CPSC - Computer Science

CPSC 1105 Introduction to Computing Principles and Technology (3-0-3)
This course provides an introduction to current and emerging computing principles and technologies used in various professional environments. It discusses the nature of information vs data, computer hardware, software, databases, programming, web, communications and other information systems-based technology. In addition, the need for information privacy and security related to these technologies is discussed. The theory is complemented by practical work aimed at gaining basic proficiency with different types of widely used application software.

CPSC 1301K Computer Science I (3-3-4)
This course includes an overview of computers and programming; problem solving and algorithm development; simple data types; arithmetic and logic operators; selection structures; repetition structures; text files; arrays (one-and-two-dimensional); procedural abstraction and software design; modular programming (including sub-programs or the equivalent). It includes a lab component that provides hands on projects to apply and reinforce the topics covered.

CPSC 1302 Computer Science II (3-0-3)
A continuation of CPSC 1301K. This course emphasizes programming using object-oriented methods. The fundamentals used in designing, developing and using classes, encapsulation, inheritance mechanisms, polymorphism and dynamic binding.

Prerequisite(s): (CPSC 1301 with a minimum grade of C or CPSC 1301K with a minimum grade of C or CPSC 1301H with a minimum grade of C or CPSC 1301I with a minimum grade of C) and MATH 1113 (may be taken concurrently) with a minimum grade of C

CPSC 1555 Selected Topics in Computer Science ((1-3)-0-(1-3))
Study of introductory topics of special interest, independent study, or directed experience in the field of computing. Course may be taken three times. A maximum of three credit hours may be applied to the degree program.

Repeatability: Repeatable for credit up to 2 times or 3 hours.

CPSC 2105 Computer Organization (3-0-3)
Overview of basic computer organization. Representation of data in computers. Introduction of Boolean Algebra and logic gates used to implement Boolean functions. Introduction to flip-flops and sequential logic. Methods to reduce the complexity of Boolean functions-algebraic and K-Maps. Overview of computer arithmetic. Instruction set architecture of a sample computer. Interaction of the machine and computer languages including discussion of the compilation, assembly, and loading process.

Prerequisite(s): (CPSC 1301 with a minimum grade of C or CSCI 1301 with a minimum grade of C or CPSC 1301H with a minimum grade of C or CPSC 1301K with a minimum grade of C or CPSC 1301I with a minimum grade of C) and MATH 2125 (may be taken concurrently) with a minimum grade of C

CPSC 2108 Data Structures (3-0-3)
This course extends the concepts of primitive data types by teaching the student a set of data structures that pervades both the theoretical and practical domains of computer science.

Prerequisite(s): (CPSC 1302 with a minimum grade of C and MATH 2125 with a minimum grade of C) or (CPSC 1302H with a minimum grade of C and MATH 2125 with a minimum grade of C)

CPSC 2115 Information Technology Fundamentals (3-0-3)
This course provides students with a foundation in the fundamentals of Information Technology to include the fundamental knowledge of the hardware, software and skills necessary to set up and securely use a computer, keep it in good working order and perform basic support for PCs and simple computer networks. The lessons include practical setup guides, as well as hands-on labs for the student to practice their new skills before deploying these technologies and strategies in a production network. Upon completion, a student will be prepared to take and pass the CompTIA IT Fundamentals+ industry certification exam.

CPSC 2125 Internet Programming (3-0-3)
This course is an introduction to Internet programming and Web application development. Subjects covered include basic Web page development and an introduction to dynamic Web page development using client-side scripting, server-side scripting, and database connectivity.

Prerequisite(s): CPSC 1301 with a minimum grade of C or CPSC 1301H with a minimum grade of C or CPSC 1301K with a minimum grade of C or CPSC 1301I with a minimum grade of C

CPSC 2555 Selected Topics in Computer Science ((1-3)-0-(1-3))
Study of topics of special interest, independent study, or directed experience in the field of computing. Course may be taken three times. A maximum of three credit hours may be applied to the degree program.

Prerequisite(s): CPSC 1302 with a minimum grade of C or CPSC 1302H with a minimum grade of C

Repeatability: Repeatable for credit up to 3 times or 3 hours.

CPSC 3105 Digital Multimedia Development (3-0-3)
This course teaches the student digital design principles and techniques. Students will learn how to create digital multimedia that can be used in software applications and Web sites. As part of this, students will develop an understanding of digital image theories, develop an understanding of how to create digital multimedia, analyze the needs associated with creating this multimedia, become familiar with the digital multimedia development process and available tools, and then implement this process while applying their knowledge to create a working, digital multimedia application or Web site.

