

توصيف المساقات

COME 6301 Advanced Computer Architecture

Classification of Computer Systems, Architectural Developments, Computer Performance, Linear and Nonlinear Pipeline Design, Instruction and Arithmetic Pipeline, Superscalar, Memory Hierarchy, Cache and Virtual Memory, Cache Coherence, Memory System Performance, Parallel Architectures, Performance Measures, SIMD and MIMD Architectures, Interconnection networks.

Prerequisite: COME 3311 Computer Architecture

COME 6302 Engineering Optimization

Functions of a Single Variable, Functions of Several Variables, Linear Programming, Constrained Optimality Criteria, Transformation Methods, Constrained Direct Search, Linearization Methods for Constrained Problems, Direction Generation Methods Based on Linearization, Quadratic Approximation Methods for Constrained Problems, Structured Problems and Algorithms.

Prerequisite: MATH 2401 Differential Equations and Linear Algebra

COME 6303 Advanced Computer Networks

Basic Terminology, Protocols, Communication Architectures, OSI Reference Model, Protocol Suites, Data Link Layer, ARQ Strategies, Analysis of ARQ Strategies, Multi-Access Communication, ATM, Delay Models in Data Networks, Performance Analysis, Little's Theorem, Single Queue Models, Network of Queues, Network Layer, Routing in Data Networks, Flow and Congestion Control, Transport Layer, Application Layers.

Prerequisite: COME 4321 Computer Networks

COME 6304 Pattern Recognition

Classifiers Based on Bayes Decision Theory, Linear Classifiers, Non Linear Classifiers, Feature Selection, Feature Generation, Template Matching, Context Dependent Classification, Clustering, System Evaluation.

Prerequisite: COME 6302 Engineering Optimization

COME 6305 Parallel Computer Architecture

Naming, Replication, Synchronization, Latency, Overhead, Workload-Driven Evaluation, Parallel Programming, Small-Scale Shared Memory Multiprocessors, Scalable Multiprocessors, Realizing Programming Models via Network Transactions, Directory-Based Cache Coherence, Interconnection Network Design, Software-Based Virtual Shared Memory, COMA Techniques, Latency Tolerance.

Prerequisite: COME 6301 Advanced Computer Architecture

COME 6311 VLSI System Design

MOS Transistor, Transistor Sizing, Circuit Layout, Static versus Dynamic Logic, Combinational and Sequential Logic, Deep Submicron Device Models and Scaling, Interconnect Models, Clocking Strategies, Clock Skew, Setup, Hold and Propagation Delays, Self-Timed Logic, I/O Design, Dynamic Characteristics of MOS Circuits, Effects of Signal Slew Rate on Propagation Delay, Dynamic Logic Circuits, Domino, CVSL, Charge Sharing, Design Considerations of Regular Structures, ROM's, PLA's, Adder and Multiplier Architectures, CAD Tools for Layout and Design Capture, CMOS Memories, ROM, SRAM, DRAM, Single and Double-Ended Bit Line Sensing, Multiport Register Files.

Prerequisite: EELE 3321 Digital Electronics

COME 6312 VLSI ASIC Design

MOS Transistor, Transistor Sizing, Circuit Layout, Static versus Dynamic Logic, MOS Logic Optimization of Delay and Area, ASIC Design Methodologies, Full Custom versus Semi-Custom, ASIC Library Design, Cell Characterization, Design Area and Delay, Standard Cell Design Methodology, Propagation Delay, Design Area, Critical Path, Placement and Routing of Cells, Design Optimization and Back annotation, Gate Arrays and Silicon Compilers, Programmable ASICs, Programmable Logic Cells, Programmable I/O, Programmable Interconnect, Hardware Description Languages, Technology Mapping and Synthesis, Test Techniques of ASICs, Fault Models, Boundary Scan and DFT.

Prerequisite: EELE 3321 Digital Electronics

COME 6313 Digital System Modeling and Verification

Simulation versus Formal Verification, Levels of Hardware Modeling (Circuit, Switch, Gate, RTL, Behavioral Levels), Logic, RTL, Behavioral Level Simulation, Principle of Formal Hardware Modeling and Verification, Mathematical Logic (First Order Logic, Higher Order Logic, Temporal Logic), Abstraction Mechanisms for Hardware Verification, Automated Theorem Provers, Verification using Specific Calculus, Formal Verification versus Formal Synthesis, Future Trends in Hardware Verification.

