Group 2 Electives

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 5.1/5

- **Course Difficulty:**
  The course CMPUT 250 is known to have a significant workload, with midterms, finals, labs, and a group project. The tests and labs are reportedly easy, but the group project can be challenging depending on the group dynamics. The average grade is high, around a 3.9, indicating that those who put in the effort can expect good grades. Additionally, getting into the class may require some effort beyond just signing up first, as it seems to be in high demand. For those taking on the music role in the group project, the amount of music creation required can vary greatly depending on the game concept, but online sources can be used for royalty-free music. While some programming knowledge can be helpful for creating specialized sounds, it is not a requirement for this role as RPG maker is used for the course.

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 the course material can be self-taught through resources like YouTube and StackOverflow, and that the professor's lectures may not provide a thorough understanding of the concepts. However, others note that the course itself is relatively low maintenance and that the professor's teaching style does not significantly impact the ability to pass the course. It is recommended that students have a strong foundation in the prerequisite course CMPUT 204 before taking 304. Overall, the course is described as challenging, particularly for those who struggle with abstracted math 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 a strong emphasis on 3D math and linear algebra. Prerequisites include knowledge from courses such as CMPUT 206, 308, or 411, or the instructor's consent. Some students suggest taking 340 and 411 beforehand, as well as having a solid understanding of 3D math concepts. The textbook for the course, 366, has been criticized for its completeness and the assignments have been reported to take a significant amount of time to mark, with results potentially taking several weeks. Some students have expressed frustration with the course's content and feel that it may not be worth taking if the instructor Sutton is not teaching it. Alternatively, the course 403, which focuses on algorithmic concepts, may be a suitable alternative for those interested in the field. Overall, 307 is known to be a difficult course, requiring a strong foundation in 3D math and linear algebra.

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. There have been instances of students becoming visibly distressed during exams, suggesting a challenging academic experience. However, it is also mentioned that students have taken the course before and succeeded, implying that it is not impossible.

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, with heavy workloads, difficult algorithms, and significant projects. Students recommend staying on top of the material, practicing consistently, and seeking help from TAs. Some commenters also mention the importance of having a strong foundation in C++ and algorithms before taking the course. The course is described as project-heavy, with significant time commitments for both the 350 and 301 projects. The comments also suggest that the course is worth the effort, with opportunities to learn valuable skills and prepare for a career in the video game industry. However, some students express frustration with the lab component of the course and the pressure to perform well. Overall, the comments suggest that CMPUT 350 is a challenging but rewarding course for students with a strong foundation in programming and a willingness to put in the time and effort.

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 generally considered to be an easier course, with some challenges arising in the later stages when neural networks are covered. The final exam is perceived as fair as long as one studies adequately. However, there have been instances of disruptions, such as fire alarms, which have caused inconvenience for students. The consensus seems to be that it would not be fair to force students to retake the exam in such cases. Overall, the course is seen as 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:**
  The comments suggest that the course CMPUT 391 can be quite difficult, with some students expressing concerns about the final exam and the harsh grading. The course focuses on the in-depth workings of a DBMS and covers topics such as table scans, joins, and various types of databases. Some students have had positive experiences with the professor, while others have found the TAs to be clueless. The course material and assignments are time-consuming, and some students have suggested that it may be more effective to learn the material on one's own rather than taking the course. The final exam is worth a significant percentage of the overall grade, and some students have expressed frustration with the "fail if you get under 50 on the final exam" policy. Overall, the course is seen as challenging and potentially worth the effort for those interested in databases, but some students have had negative experiences and found it to be a waste of time.

