

The George Washington University Graduate Certificate in

KNOWLEDGE & INNOVATION MANAGEMENT

Summary The School of Business and the School of Engineering & Applied Sciences proudly present a Joint Certificate in Knowledge and Innovation Management. These two fields are of increasing importance, and they are closely related because Knowledge is the main source of Innovation. The Certificate is offered through the Institute for Knowledge & Innovation, which is jointly managed by both Schools. .

Definitions of the Two Fields Knowledge Management is a young discipline for managing the creation, collection, and dissemination of knowledge in organizations. It typically involves forming organizational structures and systems to facilitate this process, such as knowledge capture systems, communities of practice, and online knowledge repositories. Innovation Management is emerging as a new discipline for managing the creation of innovative products and services and bringing them to market. It involves forming organizational structures and systems that encourage creative solutions to difficult problems, and developing these innovations into economically feasible applications. Progressive executives today tend to think of these two fields as intimately related. Knowledge comprises the major asset that drives strategic growth, while innovation applies knowledge to realize its commercial potential.

Who Should Enroll This program is designed to serve the career needs of ambitious professionals seeking advanced employment opportunities in today's global knowledge economy facing exploding technological innovation. It should be of particular value to people working in Knowledge Management, Innovation Management, General Management, Planning, Business Development, Human Resources, and related fields. The Certificate should also be of interest to employers who commonly list such qualifications of their employees in proposals for contract work.

Curriculum The Certificate consists of four courses, as described in the attached syllabi. As noted, the introductory and capstone courses are jointly offered by SB and

SEAS, while the two remaining courses are each offered by one School. Students are admitted into the program in cohorts of roughly 30 students that remain together throughout all four courses, thus providing opportunities for team work, networking, and class solidarity. One course is taken each semester, so students complete the entire Program in four semesters.

Upon successful completion, students are awarded a Graduate Certificate in Knowledge & Innovation Management by both Schools. Up to 14 credits can be applied to a masters degree. At the mid-point in the Program, students will be notified of this option and advised accordingly. Masters programs that qualify for this transfer of credits include the various MBA programs offered by the School of Business as well as other masters degrees, except the MS Finance and MS Project Management. In SEAS, credits could be accepted by the MS in Knowledge Management and possibly other programs.

Admission Requirements Normal admission criteria apply:

- 3.0 minimum undergraduate GPA from a recognized institution
- 3 years minimum related professional experience
- Student must maintain at least a 3.0 GPA to complete the Program

Location Classes to be held at Foggy Bottom Campus in SEAS and SB buildings. Time slots are in the evening and Saturdays to accommodate working students.

Tuition GWU tuition is \$876 per credit hour, or \$2628 for each of four courses.

Participating Faculty (Partial listing)

John Alden, Adjunct Professor of Knowledge Management, SEAS

Elias Carayannis, Associate Professor of Science, Technology, & Innovation, SB

Frank Calabrese, Adjunct Professor of EMSE, SEAS

Richard Donnelly, Associate Professor of Science, Technology, & Innovation, SB

Kent Greenes, Senior Vice President and Chief Knowledge Officer, SAIC

William Halal, Professor of Management, SB

Art Murray, Adjunct Professor of EMSE, SEAS

Ted Rosen, Assistant Professor of Organizational Behavior & Development, SB

Michael Stankosky, Associate Professor of EMSE, SEAS

Steve Weineke, Technical Fellow, General Motors

The Institute for Knowledge & Innovation (IKI) This Certificate is offered through the Institute for Knowledge & Innovation, which is jointly managed by both the

School of Business and the School of Engineering. IKI was founded three years ago by Profs. William Halal (SB) and Michael Stankosky (SEAS), who strongly felt the need for collaboration between the two schools on this important area of study and research. Listed below are highlights of IKI's recent accomplishments:

