A Reference Guide for Service Science Curriculum Development

Recommended by

Service Science Society of Taiwan (*s3tw*)

February 20, 2012

(Version 0.92)

Abstract

Service science consists of knowledge and practice from various disciplines, such as management, engineering, design, and social science. This emerging discipline needs a reference guide in developing interdisciplinary curriculum for those first movers to launch service science related programs. In this reference guide, we present the progressive version of core courses to compose the curriculum for a master program on service science. There are 13 courses including the essential knowledge and abilities of interdisciplinary study of service science in order to cultivate T-shape service science professionals. These course structures and contents were recommended through a joint effort of scholars in constituent disciplines of service science. We expect this reference guide of curriculum framework and contents as the foundation to contribute to the continuous efforts on developing the detailed course learning activities in class teaching. Then, instructors of these recommended courses can enhance the frameworks and contents through the feedback from teaching. Moreover, we hope the derivation of related courses from these core courses can further connect service science with existing various academic programs. We expect the interdisciplinary efforts on service science development contribute to the cultivation of service science talents to achieve the wellbeing of modern societies.

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1. BACKGROUND

Service science, the brief name for "Service Science, Management, Engineering, and Design," has been well recognized as an inter-disciplinary study of service systems. To cultivate "T" shape professionals to be able to design services to create value both for customers and service providers, it is not a trivial task to design service science curriculum to build the learning environment to reach this educational goal. Since SSME was first framed by IBM back in 2004, many efforts have been spent by IBM and many other universities around the world to develop educational programs mainly in master degree level to cultivate service science professionals (or service scientists). In Taiwan, National Tsing Hua University launched the first educational unit, called the Institute of Service Science, to start the service science master program in 2008. Some universities in Taiwan started to organize existing curriculum to include courses related to service science.

To make service science as an inter-disciplinary study, it is not only a curriculum design but also the cultural and mindset change. In terms of cultural and mindset change, service science initiative is an academic entrepreneurship, which relies on the proactive attitude to accomplish effective learning goals using various means, which sometimes are not commonly seen in current higher educational practice. In terms of curriculum design, we need to design course works which can activate cross- and trans-disciplinary studies to reach inter-disciplinary learning outcomes.

This report serves as a milestone to update the efforts on designing service science curriculum. In 2008, Dr. Rahul Choudaha conducted an online Delphi study as his Ph.D. dissertation to propose a competency-based curriculum for a master program in SSME, which is a very good reference on service science curriculum design. It can be viewed as the first systematic action taken to design service science curriculum. Figure 1 shows the curriculum structure proposed by Dr. Choudaha (2008).

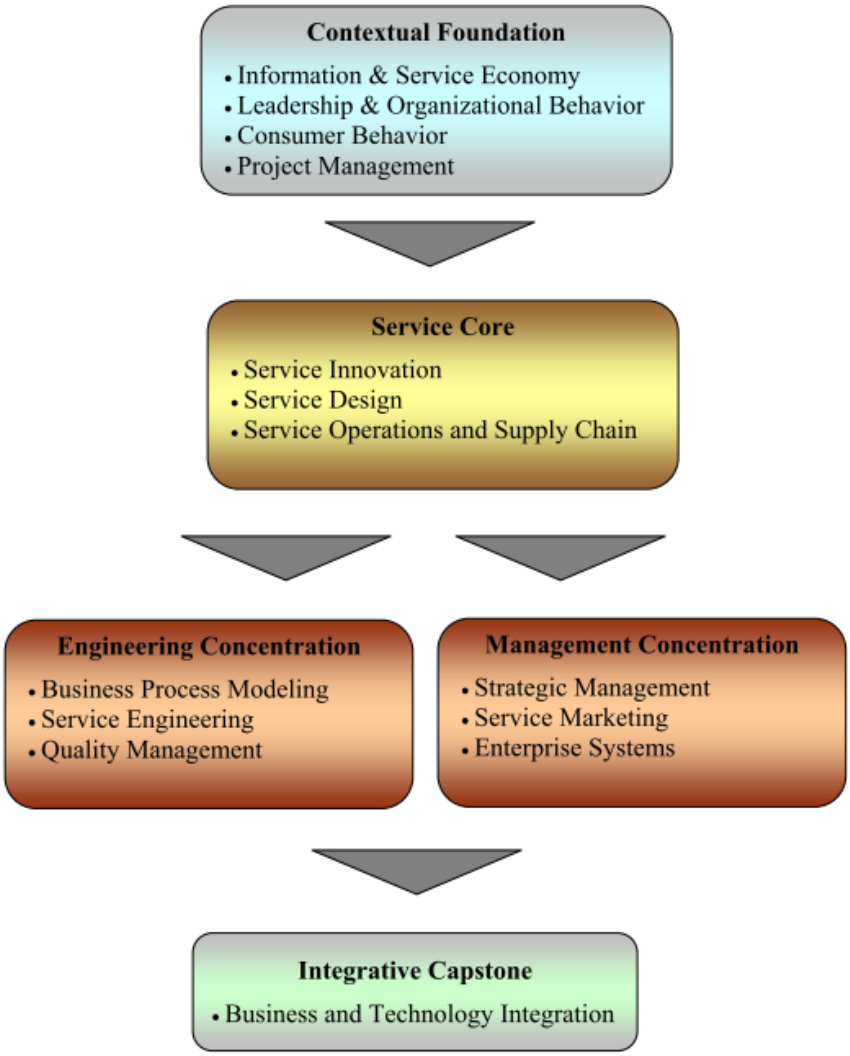

Figure 1. Curriculum for a master program in SSME (Choudaha, 2008)

In 2010, before the launch of the Service Science Society of Taiwan, led by Prof. Soe-tsyr Yuan and Prof. Hsiuju Rebecca Yen, the master students at the Institute of Service Science worked as five groups to search on the internet to obtain 46 educational institutes which offer related curriculum in service science. There are 31 universities referred by IBM, 7 well known universities in SSME programs, and 8 schools referred by Service Design Network in design discipline. This effort generated a knowledge map consisting of four constituent disciplines: Service Design, Service Engineering, Service Management, and Social Science. This is the most recent effort to summarize the constituent courses corresponding to individual

disciplines and the integration of different disciplines through internet content analysis. Figure 2 illustrates the knowledge map of constituent disciplines with representative course list.

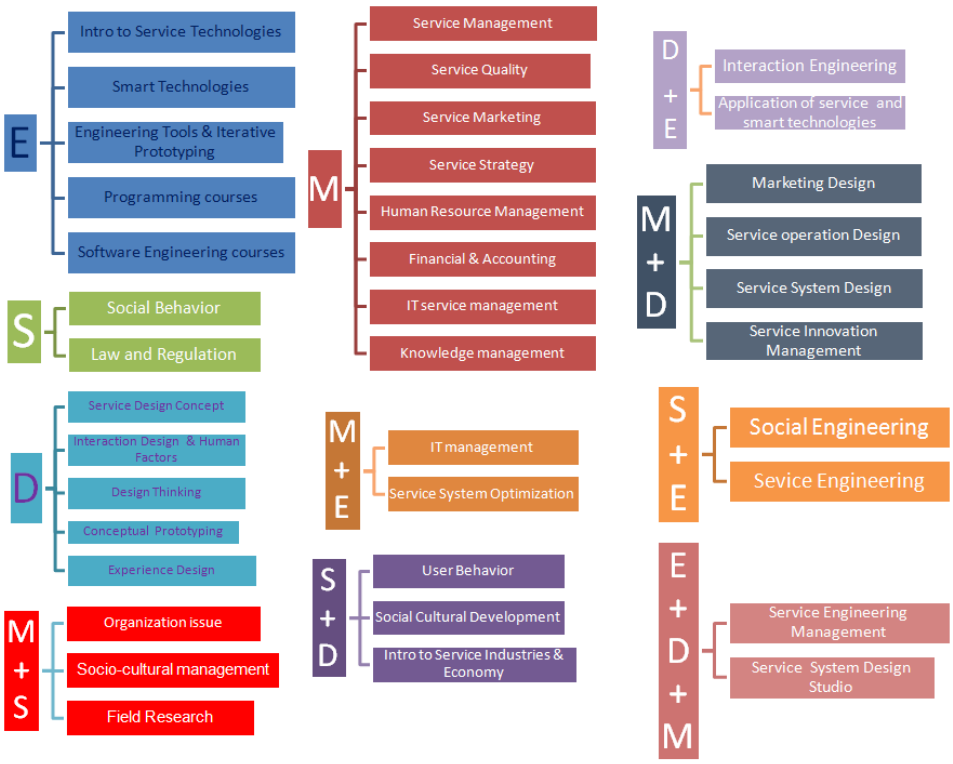

Figure 2. A knowledge map to illustrate the inter-disciplinary service science curriculum

Continuing the efforts on generating reference curriculum for service science interdisciplinary education, s3tw, founded in January 2011, invited scholars in such domains as management, engineering, design, and social science to develop a reference curriculum aimed to serve as the core courses for master programs in service science. The curriculum design forum held in October 9 and 10, 2011 concluded the curriculum structure shown in Figure 3.

