Back To FORM @ TEMPLATE

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|---|---|---|---|---|---|---|
| 1 | Course Name: | Graphics Programming | | | | |
| | Course Code: | BMCS2173 | | | | |
| | Course Classification: | Major (core) | | | | |
| 2 | Synopsis: | This course is designed to present the concepts and techniques in real time graphics programming. It focuses on the development of real time computer graphics for the use of interactive software using an appropriate Graphics API. Students will learn the concept and use of fundamental graphics programming techniques such as geometric transformations, materials, lighting, texture mapping and shadow. | | | | |
| 3 | Name(s) of Academic Staff: | 1 | Refer to timetable | | | |
| | | 2 | | | | |
| | | 3 | | | | |
| 4 | Semester and Year offered: | Year Offered | | Semester | | *Remarks:* |
| 5 | Credit Value: | 3 | | | | |
| 6 | Pre-requisite/ co-requisite (if any): | | | | | |

7

| Course Learning Outcomes (CLO) | | |
|---|---|---|
| | CLO1 | Analyse the principles and techniques used in creating 3D interactive computer graphics. (C4, PLO2). |
| | CLO2 | Solve computer graphics problems using computer graphics techniques and strategies. (P4, PLO3). |
| | CLO3 | Produce a 3D interactive graphics application using an appropriate graphics API. (P4, PLO3). |
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8 Mapping of the Course Learning Outcomes to the Programme Learning Outcomes, Teaching Methods and Assessment Methods

| Course Learning Outcomes | Programme Learning Outcomes (PLO) | | | | | | | | | | | | Teaching Methods | Assessment Methods |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PLO 1 | PLO 2 | PLO 3 | PLO 4 | PLO 5 | PLO 6 | PLO 7 | PLO 8 | PLO 9 | PLO 10 | PLO 11 | | | |
| CLO1 | | √ | | | | | | | | | | | L, NF2F | Test, Examination |
| CLO2 | | | √ | | | | | | | | | | L, P, NF2F | Practical Assessment |
| CLO3 | | | √ | | | | | | | | | | L, P, NF2F | Assignment |
| | | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | | |
| Mapping with MQF Cluster of Learning Outcomes | | C2 | | | | | | | | | | | | |
| | | | C3A | | | | | | | | | | | |
| | | | C3A | | | | | | | | | | | |

Indicate the primary causal link between the CLO and PLO by ticking '√' in the appropriate box.

**C1** = Knowledge & Understanding, **C2** = Cognitive Skills, **C3A** = Practical Skills, **C3B** = Interpersonal Skills, **C3C** = Communication Skills, **C3D** = Digital Skills, **C3E** = Numeracy Skills, **C3F** = Leadership, Autonomy & Responsibility, **C4A** = Personal Skills, **C4B** = Entrepreneurial Skills, **C5** = Ethics & Professionalism

9 Transferable Skills (if applicable)

*(Skills learned in the course of study which can be useful and utilized in other settings)*

| | |
|---|---|
| 1 | Cognitive skills |
| 2 | |
| 3 | |

Open-ended response (if any)

| | |
|---|---|
| 4 | |

10 Distribution of Student Learning Time (SLT)

Note: This SLT calculation is designed for home grown programme only.

| | | Learning and Teaching Activities** | |
|---|---|---|---|
| | | Face-to-Face (F2F) | |

| | Course Content Outline and Subtopics | CLO* | Physical | | | | Online/ Technology-mediated (Synchronous) | | | | NF2F Independent Learning (Asynchronous) | Total SLT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | T | P | O | L | T | P | O | | |
| 1 | Week 1 : Introduction to 3D graphics<br>• Introduction to Computer Graphics<br>• The Graphics Pipeline Architecture<br>• Introduction to Graphics Application Programming Interfaces | 1 | 1 | 1 | - | - | - | - | - | - | 2 | |
| 2 | Practical 1 : Introduction to OpenGL | 2, 3 | - | - | 2 | - | - | - | - | - | - | |
| 3 | Week 2 : Rendering<br>• Primitives and Polygons<br>• Colours | 1 | 1 | 1 | - | - | - | - | - | - | 2 | |
| 4 | Practical 2 : Primitives and Polygon | 2, 3 | - | - | 2 | - | - | - | - | - | - | |
| 5 | Week 3 - 6 : Viewing and Transformations<br>• Projection<br>- Orthogonal<br>- Perspective<br>•The Viewing System<br>- Culling<br>- Clipping<br>• Transformations<br>- Translation<br>- Rotation<br>- Scaling | 1 | 4 | 4 | - | - | - | - | - | - | 8 | |
| 6 | Practical 3 : Transformation | 2, 3 | - | - | 6 | - | - | - | - | - | - | |
| 7 | Practical 4 : Projection | 2, 3 | - | - | 4 | - | - | - | - | - | - | |
| 8 | Practical 5 : 3D Object | 2, 3 | - | - | 4 | - | - | - | - | - | - | |
| 9 | Week 7 - 8 : Lighting and Materials<br>• Light Sources<br>• Materials<br>• Reflection Models | 1 | 2 | 2 | - | - | - | - | - | - | 4 | |
| 10 | Practical 6 : Lighting and Materials | 2, 3 | - | - | 2 | - | - | - | - | - | - | |
| 11 | Week 9 - 10 : Texture Mapping<br>• Basic Textures Mapping<br>• Texture Filtering | 1 | 2 | 2 | - | - | - | - | - | - | 4 | |
| 12 | Practical 7 : Texture Mapping | 2, 3 | - | - | 6 | - | - | - | - | - | - | |
| 13 | Week 11 - 13 : Shadows, Curves and Surfaces<br>• Shadow Rendering<br>• Stencil Buffer Test<br>• Splines<br>• Besier Curves<br>• NURBS | 1 | 3 | 3 | - | - | - | - | - | - | 6 | |
| 14 | Practical 8 : Shadow | 2 | - | - | 2 | - | - | - | - | - | - | |
| 15 | Week 14 : Shader<br>• Vertex Shader<br>• Pixel Shader | 1 | 1 | 1 | - | - | - | - | - | - | 2 | |
| 16 | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | |
| | | | | | | | | | | | **SUB-TOTAL SLT:** | **84** |

