OLLSCOIL NA GAILLIMHE
UNIVERSITY OF GALWAY

# ***Semester 1 Examinations 2024-2025***

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| **Course Instance Code(s)** | 4BCT1, 1OA2, 1EM1, 2MF1 |
| **Exam(s)** | B.Sc. (CS&IT), Erasmus, M.Sc. (SDD) |
| **Module Code(s)** | CT404, CT336 |
| **Module(s)** | Graphics and Image Processing |
| Paper No. | 1 |

External Examiner(s) Dr. R. Trestian
Internal Examiner(s) Dr. Enda Howley
*Dr. Waqar Shahid Qureshi
*Dr. Nazre Batool

**Instructions:** Section 1 (Graphics): Q1 is compulsory.
Section 2 (Image Processing):
Choose any 3 questions out of the 4 questions Q2-Q5.
All questions carry equal marks.

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| **Duration** | 2 hours |
| **No. of Pages** | 11 |
| **Discipline(s)** | Computer Science |
| **Course Co-ordinator(s)** | Dr. Colm O'Riordan, Dr. Jawad Manzoor |

**Requirements:**

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| Release in Exam Venue | No[☑ ] | Yes [ ] |
| MCQ Answer sheet | No [ ] | Yes [ ☑ ] |
| Handout | No [☑ ] | Yes [ ] |
| Formulae & Tables* | No [☑ ] | Yes [ ] |
| Cambridge Tables 2nd Edition** | No [☑ ] | Yes [ ] |
| Graph Paper*** A4 Graph Paper 1mm 0.1cm Squared (Standard) | No [☑ ] | Yes [ ] |
| Other Materials | No [☑ ] | Yes [ ] |
| Graphic material in colour | No [ ] | Yes [ ☑ ] |

**End of requirements.**

**PTO**

# CT404/ CT336

Exam Duration: 2 Hours

**You must complete Section 1 and Section 2**

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## Section 1: Graphics

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**Instructions:** Q1 is compulsory. In Q1(i), choose ***5 out of 6*** multiple choice questions. Then choose ***one of the two coding tasks*** from Q1 (ii) and Q1 (iii).

**Question 1:** (25 Marks)

**(i): Multiple Choice Questions:** choose ***5 out of 6*** multiple choice questions. **(15 Marks)**

These MCQ's will cover the material **covered in lectures 1, 2, 3** on Computer Graphics to assess your understanding of the concepts. The questions might include images, formulae and/or code snippets.

**(ii) or (iii): NOTE:** Choose ***one of the two coding tasks*** from Q1 (ii) and Q1 (iii). Both carry equal marks **(15 Marks)**.

This part will check your graphics programming skills similar to your assignment 1. You will pick one of the two given tasks to write code (in Canvas2D or Three.js) to produce a given graphics example. Both or either task(s) can be in Canvas2D or Three.js. You are advised to look into code examples provided in lectures or in previous exams.

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## Section 2: Image Processing

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**Instructions:** Select **THREE** of the following four questions Q2 – Q5. All questions carry equal marks.

**Question 2: If you choose this question, attempt all parts of the question. (25 Marks)**

This question will have 2-3 parts focusing on **topics covered in lectures 4, 5, 6.** It will include a mix of two types of questions. The conceptual questions will assess your understanding of the fundamental principles. The applied critical thinking questions will ask you to analyse a given image by outlining and discussing relevant image processing techniques.

**Question 3: If you choose this question, attempt all parts of the question. (25 Marks)**

This question will have 2-3 parts focusing on **topics covered in lectures 7, 8**. It will include a mix of two types of questions. The conceptual questions will assess your understanding of the fundamental principles. The applied critical thinking questions will ask you to analyse a given image by outlining and discussing relevant image processing techniques.

**Question 4: If you choose this question, Attempt all parts of the Question. (25 Marks)**

This question will have 2-3 parts focused on Camera Calibration and Anatomy. It will include a mix of conceptual questions to assess your understanding of the fundamental principles, algorithmic application tasks to test your grasp of calibration techniques, and critical thinking scenarios that require analysing and interpreting results based on calibration methods.

**Question 5: If you choose this question, Attempt all parts of the Question. (25 Marks)**

This question will include 2-3 parts from the Features and Descriptor section, such as HOG features and face detection algorithms. You will be expected to demonstrate your knowledge of these algorithms, explain their working mechanisms, and apply critical thinking to evaluate their effectiveness in different scenarios, addressing both advantages and challenges in their application

**PTO**