**DigiPen**
INSTITUTE OF TECHNOLOGY
SINGAPORE

# COURSE CATALOG
# ADDENDUM: VERSION 2

**2021–2022**

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# Bachelor of Science in Computer Science in Real-Time Interactive Simulation (BSCS RTIS)

*[Updated April 2023]*
*[Revised Course Sequence]*

## BSCS RTIS Recommended Course Sequence

| S/NO | MODULE CODE | MODULE TITLE | MODULE CREDITS |
|---|---|---|---|
| | **YEAR 1 \| TRIMESTER 1** | | |
| 1 | CSD1100 | Computer Environment | 7 |
| 2 | CSD1610 | Composition | 5 |
| 3 | CSD1240 | Linear Algebra and Geometry | 7 |
| 4 | CSD1120 | High-level Programming 1 | 7 |
| 5 | CSD1400 | Software Engineering Project 1 | 5 |
| | **Sub-Total for YEAR 1 \| TRIMESTER 1** | | **31** |
| | **YEAR 1 \| TRIMESTER 2** | | |
| 6 | CSD1250 | Calculus and Analytic Geometry 1 | 7 |
| 7 | CSD1170 | High-level Programming 2 | 7 |
| 8 | CSD1130 | Game Implementation Techniques | 5 |
| 9 | CSD1650 | Interpersonal and Work Communication | 5 |
| 10 | CSD1450 | Software Engineering Project 2 | 5 |
| | **Sub-Total for YEAR 1 \| TRIMESTER 2** | | **29** |
| | **YEAR 1 \| TRIMESTER 3 (BREAK)** | | |
| | **YEAR 2 \| TRIMESTER 1** | | |
| 11 | CSD2200 | Calculus and Analytic Geometry 2 | 7 |
| 12 | CSD2180 | Operating Systems | 5 |
| 13 | CSD2100 | Introduction to Computer Graphics | 5 |
| 14 | CSD2125 | Modern C++ Design Patterns | 5 |
| 15 | CSD2400 | Software Engineering Project 3 | 7 |
| | **Sub-Total for YEAR 2 \| TRIMESTER 1** | | **29** |
| | **YEAR 2 \| TRIMESTER 2** | | |
| 16 | CSD2258 | Discrete Mathematics | 5 |
| 17 | CSD2160 | Computer Network | 5 |
| 18 | CSD2150 | Introduction to Real-Time Rendering | 5 |
| 19 | CSD2181 | Data Structures | 5 |
| 20 | CSD2450 | Software Engineering Project 4 | 7 |
| | **Sub-Total for YEAR 2 \| TRIMESTER 2** | | **27** |
| | **YEAR 2 \| TRIMESTER 3 (OIP)** | | |
| 21 | CSD3182 | Artificial Intelligence for Games | 5 |
| 22 | CSD2250 | Linear Algebra | 5 |
| 23 | CSD2300* | Motion Dynamics and Lab | 8 |
| 24 | CSD3150 | Spatial Data Structures | 5 |
| | **Sub-Total for YEAR 2 \| TRIMESTER 3** | | **23** |

| S/NO | MODULE CODE | MODULE TITLE | MODULE CREDITS |
|---|---|---|---|
| | **YEAR 3 \| TRIMESTER 1** | | |
| 25 | CSD3130 | Algorithm Analysis | 5 |
| 26 | CSD3240 | Probability and Statistics | 5 |
| 27 | CSD3115 | Low-Level Programming | 5 |
| 28 | CSD3099 | Career and Professional Development | 5 |
| 29 | CSD3400 | Software Engineering Project 5 | 7 |
| | **Sub-Total for YEAR 3 \| TRIMESTER 1** | | **27** |
| | **YEAR 3 \| TRIMESTER 2** | | |
| 30 | CSD2180 | Programming Massively Parallel Processors | 5 |
| 31 | CSD3185 | Machine Learning | 5 |
| 32 | CSD3156 | Mobile and Cloud Computing | 6 |
| 33 | CSD3122 | Developing Immersive Applications | 5 |
| 34 | CSD3450 | Software Engineering Project 6 | 7 |
| | **Sub-Total for YEAR 3 \| TRIMESTER 2** | | **28** |
| | **YEAR 3 \| TRIMESTER 3** | | |
| 35 | CSD4620 | Research, Reasoning, and Writing | 5 |
| 36 | CSD4650 | Professional Communication | 5 |
| | **Sub-Total for YEAR 3 \| TRIMESTER 3** | | **10** |
| | **YEAR 4 \| TRIMESTER 1** | | |
| 37 | CSD4400 | Capstone Project | 8 |
| 38 | CSD4901 | Integrated Work-Study Programme (IWSP) | 10 |
| | **Sub-Total for YEAR 4 \| TRIMESTER 1** | | **10** |
| | **YEAR 4 \| TRIMESTER 2** | | |
| 39 | CSD4400 | Capstone Project (cont.) | 8 |
| 40 | CSD4901 | Integrated Work-Study Programme (IWSP) (cont.) | 10 |
| | **Sub-Total for YEAR 4 \| TRIMESTER 2** | | **18** |
| | **TOTAL FOR 4-YEAR PROGRAM** | | **240** |

