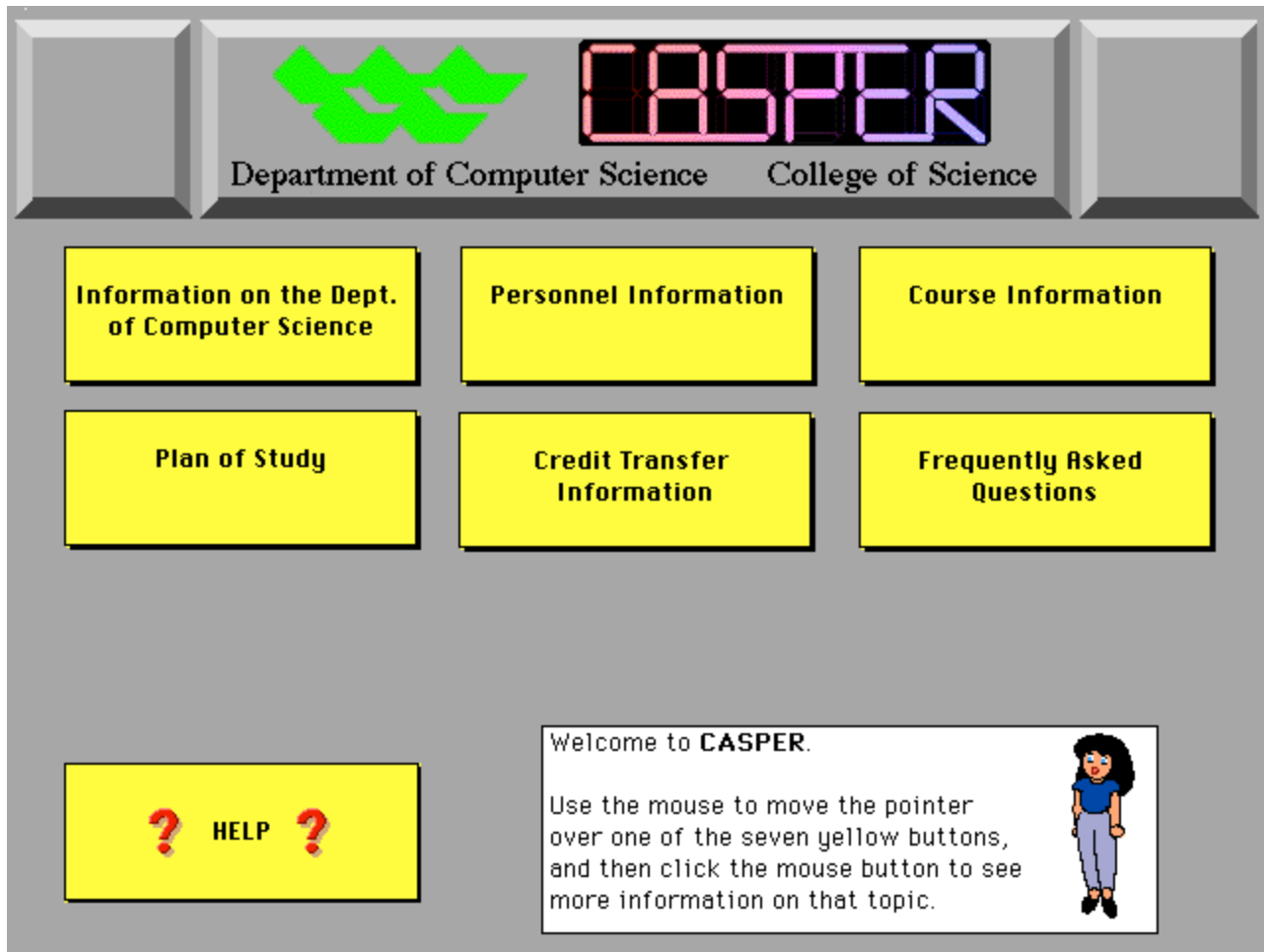


Figure 4: "Main Menu" Screen

Course


Course #

Course Name

Description

Click on an Instructor to see more information about that Instructor.