Prerequisite: COME 4311 Digital Systems Design

COME 6314 Digital System Testing

Fault Analysis, Test Generation, Design for Testability for Digital ICs and Systems, Circuit and System Modeling, Fault Sources and Types. Single Stuck-Line (SSL), Delay, Functional Fault Models, Fault Simulation Methods, Automatic Test Pattern Generation (ATPG) Algorithms for Combinational and Sequential Circuits, D-algorithm, PODEM, FAN, Genetic Algorithm, Testability Measures, Scan Design, Test Compression Methods; Logic-Level

Diagnosis, Built-In Self-Testing (BIST), VLSI Testing Issues, and Processor and Memory Testing, MEMS, Mixed-Signal Testing.

Prerequisite: COME 4311 Digital Systems Design

COME 6315 Superscalar Processor Design

Computer System Performance, Instruction Set Architecture, Integer and Floating Point Arithmetic, Interaction between Software and Hardware, Processor Implementation, Memory Systems, Input/Output, Verilog Hardware Description Language.

Prerequisite: COME 6305 Parallel Computer Architecture

COME 6316 Switching Theory

Review of Switching Algebra, Complex Gates, Boolean Algebra, Multiple-Valued Logic, Switch Network, Transient Analysis, Symmetric Functions, Unate Functions, Threshold Functions, Multiple-Output Network, Programmable Arrays, Fault Models, Test Sets, Multi-Stage Networks, Sequential-Circuit Analysis, Finite-State Machines, Multiple-Pulse and Non-Pulse Circuits, Asynchronous Circuit Design.

Prerequisite: COME 3311 Computer Architecture

COME 6317 Advanced Embedded Systems

Embedded System Design Considerations, Classical Design Methods, Co-Representation, Performance Modeling, Co-Design Trade-offs, Functional Decomposition, Partitioning, Design Methodologies, Co-Design Environments, Abstract Models, Recent Techniques in Co-Design.

Prerequisite: COME 3322 Embedded Systems

COME 6318 Selected Topics in Computer Hardware Engineering

Advanced Topics in Computer Hardware Engineering.

Prerequisite: Consent of Instructor

COME 6319 Local and Metropolitan Area Networks

Local Area Networks, CSMA/CD, Token Ring, Token Bus, IEEE Standards, Protocols and Performance Analysis, LAN Interconnection, Bridges, Routers, Gateways, Metropolitan Area Networks, FDDI, DQDB, Standards and Performance Analysis, Higher Level Protocols used in LAN/MANs, LAN/MAN Management, LAN/MAN Interconnection, SMDS, Frame Relay, X.25, ISDN, Emerging standards and Protocols.

Prerequisite: COME 6303 Advanced Computer Networks

COME 6320 Mobile Computing and Wireless Networks

Basics of Digital Communication, Radio Basics, Mobile Environment, Connecting up with Wireline Network, Channel Concept, Access technologies

(FDMA, CDMA, TDMA), Channel Assignment Algorithms, User Location and Tracking, Handoff, Packet Radio Networks, Ad-hoc Networks, Satellite Networks, Security and Authentication, Mobile IP, Wireless Local Loop, Cordless Systems, Mobile Databases, Mobile Information Systems, Power Control.

Prerequisite: COME 6303 Advanced Computer Networks

COME 6321 Computer and Network Security

Cryptographic Algorithms for Data Confidentiality, Authentication, Integrity, Security Protocols for the Internet and Local Area Networks, Firewalls, Intrusion Detection Systems, Defenses against Denial of Service Attacks, User Authentication Methods, Cryptographic File Systems, Secure Email Steganography and Usable Security.

Prerequisite: COME 6303 Advanced Computer Networks

COME 6322 Fault Tolerance and Reliability in Computer Networks

Failure Modes, Failure Detection, Logical Time Systems for Distributed Systems, N-Version Programming, Check Pointing, Optimistic and Pessimistic Logging Schemes, Software Engineering Issues in Designing Fault Tolerant and Reliable Software, Schemes for Reliable Communication.

Prerequisite: COME 6303 Advanced Computer Networks

COME 6323 Modeling and Analysis of Computer Networks

Modeling of Single and Multiprocessor Systems, Single and Multi-Stage Interconnection Networks, Computer Networks, Analysis using Stochastic Processes, Markov and Queuing Techniques, Modeling using Petri Nets and Finite State Models.

Prerequisite: COME 6303 Advanced Computer Networks

COME 6324 Protocol Engineering

Protocol Design, Specification Languages and Formal Description Techniques, Safety and Liveness Properties, Protocol Validation, Protocol Synthesis, Protocol Translation, Implementation, Conformance Testing.

Prerequisite: COME 6303 Advanced Computer Networks

COME 6325 Complex Embedded/Multimedia Computing Systems

Representing Multimedia Data, Video, Image, Audio, Compression, H.26x, MPEG, JPEG, Sending Multimedia over ATM, Wireless, and IP networks, Error Resilience and Quality of Service, H.32x Series, Standards for Audiovisual Communication.

