**CS7029: Visual Computing and Design**

<table>
<thead>
<tr>
<th>Module Code</th>
<th>CS7029</th>
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<tbody>
<tr>
<td>Module Name</td>
<td>Visual Computing and Design</td>
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<tr>
<td>Module Short Title</td>
<td>N/A</td>
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<tr>
<td>ECTS weighting</td>
<td>10 ECTS</td>
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<tr>
<td>Semester/term taught</td>
<td>Semesters 1 and 2</td>
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**Contact Hours**

This Module is split into two sections:

- **Part A** “Graphic Design” taught by Robin Fuller
- **Part B** “Visual Computing” taught by John Dingliana

**Part A (Graphic Design)** consists of 11 two-hour lectures over Semester 1. The main course material is delivered through illustrated lectures. These lectures are not circulated as lecture notes. Their function is to stimulate debate and introduce students to discourses, practices, processes and practitioners in historical and contemporary contexts. Students are expected to conduct self-directed study to further their particular interests. This activity is supported through the provision of the bibliography (see below).

**Part B (Image Processing and 3D Modelling)** consists of 22 two-hour lectures over Semester 1 & 2.

**Module Personnel**

Robin Fuller, John Dingliana

**Learning Outcomes**

On successful completion of the module, students will be able to:

**Part A (Graphic Design)**

- Identify key formal elements in graphic design processes and practices
- Analyse graphic design and visual cultural products in an informed and structured manner
- Evaluate these products in terms of formal (i.e. functional) success and socio-cultural & technological relevance

**Part B (Visual Computing)**

- Identify some of the key theoretical principles and standard architectures underlying modern graphical applications, including details of the common hardware and low-level software used in such systems.
- Discuss how low-level fundamental components common to all computer applications come together to produce high-level computer imagery in digital media and interactive graphical programs.
- Generate photo-realistic images of three-dimensional (3D) environments using modelling and scene-definition software.
### Module Learning Aims

#### Part A (Graphic Design)
- Introduce students to some of the key formal elements of graphic design practices
- Introduce students to some of the major historical and critical debates concerned with graphic design and visual cultural products
- To encourage students towards a critical engagement with visual cultural / technological intersections

#### Part B (Visual Computing)
- The objective of this course is to equip students with a fundamental understanding of the technology underlying the field of computer images and how this is applied to advanced areas such as geometric modelling, rendering and animation.
- We will discuss modes of input/output and the limitations/potentials of (graphical) digital media and attempt to provide an understanding of the production processes, complexity, tools and issues involved in production of digital images, animations and interactive graphical experiences, including games, virtual reality and augmented reality.

### Module Content

#### Part A (Graphic Design)
- Information Design
- Typography
- Identity Design
- The Photographic Image

#### Part B (Visual Computing)
- Introduction to computer generated imagery and applications
- Raster and Vector Graphics
- Images: Representation, Storage and Retrieval
- Basic mathematical principles used in computer graphics
- Colour Perception and Computer Graphics
- Graphics Hardware
- Image Manipulation, Enhancement, Filtering
- Rendering of 3D graphics
- 2D and 3D modelling data structures
- Creating 2D and 3D models and scenes
- Illumination and Lighting
- Camera Modelling, Viewing and Projection
- Texture Mapping
- Animation
- Interaction with graphical programs, Virtual and Augmented Reality
- Practical components involving labs will use the following applications: **POV-Ray, 3D Studio Max, Processing**

### Part A (Graphic Design). Required Reading is in bold

#### Primers & Handbooks
- Adobe Creative Team; *Classroom in a Book: Adobe Photoshop CS(6)*. Indianapolis: Adobe Press, 2012. (This title must correspond to the software installed on your computer. Check the software release number before purchasing / borrowing)
- Adobe Creative Team; *Adobe Illustrator CS(6) Classroom in a Book*. Indianapolis: Adobe Press, 2005. (This title must correspond to the software installed on your computer. Check the software release number before purchasing / borrowing)

#### Design Histories
- Livingston, Alan and Isabella Livingston; *The Thames and Hudson Encyclopaedia of Graphic Design and Designers (World of Art)*. London: Thames and Hudson, 1992.

#### Design Criticism

**Typography**

- Kane, John; A Type Primer. New York: Prentice Hall, 2002.

**Writing by Designers**


**Visual Culture**

- Williams, Raymond; Keywords. London: Fontana, 1976.

**Information Design**


**Photographic Images**


Part B (Image Processing and 3D Modelling)

The following are recommended readings. Each text covers somewhat equivalent scope.
