

University of South Florida
College of Business Administration
Information Systems and Decision Sciences
ISM 7911 - Seminar on Technical Information Systems Research
Spring Semester 2005 - Syllabus

Course Location:

Friday, 9:30am – 12:00noon in CIS 2074 (IS/DS Conference Room)

Instructors:

Professor Alan R. Hevner

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Professor Donald J. Berndt

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Course Objectives:

This research seminar covers current research in the technical fields of Information Systems. The course is team taught by the IS/DS faculty and guest speakers with research interests in these fields. The seminar structure of the course will allow great flexibility in the selection and presentation of current research topics and opportunities for significant student-faculty interaction. Guest speakers will include other departmental professors with technical research projects and prominent technical researchers from industry and other universities. Students will achieve a broad understanding of the research areas and research methods associated with technical Information Systems research. This knowledge will be used to prepare a research proposal on a selected technical research topic.

Course Outline with Required Readings:

Required readings will be distributed to students at least two weeks ahead of the due dates. Students are responsible for completing the readings and being well prepared to participate in a critical analysis of the readings.

Date	Topic	Instructor	Readings
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January 14	Introduction to Course <input type="checkbox"/> Course Requirements <input type="checkbox"/> Computing Curricula <input type="checkbox"/> Research in Information Systems <input type="checkbox"/> Design Science Research	Prof. Hevner Prof. Berndt Prof. Chari	Readings 1-4
January 21	Experimentation in Software Engineering <input type="checkbox"/> Inspections of Diagrams <input type="checkbox"/> Software Development in E-Commerce <input type="checkbox"/> Quality Attributes in Telemedicine	Prof. Hevner	Readings 5-9
January 28	Technology Transfer in IS Organizations <input type="checkbox"/> OO Methods <input type="checkbox"/> Software Process Innovations <input type="checkbox"/> Agile Methods and Pair Programming	Prof. Hevner	Readings 10-15
February 4	Complex Systems Development <input type="checkbox"/> Flow/Service/Quality (FSQ) Concepts <input type="checkbox"/> Functional Abstraction (FX) <input type="checkbox"/> Research Directions	Prof. Hevner	Readings 16-18
February 11	Data Warehousing <input type="checkbox"/> OLTP versus DW Environments <input type="checkbox"/> The Dimensional Model <input type="checkbox"/> The CATCH Data Warehouse <input type="checkbox"/> Performance Issues	Prof. Berndt	Readings 19-22
February 18	Data Quality <input type="checkbox"/> Data Quality Dimensions <input type="checkbox"/> Data Quality Management	Prof. Berndt	Readings 23-26
February 25	Healthcare Information Systems Research	Prof. Neset Hikmet	Readings 27-31
March 4	IT-Enabled Auctions <input type="checkbox"/> Online Auctions <input type="checkbox"/> Multi-Attribute Auctions <input type="checkbox"/> Combinatorial Auctions	Prof. Joni Jones	Readings 32-35
March 11	Software Economics	Prof. Manish Agrawal	Readings 36-42
March 18	Spring Break		
March 25	Data Mining <input type="checkbox"/> The Knowledge Discovery Process <input type="checkbox"/> Data Mining Techniques and Applications <input type="checkbox"/> Data Visualization	Prof. Berndt	Readings 43-48

April 1	Distributed Systems <input type="checkbox"/> Algorithm Complexity /NP Completeness <input type="checkbox"/> Distributed Systems and Network Design <input type="checkbox"/> System Architectures	Prof. Chari	Readings 49-54
April 8	DSS and Multi-Agent Systems <input type="checkbox"/> Model Management & Integration <input type="checkbox"/> Multi-Agent Systems <input type="checkbox"/> Automated Negotiations	Prof. Chari	Readings 55-61
April 15	Workflow Systems <input type="checkbox"/> Workflow Analysis <input type="checkbox"/> Business Process Analysis <input type="checkbox"/> Routing and Workflow Coordination	Prof. Chari	Readings 62-67
April 22	Data Warehouse Applications	Prof. Hugh Watson, Univ. of Georgia	Readings
April 29	Shared Capacity Management Architectures for Enhanced Content Delivery in Internet Services	Prof. Ram Ramesh, SUNY Buffalo	Readings 68-69
May 6	Student Presentations of Research Projects	Doctoral Students	

Grading Policy: This course will use the Plus/Minus grading system. Course grades will be determined based on the following percentages.

Class Participation	15%
Research Project	40%
3 Take-Home Exams	45%

Course Readings: Readings will be provided via handouts or via the course website. Readings must be completed before the class session.