Prerequisite(s): CPSC 2125 with a minimum grade of C or CPSC 2125H with a minimum grade of C

CPSC 3111 COBOL Programming (3-0-3)
Introduction to programming in COBOL. Emphasis on structured design techniques. Computer assignments required.

Prerequisite(s): CPSC 1302 with a minimum grade of C

CPSC 3116 z/OS and JCL (3-0-3)
This course presents an overview of IBM mainframe operating systems currently in use in the area. It includes common terminology, the most used JCL features, and an introduction to the scripting language REXX and its variants.

Prerequisite(s): CPSC 1302 with a minimum grade of C

CPSC 3118 Graphical User Interface Development (3-0-3)
The primary purpose of this course is to provide experience and skills in designing and programming event-driven Windows applications using a visual development environment and tools. This course highlights the use of Visual Basic.NET to create graphical user interfaces. Extensive lab work and programming required.

Prerequisite(s): CPSC 1302 with a minimum grade of C or CPSC 1302H with a minimum grade of C or CPSC 1302I with a minimum grade of C

CPSC 3121 Assembly Language Programming I (3-0-3)
An introduction to assembly language for mainframes or PC's. Topics include machine architecture (registers, memory, instruction formats), character data processing, decimal arithmetic, binary arithmetic, subroutine and program linkage.

Prerequisite(s): (CPSC 2105 with a minimum grade of C or CPSC 2105H with a minimum grade of C) and CPSC 1302 with a minimum grade of C

CPSC 3125 Operating Systems (3-0-3)

An introduction to basic operating system level software concepts. Course topics include processes, threads, symmetric multi-processing, thread synchronization and memory management techniques.

Prerequisite(s): (CPSC 2105 with a minimum grade of C and CPSC 2108 with a minimum grade of C) or (CPSC 2105H with a minimum grade of C and CPSC 2108 with a minimum grade of C)

CPSC 3131 Database Systems I (3-0-3)

The course covers the fundamentals of database systems. Topics to be covered include the following: file systems and database concepts, database models, relational database model, introduction to SQL, database design and implementation, database integrity, and normalization of database tables. Implementation techniques using commercial DBMS will be considered. The course includes lab work and individual database application programming projects.

Prerequisite(s): CPSC 1302 with a minimum grade of C or CPSC 1302H with a minimum grade of C or CPSC 1302I with a minimum grade of C

CPSC 3137 Natural Language Processing and Text Mining (3-0-3)

Text mining refers to the mechanisms of extracting meaningful information from unstructured text. This course will focus on programming techniques for mining and analyzing texts in order to discover interesting patterns, extract meaningful information and to make decisions in real life problems.

Prerequisite(s): CPSC 1301K with a minimum grade of C

CPSC 3156 Transaction Processing (3-0-3)

An introduction to interactive processing in a transaction-based computer system. Topics include multitasking, multi threading, maps, pseudo conversational programming and large system design. Standard tools, such as CICS and REXX for CICS will be discussed. The course will include an introduction to SOA (Service Oriented Architecture).

Prerequisite(s): CPSC 3111 with a minimum grade of C

CPSC 3165 Professionalism in Computing (3-0-3)

The social impact, implications and effects of computers on society, and the responsibilities of computer professionals in directing the emerging technology. Includes the examinations of reliable,risk-free technologies, and systems which provide user friendly processes. Specific topics include an overview of the history of computing, computer applications and their impact, the computing profession, and the legal and ethical responsibilities of professionals.

Restriction(s):

Freshman or Sophomore students may **not** enroll.

CPSC 3175 Object-Oriented Design (3-0-3)

An introduction to designing windows applications using object-oriented and component technologies. The emphasis of this course is in event-driven programming using controls and components to develop desktop windows applications. The primary focus of the course is on the full usage of the Object-Oriented Paradigm for problem-solving and software development using an object-oriented programming language and the Standard Object Modeling Language (UML).

Prerequisite(s): CPSC 2108 with a minimum grade of C

CPSC 3415 Information Technology (IT) Practicum (0-5-1)

The course is intended for Information Technology (IT) majors to provide an opportunity to develop IT skills through hands-on practical experiences in UITS (University Information Technology Services) or another approved organization. The student will work in a designated IT unit for a total of 75 hours. The course can be repeated up to two times for credit, but should be in different IT units.

Repeatability: Repeatable for credit up to 2 times or 3 hours.

Restriction(s):

Enrollment limited to students majoring in Information Technology, Information Technology - Web or Information Technology.

CPSC 3555 Selected Topics in Computer Science ((1-3)-0-(1-3))
Study of topics of special interest, independent study, or directed experience in the field of computing. Course may be taken three times. This course may be taken at most three times with a total of up to 6 credit hours. Second and third time with chair approval.

