

# Group 2 Electives

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## CMPUT 250

- **Course Description:**

An interdisciplinary course for students in Science, Arts, and other faculties. The focus is on games as interactive entertainment, their role in society, and how they are made. Teams composed of students with diverse backgrounds (e.g. English, Art and Design, and Computing Science) follow the entire creative process: from concept, through pitch, to delivery, of a short narrative-based game using a commercial game engine. To achieve the required mix of backgrounds and experience, students must apply to be considered for this course. See the Department web site for the online form.

- **Prerequisite:**

Second-year standing

- **Terms the course is available in:**

Winter Term 2024, Fall Term 2024, Winter Term 2025

- **Instructor(s):**

Matthew Guzdial (teaching in Winter Term 2024), Instructor(s) undecided for Fall Term 2024, Instructor(s) undecided for Winter Term 2025

- **Instructor ratings:**

Matthew Guzdial's Rate My Professor rating is 4.9/5

- **Course Difficulty:**

The course CMPUT 250 is known for having a significant workload, with students reporting spending a lot of time on midterms, finals, labs, and a group project. The tests and labs are described as relatively easy, but the group project's success depends on the quality of the team. The average grade is reported to be around 3.9, indicating that putting in effort should lead to a good grade. Some students have reported difficulty getting into the class, suggesting that it may be in high demand. Additionally, for students taking on the music role in the course, the amount of time spent on creating music for the game depends on the complexity of the game and the availability of royalty-free sources. While some programming knowledge can be helpful, it is not required for this role in RPG maker.

## CMPUT 304

- **Course Description:**

The second course of a two-course sequence on algorithm design. Emphasis on principles of algorithm design. Categories of algorithms such as divide-and-conquer, greedy algorithms, dynamic programming; analysis of algorithms; limits of algorithm design; NP-completeness; heuristic algorithms.

- **Prerequisites:**

CMPUT 204; one of STAT 151, 161, 181, 235, 265, SCI 151, or MATH 181; and one of MATH 225, 227, or 228

- **Terms the course is available in:**

Fall Term 2024

- **Instructor(s):**

Instructor(s) undecided for Fall Term 2024

- **Instructor ratings:**

No professors teaching this term, so no ratings available at all

- **Course Difficulty:**

The course CMPUT 304 is reported to be difficult by several students, with some expressing frustration over the teaching style of the professor. They suggest that students may need to teach themselves the material and rely on external resources such as YouTube and StackOverflow. The course is described as having a low maintenance workload, with the homework being similar to quiz questions. However, some students mention that having taken the prerequisite course 204 beforehand would have been beneficial. Overall, the course is seen as having a significant amount of content to learn, and students may need to put in extra effort to fully understand the concepts.

## CMPUT 307

- **Course Description:**

An introductory course on the theory and applications of computer based 3D modeling and animation. The course will cover a selection of topics from overview of tools supporting modeling and animation, automatically generating 3D models, and animation of skeleton based models through algorithms and software. Applications of 3D modeling and animation in games, virtual/augmented environments, movies, and emerging video transmission algorithms will be discussed.

- **Prerequisites:**  
one of CMPUT 206, 308, or 411; or consent of the instructor
- **Terms the course is available in:**  
Winter Term 2024
- **Instructor(s):**  
Anup Basu (teaching in Winter Term 2024),
- **Instructor ratings:**  
Anup Basu's Rate My Professor rating is 4.3/5
- **Course Difficulty:**  
307 is considered a challenging course, with prerequisites that may include CMPUT 206, 308, or 411, or the instructor's consent. Some students suggest having a strong background in 3D math and Linear Algebra II before attempting the course. The textbook for the course, 366, has been criticized for being incomplete and poorly written, with assignments reportedly taking weeks to be marked and exams heavily relying on memorizing formulas. Some students have expressed frustration with the course's difficulty and lack of usefulness, suggesting alternative courses such as 403 for those interested in algorithmic study.

