



**Wednesday 13 May 2020, 14:00 BST
(24 hour open online assessment – Indicative duration 2 hours)**

DEGREES OF MSc, MSci, MEng, BEng, BSc, MA and MA (Social Sciences)

Computational Social Intelligence (H)

COMPSCI 4080

(Answer all 3 questions.)

This examination paper is worth a total of 75 marks

1. Address the following questions about two major methodological instruments introduced during the course, namely Basic Signal Processing (question a) and Bayesian Decision Theory (question b).

(a) A digital signal is a sequence of physical measurements collected at regular time steps. Explain how signals are processed in the time-domain, including at least one of the most important short-term properties (the answer must not contain more than 1000 words. Any text after the 1000th word will not be considered).

[15 marks]

(b) Explain what the “Expected Loss” or “Conditional Risk” is in Bayesian Decision Theory. In particular, provide its definition and show how it is used to develop the Bayes Decision Rule (the answer must not contain more than 1000 words. Any text after the 1000th word will not be considered).

[15 marks]

2. Address the following questions about two psychological aspects of Computational Social Intelligence, namely facial expressions (question a) and multimodal communication (question b):

(a) Explain how facial expressions are analysed from a psychological point of view (the answer must not contain more than 1000 words. Any text after the 1000th word will not be taken into account).

[15 marks]

(b) Describe the concept of multimodality in Communication and Life Sciences and, in particular, explain how the combination of multiple signals can lead to different responses (the answer must not contain more than 1000 words. Any text after the 1000th word will not be taken into account).

[15 marks]

3. Explain the most important aspects of one of the four experimental studies that have been presented during the course (the answer must not contain more than 1000 words. Any text after the 1000th word will not be taken into account).:

1. Synthetic impressions;
2. Speech and Personality;
3. Facial Expressions;
4. Nonverbal Behaviour in Phone Calls.

[15 marks]