New Jersey Institute of Technology

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Informatics Syllabi   NJIT Syllabi

Spring 2024

IT 265-002: Game Architecture

Matthew Toegel

Recommended Citation

Course Number: IT265
Course Title: Game Architecture
Section: 002
Semester: Spring 2024
Date & Time:
        002: Tues/Thus 11:30am-12:50pm GITC 3200
Modality: Face to Face
Credits: 3
Office Hours: *Mon/Wed 10:00am-11:20am (CKB Main floor Lounge/Common Area, no appointment necessary)*
                General availability via Discord via a provided communication channel
Webex (when needed): https://njit.webex.com/meet/mt85njit.edu

Course Catalog:
        IT 265. Game Architecture and Design. 3 credits, 3 contact hours (3;0;0).
Prerequisites: CS 100 or CS 101 or CS 103 or CS 104 or CS 106 or CS 113 or CS 115 or BNFO 135. Course introduces students to the core concepts and design methodologies integral to designing and developing games and other Entertainment Software.

Instructor:
Matt Toegel (matthew.toegel@njit.edu)

Attending Class:

        Synchronous:
                Class will be held in the rooms and times given per your schedule from the registrar.
Mostly, I'll be sharing my screen with everyone and going over the topics either via the classroom projector or a screen-sharing service. There will commonly be time in class to practice/discuss the topic for that day and/or get a headstart on homework.
                We'll be using Respondus for exams and everyone should ensure the software runs on at least 1 device (anticipate webcams will be required even in the classroom).

        Asynchronous:
                Class material will be available each Monday and is expected to be reviewed that week. Assignments may be due at the end of the week or the end of the next week. You'll also have participation assignments each week.
                We'll be using Respondus for exams and everyone should ensure the software runs on at least 1 device (webcams will be required).

        Both:

It's highly encouraged to ask questions and express any doubts/concerns throughout the course. I want to give everyone the opportunity to raise any concerns or ask any questions to make sure they're on track for the semester.

Make sure to always keep in communication with me if there are any concerns about the class or anything related, this can be done via Discord (preferred), email, Canvas Inbox, etc.

Academic Integrity:

The work done is expected to be your own, any group work should clearly distinguish ownership of tasks. Use of snippets/material from others should be kept to a minimum and the source should be accredited where applicable.

That being said, please also note the below:

Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at:
http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. **Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university.** If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu" Any violations of the NJIT Honor Code will be brought to the attention of the Dean of Students.

Outcome:

This course will be an introduction to and study of topics in game design and game system architecture. Students will work on various projects to study professional games, prototype game designs, and work on design treatments and documents. This course will provide a foundation for game development and design efforts in future classes.

Assignments:

Most assignments will have a digital worksheet to fill out and upload/submit to Canvas. Some assignments will be accompanied by a presentation.

Illustrative Schedule

This schedule is a guideline and is subject to change to fit the particular instance of the class. All topics, in general, are planned to be covered. Some may have more focus than others

and per class interest, other topics may be included. (This has been readjusted into modules that'll be learned, some modules will cover material outside of their immediate scope since this is a Full-Stack course)

Modules: (Each module comes with homework/practice and a quiz/quizzes.) Modules may not directly correspond to Week #s, some may span multiple weeks, and others may be covered together in a single week.

- Module 1: Introduction
  - Course Overview
  - What is a game?
  - What is gameplay?

- Module 2: Game Balance
  - Player / Player Balance
  - Player / Gameplay Balance
  - Gameplay / Gameplay Balance

- Module 3: Look & Feel
  - Color Theory
  - Color Palette
  - Mood
  - Themes

- Module 4: Game Mechanics
  - Puzzles
  - Strategy / Tactics
  - Skill based challenges

- Module 5: Depth Vs Complexity
  - What is Depth?
  - What is Complexity?
  - Randomness

- Module 6: Making your First Game
  - Planning
  - Project Management

- Module 7: Midterm Milestone
  - Game Design Treatment Due
  - Midterm Exam
  - Game Design Project Presentations

- Module 8: Game Architecture
  - Game Architecture Overview
  - Features of a Game Engine

- Module 9: Entity Based Systems
  - What is an entity
  - Entity behavior
  - Entity Interactions

- Module 10: Level Mechanics
  - Tile Systems
  - Parallax
  - 3D Geometry

- Module 11: User Interfaces
  - Control Methods
  - Layout
  - Framing / Overlays

- Module 12: Actor Representations
  - Sprites
  - Models
  - Armatures

- Module 13: Artificial Intelligence
  - Perceptions
  - Finite State Machines
  - Path Finding

- Module 14: Particle Physics
  - Particle Systems
  - Physics Engines

- Module 15: Finale
  - Final Deliverable
  - Final Exam
  - Game Design Documents Due
  - Final Project Presentations

Grading:
Exams / Tests will be graded out of 100 points.

Quizzes will be graded out of 10 and will typically have only one attempt per quiz
Projects / Assignments will be graded out of 10. Some items may have opportunities for extra credit which will be determined per assignment and at the discretion of the instructor.
All points will be converted to a final percentage and letter grade at the end of the semester. Canvas will already have the weightings applied.

Grading Breakdown:
Participation/Attendance: 5%
Case Studies: 10%
Game Design Project: 10%
Design Document Treatment: 5%
Midterm: 15%
Design Document: 15%
Final Project: 20%
Final Exam: 20%

Grading Scale:

A   100 % to 89.5%

B+   < 89.5 % to 84.5%

B   < 84.5 % to 79.5%

C+   < 79.5 % to 74.5%

C   < 74.5 % to 69.5%

D+   < 69.5 % to 64.5%

D   < 64.5 % to 59.5%

F   < 59.5 % to 0.0%

Materials/Technology:

Online Resources Provided (articles and videos)
GitHub/git
IDE of choice
Game Architecture and Design: https://a.co/d/idzvvoZ
Extra Credits: https://www.youtube.com/playlist?list=PLB9B0CA00461BB187

Late Policy:
All deliverables will be eligible for a 5% penalty per day late. Typically this will be controlled by Canvas.
Late assignments will automatically be marked as 0 by Canvas and will be pending until they've been graded.

Missed Exams/Quizzes will result in a 0.

If you are going to miss a class/material and cannot hand in an assignment, it's your responsibility to let me know as soon as possible so the situation can be handled.

There also will be no make-up exams (except, at the discretion of the instructor in the case of a documented medical or family emergency from the Dean of Students).

For any emergency please reach out to the Dean of Students so they can send out an official notice.

Attendance Policy:

Attendance is mandatory and will be recorded each class.

For **synchronous** online sessions, make sure you login with your NJIT id so it's properly recorded.

For **face-to-face** sessions, please follow the in-class instructions.

For **asynchronous** sessions, make sure you do the participation assignments on time.

Having more than 4 unexcused absences will result in an Academic Warning Notice. An absence can be excused via a note from the Dean of Students.

Otherwise, refer to the NJIT Attendance Policy at https://catalog.njit.edu/undergraduate/academic-policies-procedures/ Scroll down to "Attendance Policy"

Syllabus is subject to change, attend class to stay current.