- Three conferences were held under IKI auspices in 2002/3: The KM Roundtable, AFEI, and the Global Forum, which included a former Prime Minister of France.
- IKI received a grant-in-kind from the Learning Institute valued at \$1 million.
- A Board of Governors was formed that includes prominent figures in the field.
- The Institute is presently launching the *Journal of Knowledge & Innovation*
- One of the Institute's projects, the GW Forecast, won an AOL award of \$1500 and was well-received at an AOL meeting. It was also featured in Newsweek.
- The GW forecast has a contract with the EPA to provide technology forecasts for the National Energy Model, and it has an alliance with the Potomac Institute to provide technology forecasts to government agencies.
- The Institute has recently launched a Program in Knowledge Workforce Productivity, managed by Dr. John Alden, formerly with Accenture.
- Two of the Institute's faculty, Dr. Art Murray and Dr. Mirgiani, have solicited an impressive state-of-the-art software library to launch a KIM Laboratory.
- The Institute is holding a series of conferences with General Motors to develop a unified KM framework.

Attachments:

1. Course outlines for EMSE301/Mgt 217, Mgt 218, EMSE 303, EMSE 310/Mgt 205.
2. Faculty biosketchs

EMSE 301/Mgt 217

INTRODUCTION TO KNOWLEDGE & INNOVATION MANAGEMENT

Course Description: Covers the entire range of factors affecting the knowledge economy, focusing on how organizations leverage their intellectual resources to innovate. While this is a survey course, principles and frameworks that have proven successful will be highlighted. Topics include examining the relationship between innovation and knowledge management; the roles of culture, leadership, organizational design, technology and systems in innovation and knowledge management practices.

Objectives:

1. Define the fields of Knowledge and Innovation Management, their guiding perspectives, principles, and other aspects of this body of knowledge.
2. Illustrate the close relationship between Knowledge and Innovation.
3. Provide examples and case studies demonstrating the above.

Lead Instructor: William Halal (SBPM)

Session Topics:

1. **Overview of the KIM Certificate Program** Course contents and how each course contributes to the program objectives. (Halal/Stankosky)
2. **Survey of Knowledge Management** The history of KM, definitions, perspectives, strategies, functions, value propositions, various organizational KM positions, and selected case studies. (Stankosky)
3. **Survey of Innovation Management** History of IM, various strategies, and selected case studies (Donnelly)
4. **Knowledge Economy/Logic of Knowledge** The unique attributes of a knowledge economy, knowledge as an infinite resource, and possible valuation methods for intangible assets (Halal).
5. **Systems Thinking, Engineering, and Management** Definition of systems thought, demonstrating how engineering and management creates

a framework for leveraging knowledge assets to improve innovation.
(Stankosky)

6. **KIM Frameworks** Overview of the major frameworks and models for both KM and IM. (Halal/Stankosky)
7. **The Learning Organization** An integrating KM and IM framework whose output is improvements in efficiency, effectiveness, and innovation. (Stankosky)
8. **Qualitative approaches to KIM** Surveys the various qualitative methods used in designing knowledge and innovation strategies. (Kull)
9. **IT & KIM** How various technologies can be used to support both KM and innovation initiatives (Tarabishi)
10. **International dimensions of KIM** Regional and cultural issues affecting KIM. (Carayannis)
11. **Frameworks in Action** – Case Studies (Halal)
12. **Frameworks in Action** – Case Studies (Stankosky)
13. **Critical Issues** Major issues and barriers to successful implementation of KIM. (Halal/Stankosky)
14. **Strategies for KIM Implementation** Best practices and lessons learned from KIM research. (Halal/Stankosky)
15. **Final Exam**

Texts:

Innovation Management, Strategies, Implementations and Profits, Allan Afuah, Oxford University Press, 1998

The Innovation Superhighway, Debra Amidon, Butterworth-Heinmann, 2003.

Working Knowledge, Pruzak and Davenport,

Class Format/Participation:

This course will be conducted in a lecture/seminar format. Active class participation and discussions are required. Each student will be prepared to discuss the assigned texts, directed readings, and selected case studies, and to prepare and present summary versions of related articles.

Research Project:

Each student will write an original paper on a topic directly related the core themes or issues of this course (separate guidelines will be handed out during the 2nd session).

