City University of Hong Kong

Information on a Course
offered by Department of Information Systems
with effect from Semester A in 2012 / 2013

Part I

Course Title:	Design Science Research in Information Systems
Course Code:	IS8006
Course Duration:	One Semester (13 weeks)
Credit Units:	3
Level:	R8
Medium of Instruction:	English
Prerequisites:	IS8001 IS Research Methods
Precursors:	Nil
Equivalent Course:	IS8006M Design Science Research in Information Systems
Exclusive Courses:	Nil

Part II

1. Course Aims

This course aims to equip IS research students with the necessary foundations and skills to perform design science research in IS at a postgraduate level.

2. Course Intended Learning Outcomes (CILOs)

Upon successful completion of this course, students should be able to:

No.	CILOs	Weighting (if applicable)
1.	Explain the nature of contemporary design science research in IS.	2
2.	Evaluate and critique the current design science research directions in IS.	3
3.	Apply appropriate methodologies to solve design science research problems.	3
4.	Develop comprehensive design science research proposals following suitable research methodologies.	2

(3: Relatively most focused ILOs; 2: moderately focused ILOs; 1: less focused ILOs)

3. Teaching and Learning Activities (TLAs)

(Indicative of likely activities and tasks designed to facilitate students' achievement of the CILOs. Final details will be provided to students in their first week of attendance in this course)

Seminar: 3 hours per week

TLA1: Seminar

The following items form the content of the lecture:

1. Introduction of design science research frameworks
2. Overview of current areas of design science research
3. Examination of design science research covering topics such as theory building, research design, survey research, experimental research, and modeling research
4. Detailed evaluation and critique of sample work in design science research from top IS journals

Participants are required to participate in question and answer sessions during or at the end of each lecture.

ILO No.	TLA 1: Seminar	Hours/week (if applicable)
CILO 1	2	
CILO 2	2	
CILO 3	1	
CILO 4	1	

(1: Indirectly Supporting ILO; 2: Directly Supporting ILO)

4. Assessment Tasks/Activities

(Indicative of likely activities and tasks designed to assess how well the students achieve the CILOs. Final details will be provided to students in their first week of attendance in this course)

Coursework : 100%

AT1. Discussion and Participation (40%): The lecture consists of exercises and small group discussions to assess students' understanding of the chosen research areas and their abilities to apply their skills.

AT2. Literature Review (30%): Each student is required to conduct extensive literature review in the chosen areas.

AT3. Presentation (30%): Each student is required to give presentations as critical analysis of assigned readings, which demonstrate his/her ability in solving problems in a particular research area.

ILO No	AT1 (40%)	AT2 (30%)	AT3 (30%)
CILO 1	2	2	1
CILO 2	2	2	1
CILO 3	1	1	2
CILO 4	1	1	2

(1: Indirectly Supporting ILO; 2: Directly Supporting ILO)

5. Grading of Student Achievement:

Grading is assigned based on students' achievement of ILOs in accordance to the defined grading criteria. Grading pattern*:* Standard (A+, A, A- .. C-, D, F)

Part III

Keyword Syllabus

1. Introduction to Design Science Research: evolution and status of design science research; nature and characteristics of design science research; research frameworks for design science research; areas of current design science research; characteristics of good design science research.

2. The Design Science Research Process: identifying a research problem; theory building; research design; experimental research; case study research; qualitative research; data analysis; system development; developing research proposals; publishing research results.

3. Selected work in design science research: management support systems; information systems development; modelling and analysis of information systems.

Recommended Reading

Textbook:

1. Simon, H.A., The Sciences of the Artificial, 3rd ed., Cambridge, MA: MIT Press, 1996.
2. Vaishnavi, Vijay K. William Kuechler Jr., Design Science Research Methods and Patterns: Innovating Information and Communication Technology, 248 pages, Auerbach Publications, October 30, 2007.

Methodological Articles:

1. Hevner, A.R., "A Three Cycle View of Design Science Research," Scandinavian Journal of Information Systems (19:2), 2007, pp. 87-92.
2. Gregor, S., "The Nature of Theory in Information Systems," MIS Quarterly, 30(3), 2006, pp. 611-642.
3. Hevner, A., March, S., Park, J. and Ram, S., "Design Science in Information Systems Research," MIS Quarterly, 28(1), 2004, pp. 75-105.
4. Benbasat, I. and Zmud, B., "The Identity Crisis within the IS Discipline: Defining and Communicating the Discipline's Core Properties," MIS Quarterly, 27(2), 2003, pp. 183-194.
5. Markus, M.L., Majchrzak, A. and Gasser, L., "A Design Theory for Systems that Support Emergent Knowledge Processes," MIS Quarterly, (26:3), September 2002, pp. 179-212.
6. Wand, Y. and Weber, R., "Information Systems and Conceptual Modelling - A Research Agenda," Information Systems Research, Vol. 13, No. 4, 2002, pp 363-376.
7. Berthon, Pierre, Leyland Pitt, Michael Ewing, Christopher L. Carr, "Potential Research Space in MIS: A Framework for Envisioning and Evaluating Research Replication, Extension, and Generation." Information Systems Research, Vol. 13, No. 4, December 2002, pp. 0416-0427.
8. Orlikowski, Wanda J.C. Suzanne Iacono, "Research Commentary: Desperately Seeking the "IT" in IT Research—A Call to Theorizing the IT Artifact." Information Systems Research, Vol. 12, No. 2, June 2001, pp. 0121-0134.
9. March, S., A. Hevner and S. Ram, "Research Commentary: An Agenda for Information Technology Research in Heterogeneous and Distributed Environments," Information Systems Research, Vol. 11, No. 4, Dec. 2000, 327-341.
10. Ein-Dor, P. and Segev, E., "A Classification of Information Systems: Analysis and Interpretation," Information Systems Research, 12(1), 1995, pp. 171-197.
11. March, Salvatore T. and Gerald F. Smith, "Design and Natural Science research on Information Technology," Decision Support Systems, Vol. 15, pp. 251-266, 1995.
12. Walls, J.G., Widmeyer, G.R. and El Sawy, O.A., "Building an Information System Design Theory for Vigilant EIS," Information Systems Research (3:1), March 1992, pp. 36-59.
13. Nunamaker, Jr., Jay F., Minder Chen and Titus D.M. Purdin, "Systems Development in Information Systems Research," Journal of Management Information Systems, Vol. 7, No. 3, pp. 89-106, 1991.
14. Vaishnavi, V.K., Yoon, S.-J. and Buchanan, G.C. "Research in Computer Information Systems at Georgia State University: A Balanced Approach," Proceedings of the 24th Hawaii International Conference on Systems Sciences, Hawaii, 1991, pp. 1-10.

Research Articles:

1. Bensoussan, A., Mookerjee, R., Mookerjee, V. and Yue, W.T., Maintaining Diagnostic Knowledge-Based Systems: A Control-Theoretic Approach. Manage Sci. 55, 2, Feb. 2009, pp. 294-310.
2. Dawande, M., Johar, M., Kumar, S. and Mookerjee, V.S., A Comparison of Pair Versus Solo Programming Under Different Objectives: An Analytical Approach. Info. Sys. Research, 19, 1, Mar. 2008, pp. 71-92.
3. Storey, V.C., Burton-Jones, A., Sugumaran, V. and Purao, P., "CONQUER: A Methodology for Context-Aware Query Processing on the World Wide Web." Information Systems Research, Vol. 19, No.1, March, 2008, pp.3-25.

