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# Course Syllabus - SPOL 665

## *Information Technology and Decision Science*

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## Description

### *Catalog Description:*

Survey of key concepts and tools from information science, operations research, systems science, dynamic modeling, and visualization theory within the social, behavioral and natural sciences. Focus on “knowledge management” in the public and private sector, i.e. design and application of decision-support tools, database creation and management, and communications tools for health, social welfare, public administration, sustainable development, and human services management. Includes computer laboratory experience both in-class and online.

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## Introduction

This is a graduate-level course designed to introduce the student in an integrative manner to the exciting field of **Knowledge Management (KM)** within Social Policy and Sustainable Development practice --see **Course Structure and Objectives**. The course will first explore the historical development of KM as a concept and then look at how it has influenced real-world practice in **decision-making and information technology management** within various sectors: public health, geoinformatics, agriculture, natural resource management, poverty reduction, information technology, social work, earth system science and so on.

### Key Textbooks:

- John Seeley Brown, Paul Duguid, 2000. *The Social Life of Information*. Harvard Business School Press.
- Arthur A. Few. 1996. *System Behavior and System Modeling*. University Science Books.
- Michael C. Daconta, Leo J. Obrst, and Kevin T. Smith, 2003. *The Semantic Web: A Guide to the Future of XML, Web Services, and Knowledge Management*. Wiley Publishers.
- Peter F. Drucker, 2001. *Management Challenges for the 21st Century*. Harper Business. Chapters 1-5.
- **Systems Thinking: Managing Chaos and Complexity : A Platform for Designing Business Architecture** , by Jamshid Gharajedaghi (Author). Butterworth-Heinemann; (May 10, 1999)
- **Ten Steps to a Learning Organization** by Peter Kline , Bernard Saunders . Great Ocean Pub; 2nd edition (April 1998)
- Chris Collison & Geoff Parcell, 2001. *Learning to Fly: Practical lessons from one of the World's*

**Leading Knowledge Companies. Capstone Publishing Limited.**

- **Presentation Skills For Managers by Jennifer Rotondo, Mike Rotondo Jr.**
- Presenting to Win by Jerry Weissman
- Say It with Presentations: How to Design and Deliver Successful Business Presentations, by Gene Zelazny
- **Say It With Charts: The Executive's Guide to Visual Communication, by Gene Zelazny**
- **An Introduction to General Systems Thinking** , by Gerald M. Weinberg . Dorset House; ( April 15, 2001)
- **Isee Systems, Introduction to Systems Thinking with STELLA Guide (Win).**
- **Andrew Ford, Modeling the Environment. Island Press.**
- National Academy of Sciences, 2002. **Down to Earth: Geographic Information for Sustainable Development in Africa**, Committee on the Geographic Foundation for Agenda 21, Committee on Geography, Mapping Science Committee, National Research Council.
- National Academy of Sciences. 1998. **People and Pixels: Linking Remote Sensing and Social Science.** Washington DC
- **Tomlinson. Roger F. 2003.** - *Thinking About GIS: Geographic Information System Planning for Managers.* ESRI Press.

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## Course Structure and Objectives

The course is organized into **SIX modules**; each designed to introduce a major area of **Knowledge Management (KM)** and **Decision Science**. Each module includes both a lecture/discussion portion (3 hours/week) including presentations by guest speakers, and a laboratory practical portion (3-6 hours per week). Some of the work will be "face-to-face" in lab or lecture and some "online" (you will participate in structured and guided "chats" and asynchronous discussions--responding to guest presentations and specific readings. See **Grading and Assignments** below for specifics on both the writing and project work required.