1. Joint Task Force for Computing Curricula 2004, "Overview Report including A Guide to Undergraduate Degree Programs in Computing," November 2004, at campus.acm.org/public/comments/comments.cfm.
2. R. Glass, V. Ramesh, and I. Vessey, "An Analysis of Research in Computing Disciplines," *Communications of the ACM*, Vol. 47, No. 6, June 2004, pp. 89-94.

3. I. Vessey, V. Ramesh, and R. Glass, "Research in Information Systems: An Empirical Study of Diversity in the Discipline and Its Journals," *Journal of Management Information Systems*, Vol. 19, No. 2, Fall 2002, pp. 129-174.
4. A. Hevner, S. March, J. Park, and S. Ram, "Design Science Research in Information Systems," *Management Information Systems Quarterly*, Vol. 28, No. 1, March 2004, pp. 75-105.
5. R. Glass, "The Realities of Software Technology Payoffs," *Communications of the ACM*, Vol. 42, No. 2, February 1999.
6. M. Zelkowitz and D. Wallace, "Experimental Models for Validating Technology," *IEEE Computer*, Vol. 31, No. 5, May 1998, pp. 23-31.
7. B. Hungerford, A. Hevner, and R. Collins, "Reviewing Software Diagrams: A Cognitive Study," *IEEE Transactions on Software Engineering*, Vol. 30, No. 2, Feb. 2004, pp. 82-96.
8. A. Hevner, R. Collins, and M. Garfield, "Product and Project Challenges in Electronic Commerce Software Development," *The Data Base for Advances in Information Systems*, Vol. 33, No. 4, Fall 2002, pp. 10-23.
9. C. LeRouge, A. Hevner, R. Collins, M. Garfield, and D. Law, "Telemedicine Encounter Quality: Comparing Patient and Provider Perspectives of a Socio-Technical System," *Proceedings of the 37th Annual Hawaii International Conference on System Sciences (HICSS37)*, Hawaii, January 2004.
10. R. Fichman and C. Kemerer, "The Assimilation of Software Process Innovations: An Organizational Learning Perspective," *Management Science*, Vol. 43, No. 10, Oct. 1997.
11. G. Green and A. Hevner, "Guidance for the Successful Diffusion of Information Technology Innovations in Software Development Organizations," *IEEE Software*, Vol. 14, No. 6, November/December 2000.
12. G. Green, R. Collins, and A. Hevner, "Perceived Control and the Diffusion of Software Development Innovations," *Journal of High Technology Management Research*, Vol. 15, No. 1, February 2004, pp. 123-144.
13. G. Green, A. Hevner, and R. Collins, "The Impacts of Quality and Productivity Perceptions on the Use of Software Process Improvement Innovations," to appear in *Information & Software Technology*, 2005.
14. L. Williams, R. Kessler, W. Cunningham, and R. Jeffries, "Strengthening the Case for Pair Programming," *IEEE Software*, Vol. 14, No. 4, July/August 2000.
15. M. Domino, R. Collins, and A. Hevner, "Research on Collaborative Software Development," Working Paper, 2005.
16. A. Hevner, R. Linger, M. Pleszkoch, and G. Walton, "Flow-Service-Quality (FSQ) Engineering for the Specification of Complex Systems," Chapter 11 in *Practical Foundations of Business System Specifications*, Edited by H. Kilov and K. Baclawski, Kluwer Academic

Publishers, The Netherlands, 2003, pp. 215-229.