4. Abbasi, Ahmed and Hsinchun Chen, "CyberGate: A System and Design Framework for Text Analysis of Computer Mediated Communication," MIS Quarterly, Vol. 32, No. 4, December 2008.
5. Adomavicius, Gediminas, Jesse C. Bockstedt, Alok Gupta and Robert J. Kauffman, "Making Sense of Technology Trends in the Information Technology Landscape: A Design Science Approach," MIS Quarterly, Vol. 32, No. 4, December 2008.
6. Lee, Jintae, George M. Wyner, Brian T. Pentland, "Process Grammar as a Tool for Business Process Design," MIS Quarterly, Vol. 32, No. 4, December 2008.
7. Pries-Heje, Jan and Richard Baskerville, "The Design Theory Nexus," MIS Quarterly, Vol. 32, No. 4, December 2008.
8. Parsons, Jeffrey and Yair Wand, "Using Cognitive Principles to Guide Classification in Information Systems Modeling" MIS Quarterly, Vol. 32, No. 4, December 2008.
9. Subodha Kumar, Milind Dawande, Vijay S. Mookerjee: Optimal Scheduling and Placement of Internet Banner Advertisements. IEEE Trans. Knowl. Data Eng. 19(11): pp. 1571-1584, 2007.
10. Kalvenes, J. and A. Basu, "Design of Robust Business-to-Business Electronic Marketplaces with Guaranteed Privacy", Management Science, Vol. 52, No. 11, 2006, pp. 1721-1736.
11. Sun, Sherry X., J. Leon Zhao, Jay F. Nunamaker, Olivia R. Liu Sheng, "Formulating the Data Flow Perspective for Business Process Management", Information Systems Research, Vol. 17, No. 4, December 2006, pp. 374-391.
12. Gove, Allen, N., Salvatore T. March: "The Effects of State-Based and Event-Based Data Representations on User Performance in Query Formulation Tasks." MIS Quarterly, (30:2) June, 2006, pp. 269-290.
13. Sugumaran, V. and Storey, V.C., "The Role of Domain Ontologies in Database Design: An Ontology Management and Conceptual Modeling Environment," ACM Transactions on Database Systems, Vol. 31, No. 3, 2006, pp.1064-1094.
14. Yong Tan, Vijay S. Mookerjee: Comparing Uniform and Flexible Policies for Software Maintenance and Replacement. IEEE Trans. Software Eng. 31(3): 238-255, 2005.
15. Storey, V.C., "Classifying and Comparing Relationships in Conceptual Modeling." IEEE Transactions on Knowledge and Data Engineering, Vol.17, No.11, 2005, pp.1-13.
16. Daniel Zeng and J. Leon Zhao, "Effective Role Resolution in Workflow Management", INFORMS Journal on Computing, Vol. 17, No. 3, Summer 2005, pp. 374-387.
17. Raghu, T. S., B. Jayaraman and H. R. Rao, "Toward an Integration of Agent- and Activity-Centric Approaches in Organizational Process Modeling: Incorporating Incentive Mechanisms", Information Systems Research, Vol. 15, Issue: 4, December 2004, pp. 316-325.
18. Purao, Sandeep, Veda C. Storey and Taedong, Han, "Improving Analysis Pattern Reuse in Conceptual Design: Augmenting Automated Processes with Supervised Learning", Information Systems Research, Vol. 14, Issue: 3, March 2003, pp. 269-290.
19. Basu, Amit and Robert W. Blanning, "Synthesis and Decomposition of Processes in Organizations", Information Systems Research, Vol. 14, No. 4, December 2003, pp. 337-355.
20. Aalst, Wil M.P. van der and Akhil Kumar, "XML-Based Schema Definition for Support of Interorganizational Workflow", Information Systems Research, Vol. 14, Issue: 1, March 2003, pp. 23-46.
21. Dey, Debabrata and Sumit Sarkar: Generalized Normal Forms for Probabilistic Relational Data. IEEE Trans. Knowl. Data Eng. 14(3): 485-497, 2002.

22. Kiang, Melody Y. and Ajith Kumar, “An Evaluation of Self-Organizing Map Networks as a Robust Alternative to Factor Analysis in Data Mining Applications.” Information Systems Research, Vol. 12, No. 2, June 2001, pp. 0177-0194.
23. Dutta, A., “Business Planning for Network Services: A Systems Thinking Approach,” Information Systems Research, Vol. 12, No. 3, September 2001, pp. 260-283.
24. Raghu, T.S., R. Ramesh, Ai-Mei Chang, Andrew B. Whinston, “Collaborative Decision Making: A Connectionist Paradigm for Dialectical Support.” Information Systems Research, Vol. 12, No. 4, December 2001, pp. 0363-0383.
25. Krishnan, Ramayya, Xiaoping Li, David Steier, J. Leon Zhao, “On Heterogeneous Database Retrieval: A Cognitively Guided Approach.” Information Systems Research, Vol. 12, No. 3, September 2001, pp. 0286-0301.
26. Basu, Amit and Robert W. Blanning, “A Formal Approach to Workflow Analysis.” Information Systems Research, Vol. 11, No. 1, March 2000, pp. 0017-0036.
27. Konana, P., A. Gupta and A.B. Whinston, “Integrating User Preferences and Real-Time Workload in Information Services,” Information Systems Research, Vol. 11, No. 2, June 2000, pp. 177-196.
28. Sarkar, Sumit and Mysore Ramaswamy, “Knowledge Base Decomposition to Facilitate Verification.” Information Systems Research, Vol. 11, No. 3, September 2000, pp. 0260-0283.
29. Dey, Debabrata and Sumit Sarkar, “Modifications of Uncertain Data: A Bayesian Framework for Belief Revision.” Information Systems Research, Vol. 11, No. 1, March 2000, pp. 0001-0016.
30. Kumar, Akhil and J. Leon Zhao, "Dynamic Routing and Operational Controls in Workflow Management Systems," Management Science, Vol. 45, No. 2, 1999, pp. 253-272.
31. Basu, Amit and Robert W. Blanning, “The Analysis of Assumptions in Model Bases Using Metagraphs.” Management Science, Vol. 44, No. 7, July 1998, pp. 0982-0995.
32. Chen, Peter Pin-Shan, "The Entity-Relationship Model--Toward a Unified View of Data," ACM Transactions on Database Systems, Vol.1, No. 1, 1976, pp. 9-36.
33. Codd, E.F., "A Relational Model of Data for Large Shared Data Banks," Communications of the ACM, Vol. 13, No. 6, June 1970, pp. 377-387.