Click on "Show Syllabus" to see a more detailed description of the course.



Lecture Hours

Lab Hours

Credit Hours

Term	Section	Time	Days	Room	State	Instructor
Spring/Summer, 1993	73832	5:30-7:35T&S	5:30-6:35Th	106	STATE	"Suzanne Jennings"
	73833 D	6:40-7:35PM	Th	106	STATE	"Gurmeet Singh"
Fall, 1993	73918	1:25-2:50PM	TTh	131	STATE	"Farshad Fotouhi"
	73919 D	3:00-3:55PM	T	308	STATE	"Imran Ahmad"
	73924 D	3:00-3:55PM	Th	308	STATE	"Imran Ahmad"
	73928	5:30-7:20PM	MW	128	STATE	"William I. Grosky"

Figure 5: "Course" Screen

Faculty Member

Assistant Prof.



Farshad Fotouhi

Play Movie

Research Interests

Database management systems, distributed database systems, knowledge-based systems, parallel processing, object-oriented databases, multimedia databases.

Office 438

Office Phone (313)577-3107

Lab 414

Office Hours

Click on "Play Movie" to see and hear Farshad Fotouhi.

Click on the Office or Lab to see where that room is located.

Click on a Course to see more information on that course.



Teaching Assignments

Spring/Summer, 1993

csc-506 73902	4:00-7:00PM W	1500 ENGG.
csc-506 95723	4:00-7:00PM W (Th)	FHC-Dearborn
csc-511 95728		FHC-England

Fall, 1993

csc-203 73918	1:25-2:50PM TTh	131 STATE
csc-871 74134	4:30-7:20PM T	400 STATE

Main Menu



? Turn Help On ?

Go Back to "Faculty Members"

Figure 6: "Instructor" Screen

Courses Offered By Term

Term

Spring/Summer	1994	↑
Winter	1994	□
Fall	1993	↓

Fall, 1993

Click on a Term for more information on that term.
Click on a Course for more information on that Course.
Click on an Instructor for more information on that Instructor.



csc-203 Computer Science 2					
73918	1:25-2:50PM TTh	131	STATE	"Farshad Fotouhi"	↑
D 73919	3:00-3:55PM T	308	STATE	"Imran Ahmad"	□
D 73924	3:00-3:55PM Th	308	STATE	"Imran Ahmad"	↓
73928	5:30-7:20PM MW	128	STATE	"William I. Grosky"	↑
D 73929	7:30-8:25PM M	308	STATE	"Elena Zammoni"	□
D 73934	7:30-8:25PM W	308	STATE	"Cancelled"	↓
csc-206 Introduction: FORTRAN					
73939	10:40-11:35AM MWF	28	COHN	"Eyad Hajeer"	↑
csc-210 Introduction: COBOL					
73944	11:45AM-12:40PM MWF	306	STATE	"Michael Cavaretta"	↑
csc-314 Information System Design: COBOL					
73949	12:50-1:45PM MWF	128	STATE	"Andrew E. Johnson"	↑
csc-371 Data & File Structures					
73954	9:35-11:25AM TTh	106	STATE	"Joao Silva"	↓

Main Menu









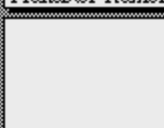


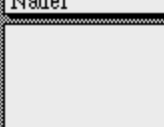






? Turn Help On ?


Go Back to "Course Information"


Figure 7: "Courses Offered By Term" Screen

Faculty Members

 Conrad	 Korel	 Reynolds	 Wolfson
 Fotouhi	 Manaster-Ramer	 Sabata	
 Goel	 Nadel	 Sethi	
 Grosky	 Rajlich	 Tsao	
 Iwanska	 Rana	 Weinand	

Click on a Faculty Member to see more information about that Faculty Member



Main Menu 

? Turn Help On ?