Prerequisite(s): CPSC 2108 with a minimum grade of C

Repeatability: Repeatable for credit up to 2 times or 6 hours.

CPSC 4000 Baccalaureate Survey (0-0-0)
This is a zero-credit hour course that must be taken in the last semester prior to graduation. It includes an outcomes assessment for the major and an exit survey. (S/U grading)

CPSC 4111 Game Programming I (3-0-3)
This course introduces the student to Game Programming using 2D principles. The student will be exposed to many aspects of the process of game programming. The course will concentrate on aspects of 2D game programming taking a tour of all aspects of the creation of games including game production; language and architecture; mathematics, collision detection and physics; graphics, textures, artificial intelligence, audio and networking. The student will create a 2D game with a game engine.

Prerequisite(s): (CPSC 3118 with a minimum grade of C and CPSC 3175 with a minimum grade of C)

CPSC 4112 Game Programming II (3-0-3)
This course continues the introduction to Game Programming using 3D principles. The student will continue to delve deeper in the concepts introduced in the first Game Programming course. The student will be exposed to more advanced topics in game programming such as Multiplayer games and Massively Multiplayer Online Games (MMOGs). The student will create a 3D game with a game engine.

Prerequisite(s): (CPSC 4111 with a minimum grade of C and CPSC 4113 (may be taken concurrently) with a minimum grade of C)

CPSC 4113 Game Jam (0-3-1)
This course is intended for students about to start CPSC 4112 to work in teams to create a video game. It is carried out in a period of 48 hours. The objective is to create a game prototype from a theme given at the start of class.

Prerequisite(s): (CPSC 4111 with a minimum grade of C and CPSC 4112 (may be taken concurrently) with a minimum grade of C)

CPSC 4115 Algorithms (3-0-3)
This course emphasizes the understanding of data structures and algorithms from an analytical perspective rather than from an implementation standpoint. The concepts developed allow discussion of the efficiency of an algorithm and the comparison of two or more algorithms with respect to space and run-time requirements. Analytical methods are used to describe theoretical bounds as well as practical ones. In general, this course addresses the constraints that affect problem solvability.

Prerequisite(s): CPSC 2108 with a minimum grade of C and MATH 5125U with a minimum grade of C

CPSC 4121 Robotics Programming I (3-0-3)
In this course the basic principles of Robotics programming will be introduced. Various types of robots will be programmed to accomplish a series of tasks. Topics include: Design and construction of robotic bases, Design and construction of attachments for specific tasks, Microcontroller architecture and programming, and Programming of robots to carry out assigned tasks.

Prerequisite(s): CPSC 1302 with a minimum grade of C or CPSC 1302H with a minimum grade of C

Restriction(s):

Freshman students may **not** enroll.

CPSC 4122 Robotics Programming II (3-0-3)

More advanced principles of Robotics programming will be utilized. A variety of robots will be programmed to accomplish a series of tasks. Topics include: Design and construction of attachments for advanced tasks, Servo architecture and programming, Remote control of robot from Windows, Mac or Smart Phone platforms, Programming of robot to carry out assigned tasks.

Prerequisite(s): CPSC 4121 with a minimum grade of C

Restriction(s):

Freshman students may **not** enroll.

CPSC 4125 Server-Side Web Development (3-0-3)

This course is a continuation of CPSC 2125. Topics include: server-side scripting languages, interfacing web applications with databases, advanced topics in hypertext markup languages and client-side scripting. Modern software tools for the server-side web application development will be introduced. Students will develop a functional web site that makes use of database connectivity.

Prerequisite(s): (CPSC 2125 with a minimum grade of C and CPSC 3131 with a minimum grade of C)

CPSC 4126 Web Development Projects (3-0-3)

This course is a continuation of CPSC 4125, Introduction to Server-Side Web Development. This is a project-based class. Teams consisting of 3-4 students will develop working prototypes of large-scale web applications. Teams and their individual members will be required to make presentations reflecting progress through each stage of the project development: task formulation, analysis, prototyping and design, coding, debugging and testing. The final report will include a demonstration of the fully functional project.

Prerequisite(s): CPSC 4125 with a minimum grade of C

CPSC 4127 Computer and Network Security (3-0-3)

This course is a basic introduction to the issues of software security with a focus on raising the students' awareness of the difficulties of maintaining a secure software environment. It reviews traditional security techniques and discusses the vulnerabilities of such methods. The course emphasizes well-written software as a prerequisite to network security and highlights security implications of common programming mistakes.