*Indicates classes are conducted at SIT@Dover (subject to changes)

# Module Listings for BSCS RTIS and BSCS IMGD

# Department of Computer Science

*[Updated April 2023]*
*[Updated Module Listings]*

### CSD2170 **Programming Massively Parallel Processors** (5 credits)
Prerequisite(s): CSD2150

This course provides a foundation on programming individual stages of a GPU's programmable pipeline using a shader language. The goal of the course is to motivate the concept that processing times of various CPU-based applications can be accelerated by offloading this work from the CPU to the large number of massively parallel processors on the GPU. The emphasis of the course is to program the compute, geometry, and tessellation stages of the programmable pipeline using a modern software API with a compatible shader language for a variety of real-time interactive applications

### CSD3150 **Spatial Data Structures** (5 credits)
Prerequisite(s): CSD2150

This module deals with the efficient representation and processing of complex 3D scenes in order to avoid bottlenecks in the use of the CPU and the GPU. Specific topics include a variety of spatial data structures (binary space-partitioning trees, octrees, kd-trees, and grid data structures), several object-culling methods (occlusion, viewport, and portal), and finally the construction and uses of bounding volumes and their hierarchies for collision detection and related geometric operations.

### CSD3122 Developing **Immersive Applications** (6 credits)
Prerequisite(s): CSD1130, CSD2182

Virtual Reality (VR), Augmented Reality (AR), and other eXtended Reality (XR) or immersive applications in general, are increasingly becoming an important medium of interaction with the digital realm. This course provides a practice-based introduction to the concepts and techniques to develop and evaluate immersive applications. Topics covered include implementation techniques, in the context of immersive applications, for interaction, locomotion and creation of virtual environments. At the end of this module, the student will be proficient in explaining the core components of immersive applications, as well as develop and evaluate a basic 3D immersive application with appropriate interaction modalities.

# Bachelor of Arts in User Experience and Game Design (BA UXGD)

*[Updated October 2022]*
*[Revised Course Sequence]*

## BA UXGD Recommended Course Sequence

| S/NO | MODULE CODE | MODULE TITLE | MODULE CREDITS |
|---|---|---|---|
| | **YEAR 1 \| TRIMESTER 1** | | |
| 1 | UXG1500 | Introduction to Design Process | 7 |
| 2 | UXG1501 | Principles of Interactive Design | 7 |
| 3 | UXG1701 | Introduction to Psychology | 5 |
| 4 | UXG1116 | Introduction to Computer Technology and Programming | 7 |
| 5 | UXG1205 | Introductory Probability and Statistics | 5 |
| | **Sub-Total for YEAR 1 \| TRIMESTER 1** | | **31** |
| | **YEAR 1 \| TRIMESTER 2** | | |
| 6 | UXG1420 | Introduction to Digital Production | 7 |
| 7 | UXG1505 | Game Design Process | 5 |
| 8 | UXG1560 | User Experience Design 1 | 6 |
| 9 | UXG1702 | Cognitive Psychology | 5 |
| 10 | UXG1616 | Storytelling | 5 |
| 11 | UXG1175 | Scripting Languages | 5 |
| | **Sub-Total for YEAR 1 \| TRIMESTER 2** | | **33** |
| | **YEAR 1 \| TRIMESTER 3 (BREAK)** | | |
| | **YEAR 2 \| TRIMESTER 1** | | |
| 12 | UXG2400 | Project 2 | 7 |
| 13 | UXG2520 | System Design 1 | 5 |
| 14 | UXG2570 | User Research 1 | 5 |
| 15 | UXG2165 | Programming Foundations | 7 |
| 16 | UXG2200 | Precalculus with Linear Algebra and Geometry | 7 |
| | **Sub-Total for YEAR 2 \| TRIMESTER 1** | | **31** |
| | **YEAR 2 \| TRIMESTER 2** | | |
| 17 | UXG2450 | Project 2 (continued) | 7 |
| 18 | UXG2540 | Level Design | 7 |
| 19 | UXG2501 | Game Design 1 | 5 |
| 20 | UXG2176 | Advanced Scripting | 5 |
| 21 | UXG2315 | Introduction to Applied Math and Physics | 5 |
| 22 | UXG2735 | College Success for Designers | 1 |
| | **Sub-Total for YEAR 2 \| TRIMESTER 2** | | **30** |
| | **YEAR 2 \| TRIMESTER 3 (OIP)** | | |
| 23 | UXG4515/UXG4535/UXG4536 | Design Elective | 5 |
| 24 | UXG2565 | Game Feel | 5 |
| 25 | UXG2805 | Art Processes | 5 |
| 26 | UXG2802 | 2D Raster Graphics for Designers | 5 |
| | **Sub-Total for YEAR 2 \| TRIMESTER 3** | | **20** |

