FLORIDA ATLANTIC UNIVERSITY

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Professional Weekend Master's Degree Program in Computer Science

11 Months to Complete, Includes Specializations in:

- Internet and Web Technologies
- Software Engineering
- Embedded and Wireless Systems

Course Syllabi

ISM 4052 – Internet Application Programming

Course Description:
The purpose of this course is to teach students how to design and develop Web sites at the introductory to intermediate level. This course is project-oriented. Students are required to finish several internet-based projects using the tools introduced in class.

Textbook:
Internet & World Wide Web -- How to Program, 3rd ed., Deitel, Deitel & Nieto, Prentice Hall, 2004.

Instructors:

Dr. Oge Marques, Assistant Professor, omarques@fau.edu

Dr. Roy Levow, Professor, roy@cse.fau.edu

Course Objectives:
To understand the essential components of Internet-based applications. Students will learn how to do Web design and Web programming at the introductory to intermediate level. More specifically,
1. To learn the basic concepts of the Internet.
2. To learn how to search, collect, and organize information obtained from the Internet.
3. To learn how to do Web authoring in XHTML, and/or using tools.
4. To learn how to create interactive Web pages using programming tools.
5. To learn how to do Web programming at the introductory to intermediate level.
6. To learn how to design and implement an Internet-based, client/server system.

Course Implementation:
- One weekend (17 hours) of live classes
- Pre-taped lectures on CD-ROMs (18 hours)
- Online group discussions through Blackboard (10 hours)
- Blackboard software (via Web) will be used for assignments, papers, discussions, and exams

Prerequisites: COP 3530 – Data Structures and Algorithm Analysis or permission of instructor

Topics:

Part I – Building a basic Web site with static (X)HTML contents
1. Introduction to the Internet, Web, and Web browsers

2. Creating, manipulating, and adding images to a Web page
3. Extensible Hypertext Markup Language (XHTML)
4. Cascading Style Sheets (CSS)

Part II – Building interactive Web sites using JavaScript
5. JavaScript

Part III – Building rich content Web sites using dynamic HTML and Flash
6. Dynamic HTML
7. Macromedia Flash
8. Adding multimedia contents to Web pages

Part IV – Building data-driven Web sites
9. Extensible Markup Language (XML)
10. Web servers
11. Principles of relational databases and SQL
12. VBScript
13. Active Server Pages (ASP)
14. ColdFusion
15. Case studies and applications

Instructor's Bio:
Oge Marques is an Assistant Professor in the Department of Computer Science and Engineering at Florida Atlantic University in Boca Raton, Florida. He received his B.S. degree in Electrical Engineering from Centro Federal de Educação Tecnológica do Paraná (CEFET-PR) in Curitiba, Brazil, and a Master's degree in Electronic Engineering from Philips International Institute of Technological Studies in Eindhoven, The Netherlands, and a Ph.D. degree in Computer Engineering from Florida Atlantic University.

Dr. Marques has several recent publications in the fields of Image and Video Processing, Video Databases, and Visual Information Retrieval, including the books "The Handbook of Video Databases" (CRC Press, Boca Raton, FL, 2004) and "Content-Based Image and Video Retrieval" (Kluwer Academic Publishers, Boston, MA, 2002). His current fields of interest include Visual Information Retrieval, Digital Image Processing, Video Processing and Communications, and Web-based applications.

COT 6930 Concurrency Modeling

Catalog Description: Prerequisite: COP 3530, Data Structures and Algorithms Analysis, or consent of instructor. This course makes it practical and accessible to learn about concurrency and concurrent programming, and to combine theory and practice in one common environment. The course will allow students to verify and resolve concurrency issues at a high level of abstraction in a productive and efficient way.

Textbook: Concurrency, State Models and Java Programs, by Jeff Magee and Jeff Kramer, Wiley, 2000. ISBN: 0-471-98710-7

Instructor: Dr. R. Shankar

Email: ravi@cse.fau.edu

Phone: (561) 297-3470

Schedule: Two Weekend Days, 8.30 AM to 5 PM.

Goals: Concurrent programming is needed today, not only for programmers involved in operating systems and embedded real-time applications, but also in other domains such as Internet, Games, Animation, etc. Concurrency is useful in a wide range of applications where responsiveness and throughput are issues. Ths course will provide a systematic treatment of the concepts and issues in concurrency; a rigorous technique to specify and model concurrent behavior, with analysis tools for animation and verification; and a wide range of design examples.

Prerequisite by Topics: Programming and introduction to Object Oritented design. Knowledge of Java or C++ is not a prerequisite.