Go Back to "Personel Information"

Figure 8: "Faculty" Screen

Equiv. Courses at WSU

University Name

University of California
University of Kentucky
University of Maryland Univ. Coll.
University of Michigan, Ann Arbor
University of New Mexico
University of South Alabama
University of Toledo
Vincennes University
Washtenaw Community College
Wayne County Community College

University of Michigan, Ann Arbor

Department Name

Computer Science

Click on a Course
to get more
information about
that Course



Computer Science

Course #

Course Name

Equivalent WSU Courses

Course #	Course Name	Equivalent WSU Courses
cs-183	Elementary Programming Concepts	csc-100 csc-101
cs-280	Programming and Intro Data Struct	csc-203
cs-303	Discrete Structures	mat-186 mat-187
cs-380	Data Structures and Algorithms	csc-371
cs-476	Foundations Of Computer Science	csc-450

Main Menu



? Turn Help On ?

Go Back to "Credit Transfer Information"

Figure 9: "Equivalent Courses at WSU" Screen

Equiv. Courses Elsewhere

Wayne State Univ. Department Name

Computer Science
Mathematics

Computer Science

Course # Course Name

csc-203 Computer Science 2
csc-206 Introduction: FORTRAN
csc-210 Introduction: COBOL
csc-314 Information System Design: COBOL
csc-371 Data & File Structures
csc-441 Computer Organization
csc-442 Computer Operating Systems
csc-450 Intro. to Theoretical Computer Science
csc-451 Computer System Architecture
csc-513 Introduction to Information Systems

Click on a Course
to get more
information about
equivalent Courses
at other Universities



Courses Equivalent to csc-203 Computer Science 2

University	Department	Course
California State University	Computer Science	cs-2500 Computer Programming 2
George Mason University	Computer Science	cs-211 Computer Science 2
Hawaii Pacific University	Computer Science	csai-201 Intermediate PASCAL
Highland Park Community College	Computer Information Tech.	cit-180 Data Structures
Hillsdale College	Computer Science	cnp-201 Computers Programming II (PASCAL)
Lake Superior State University	Computer Science	cs-162 Introduction to Computer Science II
Michigan Technological University	Computer Science	cs-211 Introduction to Data Structures
Oakland Community College	Computer Information Systems	cis-281 Data Structures
Oakland University	Computer Science & Engineering	cse-262 Data Structures

Main Menu



? Turn Help On ?

Go Back to "Credit Transfer Information"

Figure 10: "Equivalent Courses Elsewhere" Screen

Past Terms

Bachelor of Science in Computer Science

MAT 186	Fall	1992	B	↑
MAT 187	Winter	1993	A	□
MAT 201	Fall	1992	C	□
MAT 202	Fall	1993	?	□
MAT 203	?	?	?	□
MAT 221	Spring/Summer	1993	?	□
MAT 225	?	?	?	□
CSC 102	Fall	1992	A	□
CSC 203	Winter	1993	A	□
CSC 371	Spring/Summer	1993	?	□
CSC 441	Fall	1993	?	□
CSC 442	?	?	?	□
CSC 450	?	?	?	□
CSC 451	?	?	?	□
ELECTIVE > 210	?	?	?	□
ELECTIVE > 210	?	?	?	□
ELECTIVE > 210 CSC314	Spring/Summer	1993	?	□
ELECTIVE > 510	?	?	?	□

Click the mouse button on a course, year, term, or grade to change its value.

Required courses are shown in red.
Passed courses are shown in green.

Main Menu

? Turn Help On ?

