

# ES4E9-15 Affective Computing

**22/23**

**Department**

School of Engineering

**Level**

Undergraduate Level 4

**Module leader**

Tardi Tjahjadi

**Credit value**

15

**Module duration**

10 weeks

**Assessment**

30% coursework, 70% exam

**Study location**

University of Warwick main campus, Coventry

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## Description

### Introductory description

Affective Computing is the inter-disciplinary study and development of systems that can recognise and interpret human affects (emotion). Information gathered from various sensors (e.g., video camera, speech detector and electroencephalogram (EEG)) are processed to recognise the appropriate affect responses.

[Module web page](#)

### Module aims

This module aims to introduce: theoretical underpinnings (psychological, physiological and technological) of affect recognition; affect sensing involving signal processing, computer vision and machine learning; and the design and implementation of effective human-machine interface applications such as health monitoring, deception detection, gaming experience and learning technologies.

### Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

Theoretical underpinnings of affective computing from an interdisciplinary perspective encompassing the affective, cognitive, social, media, and brain sciences.

Affect recognition from facial expressions, body language, speech, physiology, contextual features, and multimodal combinations of these modalities.

Applications of affective computing in human-robot interactions, unobtrusive deception detection and health monitoring.

## **Learning outcomes**

By the end of the module, students should be able to:

- Integrate theories from multiple disciplines (Computer Science / Engineering / Psychology) in order to explain the main concepts of affective computing.
- Evaluate and implement the principles of automated facial expression recognition.
- Analyse and implement the principles of automated body language recognition
- Examine the principles of physiology for affective computing.
- Critique the applications of affective computing in human-robot interactions, unobtrusive deception detection and health monitoring.

## **Indicative reading list**

Calvo RA, D'Mellor SK, Gratch J, Kappas A (Eds), The Oxford Handbook of Affective Computing, Oxford University Press, 2015, ISBN: 9780199942237.

Peter C, Beale R (Eds), Affect and Emotion in Human Computer Interaction: From Theory to Applications, Springer, 2008, ISBN: 9783540850984.

Picard R, Affective Computing, MIT Press, 2000, ISBN: 9780262661157.

## **Subject specific skills**

1. Ability to conceive, make and realise a component, product, system or process.
2. Ability to be pragmatic, taking a systematic approach and the logical and practical steps necessary for, often complex, concepts to become reality.
3. Ability to seek to achieve sustainable solutions to problems and have strategies for being creative and innovative.

## **Transferable skills**

1. Numeracy: apply mathematical and computational methods to communicate parameters, model and optimize solutions.
2. Apply problem solving skills, information retrieval, and the effective use of general IT facilities.
3. Ability to formulate and operate within appropriate codes of conduct, when faced with an ethical issue.

4. Appreciation of the global dimensions of engineering, commerce and communication.

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## Study

### Study time

Type	Required
Lectures	25 sessions of 1 hour (17%)
Seminars	5 sessions of 1 hour (3%)
Tutorials	3 sessions of 1 hour (2%)
Demonstrations	1 session of 3 hours (2%)
Private study	114 hours (76%)
Total	150 hours

### Private study description

114 hours guided independent learning.

### Costs

No further costs have been identified for this module.

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## Assessment

You must pass all assessment components to pass the module.

### Assessment group D5

	Weighting	Study time	Eligible for self-certification
<b>Assessment component</b>			
In-class test Test held during timetabled session	30%		No
<b>Reassessment component</b>			
resit assignment			No

**Weighting****Study time****Eligible for self-certification****Assessment component**

Online Examination      70%

No

QMP includes answers: multiple-choice, text entry, numeric entry and upload of answers. 2 X 1hr  
QMP with break inbetween

~Platforms - QMP

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- Online examination: No Answerbook required
- Students may use a calculator
- Engineering Data Book 8th Edition
- Graph paper

Reassessment component is the same

**Feedback on assessment**

In-class test: mark and comments.

Online examination - cohort level feedback on examinations.

[Past exam papers for ES4E9](#)

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**Availability****Courses**

This module is Optional for:

- Year 4 of UESA-H116 MEng Engineering with Exchange Year
- Year 5 of UESA-H115 MEng Engineering with Intercalated Year
- Year 4 of UESA-HH33 MEng Systems Engineering with Exchange Year
- Year 1 of TESA-H800 Postgraduate Taught Biomedical Engineering

This module is Option list A for:

- Year 4 of UESA-H163 MEng Biomedical Systems Engineering
- Year 4 of UESA-H114 MEng Engineering
- Year 4 of UESA-HH31 MEng Systems Engineering
- Year 5 of UESA-HH32 MEng Systems Engineering with Intercalated Year

This module is Option list B for:

- Year 4 of UCSA-G408 Undergraduate Computer Systems Engineering
- Year 5 of UCSA-G409 Undergraduate Computer Systems Engineering (with Intercalated Year)