1. **Information Technology and Society—the Promise and Reality.**
2. **Knowledge Management (KM): Building Communities of Practice and Using Technology to Foster Collaboration and Teamwork within Organizations.**
3. **Executive Communications: ICT (Information and Communications Technology) for Leaders, Consultants, and Advocates.**
4. **Transforming Data into Knowledge for Decision-making: Non-spatial and Statistical Data, Databases, and Application Tools.**
5. **Systems Thinking and Dynamic Modeling in Decision-Science.**
6. **Spatial-Visual Data and Tools in the Applied and Policy Sciences**

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### Information Technology and Society—the Promise and Reality

**Goals :** Present a historical overview of IT's development as a management tool, i.e. growth of the Internet and its use in private and public arenas, role of data and information (databases) in decision-making and scientific analysis—particularly in human service organizations, health science and practice, and sustainable development. The key question is how has technology changed the way we work, communicate, inform the public and make decisions?

What are the business consequences of IT and the changing business models and styles of management that have engendered. Help students to become more “savvy” consumers and users of technology. Candidly look at both the positive and negative consequences of working in the information age and what are the options for future and likely scenarios in human service professional practice.

**Panels/Presentations by Experts:** Hear from select managers, leaders, administrators, users and providers of technology on how it has impacted society and their work within a variety of organizational settings.

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### **Knowledge Management (KM): Building Communities of Practice and Using Technology to Foster Collaboration and Teamwork within Organizations.**

**Goals:** Introduction to the fundamentals of KM (Knowledge Management) theory and practice within human service organizations. Discuss the fundamentals of building CoPs (Communities of Practice), fostering “organizational learning” and effective sharing and networking with technology in ways that promotes collaboration and teamwork, “level hierarchies” and maximizes flexible and quick response to opportunities and challenges.

**Tools/Issues Introduced :** creation and management of web-sites and portals that serve both outside and inside audiences, using and managing listservs, forums, BLOGs, and other web-based collaboration tools. Management and use of “super-collaboration” tools such as Tomoye’s SIMPLIFY, Peachtree; design of data-sharing technologies for virtual teams; exploration of new tools for improved efficient communications, tracking, monitoring and inventorying, e.g. “mobile” services, use of PDAs, paging systems, interlinking of desktop and mobile systems, managing and facilitating “telecommuting staff”, linking people skills to problem sets through skills-banks and directories, etc.

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### **Executive Communications: ICT (Information and Communications Technology) for Leaders, Consultants, and Advocates**

**Goals:** Presentation and communications technologies/skills for effective leadership, advocacy, and visioning by researchers, consultants, practitioners, managers, and educators in settings where they influence decision-making or educate formal and informal groups within organizations or in public settings, e.g. role of expert witnesses, oral and written communications, graphical issues and

visualization design impacts on audiences, “storytelling” as motivation tool, etc .

**Tools Introduced** : effective presentation design and delivery (Powerpoint); testifying at public hearings; brief introduction to “visualization tools” including Photoshop, Macromedia Flash technology, Adobe PDF, Macromedia Freehand or Adobe Illustrator. Basics of publishing in the digital age for diverse audiences and maximizing impact, e.g. use of digital cameras, video, video-streaming, basic HTML and webpage/site design.

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## **Transforming Data into Knowledge for Decision-making: Non-spatial and Statistical Data, Databases, and Application Tools.**

**Goals** : Explore the nature of data and Information and how it is used in **DSS (Decision-Support-Systems)**. How to manage and use data within human service organizations (public and private). Introduction to the essential issues around the use of databases and related management issues: data security and confidentiality, application areas, reporting, decision-support, data warehousing, business intelligence, IPR (Intellectual Property Rights), database law, “interoperability”, transparency, open access vs. controlled access to data, cost of data, and business plans for maintenance and storage, e.g. custodianship issues between public and private sectors, issues of long term archive management, etc.

**Tools Introduced** : SAS Enterprise Miner, introduction to data systems (relational databases, etc.), finding and “mining” data, ERP packages, Open-Source Solutions (OSS) vs. COTS (Commercial of the Shelf) solutions vs. “building your own” data systems. Exploration of public access databases on the web and how to use them effectively in various sectors, e.g. public health, medicine, social welfare, sustainable development and related areas such as e-Government solutions.

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## **Systems Thinking and Dynamic Modeling in Decision-Science.**

**Goals:** Explore the fundamentals of “**systems science**” **thinking (cybernetics)**; what are “models and simulations” and how are they used in both scientific analysis, management practice, and for public/private decision-support, e.g. government, industry, NGO sector, etc.

