ICS 303 – Human Computer Interaction (2 Credits – Compulsory)

Course Duration: Two hours per week for 15 weeks (30 hours), as taught in 2011/2012 Session

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Consultation Hours: 12:00noon – 2:00pm on Mondays and Wednesdays

Course Content
Research and theories on topics in human cognition: perception, attention, pattern recognition, memory, representation of knowledge, language, problem solving, reasoning, and learning. Emphasis on the relationship to computer models. Implications of building information systems.

Course Description
Definition, reasons goals and evolution of HCI. The multidisciplinary nature of HCI. HCI in Information Systems development and in organisations. Importance of cognition and cognitive frameworks in HCI. Concept of attention, learning, memory models, planning, reasoning, decision making and problem solving. The role of human input-output channels and movement. Human eye physiology and visual perception, hearing perception and haptic perception. GOMS, Fitt’s Law, Object-Action Interface, Prescriptive theories, Fisheye strategy, the conceptual, semantic, syntactic, & lexical (CSSL) theories, Direct Manipulation, Information Processing, Hacker’s Action, Attention & Memory, Andersen's ACT-R, Knowledge & Mental, Social & Cultural and Norman's theories as they relate to HCI and how they impact on information system development. Models used for development of software. Define interaction, discuss interaction styles, interaction framework and ergonomics

Course Justification
Theories on computing remain of abstract interest until they are brought forcibly into contact with the real people who will apply those theories in practice in real systems. Human Computer Interaction (HCI) brings theory and practice together. As the first of a two-part course, this course examines the fundamentals of human computer interaction and the several disciplines that constitute it and this will hopefully enhance understanding of the concept. The understanding of the numerous theories of HCI will broaden students’ knowledge and understanding of how
information systems are created to be tailored towards the user. The importance of computer models which have their roots in most of these theories/models of HCI and which are germane to building effective information system makes this course a necessity to a would be practitioner in the field of information and communication science.

**Course Objectives**
By the completion of the course students should be able to:

- Define HCI and explain its significance.
- Explain the concept of human computer interaction and understand the interdisciplinary nature of the course;
- Discuss the major theories of HCI and their implication for building information systems;
- Discuss and argue the importance of HCI with reference to the way in which technology is evolving.

**Course Requirements**
Students must have a minimum of 75% attendance. As well, all students will be involved in the learning process by participating in assignments individually and in groups. Each student is required to have a yahoo mail address to facilitate students’ web interaction and web group discussion.

**Methods of Grading**

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<th>S/N</th>
<th>Description</th>
<th>Score (%)</th>
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<tr>
<td>1</td>
<td>Assignment</td>
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<tr>
<td>2</td>
<td>Class Participation</td>
<td>5</td>
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<tr>
<td>3</td>
<td>Class Test</td>
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<td>4</td>
<td>Examination</td>
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**Course Delivery Strategies**
The strategies for delivering this course will include lectures, group work and web-interactions.

**Weeks 1: Introduction and Course Overview**

**Objective**
At the end of the lecture, students should have a general feel of the course. They should also be able to explain the concept of human computer interaction (HCI), why it should be studied and the goals of the concept. The evolution of the concept of HCI will be traced for students to know the background of the concept.

**Description**

**Week 1**
First Hour (Week 1)
An overview of the course, Definition, reasons and goals of HCI.

Second Hour (Week 1)
Evolution of HCI.

Study Questions
1. What do you understand by human computer interaction?
2. Describe the goals HCI set out to achieve.
3. Explain what you understand by usability in HCI? Explain the breakdown of its goals.
4. Discuss the history and evolution of HCI.
5. Differentiate between user experience goals and usability goals.
6. Explain the parameters used in measuring the quality of software.

Reading List

Week 2: Nature and Importance of HCI

Objective
At the end of the lecture, students should be able to explain the different disciplines involved in HCI. They should also be able to discuss the importance of HCI in Information System development as well as its importance in organisations.

Description
First Hour (Week 2)
Multidisciplinary nature of HCI.

Second Hour (Week 2)
HCI in information systems development and in organisations

Study Questions
1. Describe the nature of HCI
2. Make a list of some disciplines from which HCI borrows and establishes its root.
3. What is cognitive psychology and how does it relate to HCI?
4. Why is it important to study HCI?
5. What is the contribution of computer science to HCI?
6. What is the contribution of the field of ergonomics and human factor to HCI?