Topics: (Lectures and Hands-On Java Applet-based Demos)

1. Object Oriented Design;
2. Concurrency programming with Java (introduction);
3. Processes and Threads; FSP (Finite State Processes) for concurrency notation
4. Concurrent Execution;
5. Shared Objects and Mutual Exclusion;
6. Monitors and Condition Synchronization;
7. Deadlock;
8. Safety and Liveness Properties;
9. Model-Based Design;
10. As time permits: Dynamic Systems; Message Passing; Concurrent Architectures; and Timed Systems.

Assignments: 3 assignments/quizzes (50 %) and 1 term project (50 %). No exams.

CIS 6370 - Data and Internet Security

Description: Overview of technical aspects of data security with emphasis on the Internet and the design of secure systems.

Prerequisites: General concepts of operating systems, computer systems architecture, and languages. Some knowledge of object-oriented concepts, in particular UML modeling.

Outline:

1. Introduction to Internet and Intranet. Structure, growth, possibilities. Related subjects, overview of course
2. The Internet and its threats: Structure of the Internet, web services. Viruses, worms, denial of service, and other types of attacks
3. Security policies and models: Basic policies. Access matrix, multilevel, mandatory, discretionary models. Role-Based Access Control
4. The design of secure systems: Secure system design methodology
5. Cryptography : Symmetric and public key systems, PKI, protocols
6. Network Security: SSL, Kerberos, VPNs, Wireless systems. Firewalls
7. Operating systems security: Unix, Windows XP and 2000. Hardened operating systems, types of attacks. Authentication. Effect of hardware on security
8. Database security: Authorization systems in Oracle and similar systems.
9. Application and language security: Language problems, buffer overflow, Java security. Application/content firewalls.
10. Distributed systems: Security in .NET and Sun ONE, WebSphere and other application servers. Security in XML and Web Services

Objectives of the course:
Understanding of the security problems that arise in the combination of the Internet with Intranets. Need to protect all architectural levels to achieve security. Understanding of how to coordinate

hardware and software to provide data security against internal and external attacks. Modeling of the systems involved through the use of object-oriented patterns.

Implementation aspects:

- One weekend (17 hours) of live lectures.
- Specialized material will be covered in several CD ROMs (20 hours)
- Online group discussion and projects through distance learning using Blackboard (8 hours)
- Three assignments, one exam (combination of questions and design), and a project on a subject chosen by the student from a list of topics

Textbook:

E.B.Fernandez, E.Gudes, and M. Olivier, *Secure Software Systems*, under contract with Addison-Wesley. Draft version available as Blackboard notes.

What the student will learn:

How the many security mechanisms used in Internet systems fit together. How to evaluate the security of a given system. Principles and guidelines to build secure systems. What is the effect of the different architectural layers and units on the security of a system

Instructor:

Prof. Eduardo B. Fernandez
Tel. (561)297-3466, Fax (561)297-2800
Email: ed@cse.fau.edu
http://www.cse.fau.edu/~ed

Instructor's Bio:

Eduardo B. Fernandez (Eduardo Fernandez-Buglioni) is a professor in the Department of Computer Science and Engineering at Florida Atlantic University in Boca Raton, Florida. He has published numerous papers on authorization models, object-oriented analysis and design, and fault-tolerant systems. He has written three books on these subjects. He has lectured all over the world at both academic and industrial meetings. He has created and taught several graduate and undergraduate courses and industrial tutorials. His current interests include patterns for object-oriented design and web services security. He holds a MS degree in Electrical Engineering from Purdue University and a Ph.D. in Computer Science from UCLA. He is a Senior Member of the IEEE, and a Member of ACM. He is an active consultant for industry, including assignments with IBM, Allied Signal, Motorola, Harris, Lucent, and others. He is also a frequent proposal reviewer for NSF. More details can be found at http://www.cse.fau.edu/~ed

MAP 6264 – Queueing Theory and Networks

Overview: This course is designed to explain queueing theory, which is a mathematical theory that underlies the performance analysis of computer and telecommunication networks, and to illustrate how the theory is applied. The basic model is that of a system of fixed resources that is designed to handle demands for service (messages, packets, phone calls, etc.) that are characterized by random arrival times and random bandwidth requirements. (Sometimes demands are blocked and forced to wait in a queue; hence, "queueing theory.") The tools used in the course are elementary probability theory (which will be reviewed) and computer simulation. Theory and simulation complement each other; a typical homework assignment is to calculate some performance measure (theory) and compare it with the output of a computer simulation program (experiment). This presumes of the student a mathematical level consistent with an undergraduate engineering education, and an ability to write simple computer programs. All background material will be reviewed and explained as necessary.

