

# COMP3204/COMP6223 - Computer Vision Revision Lecture

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Tuesday 19th January  
1430-1630



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# Exam Format

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- ❖ 2 hours duration
- ❖ Choose 3 questions from 6
- ❖ Each question worth 33 marks
- ❖ Mark wrote 3; I wrote 3
  - ❖ Expect that Mark's will *typically* cover lower level vision & mine will cover higher level vision
  - ❖ but, there will probably be some overlap!

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# Typical mark scheme

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- ❖ 80% from lectures and notes; 20% from independent reading
- ❖ Most questions will be broken down into sub-parts
  - ❖ Mark has a tendency to write a single question with 33 marks!
- ❖ The marks for each question are **there to help you**
  - ❖ Use them to judge how much to write and how much time to spend

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## Search Results - 17 papers

Unit Code	Unit Title
<b>COMP3005</b>	<b>Computer Vision</b>
<a href="#">COMP3005W1 2013-14/S2</a> 43k   <a href="#">COMP3005W1 2012-13/S2</a> 181k   <a href="#">COMP3005W1 2011-12/S2</a> 63k   <a href="#">COMP3005W1 2010-11/S2</a> 12k <a href="#">COMP3005W1 2009-10/S2</a> 652k   <a href="#">COMP3005W1 2008-09/S2</a> 20k   <a href="#">COMP3005W1 2007-08/S2</a> 124k   <a href="#">COMP3005W1 2006-07/S2</a> 108k <a href="#">COMP3005W1 2005-06/S2</a> 1.9M   <a href="#">cm306w1 2002-03/S2</a> 267k   <a href="#">cm306w1 2001-02/S2</a> 191k   <a href="#">cm306w1 2000-01/S2</a> 259k <a href="#">cm306w1 1999-00/S2</a> 340k   <a href="#">cm306w1 1998-99/S2</a> 120k	
<b>el424</b>	<b>Computer vision</b>
<a href="#">el424w1 1999-00/S2</a> 63k   <a href="#">el424w1 1998-99/S2</a> 39k	
<b>ez424</b>	<b>Computer vision</b>
<a href="#">ez424w1 2002-03/S2</a> 197k	



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4.

## **Feature morphology and segmentation**

- (a) **Describe** with the aid of sketches three different morphologies of image feature. [6 marks]
- (b) **Describe** two strategies for segmenting an image. [13 marks]
- (c) **Compare** the two strategies from the previous answer, highlighting advantages and disadvantages of one with respect to the other. [8 marks]
- (d) **Identify** parameters that will need to be set, either manually or automatically for the segmentation methods you described and strategies to choose them. [6 marks]

5.

**Eigenfaces and PCA:** *Eigenfaces uses principle component analysis to reduce the dimensionality of a feature based on the raw grey-level pixel values in a face image. Face recognition is achieved by training a classifier on these low-dimensional features.*

- (a) **Describe** what Eigenvalues and Eigenvectors are, and in terms of the distribution of a set of data points describe what they represent. [7 marks]
- (b) For a 2x2 covariance matrix, demonstrate with the help of diagrams the effect of different values within the covariance matrix on the principal axes. [6 marks]
- (c) **Provide** a description of the steps to achieving dimensionality reduction using PCA. [10 marks]
- (d) **Describe** two classification approaches that could be used with the reduced dimension features to build a face-recognition system. What are the advantages and disadvantages of the two techniques? [10 marks]



## Visual Words

- (a) **Describe** in detail an approach to learning a set of “Visual Words” from a local feature like SIFT. [11 marks]
- (b) **Describe** what is meant by vector-quantisation. [3 marks]
- (c) **Describe** how you might use a Bag-of-Visual-Words to create a system for searching large numbers of images. Relate your answer to the techniques used in text indexing and search. [11 marks]
- (d) One key parameter of a Bag-of-Visual-Words representation is the size of the vocabulary. Provide details of the trade-offs in vocabulary size for the tasks of (a) image search and (b) image classification. [8 marks]



# Questions