

## DIGH 401 - Introduction to Computing

### *Overview*

This course introduces students of the MA in Digital Humanities degree programme to computing. It offers a broad spectrum of information, including a brief history of computing, introductory programming, both conceptual and practical, and introductory computer science concepts such as data structures, algorithms, design patterns and methods, databases, and an introduction to the developing field of data science.

This course has been designed to be complementary to the DIGH 400 Fall semester course, but not reliant upon its content.

### *Goals of the Course*

- introduce computer systems, their development, and the impact of computers in society
- application of computing and computer science in academic research, publishing, libraries, and the arts
- consider the history of programming and its implementation
- explore theory of programming and its practical application
- consider procedures, analysis, and problem solving
- a consideration of data, and its manipulation and application

### *Course Assessment*

- ongoing weekly assessment work (25%)
- class presentations (20%)
- practical work (15%)
- conceptual design specification (40%)

### *Plan and outline*

#### Part 1

- introduction to computing
  - computing power
  - information
  - systems
- a gentle introduction to the history of computing
- what is computing and programming?
  - a few basics
- getting started with XML
  - overview

- structure and a few advanced concepts
- working with XML
- viewing and validation

## Part 2

- getting started with programming
  - alternative methods for writing programs
  - no discernible plan (spaghetti)
  - planning ahead (structured)
  - organising a program (object oriented)
- programming languages
  - assessment of 'curly bracket' languages
- programming tools
  - compiler, interpreter, debugger, profiler, disassembler, VM...
  - sandboxing
- software engineering methods
  - waterfall model
  - extreme or agile programming
  - computer aided software engineering
  - modelling a large project

## Part 3

- programming basics
  - variables, data types, constants
  - scope
  - access identifiers...
- manipulating data
  - introduction
  - simple operators
  - operator precedence
  - mathematics
  - working with strings
  - comparison and boolean operators
  - regular expressions
- decision making
  - branching options
  - conditional statements and options
- looping
- data structures
  - arrays
  - stacks

- queues
- collections and dictionaries
- hash tables
- graphs

## Part 4

- an introduction to web design
  - HTML and XHTML
  - CSS
  - HTML 5
  - CSS 3
- databases and database management
  - introduction
  - free-form and flat-file
  - relational
  - manipulating data
  - sql...
- data science
  - introduction
  - what is big data?
  - tools and practices for manipulating and working with big data?
    - R, Python libraries...
  - example data sets, processing, and conclusions...
- artificial intelligence
  - introduction
  - strong and weak AI
  - game playing
  - natural language processing