## CMPUT 325

- **Course Description:**  
A study of the theory, run-time structure, and implementation of selected non-procedural programming languages. Languages will be selected from the domains of functional, and logic-based languages.
- **Prerequisites:**  
CMPUT 201 and 204 or 275; one of CMPUT 229, E E 380 or ECE 212, and MATH 125
- **Terms the course is available in:**  
Winter Term 2024, Winter Term 2025
- **Instructor(s):**  
Jia-Huai You (teaching in Winter Term 2024), Instructor(s) undecided for Winter Term 2025
- **Instructor ratings:**  
The professor does not have a rating on Rate My Professor

- **Course Difficulty:**

The course CMPUT 325 is known to have exams with questions similar to the assignments, indicating a moderate to high level of difficulty. The comments also mention past students experiencing significant stress during exams, suggesting a challenging academic environment.

## **CMPUT 350**

- **Course Description:**

This course focuses on state-of-the-art AI and graphics programming for video games. Part 1 introduces C++, the language of choice for video game engines, emphasizing efficiency, safety, the Standard Template Library, and OpenGL. Part 2 on real time strategy deals with efficient pathfinding algorithms, planning, and scripting AI systems. Student projects give hands-on experience directly applicable to the video games industry.

- **Prerequisites:**

CMPUT 201 or 275, and 204

- **Terms the course is available in:**

Fall Term 2024

- **Instructor(s):**

Instructor(s) undecided for Fall Term 2024

- **Instructor ratings:**

No professors teaching this term, so no ratings available at all

- **Course Difficulty:**

The comments suggest that CMPUT 350 is a challenging course, particularly in the areas of algorithms and performance. Students recommend staying on top of the material, practicing consistently, and seeking help from TAs when needed. The course is also project-heavy, with significant projects requiring a good understanding of C++ and AI concepts. Prerequisites such as CMPUT 201, 204, and 301 are recommended for success in the course. The course load includes assignments, readings, labs, quizzes, and a final exam. Some students have reported struggling with the labs and the heavy workload. Overall, the course is described as intense and requiring a strong foundation in programming and algorithms to succeed.

## CMPUT 366

- **Course Description:**

This course provides an introduction to search and planning in artificial intelligence. The course covers deterministic single-agent and multi-agent problems. Students will learn how to model real-world problems as state-space search problems and how to solve such problems. The course covers algorithms for solving deterministic shortest path problems with factored and non-factored states, combinatorial optimization problems, constraint satisfaction problems, and multi-agent problems.

- **Prerequisites:**

CMPUT 204 or 275, and CMPUT 272

- **Terms the course is available in:**

Winter Term 2024, Fall Term 2024

- **Instructor(s):**

Levi Santana de Lelis (teaching in Winter Term 2024), Instructor(s) undecided for Fall Term 2024

- **Instructor ratings:**

The professor does not have a rating on Rate My Professor

- **Course Difficulty:**

The comments suggest that CMPUT 366 is a foundational course for AI, providing a solid understanding of fundamental algorithms and ideas. However, its applicability to industry may be limited for those without advanced degrees. The course is generally considered to be of moderate difficulty, with a fair final exam if studied properly. Some students may find the assignments challenging, but others find them to be a good introduction to AI techniques.

## CMPUT 391

- **Course Description:**

This course covers the implementation of RDBMSs and some non-relational data models, along with their query languages. Topics: compilation, execution, and optimization of SQL queries; concurrent execution of transactions; indexing; advanced constructs in SQL; semi-structured data models and query languages; distributed and parallel databases; NoSQL and cloud-based database systems.

