

## Computer-Science 2 /GITA 2/ Advanced Web Design –

Emphasis: Designing the Human-Computer Interface and computer science programming theory.

### **Course Goals:**

- To focus on issues involved in the design of the interaction between people and computers
- To identify issues and tradeoffs in human computer interaction design
- To introduce the guidelines, principles and theories for effective interface design
- To evaluate user interfaces
- To understand user interface design guidelines
- To discuss ethical and social issues related to the use of computers
- To create websites based on interface design guidelines

### **Course Objectives:**

- Students will design user interfaces based on basic principles of design and human psychology,
- Students will use design guidelines, input devices, color selection, interface styles, for interface environments.
- Students will research past and current human computer interface implementation
- Students will critique user interfaces following principles of design
- Students will create web pages in HTML
- Students will create web sites based on design templates
- Students will make websites dynamic thru programming
- Students will develop websites using design principles of structure and navigation

### Course Outline:

The course has two major emphases. One emphasis is on the design theory behind web sites. The second emphasis is the creation of functional web sites based on the theory of design.

### Emphasis I – Designing the User Interface

This topic will be studied throughout the length of the course. It provides theory behind the development of high-quality user interfaces for interactive systems.

Students will complete a variety of readings from the text. These readings will include:

- Usability of Interactive Systems
- Guideline, Principles and Theories
- Development Processes.
- Management Design
- Scenario Development
- Social Impact
- Legal Issues
- Evaluation of Interface Designs
- Usability Testing
- Interface-Building tools
- Interaction Styles
- Direct Manipulation and Virtual Environments
- Menu Selection, Forms and Dialog Boxes
- Task-Related Menu Organization
- Language Selection
- Interaction Devices
- Design Issues
- User Productivity
- Function verses Fashion

Students will research and write a series of “White” papers based on their readings. Students will complete individual and group presentations as assigned on readings and research.

### Samples of written assignments:

Description of usability problems within commercial websites

Document how a user interface meets human computer interface design theory

Document how websites violate web design rules and illustrate solutions for violations.

Document usability problems within public websites and solutions to remedy usability problems

Document how a website user maneuvers within websites around usability problems

## Emphasis II - Web Interface Design and Site Construction

Students will study the following concepts:

- Web Page creation in HTML
- How web pages and web servers work
- How to upload(post) files to a web server
- WebPages that include style sheets
- How to use tables and nested tables
- How to create web forms and form elements
- Creating dynamic web pages
- Using templates to create web pages and web sites
- How to incorporate multimedia objects into web pages
- How to plan and manage large-scale websites.
- Server Side technologies
- **Programming in JavaScript** will include variables, literals & expressions, conditions, functions, objects, properties & methods, and formatting.

- Data Types and Variables

- Numerical Data

- Text Data

- Boolean Data

- Declaring Variables and Assigning Variables

- Numerical Calculations

- Operator Precedence

- String Operations

- Data Type Conversion

- Arrays

- Variable Scope and Lifetime

- Decision, Loops and Functions

- Comparison Operators

- If Statement

- Logical Operators

- Multiple Conditions

- Else and else if

- Comparing Strings

- The switch statement

- For loop

- While loop

- do...while loop
- break and continue statements
- functions
- Object-Based Programming
  - Objects in JavaScript
  - Using JavaScript Objects
  - Primitives and Objects
  - String Objects
  - The Math Object
  - Number Object
  - Array Object
  - Date Objects
  - JavaScript Classes
- Programming the Browser
  - The window Object
  - The history Object
  - The location Object
  - The navigator Object
  - The screen Object
  - The document Object
- HTML Forms
  - Object Properties and Methods
  - Common Properties
  - Button Form Elements
  - Text Elements
  - Textarea Element
  - Check Boxes and Radio Buttons
  - The select Elements

Samples of programming assignments using design theory:

Personal web page

New Technology web page

Design and create a web site to represent the Global IT Program/semester project

Design and create a school web site/semester project

Design and create a website for a local charity/semester project

Text & Supplemental Instructional websites:

Title: "Designing The User Interface"  
Authors: Ben Shneiderman and Cathering Plaisant  
Publisher: Addison Wesley  
ISBN: 0-321-19786-0  
Copyright: 2005

This text is the same text used at the University of California, Irvine in their human computer interface design course

Documents:

"Guidelines for designing web navigation"  
by DAVID K. FARKAS AND JEAN B. FARKAS

"GuideLines for Authoring Comprehensible Web Page and Evaluating Their Success"  
by JAN H. SPYRIDAKIS

Websites:

Blooberry's CSS Properties -[www.blooberry.com/indexdot/css/propindex/all.htm](http://www.blooberry.com/indexdot/css/propindex/all.htm)  
HTML Dog -[www.htmldog.com](http://www.htmldog.com)  
HTML Goodies-[www.htmlgoodies.com](http://www.htmlgoodies.com)  
HTML Code Tutorials-[www.htmlcodetutorial.com](http://www.htmlcodetutorial.com)  
W3 Schools-[www.w3schools.com](http://www.w3schools.com)  
How-To-Build-[www.how-to-build-websites.com](http://www.how-to-build-websites.com)  
JavaScript Mall-[www.javascriptmall.com](http://www.javascriptmall.com)  
EchoEcho-[www.echoecho.com/javascript.htm](http://www.echoecho.com/javascript.htm)  
[javascript.internet.com](http://javascript.internet.com)-[javascript.internet.com](http://javascript.internet.com)

Instructional Methods and Strategies:

- A. Content reading from text with written outline identifying key terminology and concepts
- B. Research online for current industry standards of design
- C. Paired and group programming assignments

- D. Paired and group presentations of key concepts in design
- E. Teacher directed programming exercises

#### Assessment Methods:

- A. Small written assignments addressing design problems assigned to be completed in the form of “White Paper”.
- B. Large programming assignments that take several class periods to complete.
- C. Presentations of major programming assignments including midterm project and final project.
- D. Written exams based on chapter readings
- E. Midterm Project/Midterm Exam
  - 1. Midterm Project is large programming assignment
  - 2. Midterm written exam
- F. Final Project/Final Project
  - 1. Final Project is large programming assignment
  - 2. Final written exam
- G. Participation is required to present major programming assignments and discussion of topics

#### Grade Weights By Semester

Homework/Class-work	50%
Tests/Quizzes	45%
Participation	5%

#### Context for Course:

Many students entering our AP computer science course have no experience in programming or software applications. This course was implemented to sustain the AP Computer-Science course. The theory behind user interface design is a major emphasis. However, students will be exposed to programming in HTML and JavaScript. The same elements of programming theory for advanced languages will be adopted. This course was designed to stop the attrition of unprepared students in the AP course.