COMPUTING AND INFORMATION SCIENCE (CIS)

CIS*6000 Distributed Systems Unspecified [0.50]
Department(s): School of Computer Science
Location(s): Guelph

CIS*6020 Artificial Intelligence Unspecified [0.50]
An examination of Artificial Intelligence principles and techniques such as: logic and rule based systems; forward and backward chaining; frames, scripts, semantic nets and the object-oriented approach; the evaluation of intelligent systems and knowledge acquisition. A sizeable project is required and applications in other areas are encouraged.
Department(s): School of Computer Science
Location(s): Guelph

CIS*6030 Information Systems Unspecified [0.50]
Relational and other database systems, web information concurrency protocols, data integrity, transaction management, distributed databases, remote access, data warehousing, data mining.
Department(s): School of Computer Science
Location(s): Guelph

CIS*6050 Neural Networks Unspecified [0.50]
Department(s): School of Computer Science
Location(s): Guelph

CIS*6060 Bioinformatics Unspecified [0.50]
Data mining and bioinformatics, molecular biology databases, taxonomic groupings, sequences, feature extraction, Bayesian inference, cluster analysis, information theory, machine learning, feature selection.
Department(s): School of Computer Science
Location(s): Guelph

CIS*6070 Discrete Optimization Unspecified [0.50]
This course will discuss problems where optimization is required and describes the most common techniques for discrete optimization such as the use of linear programming, constraint satisfaction methods, and genetic algorithms.
Department(s): School of Computer Science
Location(s): Guelph

CIS*6080 Genetic Algorithms Unspecified [0.50]
This course introduces the student to basic genetic algorithms, which are based on the process of natural evolution. It is explored in terms of its mathematical foundation and applications to optimization in various domains.
Department(s): School of Computer Science
Location(s): Guelph

CIS*6090 Hardware/Software Co-Design of Embedded Systems Unspecified [0.50]
Specification and design of embedded systems, system-on-a-chip paradigm, specification languages, hardware/software co-design, performance estimation, co-simulation and validation, processes architectures and software synthesis, retargetable code generation and optimization.
Department(s): School of Computer Science
Location(s): Guelph

CIS*6100 Parallel Processing Architectures Unspecified [0.50]
Parallelism in uniprocessor systems, parallel architectures, memory structures, pipelined architectures, performance issues, multiprocessor architectures.
Department(s): School of Computer Science
Location(s): Guelph

CIS*6120 Uncertainty Reasoning in Knowledge Representation Unspecified [0.50]
Representation of uncertainty, Dempster-Schafer theory, fuzzy logic, Bayesian belief networks, decision networks, dynamic networks, probabilistic models, utility theory.
Department(s): School of Computer Science
Location(s): Guelph

CIS*6130 Object-Oriented Modeling, Design and Programming Unspecified [0.50]
Objects, modeling, program design, object-oriented methodology, UML, CORBA, database
Department(s): School of Computer Science
Location(s): Guelph

CIS*6140 Software Engineering Unspecified [0.50]
This course will discuss problems where optimization is required and describes the most common techniques for discrete optimization such as the use of linear programming, constraint satisfaction methods, and meta-heuristics.
Department(s): School of Computer Science
Location(s): Guelph

CIS*6160 Multiagent Systems Unspecified [0.50]
Intelligent systems consisting of multiple autonomous and interacting subsystems with emphasis on distributed reasoning and decision making. Deductive reasoning agents, practical reasoning agents, probabilistic reasoning agents, reactive and hybrid agents, negotiation and agreement, cooperation and coordination, multiagent search, distributed MDP, game theory, and modal logics.
Department(s): School of Computer Science
Location(s): Guelph

CIS*6200 Design Automation in Digital Systems Unspecified [0.50]
Techniques and software tools for design of digital systems. Material covered includes high-level synthesis, design for testability, and FPGAs in design and prototyping.
Department(s): School of Computer Science
Location(s): Guelph

CIS*6320 Image Processing Algorithms and Applications Unspecified [0.50]
Brightness transformation, image smoothing, image enhancement, thresholding, segmentation, morphology, texture analysis, shape analysis, applications in medicine and biology.
Department(s): School of Computer Science
Location(s): Guelph
CIS*6420 Soft Computing Unspecified [0.50]
Neural networks, artificial intelligence, connectionist model, back propagation, resonance theory, sequence processing, software engineering concepts.
Department(s): School of Computer Science
Location(s): Guelph

CIS*6490 Analysis and Design of Computer Algorithms Unspecified [0.25]
The design and analysis of efficient computer algorithms: standard methodologies, asymptotic behaviour, optimality, lower bounds, implementation considerations, graph algorithms, matrix computations (e.g. Strassen’s method), NP-completeness.
Department(s): School of Computer Science
Location(s): Guelph