Prerequisite(s): (CYBR 2160 with a minimum grade of C or CYBR 2106 with a minimum grade of C) and (CYBR 2159 with a minimum grade of C or MISM 3145 with a minimum grade of C)

CPSC 4130 Mobile Computing (3-0-3)

This course introduces students to mobile computing and mobile application development. The course presents an overview of various mobile computing applications, technologies and wireless communication. Additional topics include mobile application frameworks and development environments; mobile security; and mobile user interface, user experience and application development guidelines. Students will be expected to learn at least one mobile application development framework and use it to implement course assignments.

Prerequisite(s): CPSC 3175 with a minimum grade of C

CPSC 4135 Programming Languages (3-0-3)

Emphasizes the run-time behavior of programs. Languages are studied from two points of view: (1) the fundamental elements of languages and their inclusion in commercially available systems; and, (2) the difference between implementations of common elements in languages.

Prerequisite(s): CPSC 3175 with a minimum grade of C

CPSC 4138 Advanced Database Systems (3-0-3)

This course is intended for computer science students and professionals who have already acquired a basic background on databases. The objective of the course is to introduce the students to the most advanced concepts and recent issues in several areas of database technology, including the following: advanced database design and implementation, transaction management and concurrency control, distributed database management systems, object-oriented databases, client/server systems. The course includes lab work and individual database application projects.

Prerequisite(s): CPSC 3131 with a minimum grade of C

CPSC 4145 Computer Graphics (3-0-3)
Introduction to the input, construction, storage, retrieval, manipulation, alternations, and analysis of computer graphics objects. Graphics computer hardware, graphics primitives, two-dimensional and three-dimensional viewing and transformations, basic modeling.
Prerequisite(s): CPSC 2108 with a minimum grade of C

CPSC 4148 Theory of Computation (3-0-3)
This course provides an introduction to the theoretical foundations of computer science and formal models of computation. Topics will include basic set theory, a review of graph theory, formal languages, finite automata, computability, and undecidability. Computational complexity will be introduced and intuitively described.
Prerequisite(s): CPSC 4115 with a minimum grade of C or CPSC 5115U with a minimum grade of C

CPSC 4155 Computer Architecture (3-0-3)
This course introduces the fundamentals of computer architecture. It covers a wide range of computer hardware, system software and data concepts from a security perspective. The course starts with combinational and sequential logic and circuit simulations, and is then followed with FPGA, RFID, NFC, TPM and PUF technologies. The course also covers Instruction set architecture, RISC processors, pipelining, virtualization, networks, and cryptographic hardware. It is essential for computer science and security professionals to understand both hardware and software security solutions to survive in the workplace.
Prerequisite(s): CPSC 3121 with a minimum grade of C

CPSC 4157 Computer Networks (3-0-3)
Local area networks, wide area networks, and internets. Protocols and the ISO Open Systems Interconnect reference model. Design, analysis, and performance evaluation. Emphasis on data link, network, and transport protocols.
Prerequisite(s): CPSC 2108 with a minimum grade of C

CPSC 4175 Software Engineering (3-0-3)
In this course, students are introduced to the basic principles of software engineering. The course focuses on the issues, methods and tools applied at every phase of the iterative development life cycle spanning from the conception of the actual requirements, through the analysis, design, development, testing, deployment and maintenance of the software product. Other subjects include project management and quality assurance. Students must complete a significant software project.
Prerequisite(s): CPSC 3175 with a minimum grade of C

CPSC 4176 Senior Software Engineering Project (3-0-3)
The course encompasses a practical application of knowledge and skills mastered in the Computer Science curriculum through the development of a significant project. Students will apply a software engineering methodology in a team environment to develop a complex real-world application with an external customer under the guidance of instructor. Team members are involved in all phases of the software development life cycle.
Prerequisite(s): CPSC 4175 with a minimum grade of C

CPSC 4185 Artificial Intelligence and Machine Learning (3-0-3)
This course provides an introduction to the field of artificial intelligence with an emphasis on intelligent system methodologies for real-life problem solving. Topics are selected from the following: rule-based systems, search techniques, supervised and unsupervised machine learning, fuzzy systems, genetic algorithms, intelligent agents, game AI, natural language processing and computer vision.
Prerequisite(s): CPSC 2108 with a minimum grade of C

CPSC 4205 IT Senior Capstone (3-0-3)
A capstone course for IT majors to be taken in their last semester, students will be expected to complete a final team

project integrating the knowledge acquired in preceding IT courses. The project may be an approved industry project or one developed and designed by faculty of the IT program. Students will apply skills and knowledge including project management, system design and development, database design, system integration, leadership, team work, and communication skills.

Restriction(s):

Enrollment limited to Senior students.

CPSC 4505 Undergraduate Research (0-0-(1-6))

Students work in conjunction with a faculty member to select a research topic, complete a written research proposal and execute a research plan. Students will prepare both written and oral presentations of their work and present their work at one or more local, regional or professional meetings, or submit their work for publication.