Reading List
Week 3: Cognitive Frameworks

Objective
At the end of the lecture, students should be able to explain the importance of cognition and also discuss different cognitive frameworks in HCI.

Description
First Hour (Week 3)
Importance of cognition

Second Hour (Week 3)
Cognitive frameworks in HCI

Study Questions
1. What is cognition?
2. List and explain the processes involved in cognition.
3. Explain the two general modes of cognition as identified by Norman (1993)
4. Explain the human processor model
5. Explain GOMS model

Reading List


Week 4: Cognitive Process

Objective
At the end of the lecture, students should be able to discuss the concept of attention and learning, describe memory models, and discuss planning, reasoning, decision making and problem solving.

Description
First Hour (Week 4)
Attention, Memory Models and Learning

Second Hour (Week 4)
Planning reasoning, decision making and problem solving
Study Questions
1. Explain attention as a process of cognition.
2. What are the two models of attention? Explain them.
3. Explain memory as a process of cognition.
4. Describe the types of memories known to you.
5. Explain the concepts of procedural and declarative learning.
6. Explain the different types of reasoning known to you.

Reading List

   (Accessed 11 July 2011)

Weeks 5: Human Input-output Channels

Objective
At the end of the lecture, students should be able to explain the role of human input-output channels and movement. They should also be able to describe human eye physiology and discuss visual perception, hearing perception and haptic perception.

Description
First Hour (Week 5)
Role of input-output channels and movements

Second Hour (Week 5)
Visual, hearing, and haptic perceptions

Study Questions
1. List the five human senses and identify those that are most important to HCI.
2. Discuss the role of input-output channels in HCI.
3. Discuss the role of colour in HCI.
4. Identify the characteristics of sound.
5. How does movement affect HCI?
6. Explain the role of hatics in learning

Reading List

   (Accessed 11 July 2011)

Weeks 6: Test and Review
Objective
The objective this week is to evaluate students’ comprehension of the course so far which will form part of the continuous assessment score and also carry out an objective review of the course with a view to enhancing understandability

Description
First Hour (Week 6)
Class test

Second Hour (Week 6)
Course review

Weeks 7: HCI Theories I

Objective
At the end of the lecture, students should be able to explain GOMS, Fitt’s Law, Object-Action Interface, Prescriptive Theories and Fisheye strategy as they relate to HCI and how they impact on information system development.

Description
First Hour (Week 7)
GOMS theory and Fitt’s Law

Second Hour (Week 7)
Object-Action Interface theory, Prescriptive Theories and Fisheye strategy

Study Questions
1. Explain your understanding of the GOMS model.
2. How can GOMS Model be applied to HCI?
3. Explain your understanding of the Fitt’s Law.
4. How can Fitt’s Law be applied to HCI?
5. Explain your understanding of the Object-Action Interface theory
6. How can Object-Action Interface theory be applied to HCI?
7. Explain your understanding of the Prescriptive Theories
8. How can Prescriptive Theories be applied to HCI?
9. Explain your understanding of the Fisheye strategy.
10. How can Fisheye strategy be applied to HCI?

Reading List

Weeks 8: HCI Theories II
Objective
At the end of the lecture, students should be able to explain the conceptual, semantic, syntactic, & lexical (CSSL) theories, Direct Manipulation, Information Processing and Hacker’s Action theories as they relate to HCI and how they impact on information system development

Description
First Hour (Week 8)
CSSL, Direct Manipulation and Information Processing theories

Second Hour (Week 8)
Information Processing and Hacker's Action Theories

Study Questions
1. Explain your understanding of the CSSL theories.
2. How do CSSL theories apply to HCI?
3. Explain your understanding of Direct Manipulation.
4. How does Direct Manipulation apply to HCI?
5. Explain your understanding of Information Processing theories.
6. How do Information Processing theories apply to HCI?
7. Explain your understanding of Hacker's Action Theories.
8. How does Hacker's Action Theories apply to HCI?