2. COURSE STRUCTURE

In Figure 3, the Introduction to Service Science course brings students into the field of interdisciplinary study of service science. This course identifies the main themes of service science: a service system view of service and the co-creation of value for both customers and service providers. Besides the composition of management, engineering, and design elements in the class, this course also emphasize the service philosophy based on doctrines originated from oriental and western societies. This course also leads students to think the paradigm shifting of service science based on Kuhn's the structure of scientific revolution. The instructor could supervise students' embody of interdisciplinary knowledge and practice through team projects, in which students need to go to the field to identify and define service systems in the existing social contexts in order to exercise methods and attitudes to propose innovated service ideas.

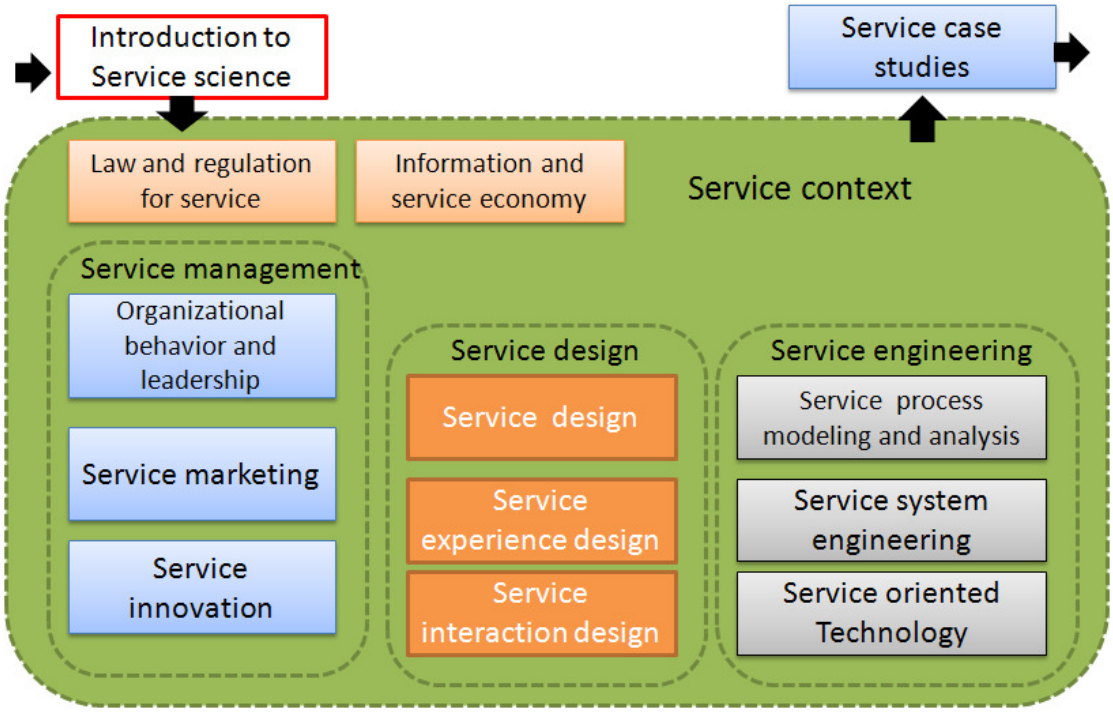

Figure 3. The curriculum for master program in service science (s3tw)

The Service Case Study course serves as the capstone course to allow students to exercise the knowledge from various disciplines, such as management, engineering, design, and social science, to discuss and debate on real business cases. This will

give the opportunity to ensure that students can employ proper knowledge and judgment to solve the issue effectively in business cases on service.

Students will be led to possess core knowledge of service science in service management, service design, and service engineering, in service contexts, which social science can bring rich ingredients. For example, in the curriculum, we suggest two courses on law and regulation for service and information and service economy as the essential knowledge to beware of service contexts. Law and Regulation for Service is essential in service innovation which should comply with existing law and regulation when deploying the new service. However, due to the fast emergent technologies, many services enabled by new technologies may challenge the existing law and regulation. Thus, students understand the principles and practice of law in protecting consumers' rights, such as privacy, equality, etc., can keep the service away from the risk of liability. Law and regulation on business conducts, such as anti-trust, monopoly, etc., could guide the service eco-system development to sustain from the growth of the business.

Information and Service Economy course aims to bring the macro economy settings for students to perceive the causal relationship in developing information and service economy. Especially, service is highly interacted with the globalization of labors and professional workers' market, which will affect the regional economy besides the trading relations on goods in general. Moreover, the common measure of economy using GDP (Gross Domestic Product) could be challenged when the world starts to look at environmental sustainability and social well being. The alternative measure called GNH (Gross National Happiness) could be investigate its feasibility in the future.

Moving to the three areas of courses in service science, *i.e.*, service management, design, and engineering, the curriculum aims to allow students to select one of them as the major area while possessing basic knowledge and skill levels in the other two. In each area, we suggest three courses as the core used to cultivate students to possess the essential concepts, methods, and abilities in corresponding areas.

First, let's look into the service management area. The goal of this area is to grant students the opportunities to possess the abilities to acquire customers' needs, to experience service value co-creation process, and to understand the organizational dynamic in conducting business. Students are able to exercise their leadership in

team works in service innovation project. The main components of theories and methods come from behavior science, such as psychology, anthropology, sociology, etc.

Second, the service design area aims to equip design abilities in students through hands-on exercises and projects. It emphasizes very much on service experience and interaction design, which facilitate the value exchange and creation during service encounter moments. The main components of theories and methods come from design science disciplines, such as aesthetics, ergonomics, narrative inquires, simulation, experimentation, etc., besides the foundation in understanding people, technologies, and organizations.

Third, students can gain the abilities from courses in the service engineering area to be able to realize service systems. For example, students are able to model and analyze service processes, design the service delivery system upon service-oriented architecture using systematic service system engineering methods. The main components of techniques and methods come from engineering disciplines, such as software engineering, business process modeling, and technology related domain knowledge.

3. LIST OF COURSES

3.1 Introduction to Service Science

The introduction to service science is the first very beginning course designed for the first year master students who are major in service science. The objectives of this course is to facilitate students to gain a comprehensive view of service science, examine their abilities to become a service professional, and then lay out their learning agenda to engage the follow-up service science curriculum. The journey to grow as a thoughtful and skillful service professional through the exploration of service science, we need follow the following path: (1) to identify the phenomena occurred in services since phenomena breed science; (2) to analyze the encountered phenomena using scientific methodologies; (3) to design service using service modeling and engineering technologies; (4) to conduct services to experience the service process as a service provider vs. a service customer; (5) to recognize the issues in service science for the following up studies. Through the learning activities, students are able to

1. To understand the composition of service science
2. To explore issues in service science
3. To experience the service delivery process
4. To practice service design and engineering methods
5. To refresh and strengthen the service humanity attitudes and behaviors
6. To discover issues for continuous studies

3.2 Service Context Area

There are two courses planned to build up the understandings of service context. They are law and regulation for service, and information and service economy. The expertise of these two courses mainly from law and economics disciplines. Thus, in planning these two course, the inclusion of inputs from both camps of academic scholars in essential. The recommended course contents are integration of inputs from both disciplines and literature reviews.

3.2.1 Law and Regulation for Service

In order to achieve one of service science study goals to equip students' ability to innovate services, students need to beware of legal environments of the target service

delivery. To organize the course contents in law and regulation for service, we adopt the service network view which focuses on the roles playing by different stakeholders in a service system. Stakeholders could play the roles as service providers, customers, service recipients, etc., and they may have different concerns of their interests. Especially, in the era of technology-driven innovation, new invention and innovation considers very much on intellectual properties, privacy, anti-trust, service internationalization, and consumer protection issues. Therefore, the course contents on law and regulation for service would emphasize more on the above mentioned topics besides the basic concepts on law and regulation.

This course would be taught in seminar type of activities due to the lack of teaching materials to meet a high variety of service industries which may have different emphases. The course instructor can organize the topics according to the emphasis on individual right, organizational conduct, intellectual properties, and technology-driven innovation to engage domain experts in these domains to deliver the talk in classes. Moreover, some cases in corresponding topics could be distributed before the class in order to create the discussion and interaction in class. Through the learning activities, students are able to

1. Understand basic legal terminology and concepts.
2. Know how to evaluate issues of legal significance in service innovative transaction.
3. Apply legal reasoning to situations and form legal conclusions.
4. Compare and apply various legal theories/interpretations to real world situations.
5. Know how to issue spot, weigh, and analyze risks, and gain a sense of comfort and familiarity with the legal system.

3.2.2 Information and Service Economy

This course is to create an opportunity for reflection and debate on topics of information and services, thus providing stimuli and ideas for the increasing challenges of a continually changing worldwide economic scenario. The present initiative is therefore dedicated to the analysis of the effects of important changes, which are now taking place in the world economy: the globalization of markets, the continuous evolution in the field of information, technology and communications and the convergence of economics and international relations.

