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|--|---|----------------|
| Module Title: | Data Structures and Algorithms | |
| Language of Instruction: | English | |
| Credits: | 10 | |
| NFQ Level: | 7 | |
| Module Delivered In | 1 programme(s) | |
| Teaching & Learning Strategies: | The course material will be delivered by laboratory based lectures where students can use a programming environment to explore data structures as they are introduced. Students will also be assigned practical exercises, upon completion of which they will be able to: develop simple game prototypes to illustrate the application of fundamental data structures; implement a graph API to demonstrate various pathfinding algorithms in a real-time game. | |
| Module Aim: | To give the student an understanding of complex data structures and algorithms and their applications in computer games. | |
| Learning Outcomes | | |
| <i>On successful completion of this module the learner should be able to:</i> | | |
| LO1 | Use data structures and algorithms from an existing professional library | |
| LO2 | Design and implement complex data structures and algorithms using object oriented techniques | |
| LO3 | Describe and implement advanced path finding techniques | |
| Pre-requisite learning | | |
| Module Recommendations <i>This is prior learning (or a practical skill) that is recommended before enrolment in this module.</i> | | |
| 6876 | PROG H2222 | Programming II |
| Incompatible Modules <i>These are modules which have learning outcomes that are too similar to the learning outcomes of this module.</i> | | |
| No incompatible modules listed | | |
| Co-requisite Modules | | |
| No Co-requisite modules listed | | |
| Requirements <i>This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.</i> | | |
| No requirements listed | | |

Module Content & Assessment

Indicative Content

Data Structures and Algorithms:

Collections: iterators; linked lists; queues; priority queues; maps; hash tables. Trees: general trees, binary trees, binary search trees, heaps. Graph theory: directed and undirected graphs; weighted graphs; graph representations; graph traversal algorithms. Pathfinding: Tile-based and non tile-based algorithms; breadth-first search, distance-first pathfinder, heuristic pathfinder, A* pathfinder.

| Assessment Breakdown | % |
|----------------------------------|--------|
| Continuous Assessment | 10.00% |
| Project | 20.00% |
| Practical | 20.00% |
| End of Module Formal Examination | 50.00% |

Continuous Assessment

| Assessment Type | Assessment Description | Outcome addressed | % of total | Assessment Date |
|-----------------|------------------------|-------------------|------------|-----------------|
| Examination | Class Exam | 1,2 | 10.00 | n/a |

Project

| Assessment Type | Assessment Description | Outcome addressed | % of total | Assessment Date |
|-----------------|------------------------|-------------------|------------|-----------------|
| Project | Mini Project | 2,3 | 20.00 | Sem 1 End |

Practical

| Assessment Type | Assessment Description | Outcome addressed | % of total | Assessment Date |
|-----------------------------|---|-------------------|------------|-----------------|
| Practical/Skills Evaluation | Participation in and completion of practical work | 1,2,3 | 20.00 | Sem 1 End |

End of Module Formal Examination

| Assessment Type | Assessment Description | Outcome addressed | % of total | Assessment Date |
|-----------------|--------------------------|-------------------|------------|-----------------|
| Formal Exam | Three hour written exam. | 1,2,3 | 50.00 | End-of-Semester |

ITCarlow reserves the right to alter the nature and timings of assessment

Module Workload

| Workload: Full Time | | |
|----------------------------|--------------------|--|
| <i>Workload Type</i> | <i>Frequency</i> | <i>Average Weekly Learner Workload</i> |
| Laboratory | 20 Weeks per Stage | 5.00 |
| Estimated Learner Hours | 20 Weeks per Stage | 4.00 |
| | Total Hours | 180.00 |

Module Delivered In

| Programme Code | Programme | Semester | Delivery |
|----------------|---|----------|-----------|
| CW_KCCGD_B | Bachelor of Science (Honours) in Computer Games Development | 3 | Mandatory |