Grading:

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| Research Project: | 30% |
| Examination: | 40% |
| Participation: | 30% |

MGT 218

ORGANIZING AND LEADING KNOWLEDGE & INNOVATION MANAGEMENT

Course Description: Provides an integrative approach to understanding organizational, managerial, and leadership concepts for Knowledge and Innovation Management (KIM). Practices and principles are surveyed for the development, implementation and maintenance of KIM systems. At the conclusion of the course, students should have gained an understanding of the systems needed to create the underlying motivation and behavior for applying KIM successfully in organizations.

Objectives:

1. Illustrate how organizational behavior and management practices are an essential part of KIM.
2. Provide an in-depth understanding of the body of knowledge in Organization and Management as it relates to KIM.

Lead Instructor: Ted Rosen (SBPM)

Session Topics

1. Introduction (Rosen) Overview of how the study of organization, management, and leadership forms an essential dimension for understanding KIM. .

2. Organizational Culture (Rosen) How values, norms, policies and leadership shape organizational culture. Students are taken through the theory and practice of these fields, with ample examples.

3. Organizational Innovation (Donnelly) Concepts and practices of innovation and creativity. Success at technology innovation is challenging because activities must take place throughout the organization, crossing organizational boundaries, requiring collaboration among a wide range of disciplines, and alignment with the system.

4. Creating Innovative Cultures. (Donnelly) Use of cultural principles to foster innovative organizations A culture for of innovation must stimulate scientific, technical and conceptual creativity, encourage reasonable risk taking, and tolerate delayed return on investment, as example cases of great innovator organizations

illustrate.

5. Learning Organizations (Rosen) Characteristics of learning organizations. Drawing on prominent scholars in this field, such as Senge, we will cover principles of learning organizations and individual learning.

6. Keeping Abreast of Rapid Advances (Donnelly) How successful organizations keep abreast of technological information. Effective innovation requires awareness of competitors, complementors, scientific and technical advances, and emerging opportunities. Recent research and key cases are used to suggest best practices.

7. Problem solving and decision making (Rosen) Decision making, biases and attitudes, ethics. Focus is on decision-making models and the characteristics of individuals in making decisions, especially as decisions affect KIM.

8. Group Dynamics (Rosen) Principles of group behavior, individual differences, perceptions and attitudes, stereotypes. The large literature in this areas is surveyed, highlighting best practices in making groups effective.

9. Team Building (Rosen) Group dynamics and problem solving applied to building Communities of Practice, encouraging knowledge sharing.

10. Managing Virtual Teams. (Donnelly) Remotely- located knowledge workers, website-based management processes, human factors in virtual settings. Competitive advantage can be gained by working in teams across organizational and national boundaries, whether in R&D, product/service implementation or sales and marketing. The utility of IT in managing such teams allow the advantages of virtual operations.

11. Knowledge-Intensive Projects (Donnelly) Use of creativity, problem solving, critical success factors in managing high-performance knowledge projects. Projects involving knowledge are essential in innovation, but are some of the least understood from the standpoint of project management methods. The reasons for this and appropriate ways to address these issues are discussed through cases and recent research findings.

12. Organizational Design (Rosen) Structures for learning organizations, operation of knowledge bases and information management. We examine various structural forms and their advantages and drawbacks. Special requirements for effective KIM are explored.

13. Creating Strategy (Halal) Guiding the strategy process to harness KIM. The typical strategic planning cycle is described, noting how different phases involve challenging issues in KIM, and the role of strategy vis-à-vis KIM..

14. Change Management (Rosen) Models of organizational change. Various approaches to organizational change are reviewed, focusing on the role of KIM in bringing about change, and the need to adopt dynamic organizations.

15. Final Exam

Textbooks:

Innovation Management, Strategies, Implementations and Profits, 2nd Edition.
Allan Afuah, Oxford University Press, 1998

Ritti, R. and S. Levy. (2003). The Ropes to Skip and the Ropes to Know, 6th Edition.
Hoboken, NJ:John Wiley and Sons.

Robbins, S. (2003). Essentials of Organizational Behavior, 7th Edition. Upper Saddle River, NJ:Prentice Hall.