Therefore, we intend to take this course to establish a strong foundation in understanding the economics of information goods and services. We hope to generate a new, interdisciplinary field that combines information, service science, economy and organization knowledge to succeed in the shift to the service and information-based economy. Students would analyze strategic issues faced by for-profit and not-for-profit organizations, such as pricing, bundling, versioning, product differentiation and variety, network externalities, and rights management. Through the learning activities, students are able to

1. Understand the paradigms of economic change
2. Know how to make the co-evolution of technology & institutions from niches to riches perspective, especially in service value networks, not in firms' viewpoint.
3. Know how can we add the value in the original product or create innovative services among the rise of service economy

3.3 Service Management Area

Service management area takes the domain knowledge mainly from management discipline. Three courses are recommended as the core courses used to build students' knowledge and skills in service management. The common goals of this module are (1) to cultivate students to understand the inter-personal and –organizational dynamics in service systems and to grow their leadership in service management; (2) to equip knowledge and skills in connect values with stakeholders in marketing services; (3) to design and manage service innovation activities to create new services.

3.3.1 Organizational Behavior and Leadership

The course is open to students from any of the social sciences, business, education, social work and health professions (public health & nursing). Organizational Behavior is the study of human behavior within organizational settings. This encompasses micro level (interpersonal and small group) and macro level (inter-organizational) interactions. This course will examine the current theories and research within the field of organizational behavior and simulations. Focus will be on the application of these theories and empirical findings through case analyses.

This course also will develop an understanding of the key issues managers need to master in order to manage the interface between people and organizations.

The course begins with a focus on the individual within the organization, including topics of attitudes, motives, and personality. The course then progresses to a broader focus on the organization as a whole, including topics of power and political concerns, group and organizational leadership, and organizational culture. Through the learning activities, students are able to

1. Assess personality, values and interpersonal skills and understand the implications for one's work life.
2. Implement practices that foster organizational citizenship, collaboration, and teamwork.
3. Diagnose and solve interpersonal and team problems.
4. Analyze the human resource architecture of an organization and its relationship to organizational strategy
5. Assess and develop leadership skills at the group and organizational levels
6. Foster innovation and creativity within organizations

3.3.2 Service Marketing

Service marketing poses special challenges for managers due to the differences between goods and services. These challenges include customer satisfaction measurement and management; coordination of marketing and operations in the design and implementation of service delivery; the development of human and technical skills of employees that deliver services; and the utilization of emerging technology. This course informs students of basic modifications to marketing concepts as the economy changes in emphasis from physical products to services. It also will distinguish between function, organization, and structure in product- (versus service-) oriented firms. Finally, it will concentrate on identifying difficulties in developing marketing plans and strategies in the service environment. Cases and projects with businesses will be used to demonstrate these concepts. Services marketing will familiarize students with service marketing concepts. Through the learning activities, students are able to

1. Understand knowledge of current service marketing concepts, theories and applications.

2. Can analyze service marketing problems, developing marketing solutions and applying service marketing principles to a broad range of situations.
3. Develop abilities to identify services decision problems, ascertain alternatives, define crucial issues, analyze and plan the implementation of these issues.
4. Understand about relationship marketing and service failure/recovery issues in the service sector.

3.3.3 Service Innovation

This course examines how value creation occurs in a range of fast-growing service sectors, including retailing, hospitality, financial services, professional services, travel, logistics, and healthcare. The course emphasizes that services are diverse, and explicitly distinguishes traditional and high-value services. Students will be able to assess the service portfolio of their organization, evaluate opportunities and emerging service trends, and learn the formal analysis and modeling techniques that are essential to realize new service offerings. The course primarily addresses the needs of public and private organizations with service offerings. The course makes use of real-world case studies to illustrate specific aspects of service analysis, specification, and implementation. Through the learning activities, students are able to

1. Understand the fundamental principles of creativity, design thinking and innovation in designing new products, services and business models.
2. Understand prevailing practical methods for developing and aligning the service innovation models, processes and operations with both the espoused enterprise strategy and customer value proposition to achieve sustainable competitive advantage.
3. Understand how firms can undertake strategic renewal through product and service innovation.
4. Acquire knowledge about context of application, relate and assess the suitability of the strategy-aligned service innovation concepts, models and methods for their own organizations.

3.4 Service Design Area

Service design area energizes the progressive achievement from design discipline, which emphasizes very much on hands-on learning activities in order to internalize

knowledge and skills to design new artifacts. Inheriting from design discipline to enrich service design, the efforts on successful service design are mainly spent on various customers' involved design processes in order to elicit customer experiences, interfaces, and embedded service process changes. Moreover, in adding the value of technology innovation, service design takes the integration of people, technology, and organization values into consideration, which are also included in the course activities.

The service design area takes three courses, *i.e.*, service design, service experience design, and service interaction design, to serve as the core to equip students' design abilities in creating new services. Service design course serves as the entry step for students to understand the essential concepts, techniques, and skills in designing new services. Service experience design course emphasizes the value of shaping new experiences for customers. Through new experiences perceived by customers, new value propositions can be recognized to enrich the service flow. Service interaction design focuses on designing interaction between service receipts and providers such that the value propositions can be precisely identified and delivered.

3.4.1 Service Design

The target students of this course are those who mostly haven't had regular design training offered by existing design discipline and would like to equip the abilities to conduct service design. Therefore, the course will start with the introduction of some basic knowledge, tools, and process of design, and then explore necessary concepts and techniques used for design services. This course will be delivered through lecture and hands-on projects, so that students can develop their design attitude and abilities by dealing with real world issues. This course will also serve as the basis for students to move forward to take other service design related learning subjects, such as service experience design, interaction design, etc. Through the learning activities, students are able to

1. Understand the characteristics and unique qualities of services and service experiences.
2. Evaluate service systems and experiences for quality and value.
3. Identify opportunities for service design.
4. Design the elements of a service experience.

5. Visualize and present services and document designs for service experiences.

3.4.2 Service Experience Design

Experience design is not driven by a single design discipline. Instead, it requires cross-disciplinary perspectives that consider multiple aspects of the brand, business, environment, and experience from product, packaging and retailing environment to the attitude and behavior of employees. Experience design seeks to develop the scenarios for exchanging values via product, service, or event. This course aims to cover various touch points which compose the scenario of service experience which could be defined by different sensational sources and cognitive judgments. This course could be conducted both by lecture and hands-on practice in order to equip students' abilities in dealing with real world issues in service experience design, so that they can internalize their knowledge and skills. Through the learning activities, students are able to

1. Understand users' experience, such as how they live, what they need and want.
2. Envision new opportunities with brainstorming, opportunity mapping.
3. Conduct "Just-enough" prototyping to model in revealing the quality of the experience
4. Design solutions, such as what is the role of the product or service in the people's lives? what is the right mental model for the user? what is the look and feel fro the interaction? what are the technical issues to solve?
5. Craft the interactive experience, such as what will people see, hear and feel
6. Present and test the outcomes.

3.4.3 Service Interaction Design

Interaction design defines product behavior, mediating relationships between people and people, people and products, people and environments, and people and services across a variety of contexts. The model of designing for interaction involves multi-disciplinary teams engaged in the planning, conception, design, implementation, and support of products, services, and systems that meet human needs and desires. This human-centered model considers psychological, social, and cultural factors on the one hand, and technical, economic, and environmental factors on the other. Service interaction design aims to design service interfaces in order to

facilitate the interaction between service provision and reception. This course can be taught by lecture and hands-on practice, so that students can equip the abilities to face issues in real world settings. Through the learning activities, students are able to

1. Demonstrate design skills, with a focus on interaction, interface design, and mechanization, through the completion of technical exercises, presentation of conceptual plans, creation of project prototypes.
2. Create dynamic strategies for organizing and presenting digital information, through oral/visual presentations of conceptual project proposals, the completion of technical exercises and the submission of original project work.
3. Explain the significance of the key developments in the history of digital media, with a focus on how the precursors to interactivity led to contemporary practices, through participation in group discussions and writing of project texts.

3.5 Service Engineering Area

Courses in service engineering area play the role to realize service through design science approach, which considers the creation and evaluation of artifacts based on the needs of target users and existing theories and techniques. In implementing services especially technology-enabled services, the integration of service process with information technologies is essential for service innovation and management. Therefore, this area of service engineering aims to transform the service prototypes from concepts to business process models, and then the service information systems can be designed, evaluated, and implemented systematically based on service oriented technologies.

3.5.1 Service Process Modeling and Analysis

Business Process Modeling is the activity of representing processes of an enterprise, so that the current process may be analyzed and improved. This course not only focuses on modeling but also emphasizing the business process change management, which helps organizations master change successfully and create immediate as well as durable competitive advantage. Through the learning activities, students are able to

1. Be conversant in the terms used to describe, analyze, and improve business processes in organizations.

2. Understand business process modeling languages.
3. Model business processes for subsequent implementation.
4. Identify weaknesses in a given process design and suggest improvements that will benefit organizational performance.
5. Redesign a given process using improvement patterns and outside best practices.
6. Develop an implementation and integration strategy for processes that leverages organizational and technical capabilities of an organization.