Prerequisite(s): CPSC 2108 with a minimum grade of C

Repeatability: Repeatable for credit up to 5 times or 6 hours.

Restriction(s):

Enrollment limited to students in the Department Prerequisite college.

CPSC 4555 Selected Topics in Computer Science (3-0-3)

Study of topics of special interest in computer science, or directed experience in computer science by means of lecture, discussion, seminar, and research. May be taken for a maximum of nine hours.

Repeatability: Repeatable for credit up to 1 times or 6 hours.

Restriction(s):

Freshman, Sophomore or Junior students may **not** enroll.

CPSC 4698 Internship (0-0-(1-3))

Prerequisite: Junior Standing. Work experience on an approved project supervised by a faculty member. May be repeated for a maximum of three credit hours. (S/U grading.)

Repeatability: Repeatable for credit up to 98 times or 3 hours.

Restriction(s):

Freshman or Sophomore students may **not** enroll.

CPSC 4899 Independent Study (3-0-3)

Course project approved and supervised by a faculty member. May be taken only once for credit.

Repeatability: Repeatable for credit up to 2 times or 6 hours.

Restriction(s):

Freshman or Sophomore students may **not** enroll.

CPSC 6000 Graduate Exit Examination (0-0-0)

This is a zero credit hour course that should be taken in the last semester prior to graduation. It is designed to prepare computer science students for graduation. (S/U grading).

Restriction(s):

Enrollment limited to students majoring in Comp Sci - Applied Computing, Computer Science/Non-Degree, Applied Computer Sci - On-Line or Applied Computer Science.

Enrollment is limited to Graduate Level level students.

Enrollment limited to students in a Master of Science degree.

Enrollment limited to students in the Turner College of Business college.

CPSC 6103 Computer Science Principles for Teachers (3-0-3)

This course introduces the AP Computer Science Principles (AP CSP) framework as well as tools and methods to teach such curriculum. Students will be exposed to the seven Computational Thinking Practices, the 6 big ideas as delineated by the framework, assessment methodology and tools to teach this curriculum. Topics include Computational Thinking

practices, Creativity, Abstraction, Data and Information, Algorithms, Programming (using block-based programming languages), the Internet, and Global Impact.

Restriction(s):

Enrollment is limited to Graduate Level level students.

CPSC 6105 Fundamental Principles of Computer Science (3-0-3)

Overview of basic concepts in computer science ranging from computer hardware components, interconnection network structures and communication protocols, analysis of computer algorithms to software systems and applications. May not be applied to a graduate computer science degree program. Need a B or better to show proficiency.

Restriction(s):

Enrollment is limited to Graduate Level level students.

CPSC 6106 Fundamentals of Computer Programming and Data Structures (3-0-3)

Computer programming, declaration of variables, definition of abstract data types, data manipulation, conditional statements, loops, functions and routines, standard input/output control, file manipulation, object-oriented programming, and data structures. May not be applied to a graduate computer science degree program. Need a B or better to show proficiency.

Restriction(s):

Enrollment is limited to Graduate Level level students.

CPSC 6107 Survey of Modeling and Simulation (3-0-3)

This course introduces the discipline of Modeling and Simulation by surveying its paradigms and methodologies as well as important and related disciplines. The Monte Carlo, continuous, and discrete event simulations are introduced as a foundation. Topics include input data analysis, model development, verification and validation, output data analysis, animation, and design and analysis of experiments using simulation software. The course requires knowledge of Calculus and Statistics.

Restriction(s):

Enrollment is limited to Graduate Level level students.

CPSC 6109 Algorithms Analysis and Design (3-0-3)

The need for efficient algorithms arises in nearly every area of computer science. This course covers the modern theory of algorithms, focusing on the themes of efficient algorithms and intractable problems. The course introduces many of the techniques that apply broadly in the design of efficient algorithms, and studies their application in a wide range of application domains and computational models. Topics include Basic Data Structuring Problems, Recursion, Computational Complexity, Graph Algorithms, Greedy Algorithms, Dynamic Data Structures, Hashing, Approximation Algorithms, Linear programming, Parallel Algorithms and Novel Approaches to NP-Complete Problems. The course requires familiarity with Java Programming Language.

Restriction(s):

Enrollment limited to students majoring in Applied Computer Science.

Enrollment is limited to Graduate Level level students.

CPSC 6114 Fundamentals of Machine Learning (3-0-3)

This course provides an introduction to machine learning using the Python programming language and libraries. Topics include data-focused Python, statistics and linear algebra for machine learning, supervised learning algorithms, unsupervised learning algorithms, semi-supervised learning algorithms, reinforcement learning algorithms, and learning theory topics including bias/variance tradeoffs, and VC theory.