Go Back to "Plan of Study"

Any Programming Language

Figure 11: "Past Terms" Screen

Future Terms

Required Courses Remaining

- CSC442
- CSC450
- CSC451
- MAT203
- MAT225

Electives Remaining

- ELECTIVE > 210
- ELECTIVE > 210
- ELECTIVE > 510


	Winter	Spring/Summer	Fall
1993		MAT221 CSC371 e:CSC314	MAT202 CSC441
1994			
1995			
1996			

Prev Term
Fall, 1993
Next Term


Courses You Can Take This Term

- CSC580
- CSC511 : 7:30-8:50PM MW
- CSC450 : 6:00-7:20PM TTh
- CSC210 : 11:45AM-12:40PM MWF

Click on "Prev Term" and "Next Term" to change the current term.
 Click on a course to schedule/unschedule that course in the current term.
 The requirements will update when you change terms.



Main Menu







? Turn Help On ?

Go Back to "Plan of Study"

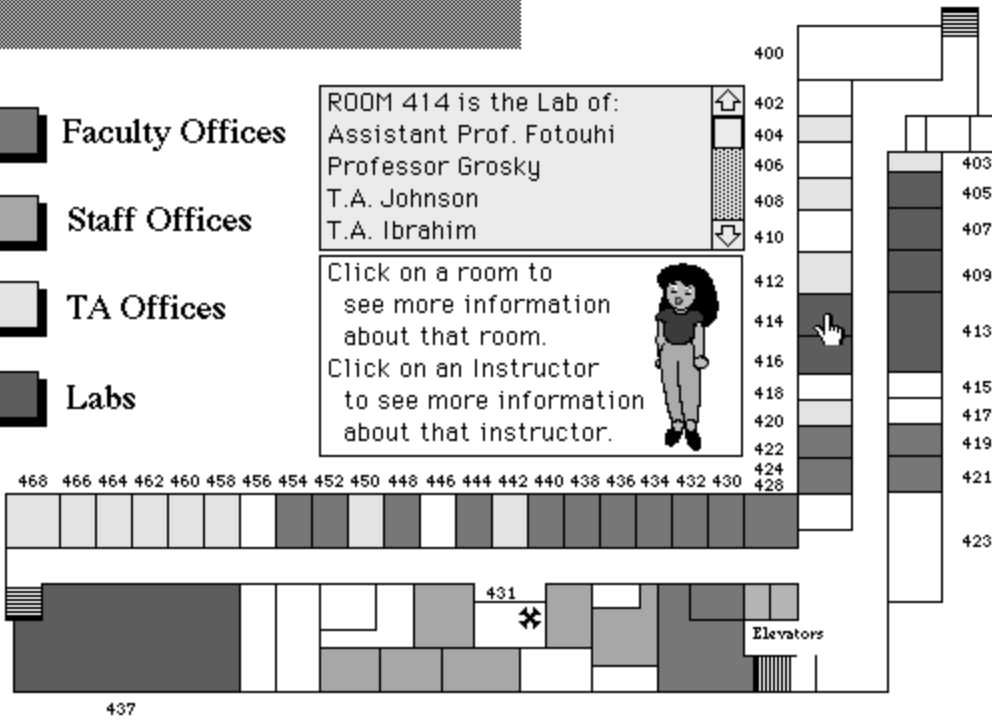

Figure 12: "Future Terms" Screen

Map of the Department

-  Faculty Offices
-  Staff Offices
-  TA Offices
-  Labs

ROOM 414 is the Lab of:
Assistant Prof. Fotouhi
Professor Grosky
T.A. Johnson
T.A. Ibrahim

Click on a room to see more information about that room.
Click on an Instructor to see more information about that instructor.



Main Menu



? Turn Help On ?

Go Back to "Department Information"

Figure 13: "Map" Screen

Faculty

Name:

Title:

Office:

Lab:

Research:

Phone:

Pri:

View:

Choose a Title

- Assistant Prof.
- Associate Prof.
- Chairman
- Lecturer
- Part Time Fac.
- Professor
- Staff
- T.A.
- Visit. Asst. Prof.

Figure 14: "Editor" Screen