3.5.2 Service System Engineering

Service system engineering is a graduate-level introductory course to bring in the cross-disciplinary components from engineering, computer science, business and cognitive sciences. This course aims to equip students with the design and implement service information systems to realize the information flows of business processes which realize service value exchange and creation. This course focuses on facilitating students to access various engineering methodologies and conducting real world projects to internalize knowledge and skills in implementing service systems. Through the learning activities, students are able to

1. Build sound technical foundation with a disciplinary focus and the flexibility to pursue professional interests in areas outside of engineering that could lead to a wide variety of career paths.
2. Learn how to function on multidisciplinary teams that extend the traditional boundaries of engineering.
3. Learn to apply problem-solving techniques to system's problems that involve human-based uncertainties.
4. Learn design and improve systems and processes that provide services by applying a system perspective coupled with a thorough understanding of the customer.
5. Understand functional specifications in programming methodology; moreover, to learn modularization in program design and development.
6. Understand and implement the software development process, software requirements specifications. Moreover, learn the risks and liabilities of applications development.

3.5.3 Service Oriented Technology

Service-Oriented Technology (SOT) is a newly developed design philosophy of modern information systems for ever-increasing demands. The service orientation approach connects business process and IT capability to enable a holistic view of problem solving. This course is designed to provide a thorough introduction to SOT, which refers to a design pattern made up of components and interconnections that stress interoperability and location transparency. This course covers both the design of SOT systems as well as practical hands-on programming of a distributed based system. Also, looks at the impact of SOT on software quality, efficiency, security, performance and flexibility. Through the learning activities, students are able to

1. Understand what SOT is about and realize SOT principles.
2. Be able to problem solve and develop program logic for distributed based systems.
3. Understand how distributed systems are evolving and how that may change the way business is conducted in the future.
4. Understand the impact of SOT on software quality, efficiency, security, performance and flexibility.

3.6 Capstone course-- Service case study

In the master program of service science, a capstone course is expected in order to allow students to exercise their inter-disciplinary abilities to deal with real world issues in service. The service case study serves as a capstone course to adopt case teaching methods to facilitate students to tackle real service cases. In the selection of cases, we aim to include those cases emphasizing the multiple perspectives of service phenomena which require students to exercise knowledge and abilities learned from different disciplines, such as management, technology, design, etc. Through the learning activities, students are able to

1. Apply concepts, methods, and tools learned to tackle issues in case studies
2. Solve the case problems by integrating knowledge from various disciplines.
3. Express properly the opinions and solutions to the problems in case studies.
4. Interact effectively during the case teaching activities.

ACKNOWLEDGEMENT

The Service Science Society of Taiwan would like to thank the following contributors to publish the reference curriculum for master programs in service science. They are highly involved in the process of generating this curriculum framework (sorted by the alphabetical order in last name).

Chen, Houn-Gee (National Taiwan University)

Chen, Ing-Yi (National Taipei University of Technology)

Cheng, Kong-Fah (National Chung Cheng University)

Chen, Lin-Lin (National Taiwan University of Science and Technology)

Chen, Yiche Grace (Yuan Ze University)

Chou, Szu-Wen Eric (National Tsing Hua University)

Chung, Paul (Sayling Wen Cultural and Educational Foundation)

Classes of 2009& 2010, Institute of Service Science (National Tsing Hua University)

Deng, Yi-Shin (National Cheng Kong University)

Hsieh, Peishan (National Tsing Hua University)

Huang, San-Yih (National Sun Yat-sen University)

Huang, Phil C.H. (Sayling Wen Cultural and Educational Foundation)

Hwang, T. K. Philip (National Taipei University of Technology)

Li, Eldon (National Chengchi University)

Li, Yung-Ming (National Chiao Tung University)

Liang, Ting-Peng (National Sun Yat-sen University)

Lii, Ding Tzann (National Tsing Hua University)

Lin, Fu-Ren (National Tsing Hua University)

Luh, Ding-bang (National Cheng Kong University)

Peng, Shin-yi (National Tsing Hua University)

Po, Jung-wei (National Tsing Hua University)

Sung, Tung-jung (National Taiwan University of Science and Technology)

Yang, Chien-Min (National Tsing Hua University)

Yang, Ren-da (Institute for Information Industry)

Yeh, Arthur S.H. (National Tsing Hua University)

Yen, HsiuJu Rebecca (National Tsing Hua University)

Yu, De-Jang (Scenario Lab)

Yuan, Soe-Tsyr Daphne (National Chengchi University)

APPENDIX A. INTRODUCTION TO SERVICE SCIENCE

Overview

The introduction to service science is the first very beginning course designed for the first year master students who are major in service science. The objectives of this course is to facilitate students to gain a comprehensive view of service science, examine their abilities to become a service professional, and then lay out their learning agenda to engage the follow-up service science curriculum. Service is a value co-creation process between server providers and customers. It can be modeled as a relationship management among stakeholders, such as service providers, clients, and service targets. It can be viewed as a system composed of front- and back-end components. It is also the results of interaction between organizations, people, technologies, and information. Thus, the richness of aspects of a service brings us a great opportunity to mobilize our creativity, design, and implementation capabilities to become a thoughtful and skillful service professional. The journey to grow as a thoughtful and skillful service professional through the exploration of service science, we need follow the following path:

7. To identify the phenomena occurred in services since phenomena breed science.
8. To analyze the encountered phenomena using scientific methodologies.
9. To design service using service modeling and engineering technologies.
10. To conduct services to experience the service process as a service provider vs. a service customer.
11. To recognize the issues in service science for the following up studies.

Part I. Course brief, it consists of course introduction, learning objectives, and overview of current adoptions

LEARNING OBJECTIVES

5. To understand the composition of service science
6. To explore issues in service science
7. To experience the service delivery process
8. To practice service design and engineering methods
9. To refresh and strengthen the service humanity attitudes and behaviors
10. To discover issues for continuous studies

Part II. Course modules and constituent subjects, it presents the structure of the course containing modules of knowledge components. In each module, several subjects can be organized to beef up the contents. In this part, we expect to give instructors an outline of the course first. The detailed description will be seen in Part III.

COURSE MODULES AND CONSTITUENT SUBJECTS

Module 1. System view of service science

Subject 1.1 Paradigm shift

Subject 1.2 Toward service science

Subject 1.3 Service systems

Module 2. Service innovation

Subject 2.1 Characters of innovators

Subject 2.2 New service development (NSD)

Module 3. Service design

Subject 3.1 Service experience engineering (SEE)

Subject 3.2 Design thinking

Module 4. Technologies for service science

Subject 4.1 Business process modeling and reengineering

Subject 4.2 Business analytics and data mining

Subject 4.3 Web service and cloud computing

Module 5. Service management and leadership

Subject 5.1 Service value and quality

Subject 5.2 Service economy and sustainability

Subject 5.3 Tribal leadership

Module 6. Philosophy of service science

Subject 6.1 The structure of science revolution

Subject 6.2 Philosophy of service science

Part III. Detailed description and referenced materials, in this part, the information of each subject in each module is elaborated in a detailed level, which an instructor can use it for determining the constituent modules and subjects for his/her course design, and sourcing teaching materials based on the this part. Moreover, the updated information can be added based on the initial contents allocated in this part.

DETAILED DESCRIPTION AND REFERENCED MATERIALS

Module 1. System view of service science

This module highlights the two major perspectives of service science: the view of service systems and the value co-creation process of service innovation. Moreover, in this module, students should recognize they are marching into a new paradigm, the interdisciplinary study of service science.

Subject 1.1 Paradigm shift

Reference materials

1. Paradigm shift http://en.wikipedia.org/wiki/Paradigm_shift
2. *Linda Dailey Paulson*, Services Science: A new field for today's economy. IEEE Computer Magazine (August 2006).
3. Paul Horn, The new discipline of services science, Business Week, January 21, 2005
4. P. Hari, To serve them all: A new field of study evolves to make services more effective , Businessworld, July 27, 2009.
5. IfM and IBM. (2009). Succeeding through Service Innovation: A Service Perspective for Education, Research, Business and Government. Cambridge, United Kingdom: University of Cambridge Institute for Manufacturing. ISBN: 978-1-902546-65-0.

Subject 1.2 Toward service science

Reference materials

1. Jim Spohrer and Paul Maglio, Toward a science of service system: value and symbol, *Handbook of Service Science*: *Research and Innovation in the Service Economy*, 2011.

2. Jim Spohrer and Paul Maglio, The emergence of Service Science: Toward systematic service innovations to accelerate co-creation of value,

3. Mary Jo Bitner and Stephen W. Brown, The evolution and discovery of service science in business schools, *Communication of ACM*, Vol. 49, No. 7, July 2006.

4. Paul Maglio, Savitha Srinivasan, Jeffery T. Kreulen, and Jim Spohrer, Service systems, service scientists, SSME and Innovation, *Communication of ACM*, Vol. 49, No. 7, July 2006.

Subject 1.3 Service systems

Reference materials

1. R. C. Basole, and W. B. Rouse, "Complexity of service value networks: Conceptualization and empirical investigation", *IBM Systems Journal*, Vol. 47, No. 1, January 2008.
2. Stephen L. Vargo & Robert F. Lusch, Evolving to a New Dominant Logic for Marketing, *Journal of Marketing*, Vol. 68, January 2004, pp.1-17.