Restriction(s):

Enrollment is limited to Graduate Level level students.

CPSC 6118 Human-Computer Interface Development (3-0-3)

This course introduces fundamentals of human-computer interfaces and concepts behind the implementation of computer

interfaces using intelligent systems and artificial intelligence techniques. Topics include an introduction to human computer interaction, conversational agents, voice-based interfaces, and sensor-based interfaces.

Prerequisite(s): CPSC 6114 with a minimum grade of C

Restriction(s):

Enrollment limited to students majoring in Cybersecurity Management or Applied Computer Science.

Enrollment is limited to Graduate Level level students.

CPSC 6119 Object-Oriented Development (3-0-3)

This course teaches object-oriented developing techniques and how to create advanced applications using classes, components, and objects. Fundamentals of developing client applications that include database access using server-level components. Topics include creating and managing objects, creating data services, testing, deploying and maintaining a component based solution.

Restriction(s):

Enrollment is limited to Graduate Level level students.

CPSC 6124 Advanced Machine Learning (3-0-3)

This course introduces the student to advanced machine learning methods such as deep learning methods and their applications. Topics include Deep Neural Networks (DNNs), Convolutional Neural Networks (CNNs), Recurrent Neural Networks (RNNs), Long Short-term Memory (LSTMs) architectures, Generative Adversarial Networks (GANs), Boltzman Machines, DNNs deployment, adversarial machine learning and ethics in ML systems.

Prerequisite(s): CPSC 6114 with a minimum grade of C

Restriction(s):

Enrollment is limited to Graduate Level level students.

CPSC 6125 Operating Systems Design and Implementation (3-0-3)

This course provides an overview of the issues in the design and functioning of operating systems, including the synchronization of concurrent activity in both centralized and distributed systems. This course's main topics are deadlocks, scheduling, performance analysis, operation system design, and memory systems including distributed file systems.

Restriction(s):

Enrollment limited to students majoring in Applied Computer Science.

Enrollment is limited to Graduate Level level students.

CPSC 6126 Introduction to Cybersecurity (3-0-3)

This course focuses on the protection of information systems against cyber threats whether data is in transit, at rest, or in processing. Topics include an overview of cyber threats, measures necessary to detect, assess, and counter such threats, network security basics, symmetric and public key encryption, basic cryptologic analysis, access control, authentication, malware, vulnerability assessment, digital forensics, security policies, privacy, and ethics. This course builds knowledge, skills and abilities (KSAs) of principles and practices in cybersecurity.

Restriction(s):

Enrollment limited to students majoring in Cybersecurity Management, Applied Computer Science or Cybersecurity Management.

Enrollment is limited to Graduate Level level students.

CPSC 6127 Contemporary Issues in Database Management Systems (3-0-3)

This course provides an overview of modern database management systems and issues relating to these systems. Topics include developing a logical model, deriving the physical design, creating data services, creating a physical database, and maintaining a database in a variety of environments.

Restriction(s):

Enrollment is limited to Graduate Level level students.

CPSC 6128 Network Security (3-0-3)

This course examines the fundamentals of security issues arising from computer networks. Topics include intrusion detection, firewalls, threats and vulnerabilities, denial of service attacks, viruses and worms, use and effectiveness of encryption, secure transactions and e-commerce, and network exploits.

Prerequisite(s): CPSC 6126 with a minimum grade of C

Restriction(s):

Enrollment limited to students majoring in Applied Computer Science.

CPSC 6129 Computer Language Design and Interpretation (3-0-3)

Working knowledge of data structures and discrete mathematics or permission of instructor. A study of the principles, concepts, and mechanisms of computer programming languages-their syntax, semantics, and pragmatics; the processing and interpretation of computer programs; programming paradigms; and language design. Additional topics will include language design principles and models of language implementation.

Restriction(s):

Enrollment limited to students majoring in Applied Computer Science.

Enrollment is limited to Graduate Level level students.

CPSC 6136 Human Aspects of Cybersecurity (3-0-3)

This course examines the human behavioral and psychological aspects that create a complex system of cybercrimes and ethical and moral violations in the Internet. Students analyze various cybercrimes and cyber incidents that impact human life, and discuss how the human factor can be controlled or manipulated in order to create a more secure cyberspace.

Prerequisite(s): CPSC 6126 with a minimum grade of C

Restriction(s):

Enrollment limited to students majoring in Cybersecurity Management or Applied Computer Science.

Enrollment is limited to Graduate Level level students.