- **Prerequisites:**  
CMPUT 201 and 204, or 275; and CMPUT 291
- **Terms the course is available in:**  
No term decided yet/not offered this year
- **Instructor(s):**  
No instructor teaching the course
- **Instructor ratings:**  
No professors teaching this term, so no ratings available at all
- **Course Difficulty:**  
Insufficient information available on course difficulty

## CMPUT 404

- **Course Description:**  
Introduction to modern web architecture, from user-facing applications to machine-facing web-services. Topics include: the evolution of the Internet, relevant technologies and protocols, the architecture of modern web-based information systems, web data exchange and serialization, and service-oriented middleware.
- **Prerequisites:**  
CMPUT 301 and 291, or consent of the instructor
- **Terms the course is available in:**  
Winter Term 2024, Fall Term 2024, Winter Term 2025
- **Instructor(s):**  
Hazel Campbell (teaching in Winter Term 2024), Instructor(s) undecided for Fall Term 2024, Instructor(s) undecided for Winter Term 2025
- **Instructor ratings:**  
Hazel Campbell's Rate My Professor rating is 1.7/5
- **Course Difficulty:**  
The course CMPUT 404 is considered to be quite difficult, with a heavy workload comparable to CMPUT 301. It is recommended for those with some prior knowledge of JavaScript, Ajax, HTML/CSS, and web servers, but it is also open to newcomers. The course covers topics such as Django backends, models and views, HTTP, websockets, REST APIs, and HTML templates. The professor, Hindle, is highly regarded and provides

great teaching materials. The course load is heavy, but manageable, and students are allowed to form teams within the same lab section. Previous experience with the languages is not required, and students can email Sharon to waive the prerequisite 391.

## **CMPUT 411**

- **Course Description:**  
2D and 3D transformation; 3D modeling and viewing; illumination models and shading methods; texture mapping; ray tracing.
- **Prerequisites:**  
CMPUT 204 or 275, 301; one of CMPUT 340, 418 or equivalent knowledge, and MATH 214
- **Terms the course is available in:**  
Winter Term 2024, Winter Term 2025
- **Instructor(s):**  
Pierre Boulanger (teaching in Winter Term 2024), Instructor(s) undecided for Winter Term 2025
- **Instructor ratings:**  
The professor does not have a rating on Rate My Professor
- **Course Difficulty:**  
Insufficient information available on course difficulty

## **CMPUT 415**

- **Course Description:**  
Compilers, interpreters, lexical analysis, syntax analysis, syntax- directed translation, symbol tables, type checking, flow analysis, code generation, code optimization.
- **Prerequisites:**  
one of CMPUT 229, E E 380, or ECE 212, and any 300-level Computing Science course
- **Terms the course is available in:**  
Fall Term 2024

- **Instructor(s):**  
Instructor(s) undecided for Fall Term 2024
- **Instructor ratings:**  
No professors teaching this term, so no ratings available at all
- **Course Difficulty:**  
415 is a challenging course with a significant workload, as indicated by multiple comments. The course material is now in C++ and involves several projects that increase in scale and sophistication throughout the semester. The first two projects are individual, while the third and fourth are completed in pairs and groups of four, respectively. The course is worth taking due to its focus on software engineering and the opportunity to architect something on a grand scale. Preparation includes a strong foundation in Java and familiarity with parser generators and intermediate languages such as LLVM. The course is known for its intense workload, which requires constant effort to keep up.

## CMPUT 466

- **Course Description:**  
Learning is essential for many real-world tasks, including recognition, diagnosis, forecasting and data-mining. This course covers a variety of learning scenarios (supervised, unsupervised and partially supervised), as well as foundational methods for regression, classification, dimensionality reduction and modeling. Techniques such as kernels, optimization and probabilistic graphical models will typically be introduced. It will also provide the formal foundations for understanding when learning is possible and practical. Credit cannot be obtained for both CMPUT 367 and CMPUT 466.
- **Prerequisites:**  
CMPUT 204 or 275; MATH 125; CMPUT 267 or MATH 214; or consent of the instructor
- **Terms the course is available in:**  
Winter Term 2024, Fall Term 2024
- **Instructor(s):**  
Bailey Kacsmar (teaching in Winter Term 2024), Instructor(s) undecided for Fall Term 2024
- **Instructor ratings:**  
The professor does not have a rating on Rate My Professor