Module 2. Service innovation

Subject 2.1 Characters of innovators

Highlight the ten different characters of an innovator using the book.Tom Kelley and Jonathan Littman, *The Ten Faces of Innovation*, Currency & Doubleday. 2005. (中譯本：決定未來的十種人，大塊文化)

Subject 2.2 New service development (NSD)

Conclude the NSD process via different literatures based on the paper:
Fu-ren Lin and Pei-shan Hsieh, A SAT view on new service development, *Service Science*, 3(2): 2011.

Module 3. Service design

The service experience design could be the fundamental knowledge to integrate knowledge from psychology, sociology, engineering, and management to design new services. The objectives of this module can be reached by introducing and practicing methods in service experience engineering and design thinking.

Subject 3.1 Service experience engineering (SEE)

There are more than 60 methods can be used in the service design process (see the reference).

Reference materials

1. 服務體驗工程指引（上下冊）資策會
2. 顧客洞察者的田野手冊，資策會

Subject 3.2 Design thinking

Design thinking coined by Stanford d.School emphasizes the quick cycle of innovative idea generation, prototyping and testing. It adopted various approaches to empathize potential customers' needs in order to define the needs, as the source of ideation. This type of methods can be learned via hands-on workshop.

Reference materials

1. Tim Brown, Innovation through design thinking (http://mitworld.mit.edu/video/357/)
2. Institute of Design at Stanford (http://dschool.stanford.edu/)

Module 4. Technologies for service science

This module introduces related techniques for modeling business processes and implementing service using related technologies, especially emphasizes on cloud computing and business analytics.

Subject 4.1 Business process modeling and reengineering

There are main reference books can be used for this subjects:

1. Peter Weil and Michael Vitale, *Place to Space: Migrating to E-business Models,* Harvard Business Press; 1st edition (June 1, 2001) (ISBN.978-1578512454)
2. Alexander Osterwalder and Yves Pigneur, Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers, Wiley, 1st edition (July 13, 2010), (ISBN: 978-0470876411)

Subject 4.2 Business analytics and data mining

It gains the attention by service sectors especially for technology-enabled services by utilizing transaction data in internal data sources and external intelligence via data/text mining technologies. In this subject, students should have basic knowledge on business analytics and data/text mining for them to engage follow-up studies in service engineering module.

Reference materials

1. Thomas H. Devenport, Jeanne G. Harris (March 2007). *Competing on Analytics: The New Science of Winning*. Harvard Business School Press.
2. Han, Jiawei, Kamber, Micheline, and Pei, Jian, *Data Mining: Concepts and Techniques, Morgan Kaufmann Publishers*, 2nd Edition, 2007. (http://www.cs.uiuc.edu/~hanj/bk2/)
3. Weiss, Sholom M., Indurkhya, Nitin, Zhang, Tong, Damerau, Fred J., *Text Mining: Predictive Methods for Analyzing Unstructured Information*, Springer, 2005.

(http://www.springer.com/computer/database+management+%26+information+retrieval/book/978-0-387-95433-2)

Subject 4.3 Web service and Cloud computing

By introducing web service concept and cloud computing architecture, students can connect the information platform with the service implementation.

Reference materials

1. Michael Armbrust , et al., *Above the Clouds*: A Berkeley View of Cloud. Computing, Feb. 10, 2009, (http://www.eecs.berkeley.edu/Pubs/TechRpts/2009/EECS-2009-28.pdf)
2. Fu-ren Lin, Michael J. Shaw, and Michael C. Chuang, The unified framework for managing Web-based services, *Journal of Information Systems and e-Business Management*, 3:299-322, 2005.
3. 陳瀅，雲端策略，天下雜誌出版，2010。
4. IBM GTS, Getting cloud computing right, 2011
5. IBM, Academy of Technology Survey, Cloud computing insights from 110 implementation projects, 2010.
6. **SOA (**http://en.wikipedia.org/wiki/Service-oriented_architecture**)**
7. (http://www-304.ibm.com/jct09002c/university/scholars/skills/soa/index.html)
8. **ITIL (**http://www.itil-officialsite.com/home/home.asp**)**

Module 5. Service management and leadership

This model delivers the major concepts on service management and economy. Moreover, this model attempts to connect service management with leadership, which is essential for service science professional to possess and exercise to lead the business transformation and innovation.

Subject 5.1 Service value and quality

Reference materials

1. Valarie A Zeithaml, A. Parasuraman, *Service Quality,* Marketing Science Institute, 2004
2. Parasuraman A., Zeithaml, V. A., and Berry, L.L. SERVQUAL: A multiple-item scale for measuring consumer perception of service quality, Journal of Retailing, 64(1): 12-40, 1988.
3. Kettinger, W.J., and Lee, C.C., Zones of tolerance: alternative scales fro measuring information systems service quality, MIS Quarterly, 29(4):607-623, 2005.

4. The Apprentice (誰是接班人 2-4)

Subject 5.2 Service economy and sustainability

Reference materials

1. Ying Chen, Ana Lelescu, Jim Spohrer, Three Factors to Sustainable Service System Excellence: A Case Study of Service Systems, 2008 IEEE International Conference on Services Computing (http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=4578516)
2. James Heilbrun, Baumol's cost disease, In James Heilbrum and Charles (eds.) *The Economics of Art and Culture*, Cambridge University Press; 2 edition (April 23, 2001).
3. Gross National Health (http://en.wikipedia.org/wiki/Gross_national_happiness)

Subject 5.3 Tribal leadership

Reference materials

1. Dave Logan, John King, and Halee Fischer-Wright, *Tribal Leadership: Levering Natural Groups to Build a Thriving Organization*, HarperCollins Publishers, New York, 2011.
2. James C. Hunter, The Servant: The Simple Story about the Essence of Leadership, 1998 (中譯本：僕人:修道院的領導啓示錄，商周出版，2010)
3. Dalai Lama XIV Bstan-'dzin-rgya-mtsho and Laurens van den Muyzenberg, The Leader's Way: Business, Buddhism and Happiness in an Interconnected World, 2009 (中譯本：領導之道：爲所有人創造正面的改變，時報文化，2010)

Module 6. Philosophy of service science

Subject 6.1 The structure of science revolution

It is important to guide students to realize the structure of science revolution, which will project the trajectory of the growth pathway of service science research in academic and practice.

Reference materials

1. T.S. Kuhn, The *Structure of Scientific Revolutions* http://en.wikipedia.org/wiki/The_Structure_of_Scientific_Revolutions
2. http://www.des.emory.edu/mfp/Kuhn.html

Subject 6.2 Philosophy of service science

Science is guided by philosophy as we can see most of science students learn the subject of philosophy of science in their professional development process. For service science professionals, the humanity of service science is the basis of service innovation to guide the service economic development. In this subject, we can bring the philosophy in individual and social levels to facilitate the discussion in class.

Reference materials

1. 王邦雄、老子十二講，遠流(2011) (ISBN：9789573267768)
2. 傅佩榮、究竟真實：傅佩榮談老子，天下文化 (2006) (ISBN：*9864178245)*

References of Service Design Techniques (The detailed usage in different new service development process can reference Fu-ren Lin and Pei-shan Hsieh, A SAT view on new service development, *Service Science*, 3(2): 2011)

1. 文獻回顧 (Literature review)
2. 問卷調查 (survey)
3. 訪談 (Interview)
4. 個案研究 (Case study)
5. 專家座談 (Expert panel)
6. 顧客小組座談法 (Customer panel)
7. 焦點團體法 (Focus Group)
8. 日誌與地圖 (Diary / tour guide)
9. 腦力激盪 (Brainstroming, BS)
10. 概念發展工作會 (Idealization workshop)
11. 服務測試法 (Service Test)
12. 服務品質法 (SERVQUAL)
13. 市場調查法 (Market Research)
14. 先驅使用者分析法 (Lead user Analysis)
15. 狩野法 (Kano method)
16. 顧客接洽經驗評比法 (Evaluation of empiric reports from the customer contact)
17. 顧客投訴評比法 (Evaluation of customer complaint)
18. 神秘客法 (Silent Shopper)
19. 情境技術法 (Scenario Technology)
20. 溝通分析法 (Transaction analysis)

21. 顧客群組法 (User Group)
22. 集群分析 (Clustering)
23. 概念測試法 (Concept test)
24. 顧客俱樂部法 (Customer Clubs)
25. 攀梯法 (Laddering)
26. 方法目的鏈法 (Means-End-Chain, MEC)
27. 多元尺度分析 (Multi-dimensional scaling, MDS)
28. 雷達圖 (Rader chart / spider chart)
29. 內容分析法 (Cotntent analysis)
30. 代言人與劇本發展 (Persona and Scenario design)
31. 框架分析 (Frame)
32. 紮根理論 (Grounded theory)
33. 需求分析法 (Requirement Analysis)
34. 市場需求分析法 (Demand Analysis)
35. 服務模擬法 (Service Simulation)
36. 顧客活動法 (Customer events)
37. 顧客價值分析法 (Customer value analysis)
38. 聯合衡量法 (Conjoint Measurement)
39. 關鍵事件法 (Critical Incident Method)
40. 客服中心法 (Customer Care Center)
41. 流失顧客反應法 (Feedback of losing customer)
42. 服務失效模式與效應分析法 (FMEA for Service)
43. 頻率關聯性分析法 (Frequency Relevance Analysis)
44. 顧客觀察法 (Customer observation)
45. 服務藍圖法 (Service Blueprinting)
46. 企業和顧客間員工交換法 (Employee exchange between company and customer)
47. 雛形設計法 (Prototyping)
48. 循序演進法 (Sequential outcome method)
49. 顧客專題討論法 (Customer workshop)
50. 服務品質機能展開法 (Service QFD)
51. 趨勢分析法 (Trend Analysis)
52. PEST