Objectives: The goals are to enable the student to understand in general the essential aspects of probability modeling and, in particular, to apply queueing theory to the analysis of communication networks. In passing, we hope to show that the interplay between intuition and mathematical analysis is surprisingly interesting.

Structure of the Course: The first few lectures (5 hours) will be delivered via CD-ROM (or videotape). These will include reading assignments and illustrative homework assignments. This will be followed by a weekend of lectures (17 hours), during which questions raised by the previous lectures and assignments will be addressed; and additional homeworks will be assigned. The remaining lectures will be covered in CD-ROM-based lectures (23 hours). All homework assignments will graded and returned promptly. Throughout the course, the instructor will be available via e-mail, telephone, and fax to answer questions. Grades will be based on the homework assignments and (maybe) a final exam.

Technical Topics:

1. Intuitive analysis (rate up = rate down), applications, subleties
2. Review of probability, simulation via inverse transform
3. One-dimensional birth-and-death process, related queueing model
4. PASTA, Little's theorem, Erlang B and Erlang C models, finite-source models
5. Multidimensional birth-and-death process, networks of queues and related models
6. Imbedded Markov chains, M/G/1 and related models (such as vacation models and polling models)

Textbooks: Cooper, R.B. INTRODUCTION TO QUEUEING THEORY, Second Edition, North-Holland, 1981 (ISBN 0-444-01065-3); SOLUTIONS MANUAL (by B. Tilt, ISBN 0-444-00379-7); and various survey papers; these can all be downloaded from the instructor's website

References: Bertsekas, D., and Gallager, R. DATA NETWORKS, Second Edition, Prentice Hall, 1987 (ISBN 0-13-200916-1).
Leon-Garcia, A., and Widjaja, I. COMMUNICATION NETWORKS, Second Edition, McGraw-Hill, 2004 (ISBN 0-07-246352-X).

Instructor: Robert B. Cooper received his BS from Stevens Institute of Technology, and his MS and PhD (Electrical Engineering) from the University of Pennsylvania. He was at Bell Labs in the 1960s and Georgia Tech in the 1970s, and since 1978 he has been at Florida Atlantic University, where he is Professor of Computer Science and Engineering. His research has been published in refereed journals, and he is the author of a textbook and several expository papers. He is on the editorial boards of several professional journals, and is a Fellow of the IEEE ("For fundamental contributions to queueing theory and its applications in teletraffic and computer engineering.") For more information, visit www.cse.fau.edu/~bob/

COT 6930 Wireless Networks

Course Description:
In this course we will discuss basic concepts and recent advances in the field of wireless communication networks. The course begins with an introduction of the fundamentals of wireless communication technology and continues with a discussion of selected topics for the following representative network types: cellular wireless networks, WLANs, ad hoc wireless networks and wireless sensor networks.

Textbook:
"*Wireless Communication and Networks*", by William Stallings, Prentice Hall Publishing Company, 2002.

Instructor:
Dr. Mihaela Cardei, Assistant Professor of Computer Science & Eng.
Email: mihaela@cse.fau.edu, Phone: (561) 297-3459
Office: Science & Engineering Building, SE 424

Goals:
Understanding the basic fundamentals in wireless communication technology as well as basic features and recent advances in various wireless networks.

Prerequisites:
Basic knowledge of computer communication networks.

Topics:
1. Introduction
2. Technical Background: Transmission Fundamentals, Communication Networks, Protocols and the TCP/IP Suite
3. Wireless Communication Technology: Signal Encoding Techniques, Spread Spectrum, Coding and Error Control
4. Cellular Wireless Networks
5. WLANs
6. Ad Hoc Wireless Networks
7. TCP for Wireless Links
8. Mobile IP
9. Wireless Sensor Networks
10. Wireless Security

Coursework and Tentative Evaluation:
Four Written Assignments 60%
One exam 40%

Course Implementation:
This course is organized in four sections, with one section to be covered each week, as follows:
Section 1:
- Introduction to Wireless Communication Networks
- Transmission Fundamentals
- Communication Networks, Protocols and the TCP/IP Suite
- Signal Encoding Techniques

Section 2:
- Spread Spectrum
- Coding and Error Control
- Cellular Wireless Networks
- WLAN

Section 3:
- WLAN, cont
- Ad Hoc Wireless Networks
- TCP for Wireless Links

Section 4:
- Mobile IP
- Wireless Sensor Networks
- Wireless Security

Parts of the topics follow the textbook, and others are based on materials selected from literature. Class notes and reference papers will be made available for the students on Blackboard. CD-ROM lectures for selected topics will be made available for the students (18 hours). We will meet one weekend (17 hours) for class lecture presentations and discussions. Online group discussions using Blackboard will be organized (10 hours). One assignment will be given every week with questions/problems from the current section. Assignments will be submitted via email or FAX. The course will conclude with a final examination, which will be scheduled during the last days allocated for this course. Exams will be submitted via email or FAX.

