



Department of Computer and Systems Engineering

The department of Computer and Systems Engineering offers distinct graduate programs towards a master or doctorate degree. The diploma and master of engineering programs will be opened pending approval from the department council. The following programs are offered:

1. Master Degrees

1.1 Master of Science in Computer and Systems Engineering

The student must complete 24 credit hours in the form of courses and an additional 8 credit hours in the form of a thesis.

The student should choose the courses from the master level course list after consulting his/her academic advisor/thesis supervisor and obtaining approval. At least one course from each specialization group is chosen to ensure breadth of knowledge.

The student can only register for Thesis credit hours after finishing at least 80% of the total credit hours corresponding to regular courses and after faculty approval of the supervisory committee assigned to the student.

3. Doctor of Philosophy- Ph.D. Degree

3.1 Doctor of Philosophy in Computer and Systems Engineering

The student must complete 18 credit hours in the form of courses and an additional 24 credit hours in the form of a dissertation.

The student should choose the courses from the Ph.D. level course list after consulting his academic advisor/thesis supervisor and obtaining approval. At least one course from each specialization group is chosen to ensure breadth of knowledge. Some courses may be from master level courses.

The student can only register for dissertation credit hours after passing the comprehensive exam and after approval of the supervisory committee assigned to the student.



List of Master and Ph.D. courses

| | Course Code | Field | Course Name | Credit Hours | Exam Duration |
|----|--------------------|--------------|--|---------------------|----------------------|
| 1 | 07 16 711 | S | Advanced Topics in Programming and Programming Languages | 3 | 3 |
| 2 | 07 16 712 | HS | Hardware – Software Computer Design | 3 | 3 |
| 3 | 07 16 713 | S | Distributed Database Systems | 3 | 3 |
| 4 | 07 16 714 | S | Advanced Topics in Software Engineering | 3 | 3 |
| 5 | 07 16 715 | S | Data Warehouse Systems and Tools | 3 | 3 |
| 6 | 07 16 716 | S | Advanced Topics In Database Systems | 3 | 3 |
| 7 | 07 16 717 | S | Advanced Data Structures and Algorithms | 3 | 3 |
| 8 | 07 16 718 | S | Randomized Algorithms | 3 | 3 |
| 9 | 07 16 721 | AHS | Network Security | 3 | 3 |
| 10 | 07 16 722 | H | Communications & Computer Networks | 3 | 3 |
| 11 | 07 16 723 | AHS | Parallel Computation | 3 | 3 |
| 12 | 07 16 724 | H | Advanced Topics In Computer Architecture | 3 | 3 |
| 13 | 07 16 730 | ACS | Fuzzy Logic with Engineering Applications | 3 | 3 |
| 14 | 07 16 731 | C | Nonlinear Control Systems | 3 | 3 |
| 15 | 07 16 732 | C | Optimal Control Theory | 3 | 3 |
| 16 | 07 16 733 | ACHS | Robotics | 3 | 3 |
| 17 | 07 16 734 | C | System Identification | 3 | 3 |
| 18 | 07 16 735 | AC | Programmable Logic Controllers (PLCs) | 3 | 3 |
| 19 | 07 16 736 | ACHS | Computer Controlled Systems | 3 | 3 |
| 20 | 07 16 737 | CH | Networked Control System | 3 | 3 |
| 21 | 07 16 738 | C | Adaptive Control | 3 | 3 |
| 22 | 07 16 739 | C | Linear stochastic control systems | 3 | 3 |
| 23 | 07 16 741 | AS | Artificial Intelligence | 3 | 3 |
| 24 | 07 16 742 | A | Neural Computing | 3 | 3 |



