Effective Term
Semester A 2022/23

Part I Course Overview

Course Title
Multimodal Interface Design

Subject Code
CS - Computer Science

Course Number
3483

Academic Unit
Computer Science (CS)

College/School
College of Engineering (EG)

Course Duration
One Semester

Credit Units
3

Level
B1, B2, B3, B4 - Bachelor's Degree

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
CS2310 Computer Programming or
CS2311 Computer Programming or
CS2313 Computer Programming or
CS2360 Java Programming or equivalent

Precursors
Nil

Equivalent Courses
Nil

Exclusive Courses
Nil
Part II Course Details

Abstract
This course aims to develop an understanding and practical skills of how to design usable interfaces to computer-based environments that interact with, and support human multi-modal information processing.

Course Intended Learning Outcomes (CILOs)

<table>
<thead>
<tr>
<th>CILOs</th>
<th>Weighting (if app.)</th>
<th>DEC-A1</th>
<th>DEC-A2</th>
<th>DEC-A3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Discover human characteristics important in carrying out tasks using computer-based environments and be able to apply these characteristics to the design of a user-oriented multi-modal interface.</td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>2. Perform a detailed analysis of the target user community of an interface.</td>
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<td></td>
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<td>x</td>
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<tr>
<td>3. Create new forms of user-oriented interfaces by applying suitable design principles.</td>
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<tr>
<td>4. Adopt alternative modalities, in addition to keyboard and mouse input, in user-oriented interface design.</td>
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<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>5. Perform critical assessment of a multimodal interface design.</td>
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<td>x</td>
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<td>x</td>
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</tbody>
</table>

A1: Attitude
Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability
Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments
Demonstrate accomplishment of discovery/innovation/creativity through producing/constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Teaching and Learning Activities (TLAs)

<table>
<thead>
<tr>
<th>TLAs</th>
<th>Brief Description</th>
<th>CILO No.</th>
<th>Hours/week (if applicable)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lecture</td>
<td>1, 2, 3, 4, 5</td>
<td>3 hours/week</td>
</tr>
</tbody>
</table>
Students will work on a different case study in each tutorial session. In particular, they will have group discussions to perform critical assessment of the case study, and each group is required to complete a take-home exercise, in the form of a brief report of their discussion results in each tutorial session.

Students will work as a group to create a new design for a user-oriented interface. The interface should allow interaction through a creative combination of different interaction modalities. The students will apply the theories, principles and guidelines they have learnt in the lectures and tutorials for their design.

Students will implement an interface design which makes use of alternative modalities of interaction, in addition to keyboard and mouse input. The implementation results are to be summarized in the form of a report.

<table>
<thead>
<tr>
<th>ATs</th>
<th>CILO No.</th>
<th>Weighting (%)</th>
<th>Remarks (e.g. Parameter for GenAI use)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Group project</td>
<td>1, 2, 3, 4</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>2 Assignment</td>
<td>4</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>3 Tutorial performance</td>
<td>5</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

**Continuous Assessment (%)**
60

**Examination (%)**
40

**Examination Duration (Hours)**
2
Additional Information for ATs
For a student to pass the course, at least 50% of the maximum mark for the continuous assessment and 30% of the maximum mark for the examination must be obtained.

Assessment Rubrics (AR)

<table>
<thead>
<tr>
<th>Assessment Task</th>
<th>Group project</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Criterion</strong></td>
<td></td>
</tr>
<tr>
<td>1.1 Capability to apply the theories, principles and guidelines they have learnt to design a multimodal interface.</td>
<td></td>
</tr>
<tr>
<td><strong>Excellent (A+, A, A-)</strong></td>
<td>High</td>
</tr>
<tr>
<td><strong>Good (B+, B, B-)</strong></td>
<td>Significant</td>
</tr>
<tr>
<td><strong>Fair (C+, C, C-)</strong></td>
<td>Moderate</td>
</tr>
<tr>
<td><strong>Marginal (D)</strong></td>
<td>Basic</td>
</tr>
<tr>
<td><strong>Failure (F)</strong></td>
<td>Not even reaching marginal levels</td>
</tr>
</tbody>
</table>

Assessment Task
Group project

**Criterion**
1.2 Capacity for creatively integrating multiple modalities of interaction to enhance user experience.

**Excellent (A+, A, A-)**
High

**Good (B+, B, B-)**
Significant

**Fair (C+, C, C-)**
Moderate

**Marginal (D)**
Basic

**Failure (F)**
Not even reaching marginal levels

Assessment Task
Assignment
Criterion
2.1 Ability to implement an interface design which makes use of alternative modalities of interaction, in addition to keyboard and mouse input.

Excellent (A+, A, A-)
High

Good (B+, B, B-)
Significant

Fair (C+, C, C-)
Moderate

Marginal (D)
Basic

Failure (F)
Not even reaching marginal levels

Assessment Task
Assignment

Criterion
2.2 Capability to compare the usability of multimodal interface and conventional user interface, and summarize their findings in a report.

Excellent (A+, A, A-)
High

Good (B+, B, B-)
Significant

Fair (C+, C, C-)
Moderate

Marginal (D)
Basic

Failure (F)
Not even reaching marginal levels

Assessment Task
Tutorial performance

Criterion
3.1 Capacity for analysing case studies in multimodal interaction design, and effectively summarizing the findings in the take-home exercises.

Excellent (A+, A, A-)
High
**Assessment Task**
Examination

**Criterion**
4.1 Ability to perform a detailed analysis of the target user community of an interface.

**Excellent (A+, A, A-)**
High

**Good (B+, B, B-)**
Significant

**Fair (C+, C, C-)**
Moderate

**Marginal (D)**
Basic

**Failure (F)**
Not even reaching marginal levels

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**Assessment Task**
Examination

**Criterion**
4.2 Capability to perform critical assessment of a multimodal interface design.

**Excellent (A+, A, A-)**
High

**Good (B+, B, B-)**
Significant

**Fair (C+, C, C-)**
Moderate

**Marginal (D)**
Basic

**Failure (F)**
Not even reaching marginal levels
Assessment Task
Examination

Criterion
4.3 Capacity for designing a multimodal interface based on a requirement specification.

Excellent (A+, A, A-)
High

Good (B+, B, B-)
Significant

Fair (C+, C, C-)
Moderate

Marginal (D)
Basic

Failure (F)
Not even reaching marginal levels

Part III Other Information

Keyword Syllabus

Syllabus

• Background to human use of computer systems
• Evaluation of human-computer interaction
  What makes products easy for people to use; frameworks for testing human-computer interaction; ways of testing: when to test and how to test; ethics of testing that involves human subjects; measurement in testing: time, response, accuracy, learning, recall, errors; what makes an interface human-centred.
• Design
• Environment and development platforms
  Hardware input/output objects. Integration of manuals, quick reference guides, courses, on-line help, tutorials and information guides as part of the user interface. User interface management systems (UIM). Managing the design
process. Multiple communication media and existing software components for developing user-interface designs: fundamentals of windowing systems, web-based systems, cyberworlds, elements of graphics, virtual environments.

Reading List

Compulsory Readings

<table>
<thead>
<tr>
<th>Title</th>
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Additional Readings

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