| S/NO | MODULE CODE | MODULE TITLE | MODULE CREDITS |
|---|---|---|---|
| | **YEAR 3 | TRIMESTER 1** | | |
| 27 | UXG3400 | Project 3 (part 1) | 7 |
| 28 | UXG2502 | Game Design 2 | 5 |
| 29 | UXG3570 | User Research 2 | 5 |
| 30 | UXG3825 | Introduction to 3D Production for Designers | 5 |
| 31 | UXG3815 | Fundamentals of Music and Sound Design | 5 |
| | **Sub-Total for YEAR 3 | TRIMESTER 1** | | **27** |
| | **YEAR 3 | TRIMESTER 2** | | |
| 32 | UXG3450 | Project 3 (part 2) | 7 |
| 33 | UXG3500 | Integrated Digital Design | 5 |
| 34 | UXG3503 | Game Design 3 | 5 |
| 35 | UXG3650 | Professional Communication | 5 |
| 36 | UXG3099 | Career and Professional Development | 5 |
| | **Sub-Total for YEAR 3 | TRIMESTER 2** | | **27** |
| | **YEAR 3 | TRIMESTER 3** | | |
| 37 | UXG4515/UXG4535/UXG4536 | Design Elective | 5 |
| 38 | PSY Elective | Any Psychology module | 5 |
| 39 | English Elective | Any English module | 5 |
| | **Sub-Total for YEAR 3 | TRIMESTER 3** | | **15** |
| | **YEAR 4 | TRIMESTER 1** | | |
| 40 | UXG3475/UXG4400/UXG4950 | Project 3 (part 3), or Project 4, or Internship 1 | 8 |
| 41 | UXG4653 | Project Management | 5 |
| | **Sub-Total for YEAR 4 | TRIMESTER 1** | | **13** |
| | **YEAR 4 | TRIMESTER 2** | | |
| 42 | UXG4400/UXG4450/UXG4950/UXG4990 | Project 4 or Project 4 (Continued), or Internship 1 or Internship 2 | 8 |
| 43 | HSS Elective | Any Humanities and Social Sciences module | 5 |
| | **Sub-Total for YEAR 4 | TRIMESTER 2** | | **13** |
| | **TOTAL FOR 4-YEAR PROGRAM** | | **240** |