Prerequisite: EELE 4310 Digital Signal Processing

COME 6326 Real-time Systems

System Specifications and Architecture, Modeling and Analysis with Time Constraints, Real-Time Systems Design, Performance Metrics, Performance Evaluation under Extreme Conditions, Hardware/Software Trade-off for Real Time Systems, Applications and Case Studies.

Prerequisite: COME 4312 Operating Systems

COME 6327 Advanced Database Systems

Bioinformatics, Watermarking and Encryption, XML Query Processing, XML Coding and Metadata Management, Data Mining, Data Generation and Understanding, Query Processing in Subscription Systems, Web Services, High-Dimensional Indexing, Sensor and Stream Data Processing, Database Performance Issues, Clustering, Classification and Data Warehouses, Data Mining and Web Data Processing, Moving Object Databases, Temporal Databases, Semantics, XML Update and Query Patterns, Join Processing and View Management, Spatial Databases.

Prerequisite: COME 4313 Database Systems

COME 6328 Principles of Broadband Networks

Low Bandwidth (Telemetry) and High Bandwidth Applications (Digitized Video), ATM, SONET, MPLS, High-Speed Switching Architecture, High-Speed Network Control, Unified Control Plane (GMPLS), Optical Networks, Designing Networking Systems, Simulation Techniques.

Prerequisite: COME 6303 Advanced Computer Networks

COME 6329 Selected Topics in Computer Networking

Advanced Topics in Computer Networking.

Prerequisite: Consent of Instructor

COME 6330 Java Parallel and Distributed computing

Design and Implementation of Distributed applications, Java as an Implementation Language, Remote Method Invocation (RMI), Common Object Request Broker Architecture (CORBA), Basic Building Blocks of Java Computing including Exceptions, Threads, Streams, Sockets, Servers.

Prerequisite: COME 6305 Parallel Computer Architecture

COME 6331 Distributed Systems

Inter-process Communication, Operating Systems, Middleware, Concurrency, Applications, Recent Advances and New Applications in Distributed Systems.

Prerequisite: COME 6305 Parallel Computer Architecture

COME 6332 Cluster Computing

Hardware and Software Tradeoffs for Cluster and Application Performance, Development, Management, and Programming of Cluster of Computers, Meta-Clustering (computational grids).

Prerequisite: COME 6305 Parallel Computer Architecture

COME 6333 Parallel Programming Languages

Architecture of Parallel Systems, Shared Memory, Distributed Memory, Data Parallel, Parallel Programming Languages and Automatic Parallelization of Programs.

Prerequisite: COME 6305 Parallel Computer Architecture

COME 6334 Parallel Compilers

Principles of Parallel Compilers, Parallel Syntax Analysis, Deterministic Methods of Parallel Top-Down Syntax Analysis, Deterministic Methods of Parallel Bottom-Up Syntax Analysis, Parallel Code Generation, Modern Formal Tools for Language Specification, Regulated and Parallel Models, Formal Tools for Language Translation, Transducers and Translation Grammars, Advanced Optimization.

Prerequisite: COME 6305 Parallel Computer Architecture

COME 6335 Grid Computing

Grid Information System, Grid Resource Management, Grid Security System, Data Grid and Cross Grid System, Web and Grid Services, Large Scale Grid Applications.

Prerequisite: COME 6305 Parallel Computer Architecture

COME 6336 Parallel Operating Systems

Distributed Systems Foundations, Concurrent Programming, Clock Synchronization, Mutual Exclusion in Distributed Systems, Consistent Global State, Agreement Protocols in Distributed Systems, Deadlock in Distributed Systems, Distributed Operating Systems Issues, Processor Allocation and Load Balancing, Distributed Shared Memory Systems, Distributed File Systems, Parallel Disks, Concurrency Control for Transaction Processing.

Prerequisite: COME 6305 Parallel Computer Architecture

COME 6337 Message Passing Multiprocessing Systems

Message Communication Models and their Correctness, Message Passing System Architecture and Languages, Architectural Support for Message Passing, Processor Time Allocation, Inter-Module Message Communication, Real Time Applications for Message Passing systems.

Prerequisite: COME 6305 Parallel Computer Architecture

COME 6338 Heterogeneous Computing

Taxonomy of Heterogeneous Computing, Mixed-Mode and Multimode Heterogeneous Systems. Network Heterogeneous Computing, Design Issues, Architecture, Programming Paradigm and Environment, Mapping, Load Balancing and Scheduling, Applications.