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:**
  Pierre Boulanger's Rate My Professor rating is 2.8/5

- **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:**
  The course CMPUT 415 is quite difficult, with a heavy workload and multiple projects that ramp up in scale and sophistication. Students are expected to finish the entire final project, which can be challenging given the large project scope. Knowledge of Java and familiarity with parser generators and intermediate languages, such as Antlr and LLVM, are essential for success in the course. The course covers a lot of material and requires a significant amount of studying for tests. The projects involve implementing a compiler for a defunct IBM language, which can be a complex and time-consuming task. The workload never lets up and students are encouraged to start working on the next assignment as soon as the current one is completed. Despite the challenges, many students find the course to be the most rewarding and valuable of their CMPUT studies.

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 course CMPUT 466 is considered to be quite challenging, with a heavy emphasis on calculus, statistics, and theory. Some students may find it easier than others, depending on their background in these areas. The course covers machine learning methods and requires a strong understanding of the underlying mathematics and statistics. Prerequisites for the course include STAT 265, 266, 371, and 372, which also have a strong mathematical and statistical focus. Some students may find these prerequisites to be a barrier to entry, especially if they have a weaker background in these areas. Alternatively, there are other courses such as CMPUT 304 and CMPUT 474 that may be more suitable for students who are interested in systems and data management. The course includes assignments, exams, and a final project, with the assignments being the most challenging for some students. The exams are open-ended and require clear communication of machine learning concepts. Overall, the course is considered to be quite difficult, especially for students with a weaker background in mathematics and statistics. However, some students with no prior experience have still been able to succeed in the course.

ECE 303

- **Course Description:**
  Differential amplifiers. Frequency response: active device high-frequency behaviour and circuit models; amplifier circuits and design. Feedback: concepts and structure; feedback topologies and amplifiers; open- and closed-loop response. Operational amplifiers: behaviour, circuit analysis and design. Requires payment of additional student instructional support fees. Refer to the Tuition and Fees page in the University Regulations section of the Calendar. Credit may be obtained in only one of ECE 303 or E E 350.

- **Prerequisite:**
  ECE 302 or E E 340

- **Terms the course is available in:**
  Winter Term 2024, Fall Term 2024, Winter Term 2025

- **Instructor(s):**
  Zhenyu Zhang (teaching in Winter Term 2024), Instructor(s) undecided for Fall Term 2024, Instructor(s) undecided for Winter Term 2025

- **Instructor ratings:**
  Zhenyu Zhang's Rate My Professor rating is 4.3/5

- **Course Difficulty:**
  Insufficient information available on course difficulty

ECE 321

- **Course Description:**
  Software quality attributes. Software requirements. Requirements elicitation via interviewing, workshops, prototyping, and use case analysis. Vision document and Software Requirement Specification document standards. Formal software specification methods including operational and descriptive models. Design by contract. Verification and validation of requirements. Credit may be obtained in only one of CMPE 310 or ECE 321.

- **Prerequisite:**
  CMPUT 275

- **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 321, as described, appears to have a moderate level of difficulty. The instructor emphasizes understanding the material over memorization, and the course includes both theoretical and design components. Students work on a single project throughout the semester, which involves creating various documents and diagrams.

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 2.9/5

- **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 about the course content or project, feel free to ask in the ECE labs discord or start a discussion on e-class.

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:**
  Xingyu Li's Rate My Professor rating is 3/5

- **Course Difficulty:**
  Insufficient information available on course difficulty

ECE 402

- **Course Description:**
  Introduction to radio communications systems. Frequency selective circuits and transformers. Parallel resonant circuits including transformers. Double-tuned circuits. Impedance matching. Oscillators. Conditions for oscillation. Amplitude limitation mechanisms. Phase stability. Crystal oscillators. Mixers. Diode-ring mixers. Square-law mixers. BJT mixers. Intermodulation distortion. Modulators and demodulators. Average envelope detectors. FM demodulators. High frequency amplifiers and automatic gain control. Broadband techniques. Neutralization. Phase-lock loops. Phase detectors. Voltage-controlled oscillators. Loop filters. Phase-locked loop applications. Power amplifiers. Corequisite: ECE 360 or ECE 362 or E E 357 or E E 462. Credit may be obtained in only one of ECE 402 or E E 451.