CIS*6450 Cybersecurity and Defense in Depth Fall Only [0.50]
This course provides an overview of concepts and technical measures that are employed to enforce security policies and protect networks and systems from malicious activities. Students will learn how to engineer a secure system and how to secure networks in an ethical manner.
Restriction(s): Student registered in the MCTI program.
Department(s): School of Computer Science
Location(s): Guelph

CIS*6450 Advanced Digital Forensics and Incident Response Fall Only [0.50]
This course provides an in-depth understanding of theoretical concepts and practical issues in the field of digital forensics and incident response. Students will develop necessary skills, methodologies, and processes to detect cyber incidents and conduct in-depth computer and network investigation.
Restriction(s): Student registered in the MCTI program.
Department(s): School of Computer Science
Location(s): Guelph

CIS*6530 Cyber Threat Intelligence and Adversarial Risk Analysis Winter Only [0.50]
This course provides an in-depth understanding of techniques for detecting, responding to, and defeating Advanced Persistent Threats (APT) and malware campaigns using artificial intelligence and data mining techniques. Students will identify, extract, and leverage intelligence from different types of cyber threat actors.
Restriction(s): Student registered in the MCTI program.
Department(s): School of Computer Science
Location(s): Guelph

CIS*6540 Advanced Penetration Testing and Exploit Development Winter Only [0.50]
This course provides an in-depth understanding of techniques for detecting, responding to, and defeating Advanced Persistent Threats (APT) and malware campaigns using artificial intelligence and data mining techniques. Students will identify, extract, and leverage intelligence from different types of cyber threat actors.
Restriction(s): Student registered in the MCTI program.
Department(s): School of Computer Science
Location(s): Guelph

CIS*6550 Privacy, Compliance, and Human Aspects of Cybersecurity Unspecified [0.50]
This course provides an in-depth view of the privacy, regulatory, and ethical issues surrounding cybersecurity. It covers methods of mitigating/treating privacy risks associated with emerging technologies that collect, manage, and analyse data. This course also examines data protection regulations and compliance strategies.
Department(s): School of Computer Science
Location(s): Guelph

CIS*6560 Cybersecurity and Threat Intelligence Project Winter and Summer Reg Required [1.00]
Students plan, develop, and write an industry- or faculty-led report and produce required tools, services, and software. Projects should advance knowledge or practice, and address an emerging challenge in cybersecurity, cyber threat intelligence, digital forensics and incident response, cyber threat hunting, or a closely related field.
Restriction(s): Student registered in the MCTI program.
Department(s): School of Computer Science
Location(s): Guelph

CIS*6570 Advanced Cryptography and Cryptanalysis Unspecified [0.50]
This course provides an in-depth understanding of modern cryptography, with emphasis on practical applications. Topics covered include classical systems, information theory, symmetrical cryptosystems, block ciphers, stream ciphers, DES, AES, asymmetric cryptosystems, ECC, provable security, key exchange and management, and authentication and digital signatures, among others.
Department(s): School of Computer Science
Location(s): Guelph

CIS*6580 Security Monitoring and Cyber Threat Hunting Unspecified [0.50]
This course provides a comprehensive review of tools, techniques, and procedures for monitoring network events and assets to build a secure network architecture. It trains students in methods for hunting attackers that could bypass designed network defense mechanisms in an enterprise.
Restriction(s): Student registered in the MCTI program.
Department(s): School of Computer Science
Location(s): Guelph

CIS*6590 Professional Seminar in Cybersecurity Fall and Winter Reg Required [0.50]
This two-semester course offers a multidisciplinary forum for discussion of topics related to cybersecurity. The seminar fosters professional skills development (academic and industry), promotes collaboration between industry experts and graduate students, facilitates mentoring and project development, and contributes to the transfer of knowledge between industry and academia.
Location(s): Guelph

CIS*6650 Topics in Computer Science I Unspecified [0.50]
This special topics course examines selected, advanced topics in computer science that are not covered by existing courses. The topic(s) will vary depending on the need and the instructor.
Department(s): School of Computer Science
Location(s): Guelph
CIS*6660 Topics in Computer Science II Unspecified [0.50]
This is a reading course. Its aim is to provide background knowledge to students who need to get a head-start in their thesis research fields early during their program while no suitable regular graduate courses are offered. Admission is under the discretion of the instructor.
Restriction(s): Instructor consent required.
Department(s): School of Computer Science
Location(s): Guelph

CIS*6670 ST: Cybersecurity Unspecified [0.50]
Special Topics in Cybersecurity
Location(s): Guelph

CIS*6890 Technical Communication and Research Methodology Unspecified [0.50]
This course aims to develop students’ ability in technical communication and general research methodology. Each student is expected to present a short talk, give a mini lecture, review a conference paper, write a literature survey and critique fellow students’ talks and lectures.
Department(s): School of Computer Science
Location(s): Guelph