53. SWOTs
54. 產業地圖法 (Roadmap)
55. 生態系統分析 (Ecosystem analysis)
56. 價值鏈分析 (Value chain)
57. 關鍵成功要素 (Critical success factors, KSFs)
58. 關鍵績效指標 (Key performance index, KPI)
59. 比對與標竿研究 (Benchmarking)
60. 類比分析 (analogy)
61. 顧客論壇法 (Customer forum)
62. 顧客滿意度分析法 (Customer satisfaction analysis)

Extended Reference Materials

books

1. Maglio, Paul P.; Kieliszewski, Cheryl A.; Spohrer, James C. (Eds.), *Handbook of Service Science*, Springer, 2010. ISBN: 978-1-4419-1627-3. (http://www.springer.com/business+%26+management/operations+research/book/978-1-4419-1627-3)
2. Tom Kelley and Jonathan Littman, The Ten Faces of Innovation, Currency &Doubleday. 2005. (中譯本：決定未來的十種人，大塊文化)
3. Dave Logan, John King, and Halee Fischer-Wright, *Tribal Leadership: Levering Natural Groups to Build a Thriving Organization*, HarperCollins Publishers, New York, 2011 (paper back, ISBN, 978-0-06-125130-6) (http://www.triballeadership.net/)
4. Thomas S. Kuhn, *The Structure of Scientific Revolutions*. 3rd ed. Chicago, IL: University of Chicago Press, 1996. (ISBN. **978-0226458083**) (中譯本：科學革命的結構，遠流出版)
5. IBM Service Science Initiative, https://www.ibm.com/developerworks/mydeveloperworks/groups/service/html/communityview?communityUuid=d433e517-1ebc-410d-bdc3-cc2b4c1952fc
6. Open Learning Resource of Service Science, http://wiki.service-science.ctm.nthu.edu.tw/index.php/Main_Page

7. James Teboul, Service Is Front Stage: Positioning Services for Value Advantage, Insead Business Press, 2006.
8. 服務體驗工程指引（上下冊）資策會

9. 顧客洞察者的田野手冊，資策會

Reference Journals and Conferences

1. Service Science (http://www.sersci.com/ServiceScience/)
2. Journal of Service Science Research (http://www.springer.com/business+%26+management/journal/12927)
3. SSME Minitrack of HICSS (Hawaii International Conference on System Sciences) (http://www.hicss.hawaii.edu)
4. A list of relevant conferences can be found at http://almaden.ibm.com/asr/SSME/index.shtml

Communities

1. Service Science Society of Taiwan (s3tw) (http://www.s3tw.org)
2. Jim Spohrer's blog (http://service-science.info/archives/category/blogs/spohrer)
3. IBM Smarter Planet (http://www.ibm.com/smarterplanet/us/en/)

APPENDIX B. Service Context

Appendix B.1. Law and Regulation for Service

Overview

In order to achieve one of service science study goals to equip students' ability to innovate services, students need to beware of legal environments of the target service delivery. To organize the course contents in law and regulation for service, we adopt the service network view which focuses on the roles playing by different stakeholders in a service system. Stakeholders could play the roles as service providers, customers, service recipients, etc., and they may have different concerns of their interests. Especially, in the era of technology-driven innovation, new invention and innovation considers very much on intellectual properties, privacy, anti-trust, service internationalization, and consumer protection issues. Therefore, the course contents on law and regulation for service would emphasize more on the above mentioned topics besides the basic concepts on law and regulation.

This course would be taught in seminar type of activities due to the lack of teaching materials to meet a high variety of service industries which may have different emphases. The course instructor can organize the topics according to the emphasis on individual right, organizational conduct, intellectual properties, and technology-driven innovation to engage domain experts in these domains to deliver the talk in classes. Moreover, some cases in corresponding topics could be distributed before the class in order to create the discussion and interaction in class.

Part I. Course brief, in consists of course introduction, learning objectives, and overview of current adoptions

LEARNING OBJECTIVES

6. Understand basic legal terminology and concepts.
7. Know how to evaluate issues of legal significance in service innovative transaction.
8. Apply legal reasoning to situations and form legal conclusions.
9. Compare and apply various legal theories/interpretations to real world situations.

10. Know how to issue spot, weigh, and analyze risks, and gain a sense of comfort and familiarity with the legal system.

OVERVIEW OF CURRENT ADOPTIONS

Country	Instructor	Institution	Course Title (Date)	Description
US	Michael Sandel	Harvard Law School	Ethics, Economics and Law: Seminar (Spring 2011-2012)	The seminar will examine arguments for and against cost-benefit analysis, the monetary valuation of life and the risk of death, and the use of economic reasoning in public policy and law.
US	Ashish Nanda	Harvard Law School	Professional Services: Advanced Topics: Seminar (Spring 2011-2012)	Delve in depth into topics related to the management of professional service firms (PSFs) and the careers of professionals.
US	Waibel	University of California Berkeley HAAS School of Business	Business Law (Spring 2008)	Broader background in the legal environment of business. Topics covered may include contracts, laws regarding buying and selling, warranties and consumer protection, legal documents, negotiable instruments, and owning and renting property
US	Donald G. Kempf, Jr.	University of Colorado Law School	Government Regulation of Business (Spring 2011)	Surveys the legal, economic and policy framework that governs American business.
TW	柯承恩、王文宇、葉銀華	National Taiwan University, EMBA of Management School	Corporate Governance and Business Development (Fall 2010)	1. 瞭解公司治理的意義及其與企業經營的關係; 2. 分析公司治理各構面及影響因素; 3. 探討公司治理之法制層面問題; 4. 介紹人力資源相關議題，包括高階經理人之薪酬、員工分紅入股計畫、外部監理機制，以及盈餘管理。
TW	Kuan-Chun Johnny Chang	National Chengchi University	Business Law (Fall 2010)	Basic understanding on laws concerning business associations and making arguments for his/her own position.
TW	范建得、高銘志	清大科法所	科技與法律 (Fall 2011)	以演講方式介紹「生命科學」、「智慧財產」、「法理與法社會」、「能源環境」、「航太與資訊及企業融資」共計五個區塊的法學主題
TW	范建得	清大科法所	公平交易法	授課方式將隨社會逐步跨入知識經濟時代，而側重在以高科技爲中心的產業發展趨勢及智慧

Country	Instructor	Institution	Course Title (Date)	Description
			(Fall 2011)	財產相關問題之研究爲主
TW	劉孔中	清大科法所	商標法 (Fall 2011)	商標之定義、型態、法律相關問題之研究爲主
TW	劉孔中	清大科法所	著作權法 (Fall 2011)	著作權法相關問題之研究爲主
TW	章忠信	交大科法所	著作權法 (Fall 2010)	著作權法相關問題之研究爲主 http://www.copyrightnote.org/crnote/mainfile/class.htm
TW	楊千旻	清大科法所	專利法 (Fall 2011)	專利法相關問題之研究爲主
TW	楊千旻	清大科法所	電腦與軟體法律專題研究 (Fall 2011)	電腦與軟體法律相關問題之研究爲主
TW	蔡明誠	台大法律系	專利法 PATENT LAW (Sprig 2009)	專利權之概念、原則及其與智慧權之關係等基本觀念及原理，然後將以我國專利法規、法院判例、判決及解釋等實務上問題作爲研討素材，以評析其妥適性
TW	蔡明誠	台大法律系	專利法 PATENT LAW (Sprig 2009)	

Part II. Course modules and constituent subjects, it presents the structure of the course containing modules of knowledge components. In each module, several subjects can be organized to beef up the contents. In this part, we expect to give instructors an outline of the course first. The detailed description will be seen in Part III.

COURSE MODULES AND CONSTITUENT SUBJECTS

Module 1. Personal level of service-related legal topics

Subject 1.1 Privacy Right (I): Technology development and privacy law enforcement

Subject 1.2 Privacy Right (II): Personal medical information (Health information) and the Protection of Privacy (professional ethics, genetic information)

Subject 1.3 Consumer's Protection Law

Module 2. The legal issues of Service organization related

Subject 2.1 Tax litigation case analyses

Subject 2.2 Case Studies on the Fair Trade Law

Subject 2.3 Legal aspect of International Businesses and Trade

Subject 2.4 Potential litigation risk of the transaction

Module 3. Knowledge-intensive service development and intellectual property related topics

Subject 3.1 Industrial development and intellectual property law

Subject 3.2 The content and limitations of Intellectual property rights to (I) Copyright

Subject 3.3 The content and limitations of Intellectual property rights to (II) Patent Engineering

Subject 3.4 The content and limitations of Intellectual property rights to (III) Trademark Law

Module 4. Information Technology Law from Service Aspect

Subject 4.1 Anglo-american Contract Law: Theory and Application

Subject 4.2 Information, Telecommunications Law Introduction

Subject 4.3 Computer & Software Law

Part III. Detailed description and referenced materials, in this part, the information of each subject in each module is elaborated in a detailed level, which an instructor can use it for determining the constituent modules and subjects for his/her course design, and sourcing teaching materials based on the this part. Moreover, the updated information can be added based on the initial contents allocated in this part.