- **Course Difficulty:**

The comments suggest that CMPUT 466 is a challenging course, particularly for those who struggle with mathematics and theory. The course is described as having a heavy focus on calculus and statistics. Some commenters recommend taking related courses such as STAT 265, 266, 371, and 372, but warn that these courses also have significant mathematical components. Other commenters suggest alternative courses, such as CMPUT 304 and CMPUT 474, that may be more suitable for those with a weaker mathematical background. Overall, the consensus seems to be that CMPUT 466 is a difficult course, particularly for those without a strong mathematical foundation.

## ECE 360

- **Course Description:**

Linear system models. Time response and stability. Block diagrams and signal flow graphs. Feedback control system characteristics. Dynamic compensation. Root locus analysis and design. Frequency response analysis and design. Credit may be obtained in only one of ECE 360, ECE 362, E E 357, E E 462 or E E 469.

- **Prerequisites:**

ECE 203 or E E 250, and ECE 240 or E E 238

- **Terms the course is available in:**

Winter Term 2024, Fall Term 2024, Winter Term 2025

- **Instructor(s):**

Tongwen Chen (teaching in Winter Term 2024), Instructor(s) undecided for Fall Term 2024, Instructor(s) undecided for Winter Term 2025

- **Instructor ratings:**

Tongwen Chen's Rate My Professor rating is 3/5

- **Course Difficulty:**

442, the course on multimedia signal processing, is generally considered to be the easiest elective on the ECE list. However, some students find it to be the most fun and interesting due to its in-depth exploration of machine learning concepts. If you have any specific questions or concerns about the course, consider reaching out to the ECE labs discord or starting a discussion on e-class. The difficulty of the course appears to be relatively low, with the main challenges likely coming from the project work rather than the lecture content.

## ECE 370

- **Course Description:**

Review of vector calculus, electrostatics, and magnetostatics. Electric and magnetic fields in material media, including polarization mechanisms and general boundary conditions. Solutions to static field problems. Maxwell's equations and waves in free space, dielectrics and conducting media. Reflection and refraction, standing waves. Credit may be obtained in only one of ECE 370 or E E 315.

- **Prerequisites:**

MATH 102, 209 and PHYS 230

- **Terms the course is available in:**

Fall Term 2024

- **Instructor(s):**

Instructor(s) undecided for Fall Term 2024

- **Instructor ratings:**

No professors teaching this term, so no ratings available at all

- **Course Difficulty:**

The course ECE 370 is reportedly difficult by some students, with comments suggesting that the professor does not effectively teach the material, does not provide clear notes or examples, and has a biased grading system. The textbooks used for the course may vary, with some focusing on integral forms of Maxwell's equations and others on differential forms. The exams are reportedly challenging, with some students expressing uncertainty about whether they had solved the final exam's PDE correctly. The passing mark for the course is unclear, but students are encouraged to write out their equations, assumptions, and diagrams, and to use their textbooks for guidance.

## ECE 380

- **Course Description:**

Basics of analog communication: amplitude, angle, and analog pulse modulation; modulators and demodulators; frequency multiplexing. Basics of digital communication: sampling, quantization, pulse code modulation, time division multiplexing, binary signal formats. Credit may be obtained in only one of ECE 380 or E E 390.

- **Prerequisite:**  
ECE 240 or E E 238
- **Terms the course is available in:**  
Winter Term 2024, Fall Term 2024, Winter Term 2025
- **Instructor(s):**  
Xingyu Li (teaching in Winter Term 2024), Instructor(s) undecided for Fall Term 2024, Instructor(s) undecided for Winter Term 2025
- **Instructor ratings:**  
The professor does not have a rating on Rate My Professor
- **Course Difficulty:**  
Insufficient information available on course difficulty