Instructor's Bio:
Dr. Mihaela Cardei is an Assistant Professor in the Department of Computer Science and Engineering at the Florida Atlantic University. Dr. Cardei received a Ph.D. in Computer Science from the University of Minnesota in 2003. Her research interests are in the areas of wireless networking, wireless sensor networks, network protocols, and resource management in computer networks.

CIS 6302 – Mobile Computing

Course Implementation: The course consists of one weekend (17 hours) of face-to-face lectures plus 25 hours of CD-ROM lectures. Material not covered in the face-to-face lectures will be covered in the CD-ROM lectures. FAU Blackboard distance learning environment will be used, which will include online group discussions (5 hours)

Textbook: Handbook of Mobile Computing
Eds. I. Mahgoub and M. Ilyas, CRC Press 2004,
plus instructor's notes, selected articles and papers

Reference: *Mobile Computing*
Tomasz Imielinski and Henry Korth, Kluwer Academic, 1996.

Instructor: Dr. Imad Mahgoub, Professor of Computer Science & Engineering
Sci & Eng. Bldg., Rm 406

E-Mail: imad@cse.fau.edu

Telephone: 561-297-3458

Objectives: The course offers detailed discussion of the important and challenging issues in mobile computing and examines the different approaches that address these issues.

Prerequisites By Topics:

1. Basic knowledge of computer architecture
2. Basic knowledge of data communications and networking

Topics:

1. Introduction to mobile computing
2. Bandwidth and disconnected operation issues
3. Location management
4. Location-Based services
5. Caching strategies
6. Mobile ad hoc wireless networks
7. Power consumption issues
8. Security issues
9. Applications

Instructor's Biography:

Dr. Imad Mahgoub received MS in Applied Mathematics in 1983 and MS in Electrical and Computer Engineering in 1986 both from North Carolina State University. In 1989, he received his Ph.D. in Computer Engineering from The Pennsylvania State University.

Since August 1989, he has been with the College of Engineering at Florida Atlantic University, Boca Raton, Florida, where he is currently Professor of Computer Science and Engineering. He is the director of the Computer Science and Engineering Department Mobile Computing Laboratory at Florida Atlantic University, which was funded by the National Science Foundation.

Dr. Mahgoub has conducted successful research in various areas including mobile computing, interconnection networks, performance evaluation of computer systems, and advance computer architecture. He has published over 70 research articles. He has supervised 3 PhD dissertations and 18 MS theses to completion. He has been a consultant to Industry. Dr. Mahgoub served as a member of the executive committee/program committee of the 1998, 1999 and 2000 IEEE International Performance, Computing and Communications Conferences. He served on the program committees of several international conferences and symposia. He is currently, the Vice Chair of 2004 International Symposium on Performance Evaluation of Computer and Telecommunication Systems.

Dr. Mahgoub is a senior member of IEEE and a member of ACM.

CAP 6010 - Multimedia Systems and Internet

Prerequisites: Programming skills (in C, C++, or Java)

Course Description: Multimedia systems concepts and characteristics. Multimedia compression techniques. Systems architectures for multimedia. Multimedia networking, communications, and synchronization. Multimedia operating systems. Video partitioning and retrieval. Multimedia and the Internet. Wireless multimedia. Multimedia applications. Student projects.

Textbook:
B. Furht, *Handbook of Multimedia Computing*, CRC Press, 1999.

