

| Module Details |                                         |
|----------------|-----------------------------------------|
| Module Title   | Numerical Methods and Computer Graphics |
| Module Code    | COS6021-B                               |
| Academic Year  | 2022/3                                  |
| Credits        | 20                                      |
| School         | Department of Computer Science          |
| FHEQ Level     | FHEQ Level 6                            |

| Contact Hours  |       |
|----------------|-------|
| Type           | Hours |
| Lectures       | 12    |
| Laboratories   | 24    |
| Directed Study | 164   |

| Availability |                                     |
|--------------|-------------------------------------|
| Occurrence   | Location / Period                   |
| BDA          | University of Bradford / Semester 1 |

| Module Aims                                                                                                                                                                                                                                                                                                                                             |
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| To introduce, analyse and apply the basic principles, concepts, techniques and tools that are used to develop numerical algorithms for computer graphics, computer games and general real time applications. To instil an appreciation of the numerical techniques available for computer graphics, computer games, and general real time applications. |

| Outline Syllabus                                                                                                                                                                                                                                     |
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| Co-ordinate system; geometric transformation and projection; rotation and translations in 2D; surfaces; advanced rendering; rotation in 3D; raster graphics algorithms; Bezier curve; interpolation; fixed point iteration; optimisation techniques. |

| Learning Outcomes |                                                                                                                                                                                                                                                                                                                     |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Outcome Number    | Description                                                                                                                                                                                                                                                                                                         |
| 01                | a) Demonstrate a breadth of knowledge of the problems encountered in real time implementation of numerical algorithms. b) Demonstrate knowledge in the use of computer libraries to develop and implement efficient numerical algorithms for computer graphics, computer games, and general real time applications. |
| 02                | a) Analyse and then implement real time solutions to problems in computer graphics, computer games and general real time applications. b) Use state-of-the-art computer libraries to develop and implement efficient numerical algorithms for computer graphics, computer games and general real time applications. |
| 03                | Learn and work independently with patience and persistence using good general skills of organisation and time-management, be adaptable with a highly developed ability to assess problems from new areas logically through an analytical approach, write coherently and clearly communicate results.                |

| Learning, Teaching and Assessment Strategy                                                                                                                                                                                                                                                                                                                     |
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| <p>The basic theory and illustrative examples will be presented and developed in formal lectures.</p> <p>Complimentary tailor made example sheets will be provided. These are discussed, and assistance with their solution is provided in laboratory sessions, either on a one to one basis or as a member of staff or student led group, as appropriate.</p> |

| Mode of Assessment |                           |                            |           |
|--------------------|---------------------------|----------------------------|-----------|
| Type               | Method                    | Description                | Weighting |
| Summative          | Coursework - Artefact     | Individual Coursework      | 30%       |
| Summative          | Examination - Closed Book | Exam - Closed Book (2 Hrs) | 70%       |

| Reading List                                                                                                                                             |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| To access the reading list for this module, please visit <a href="https://bradford.rl.talis.com/index.html">https://bradford.rl.talis.com/index.html</a> |

*Please note:*

*This module descriptor has been published in advance of the academic year to which it applies. Every effort has been made to ensure that the information is accurate at the time of publication, but minor changes may occur given the interval between publishing and commencement of teaching. Upon commencement of the module, students will receive a handbook with further detail about the module and any changes will be discussed and/or communicated at this point.*