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|----|-----------|-----|--|---|---|
| 25 | 07 16 743 | AS | Multi-Agent Systems: Theory and Application | 3 | 3 |
| 26 | 07 16 744 | A | Optimization Theory | 3 | 3 |
| 27 | 07 16 745 | AS | Natural Language Processing | 3 | 3 |
| 28 | 07 16 746 | AS | Digital Image Processing | 3 | 3 |
| 29 | 07 16 747 | AS | Pattern Recognition | 3 | 3 |
| 30 | 07 16 748 | A | Bioinformatics | 3 | 3 |
| 31 | 07 16 749 | A | Simulation Techniques | 3 | 3 |
| 32 | 07 16 750 | AS | Computer Graphics | 3 | 3 |
| 33 | 07 16 751 | AH | Network Protocols | 3 | 3 |
| 34 | 07 16 752 | AHS | Mobile Computing | 3 | 3 |
| 35 | 07 16 753 | AS | Game Programming | 3 | 3 |
| 36 | 07 16 754 | AS | Data Compression | 3 | 3 |
| 37 | 07 16 755 | AS | Distributed and Intelligent Systems | 3 | 3 |
| 38 | 07 16 756 | A | Decision Analysis and Operations Research | 3 | 3 |
| 39 | 07 16 757 | AS | Combinatorial Mathematics | 3 | 3 |
| 40 | 07 16 758 | AS | Topics in Data Mining | 3 | 3 |
| 41 | 07 16 760 | AS | Text Information Systems | 3 | 3 |
| 42 | 07 16 780 | S | Directed Studies in Software and Computer Science (1) | 3 | 3 |
| 43 | 07 16 781 | S | Directed Studies in Software and Computer Science (2) | 3 | 3 |
| 44 | 07 16 782 | H | Directed Studies in Computer Engineering (1) | 3 | 3 |
| 45 | 07 16 783 | H | Directed Studies in Computer Engineering (2) | 3 | 3 |
| 46 | 07 16 784 | AC | Directed Studies in System Engineering (1) | 3 | 3 |
| 47 | 07 16 785 | AC | Directed Studies in System Engineering (2) | 3 | 3 |
| 48 | 07 16 786 | A | Directed Studies in Computer Applications (1) | 3 | 3 |
| 49 | 07 16 787 | A | Directed Studies in Computer Applications (2) | 3 | 3 |
| 50 | 07 16 788 | HS | Directed Studies in Computer Science and Engineering (1) | 3 | 3 |
| 51 | 07 16 789 | HS | Directed Studies in Computer Science and Engineering (2) | 3 | 3 |



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|----|-----------|----|--|---|---------|
| 52 | 07 16 811 | S | Directed Reading in Software and Computer Science (1) | 3 | 3 |
| 53 | 07 16 812 | S | Directed Reading in Software and Computer Science (2) | 3 | 3 |
| 54 | 07 16 813 | S | New Trends in Programming and Programming Languages | 3 | 3 |
| 55 | 07 16 814 | AS | New Trends in Software Engineering | 3 | 3 |
| 56 | 07 16 816 | AS | New Trends in Database Systems | 3 | 3 |
| 57 | 07 16 817 | S | New Trends in Algorithms and Data Structures | 3 | 3 |
| 58 | 07 16 821 | H | Directed Reading in Computer Engineering (1) | 3 | 3 |
| 59 | 07 16 822 | H | Directed Reading in Computer Engineering (2) | 3 | 3 |
| 60 | 07 16 824 | H | New Trends in Computer Architecture | 3 | 3 |
| 61 | 07 16 831 | C | Directed Reading in Systems Engineering (1) | 3 | 3 |
| 62 | 07 16 832 | C | Directed Reading in Systems Engineering (2) | 3 | 3 |
| 63 | 07 16 841 | A | Directed Reading in Some Computer Applications (1) | 3 | 3 |
| 64 | 07 16 842 | A | Directed Reading in Some Computer Applications (2) | 3 | 3 |
| 65 | 07 16 850 | AS | New Trends in Computer Graphics | 3 | 3 |
| 66 | 07 16 854 | AS | New Trends in Data Compression | 3 | 3 |
| 67 | 07 16 855 | HS | New Trends in Computer Science and Engineering (1) | 3 | 3 |
| 68 | 07 16 856 | HS | New Trends in Computer Science and Engineering (2) | 3 | 3 |
| 69 | 07 16 857 | HS | New Trends in Computer Science and Engineering (3) | 3 | 3 |
| 70 | 07 16 858 | AS | New Trends in Data Mining | 3 | 3 |
| 71 | 07 16 705 | | Master of Science Thesis in Computer and Systems Engineering | 8 | Defense |



