1. **Title of the module**

EENG5610 (EL561) Image Analysis and Applications

1. **School or partner institution which will be responsible for management of the module**

Engineering and Digital Arts

1. **The level of the module (Level 4, Level 5, Level 6 or Level 7)**

Level 5

1. **The number of credits and the ECTS value which the module represents**

15 credits (7.5 ECTS)

1. **Which term(s) the module is to be taught in (or other teaching pattern)**

Autumn or Spring

1. **Prerequisite and co-requisite modules**

Pre-requisites:

EL318 Engineering Mathematics

CO322 Foundations of Computing

1. **The programmes of study to which the module contributes**

BEng Computer Systems Engineering

BEng Computer Systems Engineering with a Year in Industry

BEng Biomedical Engineering

BEng Biomedical Engineering with a Year in Industry

MEng in Computer Systems Engineering

MEng in Computer Systems Engineering with a Year in Industry

BSc Computer Science

1. **The intended subject specific learning outcomes.  
   On successfully completing the module students will be able to:**

1. have an understanding of three main integrated themes:

(i) basic image processing (representation, transformation, extraction of key information from images);

(ii) image analysis (automatic interpretation of images and pattern recognition methodology) and

(iii) computational architectures for image analysis (especially neural network structures).

2. have familiarity with fundamental algorithms underpinning modern image analysis systems.

3. have experience of the requirements for implementing algorithms for image analysis.

4. have practical experience of working with typical algorithms and architectures.

1. **The intended generic learning outcomes.  
   On successfully completing the module students will be able to:**

1. demonstrate key skills in problem solving,

2. demonstrate key skills in information technology

3. demonstrate key skills in application of number.

1. **A synopsis of the curriculum**

The module introduces fundamental techniques employed in image processing and pattern recognition providing an understanding of how practical pattern recognition systems may be developed able to address the inherent difficulties present in real world situations. The material is augmented with a study of biometric and security applications looking at the specific techniques employed to recognise biometric samples.

1. **Reading list (Indicative list, current at time of publication. Reading lists will be published annually)**

* Fairhurst, Michael Christopher (1988) Computer vision for robotic systems: an introduction, Prentice Hall, London, New York.
* Gonzalez, Rafael C., Woods, Richard E. (2008) Digital image processing, Pearson Education, Pearson Prentice Hall, London, Upper Saddle River, N.J.
* Tarassenko, Lionel, Neural Computing Applications Forum (1998) A guide to neural computing applications, Arnold, John Wiley, London, New York.
* Forsyth, David, Ponce, Jean (2003) Computer vision: a modern approach, Prentice Hall/Pearson Education International, Upper Saddle River, N.J.
* Theodoridis, Sergios, Koutroumbas, Konstantinos (c2009) Pattern Recognition, Elsevier/Academic Press, Amsterdam, London.
* Nixon, Mark S., Aguado, Alberto S., Dawsonera (2008) Feature extraction and image processing, Academic Press, Amsterdam, London.
* Petrou, Maria, Petrou, Costas (2010) Image processing: the fundamentals, Wiley, Chichester.
* Beale, Russell, Jackson, Tom (1990) Neural computing: an introduction, Institute of Physics, Bristol

1. **Learning and teaching methods**

Total contact hours: 35

Private study hours: 115

Total study hours: 150

1. **Assessment methods**
   1. Main assessment methods

* Exam 2 hours 70%
* 4 Example classes - 7.5% each

In order to obtain credit for this module on IET accredited programmes, the coursework mark and the exam mark must each be greater than or equal to 30% as well as achieving the pass mark for the module. This module will only be considered for compensation if the coursework mark and exam mark are each greater than 30%.

13.2 Reassessment methods

Reassessment instrument: like-for-like

1. **Map of module learning outcomes (sections 8 & 9) to learning and teaching methods (section12) and methods of assessment (section 13)**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Module learning outcome** | 8.1 | 8.2 | 8.3 | 8.4 | 9.1 | 9.2 | 9.3 |
| **Learning/ teaching method** |  |  |  |  |  |  |  |
| Private Study | **x** | **x** | **x** |  | **x** | **x** | **x** |
| Lectures | **x** | **x** | **x** |  | **x** | **x** | **x** |
| Example classes |  | **x** | **x** | **x** | **x** | **x** | **x** |
| **Assessment method** |  |  |  |  |  |  |  |
| Exam | **x** |  |  |  | **x** | **x** | **x** |
| Example classes |  | **x** | **x** | **x** |  |  |  |

1. **Inclusive module design**

The School recognises and has embedded the expectations of current equality legislation, by ensuring that the module is as accessible as possible by design. Additional alternative arrangements for students with Inclusive Learning Plans (ILPs)/declared disabilities will be made on an individual basis, in consultation with the relevant policies and support services.

The inclusive practices in the guidance (see Annex B Appendix A) have been considered in order to support all students in the following areas:

a) Accessible resources and curriculum

b) Learning, teaching and assessment methods

1. **Campus(es) or centre(s) where module will be delivered**

Canterbury

1. **Internationalisation**

The techniques introduced are in standard use worldwide.

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**Revision record – all revisions must be recorded in the grid and full details of the change retained in the appropriate committee records.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Date approved | Major/minor revision | Start date of the delivery of revised version | Section revised | Impacts PLOs (Q6&7 cover sheet) |
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Revised FSO Jan 2018