# Bachelor of Fine Arts in Digital Art and Animation (BFA)

*[Updated October 2022]*
*[Revised Course Sequence]*

## BFA Recommended Course Sequence

| S/NO | MODULE CODE | MODULE TITLE | MODULE CREDITS |
|---|---|---|---|
| | **YEAR 1 | TRIMESTER 1** | | |
| 1 | DAA1201 | Animation Basics 1 | 7 |
| 2 | DAA1115 | Art and Technology | 5 |
| 3 | DAA1101 | The Language of Drawing 1 | 7 |
| 4 | DAA1616 | Storytelling | 5 |
| 5 | DAA1125 | Tone, Color, and Composition 1 | 6 |
| | **Sub-Total for YEAR 1 | TRIMESTER 1** | | **30** |
| | **YEAR 1 | TRIMESTER 2** | | |
| 6 | DAA1251 | Animation Basics 2 | 5 |
| 7 | DAA1151 | Basic Life Drawing | 6 |
| 8 | DAA1120 | Language of Drawing 2 | 5 |
| 9 | DAA1130 | Tone, Color, and Composition 2 | 6 |
| 10 | DAA1150 | Human Anatomy | 5 |
| 11 | DAA1401 | The Basics of Production | 5 |
| | **Sub-Total for YEAR 1 | TRIMESTER 2** | | **32** |
| | **YEAR 1 | TRIMESTER 3 (BREAK)** | | |
| | **YEAR 2 | TRIMESTER 1** | | |
| 12 | DAA2101 | Life Drawing 2 | 5 |
| 13 | DAA2301 | Introduction to 2D Computer Graphics | 6 |
| 14 | DAA2325 | Introduction to 3D Computer Graphics | 7 |
| 15 | DAA2401/DAA2402 | 2D Animation Production or Game Art Project 1 | 7 |
| 16 | DAA2515 | History of Film and Animation | 5 |
| | **Sub-Total for YEAR 2 | TRIMESTER 1** | | **30** |
| | **YEAR 2 | TRIMESTER 2** | | |
| 17 | DAA2151 | Character Design | 5 |
| 18 | DAA2150 | Storyboards | 5 |
| 19 | DAA2375 | Introduction to 3D Animation | 5 |
| 20 | DAA2451/DAA2452 | 2D Animation Production or Game Art Project 1 | 7 |
| 21 | DAA2100 | Perspective, Backgrounds, and Layouts | 5 |
| 22 | DAA2099 | College Success for Artists | 3 |
| | **Sub-Total for YEAR 2 | TRIMESTER 2** | | **30** |
| | **YEAR 2 | TRIMESTER 3 (OIP)** | | |
| 23 | DAA Elective | A Year 3 or Year 4 Art, Animation, Film or Graphics module | 5 |
| 24 | DAA2501 /DAA2510 | Cinematography / Cinematography For Visual Effects | 5 |
| 25 | DAA2110 | Animal Anatomy | 5 |
| 26 | DAA2300 | 3D Environment and Level Design | 6 |
| | **Sub-Total for YEAR 2 | TRIMESTER 3** | | **21** |

| S/NO | MODULE CODE | MODULE TITLE | MODULE CREDITS |
|---|---|---|---|
| | **YEAR 3 | TRIMESTER 1** | | |
| 27 | DAA3400 | 3D Production Pipeline | 8 |
| 28 | DAA Elective | A Year 3 or Year 4 Art, Animation, Film or Graphics module | 5 |
| 29 | DAA Elective | A Year 3 or Year 4 Art, Animation, Film or Graphics module | 5 |
| 30 | DAA3715 | Introduction to Scripting and Programming | 5 |
| | **Sub-Total for YEAR 3 | TRIMESTER 1** | | **23** |
| 31 | DAA3450/DAA3452 | Cinematic Production or Game Art Project 2 | 8 |
| 32 | DAA3099 | Career and Professional Development | 5 |
| 33 | DAA3650 | Professional Communication | 5 |
| 34 | DAA3720 | Introduction to Applied Math and Physics | 5 |
| 35 | DAA3101 | Conceptual Illustration and Visual Development | 5 |
| | **Sub-Total for YEAR 3 | TRIMESTER 2** | | **28** |
| | **YEAR 3 | TRIMESTER 3** | | |
| 36 | ENG Elective | Any English module numbered 4000 or higher | 5 |
| 37 | DAA4615 | Media and Ethics: A Social Science Perspective | 5 |
| 38 | Open Elective | A module from any department at DigiPen | 5 |
| | **Sub-Total for YEAR 3 | TRIMESTER 3** | | **15** |
| | **YEAR 4 | TRIMESTER 1** | | |
| 39 | DAA4400/DAA4402/ DAA4950 | Cinematic Production,  or Game Art Project 2, or Internship 1 | 8 |
| 40 | DAA4150 | Portfolio | 5 |
| 41 | DAA4616 | Introduction to Intellectual Property and Contracts | 5 |
| | **Sub-Total for YEAR 4 | TRIMESTER 1** | | **18** |
| | **YEAR 4 | TRIMESTER 2** | | |
| 42 | DAA4450/DAA4950/ DAA4990 | Professional Practice or Internship 1 or Internship 2 | 8 |
| 43 | GED Elective | Any English, History, Social Sciences, or Psychology module | 5 |
| | **Sub-Total for YEAR 4 | TRIMESTER 2** | | **13** |
| | **TOTAL FOR 4-YEAR PROGRAM** | | **240** |