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|-----------------|-----------|------------------------|---|-------------|---------|
| 72 | 07 16 801 | | Doctor of Philosophy Dissertation in Computer and Systems Engineering | 24 | Defense |
| A: Applications | | C: Control H: Hardware | | S: Software | |

Description of Courses for Graduate Programs (Master- Doctor of Philosophy)

07 16 711 Advanced Topics in Programming and Programming Languages

Programming language paradigms. Programming techniques. Structure of programming languages. Data systems : Data types, Mechanisms for data structuring, type equivalence, Type conversion. Control structures: sequencing, selection, iteration, parallel processing, exception handling. Alternatives in design of data system and control structures using examples from ALGOL60, Algol68, Pascal, C. C++, Java, and Ada.

07 16 712 Hardware – Software Computer Design

Overview of virtual machines. Processor architecture. Dynamic compilation: Automatic vectorization, Parallelization , intermediate representations , automatic code generation - JIKES (IBM research Java virtual machine) as an example. Case study–1 DAISY. Case study-2 CRUSOE

07 16 713 Distributed Database Systems

Distributed DBMS Architecture. Distributed Database Design. Database Integration. Data and Access Control. Distributed Query Processing. Query Decomposition and Data Localization. Query Optimization in Distributed Databases. Multi database Query Processing. Distributed Transaction Management. Distributed Concurrency Control. Distributed DBMS Reliability. Data Replication. Parallel Databases. Distributed Object Database Management. Peer – to – Peer Data Management. Web Data Management. Data Management on the Cloud .

07 16 714 Advanced Topics in Software Engineering

1. Review most well-known and emerging Models of Software Development Life Cycles (SDLC'S). Introduce analogy with search techniques. Agility metrics
2. Capability Maturity Model Integrated (CMMI).
3. Process areas procedures and templates of the Software Process Improvement model , developed by SECC, for small to intermediate enterprises (SPI-SME) :
 - 3.1. Project Management (PM).
 - 3.2. Product Development (PD): Requirements Definition, elicitation and validation. Analysis. High level and detailed design. Implementation. Testing
 - 3.3. Peer Review (PR).
 - 3.4. Quality Assurance (QA).
 - 3.5. Configuration Management (CM).



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4. Exploring open source tools.
 - 4.1. Integrated Computer-Aided Software Engineering (ICASE).
 - 4.2. Testing tools + Issue tracking tools.
 - 4.3. Change management tools.
 5. SWR - Risks & Estimation & Efforts.

07 16 715 Data Warehouse Systems and Tools

Warehouses and their basic concepts. Warehouses system components. Warehouses modeling and designing issues. Performance evaluation of the Warehouse. Data quality, Metadata, and Data transformation. OLAP, data mining and virtual Data Warehouses.

07 16 716 Advanced Topics in Database Systems

Part 1: Database Security

- 1- Data Security- how?
 - Access Control, Security policies and models
- 2- Access Control in commercial Databases
- 3- Temporal Authorization models
- 4- Privacy preserving DBM systems, Access control for complex objects
- 5-SQL injection and SOL injection in commercial databases

Part 2: XML Data Management

- 1- XML basics
- 2- Web Application Scenarios
- 3- XQuery fundamentals
- 4- XQuery Full Text (Search Languages, Scoring, Query processing)