## ECE 405

- **Course Description:**  
Introduction to the principles of biophysical instrumentation. Various sensors are examined including strain gauges, inductive, capacitive, thermal, and piezoelectric sensors. Methods of measuring blood pressure are discussed. Origin of biopotentials; membrane and action potentials. Measurement of bioelectrical signals such as the ECG and EMG. Electrical safety, noise, impedance matching, and analog-to-digital conversion. Applications of electrodes, biochemical sensors, and lasers. Credit may be obtained in only one of ECE 405 or EE BE 512.
- **Prerequisite:**  
ECE 203 or E E 250 or consent of the Instructor
- **Terms the course is available in:**  
Fall Term 2024
- **Instructor(s):**  
Instructor(s) undecided for Fall Term 2024
- **Instructor ratings:**  
No professors teaching this term, so no ratings available at all
- **Course Difficulty:**  
ECE 405, Biophysical Instrumentation and Measurement, is a course that has very few students enrolled in it, with only one student taking it since 2011. The course is known

to have a significant amount of calculations and theoretical questions on assignments and exams, but is considered to be fairly straightforward. The midterm exams in the course have been known to be time-consuming.

## ECE 406

- **Course Description:**

This course is intended to enable individuals or a small group of students to study topics in their particular field of interest under the supervision of a member of the Department of Electrical and Computer Engineering or the Department of Computing Science or other appropriate departments.

- **Prerequisites:**

None

- **Terms the course is available in:**

Fall Term 2024

- **Instructor(s):**

Instructor(s) undecided for Fall Term 2024

- **Instructor ratings:**

No professors teaching this term, so no ratings available at all

- **Course Difficulty:**

Insufficient information available on course difficulty

## ECE 407

- **Course Description:**

This course is intended to enable individuals or a small group of students to study topics in their particular field of interest under the supervision of a member of the Department of Electrical and Computer Engineering or the Department of Computing Science or other appropriate departments.

- **Prerequisites:**

None

- **Terms the course is available in:**  
Winter Term 2024, Winter Term 2025
- **Instructor(s):**  
Instructor(s) undecided for Winter Term 2024, Instructor(s) undecided for Winter Term 2025
- **Instructor ratings:**  
No professors teaching this term, so no ratings available at all
- **Course Difficulty:**  
Insufficient information available on course difficulty

## ECE 423

- **Course Description:**  
Topics include distributed communication models (e.g., sockets, remote procedure calls, distributed shared memory), distributed synchronization (clock synchronization, logical clocks, distributed mutex), distributed file systems, replication, consistency models, fault tolerance, QoS and performance, scheduling, concurrency, agreement and commitment, Paxos-based consensus, MapReduce and NoSQL datastores, cloud infrastructures and microservices.
- **Prerequisites:**  
CMPUT 379 and (ECE 487 or CMPUT 313)
- **Terms the course is available in:**  
No term decided yet/not offered this year
- **Instructor(s):**  
No instructor teaching the course
- **Instructor ratings:**  
No professors teaching this term, so no ratings available at all
- **Course Difficulty:**  
Insufficient information available on course difficulty

## ECE 440

- **Course Description:**

Extension of sampling theory and the Fourier transform to two dimensions, pixel operations including gray-level modification, algebraic and geometric transformations. The design of spatial filters for noise reduction, image sharpening and edge enhancement, and some discussion of interpolation techniques. An introduction to the concepts of image restoration from known degradations and the reconstruction of images from parallel and fan projections. Credit may be obtained in only one of EE BE 540 or ECE 440.

- **Prerequisite:**

ECE 340 or E E 338 or consent of Instructor

- **Terms the course is available in:**

Fall Term 2024

- **Instructor(s):**

Instructor(s) undecided for Fall Term 2024

- **Instructor ratings:**

No professors teaching this term, so no ratings available at all

- **Course Difficulty:**

Insufficient information available on course difficulty

## ECE 442

- **Course Description:**

Human visual/audio perception and multimedia data representations. Basic multimedia processing concepts, multimedia compression and communications. Machine learning tools for multimedia signal processing, including principle component analysis and Gaussian mixture modeling. Applications to human-computer interaction, visual-audio, and visual-text processing. Credit may be obtained in only one of ECE 442 or E E 442.

