Catalog description:
This course presents the fundamentals of computer/user interfaces using windows frameworks and object-oriented programming concepts. The basic concepts of a user interface, including command-based, graphical, and multimedia interfaces, are covered in a manner independent of specific technologies. A modern window-based interface implementation is then introduced through the use of one or more current object-oriented programming languages and object interface libraries. (Consult the instructor for the language(s) and libraries to be used.) Three lecture hours and three hours of scheduled laboratory per week, plus programming work outside of class. Not open to students who have received credit for CSC 312.

Prerequisite: CSC 260.

Goals:
The purpose of this course is to develop an understanding of the factors influencing the design of human-computer interfaces. The goals for this course are:

CG01: to develop an appreciation of the interdisciplinary nature of human-computer interface design;
CG02: to develop an understanding of the effect of hardware and software technologies on human-computer interfaces, from the past through the present and the near future;
CG03: to explore a state-of-practice library (including documentation), specifically one designed to support window-based event-driven interface implementation.

Objectives:
Upon successful completion of the course, student will have:

CO01: demonstrated knowledge of the disciplines which contribute to Human-Computer Interface (HCI) design and their roles in the analysis and design process;
CO02: demonstrated the ability to analyze the requirements for an interface, determine the significant environmental factors, and produce viable documented design proposals;
CO03: selected and utilized tools required to implement an interface design;
CO04: presented and defended HCI design(s) in a group setting;
CO05: critically evaluated implemented interfaces.

Topics:
- Human-computer interface design as an interdisciplinary practice
  - contributing disciplines and their roles
- Human side of HCI: psychology / physiology
  - cognition
  - perception
  - attention and memory constraints
  - learning in context
  - social and organizational aspects
- Computer side of HCI: technological capabilities and limitations
  - input devices
  - output devices
  - software tools
- Designing user interfaces: paradigms and their principles and characteristics

PO1  PO2  PO3  PO4  PO5  PO6  PO7  PO8  PO9  PO10
---  ---  ---  ---  ---  ---  ---  ---  ---  ---
CO01 ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓
CO02 ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓
CO03 ✓ ✓ ✓ ✓
CO04 ✓ ✓ ✓ ✓ ✓
CO05 ✓ ✓ ✓
• command-line menus forms graphical multi-media natural language

• Comparison of interfaces paradigms, their strengths and weaknesses
  command-line (text-based) vs graphical user interface (GUI)

• Tools: high-level interface libraries
  constructing general dialogues constructing file dialogues constructing find and replace dialogues building applications with standard document interfaces

• Tools: low-level interface components
  scroll bars buttons lists grouped controls

• Multi-user systems
  design considerations asynchronous vs. synchronous communication effects

• Multimedia systems

Comparison of interfaces paradigms, their strengths and weaknesses

HC3(3)    HC5(2) (not core)

Tools: high-level interface libraries

HC2 (1.5)

Tools: low-level interface components

HC2 (1.5)

Multi-user systems

HC8 (2) (not core)

Multimedia systems

HC7 (1) (not core)

Case studies and laboratory exercises:

There will be 4 to 6 programming assignments in which students will be asked to implement selected techniques. There will also be periodic written homework assignments.

Case studies presented in class and used for programming projects will be drawn from areas of current interest and significance; examples of potential case studies include:

- detailed design of a general interface
- modification of a Class Roster program to allow dialogue input
- modification of a text-based query system program to allow the use of buttons and dialogue boxes to express the query and scroll-barred windows to display the results
- modification of other selected assignments from CSC courses to make use of an enhanced graphical input or output
- construction of curriculum flow sheets to specify a prerequisite structure and to evaluate a transcript and/or specific requested courses

Careful attention will be paid to implementation details.

Grading:

The course grade will be determined using the following approximate weights: laboratory reports - 40%; written homework - 10%; examinations (two one-hour exams and a final exam) - 50%.

<table>
<thead>
<tr>
<th></th>
<th>Test / Quiz Questions</th>
<th>Homework Problems</th>
<th>Programming Projects</th>
<th>Lab Exercises</th>
<th>Group Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO01</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>CO02</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>CO03</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>CO04</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>CO05</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Bibliography:
References

Carroll, John. Human-Computer Interaction in the New Millenium. Addison-Wesley, 2002
Prentice-Hall, 1998
Hix, Deborah; Hartson, H. R. Developing User Interfaces: Ensuring Usability Through Product and Process.
John Wiley, 1993
Raskin, Jef. The Humane Interface. Addison-Wesley, 2000
Addison-Wesley, 1998

Language references

Feuer, Alan R. MFC Programming. Addison-Wesley, 1997
Lemay, Laura; Cadenhead, Rogers. Teach Yourself Java 2 in 21 Days. Sams Publishing, 2000
Musser, David R.; Saini, Atul. STL Tutorial and Reference Guide: C++ Programming with the Standard Template
Library. Addison-Wesley, 1996