

Level 6

- **CSI 321 Design & Analysis of Algorithms**

This course is continuing to provide students with the ability to select algorithms appropriate to particular purpose and to apply them, recognizing the possibility that no suitable algorithm may exist. This relies on understanding the range of algorithms that address an important set of well-defined problems, recognizing their strengths and weaknesses, and their suitability in particular contexts. Efficiency is a pervasive theme throughout this area. A new range of paradigms and techniques to design algorithms and to solve problems is considered: Review of Basic Analysis - Algorithms strategies - Solving Recursions - Sorting and Searching: Insertion sort, Selection sort, Bubble sort, Merge Sort, Quick sort, linear search, Binary search - Dynamic Programming - Advanced data structures – and Graph Algorithms.

- **CSI 322 Computer Networks**

This course is an introduction to computer networks, stressing the logical organization of the three networking features architecture, algorithms, and implementations with focus on performance. Topics include:

- Introduction: overview of computer networks
- Fundamentals of data transmission: wired/wireless media, digital vs. analog transmission, data coding.
- Multi-user communication and multiplexing

LAN technology and data link protocols: point-to-point links and sliding window flow control, Ethernet and CSMA/CD, switched and carrier Ethernet, Wireless LAN and CSMA/CA, cellular networks and advanced multi-user communication.

- **CSI 323 Computer Architecture**

This provides students with basic knowledge in: Fundamentals of computer design, Performance evaluation, Instruction set principles, Processor organization and design, Pipelining, Instruction and arithmetic pipelines, Dynamic and speculative execution, Precise exception, CISCs, RISC, and VLIW processors, Memory Hierarchy, Virtual memory, Multilevel caches, Storage and I/O, Introduction to Multicore, multiprocessors, and clusters, New trends in computer architecture.

- **CSI 324 Advanced Database**

This course introduces the concepts and principles of database management systems (DBMS). It focuses on terminology and fundamental concepts of relational databases and database management systems. Students will learn SQL and PL/SQL including, triggers and transaction processing. They will understand performance issues and optimization strategies through query rewriting, secondary storage characteristics, and access strategies. This course also exposes student to some of the current challenges facing database professionals (e.g. semi-structured data management, XML databases, information extraction, data integration) as well as some DBMS design and management issues. Major topics include: Transaction management - Recovery, concurrency control - PL/SQL Programming - Indexing and Hashing - Parallel Databases, Distributed Databases - File organization and access - Buffer management - Performance analysis and storage management - Database system architecture - Query processing and optimization, Reliability, protection, and integrity.

- **CSI 325 Software Engineering 1**

The main objective of this course is to provide students with an overall foundation of software engineering to effectively and efficiently design and implement function-oriented systems. Topics to be covered include: software development life cycle models, system analysis, system development tools, cost benefit analysis, system planning and selection, requirements engineering, system design strategies, designing human interface, rapid application development and CASE tools for function-oriented systems, and system testing, operation and maintenance.

- **STAT 320 Probability & Statistics**

Discrete Probability Distributions, Continuous Probability Densities, Jointed Conditional Probability, Random Variables, Joint Distribution: Expectation, Variance, Covariance, Correlation Coefficient, Law of Large Numbers, Central Limit Theorem, Generating Functions, Markov Chains, Random Walks. Statistics: Towards Statistical, Thinking for Decision Making, Descriptive Sampling Data , Analysis, Probability for Statistical Inference and Modelling. Necessary Conditions for Statistical Decision Making, Estimators and Their Qualities, Hypothesis Testing: Rejecting a Claim, Hypotheses Testing for Means and Proportions, Tests for Statistical Equality of Two or More Populations, Applications of the Chi-square Statistic, Regression Modelling and Analysis, Index Numbers with Applications.