**Tools Introduced** : Introduction to dynamic modeling software such as iThink, STELLA, SAS tools that facilitate gaming, simulation, scenario-building, and modeling.

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## Spatial-Visual Data and Tools in the Applied and Policy Sciences.

**Goals:** Demonstrate the growing role and utility of **SDI (Spatial Data Infrastructure)** tools, data and applications within public and private sector decision-making and service. Focus on the role of **GIS** (Geographic Information Systems), **RS** (Remote Sensing), **GPS** (Global Positioning Systems), **LBS** (Location-Based Systems), mobile tracking systems, and the migration to the web of GIS as part of "integrated web services" applications. Demonstrate "realworld" applications that integrate spatial and non-spatial data within database systems, e.g. (ArcPad).

**Tools Introduced:** IDRISI (Decision-Support Tools), ArcGIS, ArcIMS (Internet Map Server) and OSS alternatives such as the Minnesota Map Server or OGC's (Open-GIS Consortium) "webmap server GML Map "interfaces" for cross-platform visualization, database querying and integration, and solution development for a variety of human service sectors and sustainable development.

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## Grading and LAB Assignments

Grades will be based upon performance in **TWO** areas of activity (**Labs** and **Discussion Forum** work):

**1. 50%** of the grade is based on **writing, production and design of FIVE short mini-projects/products** (one each from the "key Modules" described under **Course Structure and Objective** excluding **No.1** which is an overview of IT and social science. The exact topics, issues, projects will be chosen in consultation with the professors and other students in lab. Some of the activities may become "group projects".

**Each report/product or presentation will vary in length and style depending on various issues (more in class). Your products must include at least one:**

- 1. POLICY BRIEF** prepared for hardcopy print using WORD, Adobe PDF, Illustrator, or other "layout tool" (see online criteria for the course ESSC 500 as a rough guide.

**See samples of Policy Briefs below:**

- **SCIDEV.Net - online policy briefs**
- **Brookings Institution - Policy Briefs**
- **Annenberg Public Policy Center of the University of Pennsylvania - Reports**
- **Center for American Progress - "The Issues"**
- **Heritage Foundation - home - Policy Weblog**
- **Population Action International - Factsheets or Issues**
- **Woodrow Wilson International Center for Scholars - The Wilson Quarterly - Environmental Change and Security Project Publications**
- **OECD (Organisation for Economic Co-operation and Development) - Policy Briefs**
- **AAAS (American Association for the Advancement of Science) - Policy Briefs**
- **Institute for International Economics - Policy Briefs**
- **Community Voice - Health Care for the Underserved - Policy Brief**
- **Joint Center for Poverty Research (JCPR) - Policy Briefs**

- **Institute for Policy Research (Northwestern University) - Policy Briefs**
- **Foreign Policy in Focus - Policy Briefs**

2. **Web-based Publication** (see **Web Searching and Internet Use** and other aides listed on the course **SCHEDULE** and **LAB** sheets ). Examples will be shown in class and you will be introduced to various tools to use from both simple to more complex). Within this element you will also include production of a simple **Personal Homepage (About.com)** where you will attach/publish all your mini-projects for the course, and later other documents you produce during your stint at LLU. **The homepage will be linked to the STUDENTS page of the course.**

**NOTE:** Style and length/complexity will depend on time, the audience, your ingenuity and commitment, and willingness to learn, previous experience, etc. Grading will be individualized to a great degree.

3. You will create a new or update an existing **POWERPOINT PRESENTATION** (see More online under **TOOLS** such as **Web Publishing & Image Editing** and **Executive Communications**.)
4. You will create a new or update an existing **POSTER** for a professional presentation session, including use of **CHARTS** and graphs, maps, images, photos. Again, see more under **TOOLS** such as **Web Publishing & Image Editing** and **Executive Communications**.
5. Creation of a **CHART, CONCEPT MAP, or other GRAPHIC**....that illustrates and demonstrates a thought, process or other element within one of the above presentations, e.g. to be included in a poster, powerpoint, or policy brief.