- **Prerequisite:**
  ECE 303 or E E 350

- **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 403

- **Course Description:**
  Very Large Scale Integration (VLSI) design techniques and their application. Electrical characteristics of MOSFET devices and CMOS circuits. Use of CAD tools for simulation and integrated circuit layout. Modeling delays, advanced digital logic circuit techniques, memory. Credit may be obtained in only one of ECE 403 or E E 453.

- **Prerequisite:**
  ECE 304 or E E 351; corequisite: ECE 410 or CMPE 480

- **Terms the course is available in:**
  Winter Term 2024, Winter Term 2025

- **Instructor(s):**
  Duncan Elliott (teaching in Winter Term 2024), Instructor(s) undecided for Winter Term 2025

- **Instructor ratings:**
  Duncan Elliott's Rate My Professor rating is 2.4/5

- **Course Difficulty:**
  442 is described as both the most fun and interesting elective, as well as the easiest one, indicating that the course may not be particularly difficult. However, it is also noted that it goes in depth about machine learning, which could potentially make it more challenging for some students. Overall, the course seems to have a moderate level of 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 rarely taken course with a small number of students enrolled in recent years. The course is known for its theoretical focus and heavy emphasis on calculations, which can make it challenging for some students. However, the material is interesting in its applications to the field of biophysics. The midterm exams and assignments have a reputation for being time-consuming, but the concepts are generally considered to be straightforward.

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 412

- **Course Description:**
  Defects in manufacturing, failure mechanisms, and fault modeling. Reliability and availability theory. Static and dynamic redundancy and repair. Error correcting codes and self-checking systems. Roll-back strategies. Fault-tolerant computers and network architecture. Credit may be obtained in only one of CMPE 425 or ECE 412.

- **Prerequisite:**
  ECE 342

- **Terms the course is available in:**
  Winter Term 2024, Winter Term 2025

- **Instructor(s):**
  Jie Han (teaching in Winter Term 2024), Instructor(s) undecided for Winter Term 2025

- **Instructor ratings:**
  Jie Han's Rate My Professor rating is 3.4/5

- **Course Difficulty:**
  Insufficient information available on course difficulty

ECE 421

- **Course Description:**
  Advanced programming concepts. Programming language as a vehicle for discussion about programming concepts such as productivity, components and re-use, traditional vs. scripting approaches. Object oriented construction, systems programming, concurrent programming, Graphical User Interface (GUI) programming, distributed programming, and dynamic programming. Credit may be obtained in only one of CMPE 410 or ECE 421.

- **Prerequisites:**
  ECE 322 or CMPE 320, ECE 325, CMPUT 301 and CMPUT 379

- **Terms the course is available in:**
  Winter Term 2024, Winter Term 2025

- **Instructor(s):**
  Ronald Unrau (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

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 can be considered to have varying levels of difficulty depending on the specific focus within the field of machine learning. While some may find it to be the most fun and interesting elective due to its in-depth exploration of the subject, others may perceive it as the easiest elective on the list due to its focus on multimedia signal processing.

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 one, and while it is disorganized, the professor is great and the assessments are considered easy. Students have gained basic introduction to machine learning and hands-on experience in data analysis. The course is generally considered fairly easy, especially for those with a background in software.

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:**
  The comments suggest that ECE 449 is primarily a programming course, and that lab equipment may not be necessary. However, some components may still be needed for capstone projects. The overall difficulty of the course is not explicitly stated, but it appears to be more focused on programming than lab work.

ECE 450

- **Course Description:**
  Semiconductor device physics, device scaling trends, advanced MOSFET fabrication and the associated quantum mechanical framework in nanoscale systems. Semiconductor devices as a system of elemental components. Quantum phenomena in the evaluation of semiconductor devices. Impact of new materials such as high-k gate dielectrics, copper damascene processing and diffusion barriers on device performance. Choice of channel materials and strain condition for ultrascaled logic devices, RF and power electronic devices. Credit may be obtained in only one of ECE 450 or E E 450.