| | Continous Assessement | % | Face-to-Face (F2F) | | NF2F Independent Learning for Assessment (Asynchronous) |
|---|---|---|---|---|---|
| | | | Physical | Online/ Technology-mediated (Synchronous) | |
| 1 | Test | 14 | 0.5 | - | 8 |
| 2 | Practical Assessment | 14 | 0.5 | - | 10 |
| 3 | Assignment | 42 | 1 | - | 10 |
| 4 | | | | | |
| 5 | | | | | |
| | | | | | **SUB-TOTAL SLT:** **30** |

| | | Face-to-Face (F2F) | NF2F |
|---|---|---|---|

| | Final Assessement | | % | Physical | Online/ Technology-mediated (Synchronous) | Independent Learning for Assessment (Asynchronous) | |
|---|---|---|---|---|---|---|---|
| 1 | Examination | | 30 | 2 | - | 4 | |
| 2 | | | | | | | |
| 3 | | | | | | | |
| 4 | | | | | | | |
| 5 | | | | | | | |
| | | | | | | **SUB-TOTAL SLT:** | **6** |
| | | | | | | SLT for Assessment: | 36 |
| | | | | | | **GRAND TOTAL SLT:** | 120 |
| **A** | | | | | | % SLT for F2F Physical Component:<br>*[Total F2F Physical /(Total F2F Physical + Total F2F Online + Total Independent Learning) x 100)]* | 50.00 |
| **B** | | | | | | % SLT for Online & Independent Learning Component:<br>*[(Total F2F Online + Total Independent Learning) /( Total F2F Physical + Total F2F Online + Total Independent Learning) x 100]* | **50.00** |
| **C** | | | | | | % SLT for All Practical Component:<br>*[% F2F Physical Practical + % F2F Online Practical]* | **23.33** |
| **C1** | | | | | | % SLT for F2F Physical Practical Component<br>*[Total F2F Physical Practical /( Total F2F Physical + Total F2F Online + Total Independent Learning) x 100)]* | **23.33** |
| **C2** | | | | | | *% SLT for F2F Online Practical Component*<br>*[Total F2F Online Practical / (Total F2F Physical + Total F2F Online + Total Independent Learning) x 100]* | **0.00** |

Please tick (√) if this course is **Industrial Training/ Clinical Placement/ Practicum** using 50% of Effective Learning Time (ELT)

Note:

* Indicate the CLO based on the CLO's numbering in Item 8

** For ODL programme: Courses with mandatory practical requiremnets imposed by the programme standards or any related standards can be exempted from complying to the minimum 80% ODL delivery rule in the SLT.

| | | |
|---|---|---|
| 11 | Identify special requirement or resources to deliver the course (e.g., software, nursery, computer lab, simulation room etc) | OpenGL |

| | | |
|---|---|---|
| 12 | References (include required and further readings, and should be the most current) | Main references supporting the course<br>1. Gordon.V.S and John L. C. (2021) *Computer Graphics Programming In OpenGL With C++. 2nd edn* . Mercury Learning and Information.<br>2. Joey.D.V. (2020). *Learn OpenGL: Learn modern OpenGL graphics programming in a step-by-step fashion* . Kendall & Welling. |
| 13 | Other additional information (if applicable) | NIL |
| | Note: Number of PLO indicated is purely for illustration purposes only and the number is subjected to the curriculum design. | |