Each written report/product/presentation will **synthesize and summarize an assigned "theory, concept, issues, application" within the Module**, i.e. students, **OR, students will explore the use and application of tools or concepts within their own area of research**, and they will share "lessons-learned" from real users within the field. Everyone will post the products on **BLACKBOARD** and eventually on their **PERSONAL HOMEPAGE** for the course.

**2. 50% of your grade will be based on active and thoughtful participation online in the Discussion Forum**, i.e. your response to:

- a) **questions/issues posed by the instructor or guest lecturers** extracted from presentations and lectures, and,
- b) **response to the "mini-reports/policy briefs "** posted by your classmates that focus on each of the key "modules" of the course, selected readings, or other sharing of information from **BLOGS**, digital libraries, video-streamed conferences, etc.
- c) **Critique of each other's projects/products produced during the course**...use this opportunity to get feedback that will enhance your professional competence.
- d) Brief summaries (online) of assigned readings, e.g. online **BOOK/READING REPORTS** (to be discussed more in class). See **SCHEDULE** as well as **Bibliographic Resources by THEME**; see also the **SYLLABUS** and **TOOLS** from which readings will be chosen in consultation with you and the instructor.

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## Grading Rubric:

**For an A grade:**

Above 94% on all **reports, online discussions, and lab exercises**. To get an A you must demonstrate high creativity, initiative, resourcefulness in all areas of the course and have an excellent participation and attendance record as well.

**For a B grade:**

For a B+ you must get above 87% in all **reports, online discussions, and lab exercises**.  
For a B you must achieve between 84 - 86% and a  
B- will be given to those scoring between 80 - 83%.

**For a C grade:**

Below 80% on all **reports, online discussions, and lab exercises**:  
C+ = 75 - 79%,  
C = 70 - 74%,  
C- = 65 - 69%.

**For a D or F grade:**

D+ = 60 - 64% and  
D = 55 - 59%;  
D- = 50 - 54%.

**Below 50% is a failing grade = F**

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## Procedures and Regulations:

**No make-up will be allowed** except by prior arrangement for **good cause** (official University business and death in the immediate family). In all cases you must notify the instructor **before** you make-it-up. Make-up work must be normally taken **within one week** of the missed project is due.

**Doing your best consists in:**

- **regular attendance and participation** in all class discussions and activities (face-to-face and online),
- **reading required assignments before you come to class,**
- handing-in or doing assignments **on time**--this also applies to **class presentations or Lab Assignments**
- quality of your Lab Projects in terms of **visual/graphical appeal**.

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## Notes on Communications and Web-Publishing:

1. Throughout the entire course a strong emphasis will be put on encouraging students to practice and perfect various forms of written, oral and graphic communication--emphasis on use of HTML Web-based

material as well as use of maps and charts. See the following list of **WWW Publishing Resources for ESSE (Earth System Science Education)** for more information how to publish on the web.

2. See also the various WWW Resources relating to cartography, map and aerial photo interpretation, GIS/RS (remote sensing), and so on included in the ESSE course ( **ESSC 500** ) WWW resources list entitled **--Resources for Earth System Science.**
3. Students will also be expected to learn to use basic electronic communications effectively such as email. Much of the course will be carried out online via the **BLACKBOARD** site.
4. Monitoring of participation to asses evidence of interaction with people and resources beyond the course--in **THE REAL WORLD--is encouraged and demanded!** Students will also be shown **HOW TO ACCESS ONLINE (INTERNET) DATA** in the course. One of the goals is to not only teach good email writing skills and *netiquette*, but more important **HOW TO USE THE INTERNET** to do research and communicate across the globe with other students as well as experts in their areas of interest.

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## **Time and Location - Activity Due Dates**

**TIME/PLACE: Geoinformatics Lab (formerly Jorgensen Learning Center)**

**July 29 - September 2, 2004 -**

**5:00-9:30 PM Tuesday and Thursday evenings**

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