

Simulation (SIMS)

SIMS 115 Digital Illustration 3 Credits (3,0)

Overview of illustration's transition into the digital age; foundational concepts and techniques. Application of traditional art principles to digital media. Survey of specialty areas, software, and techniques for information and entertainment media.

Course Offered at: Prescott

SIMS 150 Games Systems I Introduction 3 Credits (3,0)

Foundations of object-oriented programming for game development. Exploration of technologies behind modern games. Development, implementation, and critique of game prototypes.

Course Offered at: Prescott

SIMS 199 Special Topics in Simulation Science 1-6 Credit (1-6,0)

Individual, independent, or directed studies of selected topics in simulation science.

Course Offered at: Daytona Beach, Prescott

SIMS 200 Aviation Simulation Systems 3 Credits (3,0)

Building realistic simulation systems; understanding fidelity, FAA criteria for simulation approval, and pilot interaction. Analysis of motion and motion cueing on simulation fidelity.

Course Offered at: Daytona Beach

SIMS 201 World Building I Modeling 3 Credits (3,0)

Design and creation of animated, textured models using 3D software. Creation of virtual worlds with objects, scenes, and venues for online environments.

Course Offered at: Prescott

SIMS 202 World Building II Materials 3 Credits (3,0)

Focus on materialization techniques for 3D assets. Topics: texturing, lighting, shading, rendering, and effects simulation. Simulation of real-world and fantastical scenarios.

Course Offered at: Prescott

SIMS 203 World Building III Mechanics 3 Credits (3,0)

Mechanical rigging for animation of biological and mechanical systems. Topics: joint placement, skinning, procedural deformers, inverse kinematics, and auto-rigging.

Course Offered at: Prescott

SIMS 205 Game Design Workshop 3 Credits (3,0)

Design, development, and playtesting of games. Conceptualization, prototyping, and iteration with player feedback. Covers game structure, dramatic elements, and system dynamics.

Course Offered at: Prescott

SIMS 215 Interactive Media I 3 Credits (3,0)

Foundations of digital media production for interactive content. Topics: animation, compositing, sound design, and interactivity for digital media experiences.

Course Offered at: Prescott

SIMS 235 Graphics Processing 3 Credits (3,0)

Introduction to computer graphics algorithms, graphics programming, and design. Applications in aviation, business, and science. Term project in graphics programming.

Course Offered at: Prescott

SIMS 251 Game Systems II Multi-player 3 Credits (3,0)

Technologies for multi-user, networked virtual environments. Topics: data serialization, cloud-based databases, and server-side scripting. Development of multi-user games.

Course Offered at: Prescott

SIMS 299 Special Topics in Simulation Science 1-6 Credit (1-6,0)

Individual, independent, or directed studies of selected topics in simulation science.

Course Offered at: Daytona Beach, Prescott

SIMS 300 Flight Dynamics Algorithms 3 Credits (3,0)

Derivation of equations of motion for aerospace vehicles. Topics: static/dynamic stability, numerical integration methods, and stability derivatives.

Course Offered at: Daytona Beach

SIMS 304 World Building IV Motion 3 Credits (3,0)

Techniques for animating 3D assets for virtual scenarios. Keyframe animation, effects simulation, and motion capture for believable motion in digital environments.

Course Offered at: Prescott

SIMS 315 Interactive Media II 3 Credits (3,0)

Exploration of digital storytelling for interactive and immersive experiences. Design and analysis of impactful narratives using cutting-edge tools.

Course Offered at: Prescott

SIMS 331 Simulation II Procedural Modeling 3 Credits (3,0)

Procedural workflows for particle and dynamic simulations in interactive 3D environments. Topics: fluids, destruction effects, terrain, crowds, and game integration.

Course Offered at: Prescott

SIMS 335 Game Engine Architecture 3 Credits (3,0)

Use of open-source game engines for designing and implementing games. Principles of game engine design, team-based game projects, and evaluation.

Course Offered at: Prescott

SIMS 350 Visualization and Virtual Reality Games III 3 Credits (3,0)

Use of games, graphics, and virtual reality in engineering, science, and military training. Topics: war gaming and flight simulator development.