Instructor: Dr. Borko Furht,
Professor of Computer Science and Engineering

Course Implementation:
- One weekend (17 hours) of live lectures
- Pre-taped lectures on CD-ROMs (18 hours)
- Online group discussions through Blackboard (10 hours)
- Blackboard software (via Web) will be used for assignments, papers, discussions, and exams

Topics:
1. Introduction to multimedia systems
2. Image compression techniques and standards
3. Video compression techniques and standards
4. Motion estimation algorithms
5. Multimedia processor architectures
6. Image and video indexing and retrieval
7. Multimedia networks and communications
8. Multimedia operating systems
9. Multimedia and the Internet
10. Wireless Internet and multimedia
11. Multimedia applications
12. Case studies

Instructor's Bio:
Borko Furht is chairman and professor of computer science and engineering at Florida Atlantic University (FAU) in Boca Raton, Florida. Before joining FAU, he was a vice president of research and a

senior director of development at Modcomp in Fort Lauderdale, a computer company of Daimler Benz, Germany, a professor at the University of Miami in Coral Gables, Florida, and senior scientist in the Institute "Boris Kidric"-Vinca, in Belgrade, Yugoslavia.

Dr. Furht received BEEE (Dipl.Eng.), M.Sc. and Ph.D. degrees in electrical and computer engineering all from the University of Belgrade, Yugoslavia. His current research is in multimedia systems, video compression, Internet computing, Web engineering, and Internet and multimedia applications. He is the author of numerous books (20) and papers (170) in the areas of the Internet, multimedia, computer architecture, real-time computing, and operating systems. His latest books include *Encyclopedia of Multimedia* (Springer, 2005), *Multimedia Security Handbook* (CRC Press, 2005), *Handbook of Video Databases* (CRC Press, 2004), *Wireless Internet Handbook* (CRC Press, 2003), *Content-Based Image and Video Retrieval* (Kluwer, 2002), *The Handbook of Internet Computing* (CRC Press, 2000), and *The Handbook of Internet and Multimedia Systems and Applications* (CRC Press, 1999). He is a founder and editor-in-chief of the Journal of Multimedia Tools and Applications (Kluwer Academic Publishers). He has received external funding from both government agencies and private corporations including NSF, NASA, IBM, Xerox, and others. He has received several technical and publishing awards, and has consulted for many high-tech companies including IBM, Hewlett-Packard, Xerox, General Electric, JPL, NASA, Honeywell, and RCA. He has also served as a consultant to various colleges and universities. He has given many invited talks, keynote lectures, seminars, and tutorials. He received several technical and publishing awards.

COT 6930 – Video Communications

Course Description: This is a graduate level course on digital video communications. The course will introduce video compression and issues in video transmission over wired and wireless networks. The course will cover video technologies widely used in the industry such as MPEG-2, MPEG-4, H.264, and transport protocols such as RTP and MPEG-2 TS.

Learning Outcomes: Upon successful completion of the course students will be able to analyze and design systems for video communications. The knowledge of the fundamental concepts will allow students to implement video delivery over networks as well as objectively evaluate video communications products. The comprehensive coverage of commercially used MPEG technologies will provide students with background in industry-relevant standards and technology. The students will acquire enough knowledge to independently develop and lead video-oriented projects.

Textbook: Multimedia Communication Systems: Techniques, Standards, and Networks by K.R. Rao, Z.S. Bojkovic, and D.A. Milovanovic. Prentice Hall, 2002, ISBN 0-13-031398-X

References: A number of seminal research papers in the area will be made available

Goals: This course is intended to provide a background and experience in the area of video communications relevant to the industry needs today as well as the challenges and future developments in the field.

Topics:

1. Introduction to digital video compression
2. Video compression – MPEG-2, MPEG-4, H.264
3. Multimedia content representation (MPEG-4 Systems and SMIL)
4. MPEG-2 Transport
5. Error resilience
6. Video delivery over IP networks
7. Video delivery over wireless networks
8. RTP (Realtime Transport Protocol)
9. Video servers

10.Video adaptation and transcoding

Course Management:
- One weekend of live lectures (17 hours)
- Pre-taped lectures on CD-ROMs (20 hours)
- Online group discussions through Blackboard (8 hours)

The students will be graded based on the homework assignments, design projects, and participation.

Instructor: Dr. Hari Kalva

Dr. Kalva joined the Department of Computer Science and Engineering at Florida Atlantic University as an Assistant Professor in August 2003. Prior to that he was a consultant with Mitsubishi Electric Research Labs, Cambridge, MA, where he worked different projects including MPEG-2 to MPEG-4 real-time video transcoding. He was a co-founder and the Vice President of Engineering of Flavor Software, a New York company founded in 1999, that developed MPEG-4 based solutions for the media and entertainment industry. Dr. Kalva is an expert on digital audio-visual communications systems with over ten years of experience in multimedia research, development, and standardization. He has made key contributions to the MPEG-4 Systems standard and also contributed to the DAVIC standards development. His research interests include video compression, adaptation, and communication. He has over a two-dozen published works and three patents (six pending) to his credit. He is the author of one book and co-author of five book-chapters.