Articles:

- Hammond, J., Keeney, R. and Raiffa, H. The Hidden Traps in Decision Making. Harvard Business Review, Boston, Sept/Oct 1998.
- Harvey, J. Abilene Paradox. Organizational Dynamics. Summer, 1974.
- Janus, I. Groupthink. Psychology Today. November 1971.
- Leavitt, T. "Creativity is Not Enough," Harvard Business Review, August, 2003
- Rosen, T. Guerilla Change. Review of International Comparative Management. Spring, 2002.
- Rosen, T. Better Project Management Through Effective Meetings Management. In Carayannis, E. and Kwak, Y. (in press). The Story of Managing Projects: A Global, Cross-Disciplinary Collection of Perspectives. Greenwood Press/Quorum Books.
- Stewart, T. The Great Conundrum. Fortune. November 25, 1996.

Research Project: Original research using primary sources to examine some organizational and/or managerial aspect of KIM

Grading:

Research Project – 35%

Final Exam – 35%

Participation – 30%

EMSE 303

KNOWLEDGE & INNOVATION MANAGEMENT TECHNOLOGY

Course Description: Covers the technologies that integrate people and organizational processes to form a Knowledge and Innovation Management (KIM) System. A notional framework will be used to analyze organizational problems and opportunities, and to configure an integrated system solution encompassing leadership, management, organizational, learning, and technology elements. We will study the intellectual capital requirements needed to support the goals of the enterprise; the technical systems needed to capture, retain, transfer, and utilize knowledge; and the methods used to optimize supporting technologies. The student will either evaluate a KIM product or develop a KIM system from a case study.

Objectives:

1. Illustrate the range of software systems that are available to assist in managing KIM.
2. Understand the strengths and limitations of various systems in order to choose appropriate applications.
3. Study applications in depth to provide experience in their use.

Lead Instructor: Michael Stankosky (SEAS)

Session Topics:

1. **Introduction; KIM Technology Architecture** Defines the various architectures relating to technology; lays out the various technology models used to support KM and innovation.
2. **KIM Technologies Taxonomy: survey (1)** Provides a current list and description of the software products on the market.
3. **KIM Technologies Taxonomy: survey (2)** Continues the list and description.
4. **KIM Technologies Demonstrations** Students visit the IKM technology lab or have several demonstrations by select vendors.
5. **KIM Technologies Workshop** Hands-on interaction with technology products.

6. **KIM Technology Assurance/Security** Issues and solutions surrounding information and knowledge assurance/security. Emphasis is on design.
7. **Student project preparation** Examples of the student project.
8. **Enterprise Strategies, Processes, Structure, Behavior** Defines how technology is supportive of the aforementioned elements, and demonstrates how to architect technology as a supporting element.
9. **Framework for KIM Technology Decision-making** Introduces a framework for making technology decisions.
10. **KIM Management Issues:** Prevalent issues facing the manager in dealing with technology.
11. **KIM Systems Planning, Engineering, and Integration** Hands-on methods for technology planning, engineering, and integration.
12. **Project Presentations**
13. **Project Presentations**
14. **Examination**
15. **KIM Technology Future Trends** New technologies on the drawing boards and their impact on today's technology systems.

Textbook:

Information Systems, 4th edition, Steven Alter, Prentice Hall, 2002.

Class Format/Participation: This course will be conducted in a lecture/seminar format, with technology demonstrations inserted throughout. Each student is required to do a project from the list below.

Project Assignments (select one):

I. KM Technology Evaluation/Presentation Students will select a KM technology from one of the following areas:

1. Repositories (data warehousing, portals, vortals...etc.)
2. Collaboration (messaging, conferencing, Intranet, Extranet...etc.)
3. Automated Reasoning (Expert System, Decision Support System, Artificial Intelligence, etc.)
4. Search and Retrieval Engines (index, search, agents, browser...etc.)
5. Data Mining Tools - Knowledge Discovery tools
6. Knowledge Mapping tools
7. Process Management Tools

The student shall then research the selected technology and identify a commercial system within the category. The system will then be evaluated against the research findings and the student will prepare a research paper and give a presentation on the findings.