Part 3: Processing Massive Data Streams

- 1- Streams : Motivation and streaming Applications
- 2- Centralized Stream Processing
 - Basic Streaming models and tools
 - Stream synopses and applications
- Sampling and sketches
- Sliding Window model
- 3- Distributed Stream Processing
 - One shot distributed stream querying
 - Tree-based aggregation
 - Robustness and loss
 - Decentralized computation and gossiping

07 16 717 Advanced Data Structures and Algorithms

Data Structures: Amortized analysis, Splay trees, Finger trees, Fibonacci heaps, Leftist and skew heaps, Skip lists, Treaps. Approximation Algorithms: Set covering – Knapsack



– Traveling salesman – Max cut – Hardness of approximation. Parallel Algorithms: Parallel models and architectures – Sorting networks- Integer arithmetic – Maximal independent sets – Perfect matching.
Computational Geometry: Convex hulls – Line intersections – Duality – Polygon triangulations – Geometric data structures.

07 16 718 Randomized Algorithms

Classification of randomized algorithms. Sherwood, Las Vegas and Monte Carlo Algorithms. Tail inequalities, mutual and Pair wise independence. Randomized Complexity Classes. Improving 2-Sided error algorithms. The probabilistic method. Derandomization techniques and the method of conditional expectations. General random walks on graphs. Universal hash functions. Several applications. Specify some applications for example in cryptography and network scheduling.

07 16 721 Network Security

Introduction to Network Security and Privacy. Confidentiality using Conventional Encryption. Public-Key Crypto Systems. Authentication Techniques. Digital Signatures. Intruders, Viruses and Worms. Cryptographic Algorithms: DES, RSA, IDEA, SHA, MD5, AES, DSS. Key Exchange Protocols: Kerberos. Network Management Security, Electronic-Mail Security: PEM, PGP, E-Commerce, Secure Multiparty Computations, Zero – Knowledge Proof systems.

07 16 722 Network Communications

Data transmission and encoding. Modulation techniques. Multiplexing. Data link control. Switched Networks and Broadcast networks.

07 16 723 Parallel Computing

Principles of parallel computation. Classification of Parallel Computers. Concurrent programming Languages. Concurrent programming models. Parallel algorithms. Detecting parallelism in sequential programs.

07 16 724 Advanced Topics In Computer Architecture

Modern Computer Architecture; Multicore. Architecture for Power. Protection and Security. Disk technology. DRAM technology.

07 16 730 Fuzzy Logic with Engineering Applications

Classical sets and fuzzy sets. Classical relations and fuzzy relations. Fuzzification. Defuzzification. Neural networks. Genetic algorithms. Fuzzy-neural systems. Fuzzy Genetic systems. Engineering Applications of Fuzzy Logic.



07 16 731 Nonlinear Control Systems

This course is intended to introduce the student to the analysis of the qualitative behavior of nonlinear systems, and the synthesis and design of controllers for such systems. Techniques include state space analysis and describing function, Lyapunov's direct method, linearization, frequency domain stability analysis, and functional analysis methods. Additionally, techniques with a geometric flavor, including center manifold reduction, Lie algebraic approaches to nonlinear control systems.

07 16 732 Optimal Control Theory

The linear quadratic optimal control problem, Pontryagin's maximum principle. The Hamiltonian and dynamic programming principle of Optimizing. Optimal control with free final state. Optimal control for system with penalty constrained final state. Optimal control problem with state constraints. Singular optimal control.

07 16 733 Robotics

Spatial transformations. Robot arm Kinematics Inverse kinematics. Robot arm dynamics. Trajectory planning. Robot arm control.

07 16 734 System Identification

Course provides introduction to the construction of linear dynamical models from experimental data using parametric and non-parametric identification techniques. Theoretical and practical aspects of these techniques are addressed. Introduction to methods for modeling, analyzing, and reasoning about discrete systems, such as hardware and software designs.