CPSC 6138 Mobile Systems and Applications (3-0-3)

This course explores the post-desktop model of computing that makes use of mobile systems. Topics include wireless communication protocols, mobile data and power management, context awareness, privacy and security, mobile gaming, and the mobile application development process.

Prerequisite(s): CPSC 6119 with a minimum grade of C

Restriction(s):

Enrollment is limited to Graduate Level level students.

CPSC 6147 Data Visualization and Presentation (3-0-3)

This course introduces the principles of computer-based visualization including data representation, scalar, and vector visualization as well as image, volume and information visualization. The large amount of data that is generated in modern systems offers an opportunity to use computer-based visualization for analysis. Students will create their own data visualizations and learn how to use data visualization tools.

Restriction(s):

Enrollment is limited to Graduate Level level students.

CPSC 6155 Advanced Computer Architecture (3-0-3)

Working knowledge of data structures and discrete mathematics or permission of instructor. A comparative study of the architecture and organization of several types of computers currently in production. Issues in the design of the ISA (Instruction Set Architecture) and the control units used to implement them, including cost and performance trade-offs. Study of methods currently in use to improve CPU performance. Some attention will be paid to super-computers, parallel-execution engines, and other high-performance units.

Restriction(s):

Enrollment limited to students majoring in Applied Computer Science.

Enrollment is limited to Graduate Level level students.

CPSC 6157 Network and Cloud Management (3-0-3)

This course is specifically designed to focus on the protocols, skills and tools needed to support the development and delivery of advanced network and cloud services over the Internet. This graduate-level course is also focused on mastering technical details in a number of areas of advanced networking through reading and hands-on activities of important research topics in the field. The topics covered in this course include 1) network and cloud basics; 2) protocols; 3) network and cloud security; 4) mobile computing; 5) software-defined networking; 6) network and cloud management; 7) data center management; 8) big data analytics and cloud.

Restriction(s):

Enrollment limited to students majoring in Cybersecurity Management or Applied Computer Science.

Enrollment is limited to Graduate Level level students.

CPSC 6159 Digital Forensics (3-0-3)

The course focuses on the role of computer forensics and the methods used in the investigation of computer crimes. The course explains the need for proper investigation and illustrates the process of locating, handling, and processing computer evidence.

Prerequisite(s): CPSC 6126 with a minimum grade of C

Restriction(s):

Enrollment limited to students majoring in Cybersecurity Management or Applied Computer Science.

Enrollment is limited to Graduate Level level students.

CPSC 6167 Cybersecurity Risk Management (3-0-3)

This course focuses on the risk analysis component of cybersecurity management. It provides detailed coverage of contemporary frameworks and processes related to managing risk. Also, it involves enumerating organization's resources and prioritizing their protection based on probability of threat and subsequent damage. Reporting security breaches to management, and providing steps to mitigate threats and implement future controls will be an integral part of this course.

Prerequisite(s): CPSC 6126 with a minimum grade of C

Restriction(s):

Enrollment limited to students majoring in Cybersecurity Management or Applied Computer Science.

Enrollment is limited to Graduate Level level students.

CPSC 6175 Web Engineering and Technologies (3-0-3)

This course teaches the fundamentals of Web technologies and Web site development. This course covers many open technologies including XML and its related standards.

Restriction(s):

Enrollment limited to students majoring in Applied Computer Science.

Enrollment is limited to Graduate Level level students.

CPSC 6177 Software Design and Development (3-0-3)

Examines software requirements and design methodologies. Studies defining software requirements: interacting with end-users to determine system requirements and identifying functional, performance, and other requirements. Examines techniques to support requirements including prototyping, modeling, and simulation; the relation of requirements to design; design in the system life cycle; and hardware versus software trade-offs. Discusses subsystem definition and design and covers principles of design, including abstraction, information hiding, modularity, and reuse. Uses examples of design paradigms.

Restriction(s):

Enrollment limited to students majoring in Applied Computer Science.

Enrollment is limited to Graduate Level level students.

CPSC 6178 Software Testing and Quality Assurance (3-0-3)

This course examines the relationship between software testing and quality assurance with an emphasis on the role of testing in the software development life cycle. It covers commonly used software testing strategies and test design

techniques. The issues of test management, test support tools, and automated testing are also discussed.

Restriction(s):

Enrollment limited to students majoring in Applied Computer Science.

Enrollment is limited to Graduate Level level students.

CPSC 6179 Software Project Planning and Management (3-0-3)

Centers on the concept of a software engineering process and includes discussion of life-cycle models for software development. Addresses issues associated with the successful management of software development including planning, scheduling, tracking, cost and size, estimating, risk management, configuration, management quality, and engineering and process improvement. Includes the SEI software process Capability Maturity Model (CMM) and other process standards.