II. Conceptual KMI System (Project)/Presentation

A Conceptual KM System is designed based on the case study, where the student actually establishes a KM initiative (Personalization or Codification), researches technologies that would contribute to the implementation of the KM solution, identifies the strengths, weaknesses, opportunities and threats of the concept, and provides a Return on Investment (ROI) based on the implementation of the conceptual KM system.

Grading:

Examination: 50%
Project: 50%

EMSE 310/MGT 205

PRACTICUM IN KNOWLEDGE & INNOVATION MANAGEMENT

Course Description: Demonstrates how the principles and processes of systems thinking, systems approach, systems engineering, and integrative management can be used to design, implement, and manage a KIM System. Students gain insights into the fundamentals of applied systems thinking, and they also gain experience in the use of these concepts as a member of a project team. The course thereby integrates theory with practice.

Objectives:

1. Offer conceptual frameworks defining how KIM applications are effectively designed and managed.
2. Conduct studies of actual KIM installations.

Lead Instructor: Michael Stankosky (SEAS)

Research Project/Grade:

Students will work in teams of two, and complete the required milestones listed below. An overall grade will be assigned to the final project submitted, to include class presentation of the project.

Session Topics:

1. **Introduction: Course overview.** Introduction to Systems Thinking and the Systems Approach: reviews key elements of systems thinking, with appropriate case studies.
2. **Overview of Systems Engineering.** Reviews key elements of systems engineering, with appropriate case examples.
3. **Overview of Integrative Management** Reviews key elements of integrative management, with appropriate examples.

4. **How to use the Enterprise Management Engineering Template** Use of former student submissions.
5. **Introduction to the Assignment of Milestone I**, with examples from former student submissions.
6. **Instructor Review of Projects** Coaching of student teams on work of milestone I.
- 7. Milestone I team presentations**
8. **Introduction to Milestone II**, with examples from former student submissions.
9. **Instructor Review of Projects** Coaching of student teams on work of milestone II
- 10. Milestone II presentations**
11. **Introduction to milestone III**, with examples from former student submissions.
12. **Instructor Review of Projects** Coaching of student teams on work of milestone III
- 13. Project presentations/critique**
- 14. Project presentations/critique**
- 15. Project presentations/critique**

Texts:

The Fifth Discipline, Peter Senge, Doubleday, 1990.

Essentials of Project and Systems Engineering, Howard Eisner, Wiley, 2002.

Assignments

Milestone I

Define/illustrate your enterprise. Focus on key relationships and stakeholders.

State the value proposition of your organization.

List the critical intellectual assets needed to make strategic decisions.

Identify throughout your enterprise the sources of your intellectual assets for strategic decision-making.
List no more than 3 objectives in measurable terms (include success factors).
Identify the critical enterprise environmental changes that would impact your strategic objectives (to include what sensors you would put in place to monitor).
Do an audit of the 4 pillars in your organization (ensures that you have all the key ingredients in place for a knowledge Management System).

Milestone II

List the enterprise-wide functions to accomplish the strategic objectives.
Diagram the operational processes to accomplish these functions.
List the intellectual assets required to accomplish both functions and processes.
List the sources of these intellectual assets.
Lay out, in general terms, the codification and personalization strategies to leverage these intellectual assets. Indicate where these two strategies overlap.
Address their particular functions: assure, generate, codify, transfer, and use.
Diagram the formal organization structure.
List or diagram the informal organizational structure and show where they support the formal one.
List the KM technologies needed to support the KM strategies.

Milestone III

Develop an integrative management plan for your KMS. This plan should include as a minimum: deliverables (include metrics for control/success and expected benefits, such as efficiency, effectiveness, and innovation), resources required, persons responsible, and a timetable.
Discuss how you plan to integrate the KMS with legacy components (such as current functions, processes, formal and informal organization structures, and IT systems). Highlight risks and how you plan to manage/mitigate them.
Discuss how you plan to implement and manage change.