Dr. Kalva received a Ph.D. and an M.Phil. in Electrical Engineering from Columbia University in 2000 and 1999 respectively. He received an M.S. in Computer Engineering from Florida Atlantic University in 1994, and a B. Tech. in Electronics and Communications Engineering from N.B.K.R. Institute of Science and Technology, S.V. University, Tirupati, India in 1991.

For more information, visit: http://www.cse.fau.edu/~hari

COP 6930 – Advanced Internet Engineering

Prerequisites: Basic knowledge of Internet and Web systems and programming.

Course Description: Students will get familiar with current Internet and Web technologies and application trends. Topics include computer networks and Internet architectures, wireless Internet, Internet and application service providers, multimedia transmission over the Internet, and advanced applications. Student projects: programming and research projects.

Textbook:
- ***Handbook of Internet Multimedia Systems and Applications, CRC Press, 1999.***
  (selected chapters)

Reference Material:
- J.F. Kurose and K.W. Ross, "*Computer Networking: A Top-Down Approach Featuring the Internet*," Addison-Wesley, 2001.
- **B. Furht, *"Handbook of Internet Computing,"* CRC Press, 2000.**
- *Selected papers*

Instructor:
Dr. Borko Furht, Professor of Computer Science and Engineering

Course Implementation:
- One weekend (17 hours) of live courses
- Pre-taped lectures on CD-ROMs (18 hours)
- Online group discussions through Blackboard (10 hours)
- Blackboard software (via Web) will be used for assignments, papers, discussions, and exams

Topics:
1. Introduction to Internet and World Wide Web
2. Design of Web Sites
3. Computer Networks and the Internet
4. Wireless Internet
5. Multimedia Networking
6. Internet Service Providers and Application Service Providers
7. Content-Based Multimedia Search and Retrieval on the Internet
8. Real-Time Video Over the Internet
9. Internet-Based Unified Messaging Systems
10. Multimedia Applications on the Internet
11. E-and M-Commerce Applications
12. Students' Projects

Instructor's Bio:

Borko Furht is chairman and professor of computer science and engineering at Florida Atlantic University (FAU) in Boca Raton, Florida. Before joining FAU, he was a vice president of research and a senior director of development at Modcomp in Fort Lauderdale, a computer company of Daimler Benz, Germany, a professor at University of Miami in Coral Gables, Florida, and senior scientist in the Institute "Boris Kidric"-Vinca, in Belgrade, Yugoslavia.

Dr. Furht received BEEE (Dipl.Eng.), M.Sc. and Ph.D. degrees in electrical and computer engineering all from the University of Belgrade, Yugoslavia. His current research is in multimedia systems, video compression, Internet computing, Web engineering, and Internet and multimedia applications. He is the author of numerous books (20) and papers (170) in the areas of the Internet, multimedia, computer architecture, real-time computing, and operating systems. His latest books include *Handbook of Video Databases* (Kluwer, 2004), *Wireless Internet Handbook* (CRC Press, 2003), *Content-Based Image and Video Retrieval* (Kluwer, 2002), *The Handbook of Internet Computing* (CRC Press, 2000), and *The Handbook of Internet and Multimedia Systems and Applications* (CRC Press, 1999). He is a founder and editor-in-chief of the Journal of Multimedia Tools and Applications (Kluwer Academic Publishers). He has received external funding from both government agencies and private corporations including NSF, NASA, IBM, Xerox, and others. He has received several technical and publishing awards, and has consulted for many high-tech companies including IBM, Hewlett-Packard, Xerox, General Electric, JPL, NASA, Honeywell, and RCA. He has also served as a consultant to various colleges and universities. He has given many invited talks, keynote lectures, seminars, and tutorials. He received several technical and publishing awards.

CAP 6673 – Data and Web Mining

Coordinator: Dr. Taghi M. Khoshgoftaar
Professor of Computer Science and Engineering

Phone: (561) 297-3994
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URL: http://www.cse.fau.edu/~taghi

Goals: To enable students to understand basic concept of data mining algorithms with an emphasis on real world applications.

Catalog Description: This course deals with the principles of data mining. Topics covered include machine learning methods, knowledge discovery and representation, classification and prediction

models.