17. P. Hausler, R. Linger, M. Pleszkoch, and A. Hevner, "Using Function Abstraction to Understand Program Behavior," *IEEE Software*, Vol. 7, No. 1, January 1990, pp. 55-63.
18. M. Pleszkoch and R. Linger, "Improving Network System Security with Function Extraction Technology for Automated Calculation of Program Behavior," *Proceedings of the 37th Hawaii International Conference on System Sciences*, January 2004.
19. B. Cooper, H. Watson, B. Wixom, and D. Goodhue, "Data Warehousing Supports Corporate Strategy at First American Corporation," *MIS Quarterly*, (24/4), December 2000, pp. 547-567.
20. V. Harinarayan, A. Rajaraman, and J. Ullman, "Implementing Data Cubes Efficiently," *SIGMOD*, 1996.
21. A. Datta, D. VanderMeer, and K. Ramamritham, "Parallel Star Join + DataIndexes: Efficient Query Processing in Data Warehouses and OLAP," *IEEE Transactions on Knowledge and Data Engineering*, (14/6), December 2002.
22. D. Berndt, A. Hevner, and J. Studnicki, "The CATCH Data Warehouse: Support for Community Health Care Decision Making," *Decision Support Systems*, Vol. 35, June 2003, pp. 367-384.
23. J. Hoxmeier, "Typology of Database Quality Factors," *Software Quality Journal*, 7: 179-193, 1998.
24. R. Wang, "A Product Perspective on Total Data Quality Management," *Communications of the ACM*, 40(5): 103-110, 1998.
25. Y. Cui and J. Widom, "Lineage Tracing for General Data Warehouse Transformations," *VLDB Journal*, Vol. 12, 2003, pp. 41-58.
26. J. Fisher and D. Berndt, "Creating False Memories: Temporal Reconstruction Errors in Data Warehouses," *Eleventh Workshop on Information Technology and Systems*, New Orleans, December 2001.
27. S. Walczak, W. Pofahl, and R. Scorpio, "A Decision Support Tool for Allocating Hospital Bed Resources and Determining Required Acuity of Care," *Decision Support Systems*, Vol. 34, 2002, pp. 445-456.
28. F. Sainfort and W. George, "Healthcare Delivery Systems in the United States," *Engineering Enterprise*, Summer 2004, pp. 6-9.
29. R. Mack, et al., "Text Analytics for Life Science Using the Unstructured Information Management Architecture," *IBM Systems Journal*, Vol. 43, No. 3, 2004, pp. 490-515.
30. G. Sakellariopoulos and G. Nikiforidis, "Prognostic Performance of Two Expert Systems Based on Bayesian Belief Networks," *Decision Support Systems*, Vol. 27, 2000, pp. 431-442.
31. S. Devaraj and R. Kohli, "Performance Impacts of Information Technology: Is Actual Usage

- the Missing Link?" *Management Science*, Vol. 49, No. 3, March 2003, pp. 273-289.
32. R. Bapna, P. Goes, and A. Gupta, "Analysis and Design of Business-to-Consumer Online Auctions," *Management Science*, Vol. 49, No. 1, 85-101, 2003.
 33. M. Bichler, "An Experimental Analysis of Multi-Attribute Auctions," *Decision Support Systems*, Vol. 29, No. 3, 249-268, 2000.
 34. A. Kwasnica, J. Ledyard, D. Porter, and C. DeMartini, "A New and Improved Design for Multi-Object Iterative Auctions," *Management Science*, in press.
 35. J. Jones and G. Koehler, "A Heuristic for Winner Determination in Rule-Based Combinatorial Auctions," *INFORMS Journal on Computing*, in press.
 36. R. Banker and C. Kemerer, "Scale Economies in New Software Development," *IEEE Transactions on Software Engineering* (15:10) 1989, pp 1199-1205.
 37. K. Chari and M. Agrawal, "Software Quality, Cycle-time and Effort: An Empirical Analysis," Working Paper, Department of Information Systems and Decision Sciences, University of South Florida, 2005.
 38. D. Harter, M. Krishnan, and S. Slaughter, "Effects of Process Maturity on Quality, Cycle-Time and Effort in Software Product Development," *Management Science* (46:4) 2000a, pp 451-466.
 39. Q. Hu, R. Plant, and D. Hertz, "Software Cost Estimation using Economic Production Models," *Journal of Management Information Systems* (15:1) 1998, pp 143-163.
 40. C. Kemerer, "An Empirical Analysis of Software Cost Estimation Models," *Communications of the ACM* (30:5) 1987, pp 416-429.
 41. K. Maxwell, L. Wassenhove, and S. Dutta, "Performance Evaluation of General and Company Specific Models in Software Development Effort Estimation," *Management Science* (45:6), June 1999 1999, pp 787-803.
 42. S. Vicinanza, T. Mukhopadhyay, and M. Prietula, "Software-Effort Estimation: An Exploratory Study of Expert Performance," *Information Systems Research* (2:4) 1991, pp 243-262.
 43. B. Bederson, B. Shneiderman, and M. Wattenberg, "Ordered and Quantum Treemaps: Making Effective Use of 2D Space to Display Hierarchies," 2001.
 44. K. Osei-Bryson and M. Ko, "Applying Data Mining Techniques to Understand the Impact of Information Technology on Organizational Productivity," *America's Conference on Information Systems*, New York City, 2004.
 45. B. Padmanabhan and A. Tuzhilin, "Small is Beautiful: Discovering the Minimal Set of Unexpected Patterns," *International Conference on Knowledge Discovery and Data Mining*, Boston, 2000.
 46. V. Dhar, "Data Mining in Finance: Using Counterfactuals to Generate Knowledge from