07 16 735 Programmable Logic Controllers (PLCs)

Hardware Components: PLC Definitions: CPU and other IC chips used, Input and Output Modules, Fixed and alterable Memory, Remote locations to Input/ Output Modules, Discrete and Analog Modules, On-Off Inputs/Outputs, Sensors, Relays and Photocells, ... etc.

Programming and Software: Programming Format, Creating a Ladder Diagram for a certain process, Process scanning considerations. Basic PLC Functions: Basic PLC Time Function, Basic PLC counters Functions, Programs with both a counter and a timer. Advanced Functions: Types of PLC Analog Modules and Systems, Analog signal Processing, Examples of Real Industrial PLC applications. Visits to some Factories to illustrate some real existing PLC Systems.

07 16 736 Computer Controlled Systems

Introduction, Sampled data systems, Z-transform and its properties, Inverse of Z-transform, Closed loop performance and stability. Computer control schemes:



Supervisory and direct digital control systems, Digital PID control design, Pole placement digital control, Independent regulation and tracking pole placement control. SCADA (Supervisor Control And Data Acquisition) systems. Real time programming considerations. Applications.

07 16 737 Networked Control System

An Introduction to Networked Control Systems. Networking for Control: Technologies and Models. Simulation of Networked Control Systems. Middleware for Distributed Control Systems. Distributed Estimation and Consensus. Distributed Optimization. Decentralized Control. Decentralized and Hybrid MPC. Stability and Control of Networked Control Systems. Feedback Control over Limited-capacity Channels. Event-triggered and Self-triggered Control.

07 16 738 Adaptive Control

Lyapunov-based adaptive control methods. Model-based and non-model based controllers. Adaptive algorithms.

07 16 739 Linear stochastic control systems

Probability and random processes – integrals and stochastic differential equations - analysis of discrete-time linear stochastic control systems - optimal estimation for discrete-time linear stochastic systems - optimal control of discrete-time linear stochastic systems - continuous-time linear stochastic control systems - optimal control of continuous-time linear stochastic systems - stability analysis of stochastic differential equations.

07 16 741 Artificial Intelligence

Knowledge Representation Techniques. Problem Solving by Searching. Constraint Satisfaction Problems. Logic Programming. Uncertain Knowledge and Probabilistic reasoning. Planning. Machine Learning (Decision Trees, Neural Nets). Applications (Natural Language Processing, Perception, Robotics).

07 16 742 Neural Computing

Introduction. Associative memory and Hop field model. Simple perceptrons. Delta rule and learning by backpropagation in multilayer networks. Other learning paradigms: competitive learning, neocognitron, adaptive resonance theory, principal component analysis, Boltzman machine.

07 16 743 Multi-Agent Systems: Theory and Application

Basic Agent Definitions. Basis of Agent theory: planning agents, distributed planning, introduction to cognition. Agents in software Engineering. Agent Modeling Language (AML). MAS Languages: KQML, FIPA. MAS Platforms: FIPA-OS, Agent Cities.



Agents and information systems: exposure to systems such as KRASH, Carnot, RETSINA, Info Sleuth. Agents and e-Commerce: bidding and auctions, Web-based transactions, Agents and mobility.

07 16 744 Optimization Theory

Defining the nonlinear programming problem. Unconstrained optimization using derivatives: gradient method, Newton's method, conjugacy and conjugate directions, and others. Unconstrained search methods. Constrained nonlinear programming methods. Linear approximation methods. Penalty functions. Lagrange multipliers. Necessary and sufficient conditions for optimality.

Adding non-traditional methods such as these inspired from nature like ant colonies and those methods based on quantum computation.

07 16 745 Natural Language Processing

Overview. Language Layers. Translation Networks. Augmented Translation Networks. Case Grammars. Question Answering and Summarization. Machine Translation.

07 16 746 Digital Image Processing

Image formation and perception. Computer representation. Enhancement and restoration. Segmentation. Encoding and data compression. Reconstruction from projections. Scene understanding. Matching and recognition. Selected applications.