- **Prerequisites:**

ECE 220 or CMPUT 275, ECE 342, MATH 102 or equivalent knowledge

- **Terms the course is available in:**

Winter Term 2024, Winter Term 2025

- **Instructor(s):**  
Li Cheng (teaching in Winter Term 2024), Instructor(s) undecided for Winter Term 2025
- **Instructor ratings:**  
Li Cheng's Rate My Professor rating is 2.5/5
- **Course Difficulty:**  
442 is a course that can be considered both fun and interesting, as well as relatively easy, depending on the specific curriculum. It focuses on machine learning, which is a subfield of signal processing. The course likely delves deeply into this topic.

## ECE 447

- **Course Description:**  
The course introduces basic concepts and techniques of data analysis and machine learning. Topics include: data preprocessing techniques, decision trees, nearest neighbor algorithms, linear and logistic regressions, clustering, dimensionality reduction, model evaluation, deployment methods, and emerging topics.
- **Prerequisites:**  
ECE 220 or CMPUT 275, and ECE 342 or STAT 235, or consent of instructor
- **Terms the course is available in:**  
Winter Term 2024, Winter Term 2025
- **Instructor(s):**  
Marek Reformat (teaching in Winter Term 2024), Instructor(s) undecided for Winter Term 2025
- **Instructor ratings:**  
Marek Reformat's Rate My Professor rating is 4.7/5
- **Course Difficulty:**  
The course ECE 447 is a new introduction to machine learning, and while it is disorganized, the professor is great and the assessments are considered easy. The course content is said to provide a basic introduction to machine learning and some hands-on experience with data analysis. The programming aspect of the course is not considered too difficult, especially for those with a background in software. Overall, the course is considered fairly easy.

## ECE 449

- **Course Description:**

Intelligent systems for automatic control and data analysis. The concepts of vagueness and uncertainty, approximate reasoning, fuzzy rule-based systems and fuzzy control. Strategies for learning and adaptation, supervised and reinforcement learning, self-organization and the selection of neural network architectures. Discussion of the principles of search and optimization, evolution and natural selection and genetic algorithms. Introduction to hybrid intelligence. Applications of intelligent systems for pattern recognition, classification, forecasting, decision support, and control. Credit may be obtained in only one of CMPE 449 or ECE 449.

- **Prerequisites:**

None

- **Terms the course is available in:**

Fall Term 2024

- **Instructor(s):**

Instructor(s) undecided for Fall Term 2024

- **Instructor ratings:**

No professors teaching this term, so no ratings available at all

- **Course Difficulty:**

Insufficient information available on course difficulty

## ECE 455

- **Course Description:**

Microfluidic and nanobiotechnological devices. Fabrication techniques for devices: self-assembly, lithographic technologies. Applications of nanobiotechnology in computing, electronics, human health, environment and manufacture. Credit may be obtained in only one of ECE 455 or E E 455.

- **Prerequisites:**

MATH 201 or PHYS 230

- **Terms the course is available in:**

Winter Term 2024, Winter Term 2025



- **Instructor(s):**  
Xihua Wang (teaching in Winter Term 2024), Instructor(s) undecided for Winter Term 2025
- **Instructor ratings:**  
Xihua Wang's Rate My Professor rating is 4.5/5
- **Course Difficulty:**  
Based on the comments, ECE 455 is considered to be a challenging course. One person describes it as an "absolute ass," while another suggests that it might be worth considering taking a different course, such as ECE 442, which is reportedly more enjoyable and easier. The latter course is described as being about machine learning. The third comment indicates that ECE 442 is a multimedia signal processing course and is considered to be the easiest on the list. Therefore, based on the comments, ECE 455 appears to be a more difficult course than ECE 442.