Reading List

Weeks 9: HCI Theories III

Objective
At the end of the lecture, students should be able to explain Attention & Memory, Andersen's ACT-R, Knowledge & Mental, Social & Cultural and Norman's Theories as they relate to HCI and how they impact on information system development

Description
First Hour (Week 9)
Attention & Memory and Andersen's ACT-R theories

Second Hour (Week 9)
Knowledge & Mental, Social & Cultural and Norman's Theory

Study Questions
1. Explain your understanding of the Attention & Memory theory.
2. How does Attention & Memory theory apply to HCI?
3. Explain your understanding of Andersen's ACT-R theories
4. How do Andersen's ACT-R theories apply to HCI?
5. Explain your understanding of the Knowledge & Mental theory.
6. How do Knowledge & Mental theories apply to HCI?
7. Explain your understanding of the Social & Cultural theory.
8. How does the Social & Cultural theory apply to HCI?
9. Explain your understanding of Norman’s theory.
10. How does Norman’s theory apply to HCI?

Reading List


Weeks 10 and 11: HCI Process, Models and Methodologies

Objective
At the end of the lecture, students should be able to explain different design models used for development of software and the processes associated with them. They should also be able to discuss the need of new software development models. They should also be able to know the importance of user experience and usability in design and describe the advantages and disadvantages of different Software Development Lifecycles

Description
First Hour (Week 10)
Need for software development model.

Second Hour (Week 10)
User experience and usability in design

First Hour (Week 11)
Different design models in software development

Second Hour (Week 11)
Advantages and disadvantages of different Software Development Lifecycles

Study Questions
1. List the characteristics expected of good quality software.
2. Explain the strategic and tactical aspects of usability.
3. What is interaction design?
4. Discuss the evolution of software development process.
5. What is design?
6. Explain the waterfall model and its flaws.
7. Briefly discuss the spiral lifecycle model.
8. What are the two key features of Rapid Application Development?
9. Explain the goal directed design process.
10. Explain the goal directed design model.

Reading List
Weeks 12: Interaction and Ergonomics

Objective
At the end of the lecture, students should be able to define interaction and discuss interaction styles keeping in view different aspects of HCI. They should also be able to explain Interaction framework and ergonomics

Description
First Hour (Week 12)
Interaction: Terms, style and framework.

Second Hour (Week 12)
Ergonomics

Study Questions
1. What are the terms of interaction?
2. What is gulf of execution?
3. What is gulf of evaluation?
4. With the aid of a diagram, discuss interaction framework
5. What is ergonomics?
6. Discuss the physical aspects of interfaces as it relates to ergonomics.

Reading List
1. http://osiris.sunderland.ac.uk/~cs0car/hci/hci_all.htm

Weeks 13: Seminar

Objective
The objective this week is to enhance students’ presentation skills while assessing their assignments on theories of HCI.

Description
First Hour (Week 13)
Presentation

Second Hour (Week 13)
Presentation
Weeks 14: Seminar

Objective
The objective this week is to enhance students’ presentation skills while assessing their assignments on theories of HCI.

Description
First Hour (Week 14)
Presentation

Second Hour (Week 14)
Presentation

Week 15: Revision
All topics treated will be revised. Questions will be entertained on all topics taken from the beginning of the course and hopefully clarifications would be made on ambiguous concepts and grey areas

Review Questions
1. What do you understand by human computer interaction? Describe the goals HCI set out to achieve.
2. Make a list of some disciplines from which HCI borrows and establishes its root and discuss their relationship to HCI.
3. Why is it important to study HCI? How do you think the study of HCI will affect you as a potential information system developer?
4. Define cognition and cognitive psychology. How does cognitive psychology relate to HCI?
5. What are the two models of attention? Explain them.
6. List and explain the processes involved in cognition.
7. Select and explain a model/theory of HCI of your choice. How do you think this model applies to HCI?
8. Define design and explain what interaction design is? Discuss interaction design suitability for information system development.
9. Discuss the evolution of software development process.
10. Explain the waterfall model and its flaws.
11. With the aid of a diagram, discuss interaction framework.
12. What is ergonomics? Explain the relationship between ergonomics and HCI.
13. How has the recent technological advances affected HCI?

Further Reading List
   ISBN 1-59140-236-0
Legend:
1 – University Library
2 – Bookshops
3 – The Internet
4 – Personal Collections
5 – Departmental Library