Prerequisites: STA 4821 or equivalent. Scientific programming in a high level language (C, C++, or JAVA)

Textbook: Data Mining: Practical Tools and Techniques with JAVA Implementations, by I.H. Witten and E. Frank Morgan Kaufmann

Bibliography:

1. Data Mining: Concepts and Techniques, J. Han and M. Kamber, Morgan Kaufmann Publishers 2001.

2. Machine Learning and Data Mining Methods and Applications, R.S. Michalski, I. Bratko, and M. Kubat, John Wiley 1998.

3. Machine Learning, Tom M. Mitchell, WCB/McGraw-Hill 1997.

4. Data Mining – Introductory and Advanced Topics, Margaret H. Dunham, Prentice Hall 2002.

Instructor's Bio:
Dr. Taghi M. Khoshgoftaar is a professor of the Department of Computer Science and Engineering, Florida Atlantic University and director of graduate programs and research. Also, he is the Director of the Empirical Software Engineering Laboratory. His research interests are in software engineering, software metrics, software reliability and quality engineering, computational intelligence, computer performance evaluation, data mining, machine learning, network security, intrusion detection systems, and statistical modeling. He has published more than 300 refereed papers in these areas. He has been a principal investigator and project leader in a number of projects with industry, government, and other research-sponsoring agencies. He is a member of the Association for Computing Machinery, the IEEE Computer Society, and IEEE Reliability Society. He served as the general chair of the 1999 International Symposium on Software Reliability Engineering (ISSRE'99), and the general chair of the 2001 International Conference on Engineering of Computer Based Systems. Also, he has served on technical program committees of various international conferences, symposia, and workshops. He has served as North American editor of the Software Quality Journal, and is on the editorial boards of the journals Empirical Software Engineering, Software Quality, and Fuzzy Systems.

CDA 6508 Ad Hoc Networks

• Course Description:
A comprehensive approach to fundamentals of ad hoc networks including media access protocols, routing protocols, implementation and communication performance.

• Textbook:
I. Stojmenovic, Handbook of Wireless Networks and Mobile Computing, John Wiley & Sons, 2002

• Reference:
- C.-K. Toh, Ad Hoc Mobile Wireless Networks: Protocols and Systems, Prentice Hall PTR, 2002.
- C.E.Perkins, Ad Hoc Networking, Addison Wesley, 2001.
- D.P.Agrawal and Q.-A. Zeng, Introduction to Wireless and Mobile Systems, Thomson Brooks/Cole, 2003.

• Instructor:
Jie Wu, Professor of Computer Science and Engineering, Florida Atlantic University. Room 401, Science and Engineering Building, × 73941, jie@cse.fau.edu

• **Goals:**
An understanding of basic of the ad hoc wireless networking. Covers media access, routing, data management, power optimization, transport protocol, and much more. Current and future developments in the field.

• **Prerequisites by Topic:**
1. Basic graph theory
2. Fundamentals of computer networks

• **Topics:**
1. Introduction to Wireless Networks
2. Ad Hoc Wireless Networks and Their Origins
3. Topics in Infrastructured Networks (cellular architecture)
   - Handoffs
   - Location Management (Mobile IP)
   - Channel Assignment
4. Topics in Infrastructurless Networks (MANETs)
   - Wireless Media Access Protocols
   - Ad Hoc Routing Protocols
   - Multicasting and Broadcasting
   - Reliability and QoS
   - Power Optimization
   - Security
5. Applications
   - Sensor Networks and Indoor Wireless Environments
   - Pervasive Computing
6. Sample On-going Projects

• **Course Implementations:**
   - One weekend (17 hours)
   - Pre-taped CD-ROM lectures (over 25 hours).
   - Distance learning via Blackboard (5 hours)
   - All Homework assignments, tests (including sample tests), and a list of projects will be posted on Blackboard.

• **Instructor's Bio:**
Dr. Jie Wu a Professor at Department of Computer Science and Engineering, Florida Atlantic University. He has published over 150 papers in various journal and conference proceedings. His research interests are in the area of mobile computing, routing protocols, fault-tolerant computing, and interconnection networks. Dr. Wu served as a program vice chair for 2000 International Conference on Parallel Processing (ICPP) and a program vice chair for 2001 IEEE International Conference on Distributed Computing Systems (ICDCS). He is a program co-chair of the 12th ISCA International Conference on Parallel and Distributed Computing Systems in 1999. He is also a co-guest-editor of a special issue in IEEE Transactions on Parallel and Distributed Systems on "Challenges in Designing Fault-Tolerant Routing in Networks" and a co-guest-editor of a special issue in Journal of Parallel and Distributing Computing on "Routing in Computer and Communication Networks". He is the author of the text "Distributed System Design" published by the CRC press. Currently, Dr. Wu serves as an Associated Editor in IEEE Transactions on Parallel and Distributed Systems and three other international journals. Dr. Wu a recipient of the 1996-97 and 2001-2002 Researcher of the Year Award at Florida Atlantic University. He is also a recipient of the 1998 Outstanding Achievements Award from IASTED. He served as an IEEE Computer Society Distinguished Visitor. Dr. Wu is a Member of ACM and a Senior Member of IEEE.