- Organizational Information Systems,” *Information Systems*, Vol. 23, No. 7, 423-437, 1998.
47. S. Dumais, G. Furnas, T. Landauer, S. Deerwester, and R. Harshman, “Using Latent Semantic Analysis to Improve Access to Textual Information, *SIGCHI*, 1988.
 48. U. Fayyad et al., “From Data Mining to Knowledge Discovery in Databases,” *AI Magazine*, 17(3): 37-54, Fall 1996.
 49. M. Gerla and L. Klienrock, “On the Topological Design of Distributed Computer Networks,” *IEEE Transactions on Communications*, COM-25 (1977) 48-60.
 50. A. Hevner and A. Rao, “Distributed Data Allocation Strategies,” *Advances in Computers*, Vol. 27, 1988, 121-155.
 51. S. Bhattacharjee, R. Ramesh, and S. Zions, “A Design Framework for e-Business Infrastructure Integration and Resource Management”, *IEEE Transactions on Systems, Man and Cybernetics*, August 2001, vol. 31, no. 3, pp. 304-319.
 52. S. Bhattacharjee, and R. Ramesh, “Enterprise Computing Environments and Cost Assessment: An Object-Oriented Framework”, *Communications of the ACM*, October 2000, vol. 43, no. 10, pp. 74-82.
 53. K. Chari, and S. Seshadri, “Demystifying Integration,” *Communications of the ACM*, Vol. 47, No. 7, July 2004, 59-63.
 54. P. Vitharana, H. Jain, and M. Zahedi, “"Strategy-based Design of Reusable Business Components", *IEEE Transactions on Systems, Man and Cybernetics -Part C Applications and Reviews*, Vol. 34, No. 4, November 2004, 460-474.
 55. R. Krishnan and K. Chari, “Model Management: Survey, Future Research Directions and a Bibliography,” *Interactive Transactions of ORMS*, Vol. 3, No. 1, 2000.
 56. K. Chari, “Model Composition Using Filter Spaces,” *Information Systems Research*, Vol. 13, No. 1, March 2002, 15-35.
 57. K. Chari, “Model Composition in a Distributed Environment,” *Decision Support Systems*, Vol. 35, No. 3, June 2003, 399-413.
 58. R. Aron, A. Sundararajan, and S. Vishwanathan, “Intelligent Agents in Electronic Markets for Information Goods: Customization, Preference Revelation and Pricing,” *Decision Support Systems* (To Appear).
 59. R. Kishore, H. Zhang, and R. Ramesh, “Enterprise Integration using the Agent Paradigm: Foundations of Multi-Agent-Based Integrative Business Information Systems,” *Decision Support Systems* (To Appear).
 60. D. Zeng and K. Sycara, “Bayesian Learning in Negotiation,” *International Journal of Human-Computer Studies* (1998), 48, 125-141.
 61. K. Chari and M. Agrawal, “Automated Multi-issue Negotiations using Agents,” Working

Paper, ISDS Department, University of South Florida, 2004.

62. A. Basu, and A. Kumar, "Research Commentary: Workflow Management Issues in e-Business," *Information Systems Research*, Vol. 13, No. 1, March 2002, 1-14.
63. A. Basu and R. Blanning, "A Formal Approach to Workflow Analysis," *Information Systems Research*, Vol. 11, No. 1, March 2000, 17-36.
64. A. Kumar, and L. Zhao, "Dynamic Routing and Operational Controls in a Workflow Management System," *Management Science*, Volume 45, No. 2, February 1999.
65. A. Basu and R. Blanning, "Synthesis and Decomposition of Processes in Organizations," *Information Systems Research*, Vol. 14, No. 4, December 2003, 337–355.
66. W.M.P. van der Aalst and A. Kumar, "XML-Based L-Based Schema Definition for Support of Interorganizational Workflow," *Information Systems Research*, Vol. 14, No. 1, March 2003, 23–46.
67. T. Madhusudan, and N. Uttamsingh, "Declarative approach to composing web services in dynamic environments," *Decision Support Systems* (To Appear).
68. X. Geng, D. Gopal, R. Ramesh, and A. Whinston, "Topographical Leveraging of Sharable Services: The Concept of Capacity Provision Networks," in *Electronic Commerce and the Digital Economy*, M. Shaw (Ed.), M.E. Sharpe Publishers, 2004.
69. X. Geng, D. Gopal, R. Ramesh, and A. Whinston, "Capacity Provision Networks: A Technology Framework and Economic Analysis of Web Cache Trading Hubs," in *Innovations in Financial and Economic Networks*, A. Nagurney (Ed.), Edward Elgar Publishers, 2003.