07 16 747 Pattern Recognition

Introduction to pattern recognition as a process of data analysis. Representation of features in multidimensional space as random vectors. Similarity and dissimilarity measures in feature space. Bayesian decision theory. Discriminant functions and supervised learning. Clustering analysis and unsupervised learning. Estimation and learning. Feature extraction and selection. Introduction to syntactic P.R. Selected applications.

07 16 748 Bioinformatics

- Introduction to molecular biology (cells, DNA, RNA, genes, proteins, transcription translation, amino acids, etc).
- Sequence Alignment: Pair-wise and Multiple alignment, Local and Global alignment, Profiles, and Motif finding.
- Phylogeny.
- Gene Finding.
- DNA Micro-array Data Analysis.
- A Brief introduction to Protein Folding.
- A Brief introduction to Gene networks.



07 16 749 Simulation Techniques

Modeling and digital computer simulation of large scale systems. Discrete event simulation, statistical tests, random number generators, experimental design of simulation experiments. Introduction to simulation languages as SIMSCRIPT, GPSS, SLAM, and SIMAN which can be used in the final project. Input distribution specification. Random number generators, generating random variable. Statistical analysis of simulation output data.

Prerequisites: "probability theory and statistics"

07 16 750 Computer Graphics

Review of basic concepts in 2-D graphics. Representation of 3-D models. Generation of 3-D models (creating perspective drawing and perspective transformations). Hidden line/hidden surface algorithms. Shading models (illumination and reflection models). (Realistic images). GPU Programming.

07 16 751 Network Protocols

Overview of network and Internet protocols. Abstract Notation for network protocols (AP). More on processes and Connections. Data Transfer and Multiplexing. Error detection and error recovery. Flow Control. Routing. Switching. Congestion Control. Seminars on selected topics.

07 16 752 Mobile Computing

Introduction to mobile computing. Software architectures and mobile computing models. Location management for networks with mobile users, Tracking mobile users, Mobile IP and its variants, Management of location data, Routing/ forwarding messages to mobile users, Flow control/buffering for open connections, Data management. Transport layer protocols in mobile computing environment, Mobile networks analogues of TCP and UDP, Supporting real-time applications, Maintaining QoS guarantees in the presence of mobility. Wireless scheduling and resource management, Scheduling and channel access algorithms, Resource reservations and admission control. System level support, Disconnected operations, Weak connectivity, Caching, Failure recovery. Location management. Applications and case studies.

07 16 753 Game Programming

Specialized systems, path finding, movement, tactical issues, general purpose architectures, decision making architectures, scripting, learning, multi-party games.

07 16 754 Data Compression

- Statistical Methods
- Dictionary Methods



- Applications

07 16 755 Distributed and Intelligent Systems (1)

Bringing together the concepts from different fields such as database, operating systems, networks, artificial intelligence, architecture, and parallel processing that are essential in understanding, evaluating and building distributed intelligent systems. Enhance the student ability to scientifically criticize and discuss research papers. Develop reading, writing and presentation skills.

The student is required to select-under the supervision of the instructor-at least two recent papers from well-known international journal (usually tutorial or survey papers) that are related to the course objective. The student shall make a report on the selected papers and make at least two complete presentations to the other students and demonstrate his understanding of the topic. The student is also required to participate in the discussion of other students' work. The final exam contain questions from all presented work.

07 16 756 Decision Analysis and Operations Research (2)

Theory and methods for the analysis of decisions under uncertainty. The use of expert judgment and value of information. The encoding of attitudes toward risk. Applications selected from capital investment, bidding, purchasing, inspection, inventory control and other areas.

07 16 757 Combinatorial Mathematics

Generating Functions. Recurrence Relations. The Principle of Inclusion and Exclusion. Polya's Theory of Counting. Fundamental Concepts in the Theory of Graphs. Trees, Circuits, and Cut-sets. Planar and Dual Graphs. Domination, Independence, and Chromatic Numbers. Transport Networks. Matching Theory. Adding the following: Ramsey's theorem, Van Der Warden theorem, Sezmerdy's theorem .