Course Offered at: Prescott

SIMS 351 Game Systems III Production 3 Credits (3,0)

Project-based course in digital game development. Application of agile software development, project management, and advanced game mechanics.

Course Offered at: Prescott

SIMS 399 Special Topics in Simulation Science 1-6 Credit (1-6,0)

Individual, independent, or directed studies of selected topics in simulation science.

Course Offered at: Daytona Beach, Prescott

SIMS 400 Instrumentation for Flight Test 3 Credits (3,0)

Advanced instrumentation setups for flight testing. Topics: transducers, calibration, installation, and error investigation. Includes lab work.

Course Offered at: Daytona Beach

SIMS 401 Character Design and Production 3 Credits (3,0)

Character development for virtual worlds. Application of traditional and contemporary design principles to create detailed 3D characters.

Course Offered at: Prescott

SIMS 402 Introduction to Flight Testing 3 Credits (3,0)

Role of flight testing in aerospace. Topics: certification, risk management, performance evaluation, and flight test methods. Includes team evaluation of an aircraft.

Course Offered at: Daytona Beach

SIMS 403 Set and Environment Design 3 Credits (3,0)

Design and production of virtual environments for simulation worlds. Concept development, terrain design, set design, and real-world acquisition techniques.

Course Offered at: Prescott

SIMS 404 Fly-By-Wire Aircraft Simulation and Design 3 Credits (3,0)

Advances in automated flight control systems. Topics: fly-by-wire architecture, simulation, and stability improvement techniques.

Course Offered at: Daytona Beach

SIMS 405 Simulation Visual Systems 3 Credits (3,0)

Development of realistic visual systems for simulations. Topics: hardware, software, visual database development, and FAA-qualified display requirements. Includes lab work.

Course Offered at: Daytona Beach

SIMS 406 Aviation Simulation Systems Integration 3 Credits (3,0)

Creation of a Distributed Interactive Simulation (DIS) environment. Topics: networking, real-time simulation, ATM, OSI model, and TCP/IP protocols.

Course Offered at: Daytona Beach

SIMS 410 Flight Test and Simulation 3 Credits (3,0)

Capstone course in flight testing and simulation. Topics: FAA certification, simulator matching, and interdisciplinary flight test projects. Lab fee required.

Course Offered at: Daytona Beach

SIMS 412 Operational Applications in Simulation 3 Credits (3,0)

Project-based course in simulation applications for aviation. Topics: virtual pilot training, database development, fidelity, human factors, and simulator research.

Course Offered at: Daytona Beach

SIMS 415 User Interface Design 3 Credits (3,0)

Interface design principles for digital platforms. Topics: visual hierarchy, UI animation, navigation systems, and interactivity for various platforms.

Course Offered at: Prescott

SIMS 421 Modeling and Simulation II 3 Credits (3,0)

Advanced modeling and simulation techniques for complex systems.

Topics: object-oriented programming, advanced animation, input-output analysis, and system modeling.

Course Offered at: Prescott

SIMS 445 Advance Graphics Processing 3 Credits (2,2)

Principles of computer architecture for supporting graphics engines.

Topics: hardware, graphics processors, and system performance.

Course Offered at: Prescott

SIMS 450 Game Systems IV: Mixed Reality 3 Credits (2,2)

Tools and workflows for creating immersive experiences in spatial computing (AR/VR). Topics: gaze-based control, movement techniques, and XR-specific UI/UX.

Course Offered at: Prescott

SIMS 490 Capstone I and Laboratory 4 Credits (3,3)

First of two courses in interactive project development. Team-based work on concept development, modeling, playtesting, and design thinking.

Course Offered at: Prescott

SIMS 491 Capstone II and Laboratory 4 Credits (3,0)

Second course in interactive project development. Focus on worldbuilding, codification, and testing of a playable prototype.

Course Offered at: Prescott

SIMS 499 Special Topics in Simulation Science 1-6 Credit (1-6,0)

Individual, independent, or directed studies of selected topics in simulation science.

Course Offered at: Daytona Beach, Prescott