Restriction(s):

Enrollment limited to students majoring in Applied Computer Science.

Enrollment is limited to Graduate Level level students.

CPSC 6180 Software Estimation and Measurement (3-0-3)

Study of software measurement and estimation with an introduction to financial measurements. Students will learn to measure and predict the size, complexity, and quality of software development projects by a variety of methods. Commercially available tools are used, as well as engineering rules, benchmarks, and a variety of predictive/estimation methodologies. Topics include but are not limited to: Develop estimates for software development and maintenance projects, how to communicate the estimates to others, and how to best represent the estimates in a formal contract, cognitive biases and administrative behaviors that affect the estimation process, use of parametric models and counting methods, Delphi, paired comparisons, functional sizing methods, quantifying and incorporating uncertainty, cost behaviors, cost objects, fixed, variable, mixed & step costs, calculating total budget, how measurement is used, applying software measurement, s/w measurement definition, process definition techniques, measuring quality, measurement and CMM, performance management measurement, statistical process control etc.

Restriction(s):

Enrollment is limited to Graduate Level level students.

CPSC 6185 Intelligent Systems (3-0-3)

This course introduces students to the field of Artificial Intelligence (AI) with emphasis on its use to solve real world problems for which solutions are difficult to express using the traditional algorithmic approach. It explores the essential theory behind methodologies for developing systems that demonstrate intelligent behavior including dealing with uncertainty, learning from experience and following problem solving strategies found in nature.

Restriction(s):

Enrollment is limited to Graduate Level level students.

CPSC 6190 Applied Cryptography (3-0-3)

This course features a rigorous introduction to modern cryptography, with an emphasis on the fundamental cryptographic primitives of symmetric and public-key encryption, basic cryptanalysis, hash functions, and digital signatures. This course requires familiarity with discrete mathematics and algorithm analysis.

Prerequisite(s): CPSC 6106 with a minimum grade of B

Restriction(s):

Enrollment is limited to Graduate Level level students.

CPSC 6555 Selected Topics in Computer Science (3-0-3)

This course covers topics of special interest in the field of computing. May be repeated for credit.

Repeatability: Repeatable for credit up to 1 times or 6 hours.

Restriction(s):

Enrollment limited to students majoring in Applied Computer Science.

Enrollment is limited to Graduate Level level students.

CPSC 6698 Graduate Internship in Computer Science (0-15-3)

Prerequisites: Unconditional admission to the Computer Science graduate program, full-time student with an overall GPA of 3.0. This course provides an opportunity to graduate students to apply knowledge gained in academic courses to the real world. Internships serve the dual purposes of developing hands-on technical skills and interpersonal skills for the student. In addition to being remunerated by the place at which the internship is conducted, the student also obtains course credit. Work undertaken during an internship must be relevant to the student's course of study. May be repeated once for credit.

Repeatability: Repeatable for credit up to 1 times or 6 hours.

Restriction(s):

Enrollment limited to students majoring in Comp Sci - Applied Computing, Computer Science/Non-Degree or Applied Computer Sci - On-Line.

Enrollment is limited to Graduate Level level students.

Enrollment limited to students in a Master of Science degree.

CPSC 6899 Independent Study (0-0-3)

This is a project-based course. The project has to be approved and supervised by an appropriate member of the graduate faculty. May be taken twice for credit.

Repeatability: Repeatable for credit up to 1 times or 6 hours.

Restriction(s):

Enrollment limited to students majoring in Applied Computer Science.

Enrollment is limited to Graduate Level level students.

CPSC 6985 Research and Thesis (0-0-(1-4))

This course is required by all students completing the thesis option of the MS in Applied Computer Science. It involves completion of a research project and defense of the project thesis in adherence to the School of Computer Science MS thesis policy. The project is to be designed in consultation with a thesis advisor who is a member of the graduate faculty of the School of Computer Science. The course must be taken at least twice for a minimum total of four credit hours. The exact number of credit hours taken each semester is to be decided in consultation with the thesis advisor. (S/U grading)

Repeatability: Repeatable for credit up to 1 times or 4 hours.

Restriction(s):

Enrollment limited to students majoring in Cybersecurity Management or Applied Computer Science.

Enrollment is limited to Graduate Level level students.

CPSC 6986 Thesis Defense (0-0-0)

Department approval is required for this course. A satisfactory grade in the course indicates a successful oral defense of the thesis, the completion of edits and approval by the advisor or committee, and submission to the library. Degree candidates must be enrolled during the semester of their defense. S/U grading.

Repeatability: Repeatable for credit up to 2 times or 0 hours.

Restriction(s):

Enrollment limited to students in the Department Prerequisite college.

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