DETAILED DESCRIPTION AND REFERENCED MATERIALS

Module 1. Personal level of service-related legal topics

Subject 1.1 Privacy Right (I): Technology development and privacy law enforcement

In recent years community expectations of the service have matured, requiring a

re-evaluation of the deliverables and outcome of policing. The operational environment evolving within the police service relies heavily on the expansion of IT, communications services and data. However, the adoption of more powerful and intrusive technology is giving rise to heightened privacy concerns. Personal data increasingly is available more widely throughout the service and to outside organizations. Information is often kept indefinitely. The scope of police intelligence is also becoming broader, with more categories of intimate data used in ways that a decade ago could not have been imagined.

Therefore, this subject will lead students to understand basically on privacy right within the technology development environment. This course also introduce the original, background, reason, and foundation why the right of privacy exists.

Read assigned and references.

Required:

1. Anne Wells Branscomb, Who owns information? From Privacy to Public Access, Basic Books, 1994.（陳月霞譯，《出賣資訊》，時報文化，1996 初版。）
2. David Rrin, The Transparent Society: Will Technology Force Us to Choose Between Privacy and Freedom? Addison-Wesley, 1998.（蕭美惠譯，《透明社會—個人隱私 v.s.資訊自由》，先覺出版社，1999 年 7 月初版。）
3. UK Information Commissioner Study Project: Privacy & Law Enforcement, 1&2. Technology Development and its Effect on Privacy and Law Enforcement, 2004.

Optional:

1. 詹文凱，《隱私權之研究》，國立臺灣大學法律學研究所博士論文，1998 年 7 月。
2. 林建中，《隱私權概念之再思考—關於概念範圍、定義及權利形成方法》，國立臺灣大學法律學研究所碩士論文，1999 年 1 月。

Subject 1.2 Privacy Right (II): Personal medical information (Health information) and the Protection of Privacy (professional ethics, genetic information)

Privacy is defined in terms of a person having control over the extent, timing, and circumstances of sharing oneself (physically, behaviorally, or intellectually) with others. Privacy refers to the right of individuals to limit access by others to aspects of their person that can include thoughts, identifying information, and even information contained in bodily tissues and fluids.

In 1993, the Council for International Organizations of Medical Sciences (CIOMS) and the World Health Organization (WHO) published the Ethical Guidelines for Biomedical Research Involving Human Subjects. These guidelines provide explicit provisions for respecting the privacy of research participants and maintaining the confidentiality of their personal information. This section includes relevant background text, definitions and examples, policy statements, a video debate, and expert commentary. It should be read by those looking for both a fundamental and thorough understanding of privacy and confidentiality issues. Therefore, this course will demonstrate Health and Genetic privacy issues in Taiwan and international aspect. The first part of confidentiality of medical information includes ethical rules, evidentiary privileges, tort liability for disclosure of patient information, etc. The second part of Genetic Privacy will discuss about the Property Rights in Body Parts and DNA, Genetic Testing and Discrimination and DNA Databases and Identification-related issues.

Read assigned and references.

Required:

1. Solove, Rotenberg, and Schwartz, Information Privacy Law (2nd edition), Aspen Publishers Online, 2006.
2. Samuel Warren & Louis Brandeis, The Right to Privacy, 4 HARV. L. REV. 193 (1890).
3. William Prosser, Privacy, 48 CAL. L. REV. 383 (1960).
4. Edward J. Bloustein, Privacy as an Aspect of Human Dignity: An Answer to Dean Prosser, 39 N.Y.U. L. REV. 962 (1964).

Optional:

1. 吳旻，《由醫療資訊隱私權之觀點論全民健保 IC 卡政策》，國立臺灣大學法律學研究所碩士論文，2001 年 7 月。
2. Daniel J. Solove, Conceptualizing Privacy, 90 CAL. L. REV. 1087 (2002).

3. Daniel J. Solove, A Taxonomy of Privacy, 154 U. PA. L. REV. 477 (2006).
4. NIH Fogarty International Center Web site for a link to the CIOMS International Ethical Guidelines at: http://www.cioms.ch/frame_guidelines_nov_2002.htm.

Subject 1.3 Consumer's Protection Law

Today's governments are gradually beginning to pay more emphasis on consumer protection instead of nurturing and protecting their domestic industries. It is hoped that improved consumer protection will foster healthy competition and the development of good relations between consumers and the industries that serve them. Since consumer protection is considered one of the basic duties of governments today as well as an important marker of a nation's progress, Taiwan also sought to keep up with this worldwide trend. In the area of consumer protection policy, the government has been ensuring consumer safety and fair trade through regulation and guidance of business operators, so that they provide full, accurate information to consumers. It has also engaged in various forms of consumer education activities, raised the level of consumer consciousness and self-awareness among the citizenry, striven to establish a reasonable consumer environment, provided guidance to consumer protection groups, respected the consumers' right to choose, and given consumers the right to engage autonomously, reasonably, and correctly in various kinds of consumer activity, according to the direction of their thoughts. Furthermore, when consumer disputes do arise, consumers can indeed quickly obtain appropriate redress or compensation without spending huge amounts of money. This course will bring some real case for students to do an advanced discussion.

Read assigned and references.

Required:

1. Enforcement Rules of Consumer Protection Law in Taiwan.

Optional:

1. 楊淑文，新型契約與消費者保護，元照出版社。
2. 詹森林，民事法理判決研究(三)－消費者保護法專論，元照出版社。
3. 范建得，消費者保護法基礎理論，漢興書局。
4. 馮震宇，消費者保護法解讀，元照出版社。

5. 財團法人消費者文教基金會，消費者保護法實務。

Module 2. The legal issues of Service organization related

Subject 2.1 Tax litigation case analyses

Since 2000, the new administrative litigation system implied, the tax litigation is still the highest among the largest amount of all cases. Many contentious cases came from emerging financial products, insurance or trust funds, such as warrants and investment-type policies. The tax laws of the traditional textbook or theory unable to coverage all issues of administrative litigation. However, tax and related financial legal issues are one of the most important topics by service business operated. So that this subject will invite experienced attorneys to offer as close as possible to the practice cases of the contentions' core - accounting and tax litigation to all students.

Read assigned and references.

Required:

1. 稅捐稽徵法及其施行細則

Optional:

1. 得否將海外受控企業之銷售列爲國內控制企業之銷售？參考案例：最高行 99,判,102
2. 公司資金貸與他人應否設算利息？ 參考案例：最高行 99,判,131 釋字 650
3. 專門技術得否提列爲成本費用？ 參考案例：最高行 99,判,358
4. 出售未上市公司股票之銷售價格顯較時價爲低得否逕爲調整？ 參考案例：最高行 98,判,921
5. 同時未申報銷貨退回及進貨退出得否予以漏稅罰？ 參考案例：最高行 98,判,1371
6. 分配股利前移轉股票於受控投資公司是否得加以調整處罰？ 參考案例：最高行 98,裁,2216;中高行 98,訴,110
7. 所得稅法第 4 條第一項第 16 款之所有權人應否限定爲名義上所有權人？ 參考案例：最高行 98,裁,2097;北高行 98,訴,164

Subject 2.2 Case Studies on the Fair Trade Law

This subject offers students to knowing international competition context of relatively new law fields. This seminar of Fair Trade Law will help students

understand what are the legal concerning of market economy system, competition, Law for business: such as the abuse of power, such as exclusive, oligopoly, joint behavior, business combination, boycott, discrimination, counterfeit, misuse of advertising, and the restriction of competition and how the countermeasures to be regulated.

Read assigned and references.

Required:

1. 公平交易法暨其修訂條文

Optional:

1. 「認識公平交易法」，行政院公平交易委員會出版，(2009 年 8 月增訂第 12 版)
2. Einer Elhauge & Damien Geradin, Global Competition Law and Economics, Hart Publishing, 2007.

Subject 2.3 Legal aspect of International Businesses and Trade

Navigating the maze of international business and trade is a challenging and exciting undertaking. However, it can also be a cumbersome and costly process if undertaken without the necessary academic and professional training. Therefore, knowledge of the dynamics of the systems and subsystems of the national and international business and trade environments should be included. Particularly understanding the legal aspect of the International Monetary System, the Foreign Exchange Market and the Capital Market will help students broader their vision of service industry. The case's analyses will focus on International Economic Environment, their relative power and influence, the processes of trade, transnational trends, political, social, economic, ideological and legal forces.

Read assigned and references.

