Module Description 2016/17  
School of Computer Science and Statistics.

<table>
<thead>
<tr>
<th>Module Code</th>
<th>CS7008</th>
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<tbody>
<tr>
<td>Module Name</td>
<td>Vision Systems</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>5</td>
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<tr>
<td>Semester/term taught</td>
<td>First semester</td>
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</table>
| Contact Hours | Lecture hours: 23 hours  
Lab hours: 1 hour  
Tutorial hours: 9 hours  
Total hours: 33 hours |
| Module Personnel | Lecturing staff: Dr. Kenneth Dawson-Howe |
| Learning Outcomes | When students have successfully completed this module they should be able to:  
- design solutions to real-world problems using computer vision.  
- develop working computer vision systems using C++.  
- critically appraise computer vision techniques.  
- explain, compare and contrast computer vision techniques. |
| Module Learning Aims | The aim of this module is to give students a firm understanding of the theory underlying the processing and interpretation of visual information and the ability to apply that understanding to ubiquitous computing and entertainment related problems. It provides them with an opportunity to apply their problem-solving skills to an area which, while it is firmly part of computer science/engineering, draws strongly from other disciplines (physics, optics, psychology). The module is based around problems so that the technology is always presented in context and during some tutorials students work in groups to design solutions to real world problems using the techniques that they have been taught. In addition, the module has a significant practical component so that students can appreciate how difficult it can be to apply the technology. |
| Module Content | Specific topics addressed in this module include:  
- image digitisation and colour;  
- camera modelling;  
- binary image processing including mathematical morphology, connected components analysis; |
- video analysis;
- geometric image transforms;
- noise and smoothing;
- edge based processing including edge detection, contour extraction and representation;
- feature processing including basic corner detection techniques and SIFT/SURF;
- recognition techniques including template matching, statistical pattern recognition, and the Hough transform;

Topics will change a little bit from year to year.

**Recommended Reading List**


**Module Pre Requisite**

A working knowledge of C++

**Module Co Requisite**

**Assessment Details**

The labs and assignments account for 20% of the final mark and the exam 80%. Students must answer 2 out of 3 exam questions. There is no supplemental examination in this subject.