Prerequisite: COME 6305 Parallel Computer Architecture

COME 6339 Selected Topics in Parallel and Distributed Computing

Advanced topics in Parallel and Distributed Computing.

Prerequisite: Consent of Instructor

COME 6340 Artificial Intelligence

Rule-based expert systems, Fuzzy expert systems, Frame-based expert systems, Artificial neural networks, Evolutionary computation, Hybrid intelligent systems, Knowledge engineering, Data mining.

Prerequisite: COME 3312 Data Structures and Algorithms

COME 6341 Digital Image Processing

Fundamentals, Intensity Transformations and Spatial Filtering, Frequency Domain Processing, Image Restoration, Color Image Processing, Wavelets, Image Compression, Morphological Image Processing, Image Segmentation, Representation and Description, Object Recognition.

Prerequisite: EELE 3310 Signals and Linear Systems

COME 6342 Robot Modeling and Control

Rigid Motions and Homogeneous Transformations, Forward and Inverse Kinematics, The Jacobian, Path and Trajectory Planning, Independent Joint Control, Dynamic, Force Control.

Prerequisite: EELE 3360 Feedback Control Systems

COME 6343 Neural Networks

Fundamental Concepts of Neural Computing, Terminology, Main Neural Networks Architecture Single/Multilayer Perceptrons, Feedback(Recurrent)/Feedforward Information Flow, Supervised/Unsupervised Learning Models, Backpropagation, Self-Organizing, Adaptive Resonance, Auto/Heteroassociation Neural Memory Models, Neurocomputing Implementation, Applications, Performance Evaluation.

Prerequisite: COME 3312 Data Structures and Algorithms

COME 6344 DSP Systems and Architectures

Classification of DSP Functional Units, Programmable DSP Architectures, Video Processors, Fine Grain Image Processors, Application Specific DSP Architectures, DSP Linear Array Architectures and their Synthesis, Mapping of

DSP Algorithms, Algorithmic and Architectural Transformation for DSP, VLIW DSP Architectures, Multimedia Processor Architectures, Memory Architecture for DSPs, Programmability of Advanced Architectures.

Prerequisite: COME 6301 Advanced Computer Architecture

COME 6345 Intelligent Computing

Propositional Logic, Predicate Logic, Modal Logic, Context-dependant computations, Situated Representation, Spatial-Temporal Knowledge, Spatial-Temporal Models, Spatial-temporal Reasoning, Situated Concepts, Situated Logic, Situated Decision Making, Architectures for Intelligent Computing, Case Studies.

Prerequisite: COME 3312 Data Structures and Algorithms

COME 6346 Information Retrieval

Retrieval Strategies, Retrieval Utilities, Cross-Language Information Retrieval, Efficiency, Integrating Structured Data and Text, Parallel Information Retrieval, Distributed Information Retrieval.

Prerequisite: Consent of Instructor

COME 6347 Multimedia

Time-Frequency Representation, Predictive Coding, Speech Analysis and Synthesis, Image Understanding and Modeling, Image Compression Techniques, Color Models and Color Applications, 3-D Representation, Illumination Models, Graphics Systems, MPEG Standards, Video Compression, Video Conferencing.

Prerequisite: EELE 4310 Digital Signal Processing

COME 6348 Modeling and Simulation

Simulation Cycle, Discrete-Event Simulation Approaches, Probability and Statistics in Simulation, Random Number Generation, Building Valid and Credible Simulation Models, Output Data Analysis, Simulation Software, Distributed and Parallel Simulation, Applications to Computer Systems.

Prerequisite: EELE 3340 Probability Theory and Statistics

COME 6349 Medical Image Processing

Enhancement, Segmentation, Quantification, Registration, Visualization, Compression, Storage, Communication.

Prerequisite: EELE 3310 Signals and Linear Systems

COME 6350 Selected Topics in Artificial Intelligence

Advanced topics in Artificial Intelligence.

Prerequisite: Consent of Instructor

COME 6399 Thesis

The student has to undertake and complete a research topic under the supervision of a faculty member in order to probe in depth a specific problem in Computer Engineering.

Prerequisite: Successful completion of 18 credit hours of MS Computer Engineering core courses in addition to conditions mentioned in Higher Studies Regulations.

SHAR 6303 دراسة فقهية معاصرة

ضوابط الربح في الفقه الإسلامي وتحديده، أعمال التمويل والاستثمار التي تتعامل بها البنوك الإسلامية نظام التأمين بأنواعه الخلوات (خلو الرجل) مستجدات فقهية في قضايا الزواج والطلاق اختيار عدد من القضايا المعاصرة المستجدة بشكل مستمر.