• **Course Description:**

Prerequisite: A high-level programming language, basic knowledge of architecture and operating systems, elementary discrete mathematics, or permission of the instructor.
We consider a distributed computer system that consists of multiple autonomous processors that do not share primary memory but cooperate by sending messages over a communication network. Discussion of special problems related to distributed control such as election and mutual exclusion, routing, data management Byzantine agreement, and deadlock handling.

• **Textbook:**

1. Distributed System Design
   Jie Wu, CRC Press, 1999.

• **References:**

1. Distributed Algorithms
   Nancy A. Lynch, Morgan Kaufmann Publishers, Inc., 1996
2. Distributed Systems: Principle and Paradigms
   Andrew S. Tanenbaum and Maarten Van Steen, Prentice Hall, 2002.

• **Instructor:**

Dr. Jie Wu, Professor of Computer Science and Engineering
jie@cse.fau.edu, http://www.cse.fau.edu/~jie

• **Goals:**

The student will get exposed to fundamental issues in distributed system design, recent development, and research trends in this area.

• **Prerequisite by topic:**

- Basic concepts of computer architecture and operating systems
- Knowledge of a high level programming language
- Elementary discrete mathematics

• **Topics:**

1. Introduction and motivation
2. Program languages and clock synchronization
3. Event ordering and clock synchronization
4. Election and mutual exclusion
5. Byzantine agreement
6. Distributed faults and termination detection
7. Distributed data management
8. Distributed operating systems: deadlock handling
9. Topics in distributed communication protocols: routing, multicasting and broadcasting
10. Topics in distributed shared memory, database, and file systems

• **Course Implementations:**

- One weekend (17 hours) lectures
- Pre-taped CD-ROM lectures (over 20 hours).
- Distance learning via Blackboard
- Online group discussion (10 hours) via Blackboard
- All homework/project assignments and test (including sample tests) via blackboard.
- 6 homework/projects (60%) and 1 take-home exam (40%)

COP 6731 – Theory and Implementation of Database Systems

Instructor: Dr. M. K. Solomon, Professor
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Dr. Solomon's major areas of research include the design, implementation and theory of database systems, computational complexity theory, and the philosophical aspects of computability. Dr. Solomon has published articles on these topics in such journals as *ACM Transactions on Database Systems*, *Communications of the ACM*, *Computer Journal*, *Journal of Symbolic Logic*, *Mathematical Logic Quarterly*, and *British Journal for the Philosophy of Science.* He has a strong professional interest in all aspects of the Oracle RDBMS and has recently co-authored three books in the Osborne/McGraw-Hill Oracle Press Series.

Description: Investigation of the fundamental principles and practices of relational database processing and design. Oracle will be used intensively in these investigations.

Goal: Understand the structure, intelligent use, and implementation of relational database systems, especially as relates to Internet databases.

Blackboard Usage: The Blackboard system will be used to supply lecture notes, for assignment submission, and for enhanced student/instructor interaction.

Textbook: An Introduction to Database Systems, Eighth Edition, by C. J. Date, Addison-Wesley, 2004.

Prerequisite: The ability to program in C or C++, and some exposure to a database system.

Grading: The student's grade will be based on performance in five assignments.

Course Outline:

Topics (1)-(5) will be covered in a one week-end (17 hour) face-to-face sequence of lectures.

(1) An overview of relational database systems.
(2) Query processing with the relational database language SQL in Oracle.
(3) Database programming with SQL: embedded SQL and dynamic SQL in Oracle PRO*C.
(4) Special facilities of ORACLE relational DBMS: SQL*PLUS and PL/SQL.
(5) Relational integrity constraints and database triggers in SQL.

Topics (6)-(11) will be covered in CD-ROM lectures (28 hours).

(6) Theoretical basis of relational database language, relational calculus and relational algebra.
(7) SQL-92 join operators in Oracle9*i*.
(8) SQL-1999 OLAP queries in Oracle9*i*.
(9) Transaction processing: recovery and concurrency control.
(10) Relational database design: normalization theory.
(11) XML facilities in SQL; Oracle support for SQL/XML.