- **Prerequisite:**
  ECE 302 or E E 340

- **Terms the course is available in:**
  Winter Term 2024, Winter Term 2025

- **Instructor(s):**
  Manisha Gupta (teaching in Winter Term 2024), Instructor(s) undecided for Winter Term 2025

- **Instructor ratings:**
  Manisha Gupta's Rate My Professor rating is 1.9/5

- **Course Difficulty:**
  Based on the provided context, it appears that the commenter is sharing a link to a syllabus for a Mechanical Engineering course. It is not explicitly stated that this is the syllabus for ECE 450, but it is reasonable to assume that the commenter may be referring to this syllabus when discussing the difficulty of the course. The comments that follow indicate that ECE 450 is a challenging course, with one commenter stating "I remember ECE 450 being a nightmare" and another commenter adding "I agree, I took it last year and it was a struggle." These comments suggest that ECE 450 is a difficult course, likely due to the complex nature of the material covered.

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. Some students have reported that it is difficult enough to require in-person advising to graduate. One student's friend described it as an "absolute ass." However, there is also mention of a group II elective, 442, which is considered to be easier and more enjoyable. The specific topic of 442 is multimedia signal processing.

ECE 456

- **Course Description:**
  Fundamental concepts related to current flow in nanoelectronic devices. Energy level diagram and the Fermi function. Single-energy-level model for current flow and associated effects, such as the quantum of conductance, Coulomb blockade, and single electron charging. The Schroedinger equation and quantum mechanics for applications in nanoelectronics. Matrix-equation approach for numerical band structure calculations of transistor channel materials. k-space, Brillouin zones, and density of states. Subbands for quantum wells, wires, dots, and carbon nanotubes. Current flow in nanowires and ballistic nanotransistors, including minimum possible channel resistance, quantum capacitance, and the transistor equivalent circuit under ballistic operation. Credit may be obtained in only one of ECE 456 or E E 456.

- **Prerequisite:**
  ECE 302 or E E 340

- **Terms the course is available in:**
  Winter Term 2024, Winter Term 2025

- **Instructor(s):**
  Mani Vaidyanathan (teaching in Winter Term 2024), Instructor(s) undecided for Winter Term 2025

- **Instructor ratings:**
  Mani Vaidyanathan's Rate My Professor rating is 5/5

- **Course Difficulty:**
  The course ECE 456 in the Faculty of Engineering does not clearly state in the syllabus when a particular assignment is due. The student was informed of the due date outside of the syllabus, but this information was not included in the official document. The due date is March 11, in the evening. The student is an undergraduate. The lack of clear communication regarding assignment deadlines in the syllabus may contribute to increased stress and difficulty for students in the course.

ECE 475

- **Course Description:**
  Basic optical properties of crystalline and amorphous semiconductor materials: energy band diagrams, optical constants. Recombination and light emission in semiconductors. Light emitting diodes: spectral characteristics, materials, and applications. Stimulated emission and laser oscillation conditions in semiconductors. Laser diodes: modal and spectral properties, steady state rate equations, materials and structures. Light absorption, optical to electrical energy conversion. Photovoltaic cells: fill factors and efficiency, temperature effects, alternative materials and structures. Credit may be obtained in only one of ECE 475 or E E 475.

- **Prerequisite:**
  ECE 302 or E E 340

- **Terms the course is available in:**
  Winter Term 2024, Winter Term 2025

- **Instructor(s):**
  Amina Hussein (teaching in Winter Term 2024), Instructor(s) undecided for Winter Term 2025

- **Instructor ratings:**
  Amina Hussein's Rate My Professor rating is 4.5/5

- **Course Difficulty:**
  Insufficient information available on course difficulty