07 16 758 Topics in Data Mining

Introduction. Data Preprocessing. Data Warehouse and OLAP Technology: An Introduction. Advanced Data Cube Technology and Data Generalization. Mining Frequent Patterns, Association and Correlations. Classification and Prediction. Cluster Analysis. Web mining. Open research issues in data mining.

07 16 760 Text Information Systems

Theory and application of text information systems. Information retrieval including text preprocessing (morphological analysis, stemming, POS tagging, etc.), retrieval models (vector space, probabilistic models, language models, and advanced models), text indexing techniques and document ranking. Evaluation metrics. Relevance and pseudo feedback. Query expansion. Information filtering. Text mining including data mining style and the NLP-style techniques for text mining. Text classification. Text



dimensionality reduction and text clustering. Text summarization. Topic modeling. Information extraction and sentiment analysis.

07 16 780 Directed Studies in Software and Computer Science (1)

07 16 781 Directed Studies in Software and Computer Science (2)

07 16 782 Directed Studies in Computer Engineering (1)

07 16 783 Directed Studies in Computer Engineering (2)

07 16 784 Directed Studies in System Engineering (1)

07 16 785 Directed Studies in System Engineering (2)

07 16 786 Directed Studies in Computer Applications (1)

07 16 787 Directed Studies in Computer Applications (2)

07 16 788 Directed Studies in Computer Science and Engineering (1)

07 16 789 Directed Studies in Computer Science and Engineering (2)

07 16 811 Directed Reading in Computer Science and Software (1)

Students will be directed towards relevant publications in Computer Science and Software. Requirements would include class presentations and discussion of topics of interest. Term reports are also encouraged as a tool for student's evaluation.

07 16 812 Directed Reading in Computer Science and Software (2)

Students will be directed towards relevant publications in Computer Science and Software. Requirements would include class presentations and discussion of topics of interest. Term reports are also encouraged as a tool for student's evaluation.

07 16 813 New Trends in Programming and Programming Languages

07 16 814 New Trends in Software Engineering

07 16 816 New Trends in Database Systems

07 16 817 New Trends in Algorithms and Data Structures



07 16 821 Directed Reading in Computer Engineering Field (1)

Students will be directed towards relevant publications in the Computer Engineering field. Requirements would include class presentations and discussion of topics of interest. Term reports are also encouraged as a tool for student's evaluation.

07 16 822 Directed Reading in Computer Engineering Field (2)

Students will be directed towards relevant publications in the Computer Engineering field. Requirements would include class presentations and discussion of topics of interest. Term reports are also encouraged as a tool for student's evaluation.

07 16 824 New Trends in Computer Architecture

07 16 831 Directed Reading in Systems Engineering (1)

Students will be directed towards relevant publications in the Systems Engineering. Requirements would include class presentations and discussion of topics of interest. Term reports are also encouraged as a tool for student's evaluation.

07 16 832 Directed Reading in Systems Engineering (2)

Students will be directed towards relevant publications in the Systems Engineering field. Requirements would include class presentations and discussion of topics of interest. Term reports are also encouraged as a tool for student's evaluation.

07 16 841 Directed Reading in Some Computer applications

Students will be directed towards relevant publications in some computer applications. Requirements would include class presentations and discussion of topics of interest. Term reports are also encouraged as a tool for student's evaluation.

07 16 842 Directed Reading in Some Computer applications

Students will be directed towards relevant publications in some computer applications. Requirements would include class presentations and discussion of topics of interest. Term reports are also encouraged as a tool for student's evaluation.

07 16 850 New Trends in Computer Graphics

07 16 854 New Trends in Data Compression

07 16 855 New Trends in Computer Science and Engineering (1)

07 16 856 New Trends in Computer Science and Engineering (2)

07 16 857 New Trends in Computer Science and Engineering (3)

07 16 858 New Trends in Data Mining