Optional:

1. Optional reading August, Ray, International Business Law (International Edition), 4th Edition, Prentice Hall, 2003
2. Recommended reading Bixby, Michael, Caryn Beck-Dudley & Patrick Cihon, The Legal Environment of Business, Prentice Hall, 2001 Hanlon, James,

European Community Law, 3rd Edition, Thomson/Sweet & Maxwell, 2003
3. Holland, James A., & Julian S. Webb, Learning Legal Rules, 5th Edition, Oxford University Press, 2003
4. Keenan, Denis, Smith and Keenan's Law for Business, 12th Edition, Pearson, Clarkson, Christopher, Hill, Jonathan, Jaffey on the Conflict of Laws, 2nd Edition, Butterworths 2002

Subject 2.4 Potential litigation risk of the transaction

This week we continue with the subject of the business transaction from the litigation risk aspect. The structure of the topic reflects the consecutive stages of an international commercial dispute. This subject focus on cases of international litigation introduction particularly emphasized that legal strategic practice when business had occurred. Students also are taken the concept of the applicable law in commercial disputes and choice of law in the contract.

Read assigned and references.
Optional:

1. Andrew T. Guzman and Alan O. Sykes, eds., Research Handbook in International Economic Law (Edward Elgar, 2008).
2. Braithwaite, John, and Peter Drahos, Global Business Regulation (New York: Cambridge University Press, 2000).
3. Goldsmith and Posner, The Limits of International Law, Chapter 5.
4. Richard H. Steinberg, "In the Shadow of Law or Power? Consensus-Based Bargaining and Outcomes in the GATT/WTO," International Organization, Vol. 56 (2002), pp. 339-374.
5. Gregory Shaffer, "Power, Global Governance and the WTO" (in Barnett & Duvall, eds., Power and Global Governance, Cambridge University Press).
6. Jeffrey L. Dunoff, The Death of the Trade Regime, 10 EUR. J. INT'L L. 733 (1999).
7. Kelly, Claire (2006). "Power, Linkage and Accommodation: The WTO As An International Actor And Its Influence On Other Actors And Regimes," Berkeley Journal of International Law, Vol. 24, pp. 79-128.
8. Thomas Bernauer and Thomas Sattler, "Dispute-Escalation at the WTO: Are

Conflicts over Environment, Health and Safety Regulation Riskier?" Center for Comparative and International Studies Working Paper, Zurich, No. 21.

9. Daniel W. Drezner, All Politics is Global: Explaining International Regulatory Regimes (Princeton: Princeton University Press, 2007).

Module 3. Knowledge-intensive service development and intellectual property related topics

Subject 3.1 Industrial development and intellectual property law

The course examines intellectual property (IP) law and policy in the international arena by addressing the core international agreements governing intellectual property, such as the Paris Convention, and the Berne Convention; and the TRIPS Agreement (Trade-Related Aspects of Intellectual Property Rights). We will focus on the legal and economic implications of the international intellectual property standards in the light of prior Conventions, with particular regard to such topics as copyrights, patents, trademark, and trade secrets. There is no pre-requisite for this course. Background in intellectual property laws is not necessary, although it may occasionally help you understand the subject.

Read assigned and references.

Required:

1. Paul Goldstein, International Intellectual Property Law: Cases and Materials (2nd Edition), Foundation Pr, 2008.

Optional:

1. 馮震宇，國際智慧財產公約及國際發展趨勢，經濟部智慧財產局，九十五年。
2. Abbott, Frederick et al., International Intellectual Property system in an Integrated World Economy, 2007.
3. Graeme B. Dinwoodie et al., International Intellectual Property Law and Policy, 2004.
4. Peter Drahos and John Braithwaite, Information Feudalism: who owns the knowledge economy, New York: New Press., 2002.
5. Peter Drahos and Ruth Mayne, eds, Global Intellectual Property Rights: Knowledge, Access and Development, Palgrave, Macmillan, 2002.

Subject 3.2 The content and limitations of Intellectual property rights to (I) Copyright

The subject make students understand some incidents involving copyright from real society aspect and to be analyzed in terms of copyright law. We attempt to promote student's understanding and establish the concept of copyright protection, to avoid infringement of the rights of others, and to prevent violations of right.

Read assigned and references.

Required:

1. 著作權法中英文對照, 民國 99 年 02 月 10 日修正。

Optional:

2. 馮震宇，國際智慧財產公約及國際發展趨勢，經濟部智慧財產局，2006 年。
3. Abbott, Frederick et al., International Intellectual Property system in an Integrated World Economy, 2007.
4. 章忠信，著作權法的第一堂課，書泉出版社，2007 年。
5. 蕭雄淋，著作權法論七版，五南圖書出版有限公司，2010 年。

Subject 3.3 The content and limitations of Intellectual property rights to (II) Patent Engineering

In the current age of information, innovation has become the key to economic growth. In budding and rapidly growing industries, intellectual property (IP) can be the difference between survival and failure.

The course broadly covers patents as a business tool and the use of intellectual capital for competitive advantage. It provides students with the knowledge necessary to understand intellectual property from the engineering and business perspectives, and it discusses how to protect and commercialize intellectual assets. This subject will introduce several patent litigation case studies from engineering, legal, and business perspectives. Technical analysis of these cases will be carried out to develop skills to quickly ascertain the protected technical content of patents, and to recognize what intellectual property can and should be protected. Inventors and entrepreneurs have four concerns related to patents: protecting their inventions in the very early stages of product development; determining the patentability of their invention; avoiding infringement of a competitor's patent; and leveraging their patent as a business asset.

This subject will address each of these concerns through the application and analysis of engineering and business cases to an invention of the student's choice.

Read assigned and references.

Required:

1. 專利法，民國民國 100 年 11 月 29 日修正。
2. United States Code Title 35 - Patents

Optional:

1. Janice M. Mueller, An Introduction to Patent Law, 2nd Edition, Aspen Publishers 2006.
2. Roger E. Schechter, John R. Thomas, Principles of Patent Law, 2nd Edition, Thomson/West 2004.
3. 劉國讚，專利實務論，元照出版公司，2009 年 4 月。
4. 黃文儀，專利實務(第四版)，三民書局經銷，2004 年 8 月。
5. 劉尚志，王敏銓，張宇樞，林明儀，Patent Wars 美台專利訴訟，元照出版公司，2005 年 4 月。

Subject 3.4 The content and limitations of Intellectual property rights to (III) Trademark Law

This subject focuses on the international system regulating the protection of trademark rights. Which will introduce students to the principal international conventions in the field of trademarks and some bilateral treaties. It will briefly consider comparative trademark law in terms of the differences in the registration process and problems in priority of rights and pay particular attention to trademark law in the Taiwan and efforts toward harmonization.

Read assigned and references.

Required:

1. 商標法逐條釋義
2. 1000531 商標法修正草案條文對照表三讀通過版

Optional:

1. 曾陳明汝著，蔡明誠續著，商標法原理，台北：作者發行，2007 年 4 月修訂三版。

2. 商標相關法規，參考 http://www.tipo.gov.tw/trademark/trademark_law/trademark_law.asp.
3. 蔡明誠主編，智慧權法典，台北市:新學林，2007 年 9 月四版。

Module 4. Information Technology Law from Service Aspect

Subject 4.1 Anglo-american Contract Law: Theory and Application

The economic development of Taiwan and social prosperity is built in ICT electronics manufacturing and global sales. However, the trade interface among Taiwan and other countries is contract that based on Anglo-American contract law. According to normal international trading conditions, people who tend to promote the profits of business, the basic principles of common law and its effective use should have been known. This subject is based on case studies to explore the basis of the Anglo-American contract law, philosophy, and examples of high-tech enterprise, sale, supply and procurement contracts.

Read assigned and references.
Optional:

1. E. Allan Farnsworth, Contracts, Fourth Edition, Aspen 2004
2. G.H. Treitel, Q.C., The Law of Contract, Seventh Edition, Stevens and Sons, 1987
3. LexisNexis Butterworths, The Law of Contract, Third Edition, 2007
4. P.S. Atiyah, An Introduction to The Law of Contract, Fourth Edition, Clarendon Press, 1989
5. Principles of European Contract Law, Kluwer Law International, 2000.

Subject 4.2 Information, Telecommunications Law Introduction

The Telecommunications Act regulates two types of telecommunications companies in Taiwan, Type I operators and Type II operators. Type I operators, such as Chunghwa Telecom, are enterprises that have established their own switching and transmission facilities to provide telecommunications services. These facilities-based services are similar to common carrier services or basic services in the United States. Type II operators, such as Hoshin GigaMedia and KBT, comprise all telecommunications operators other than Type I operators, including companies which generate fees from providing Internet access, online information, electronic

mail and electronic commerce services. Regulation telecommunications affect the structure of information service operation buildup. In addition to introduce telecommunication law in Taiwan, cases of cyber law, information and media competitive legal issues also included in this subject.

Read assigned and references.
Required:
中華民國電信法
Optional:
This subject except student contributed to the advancement of ideas as a course proceeds. Additional readings in articles and cases will be assigned to supplement the regulations. The supplementary readings will be easily located on line.

Subject 4.3 Computer & Software Law

As software technology increasingly serves virtually every facet of industrial, commercial, and personal activity, this area of the law has attracted the attention of practitioners, legislators, marketers of software, and users of computers and computer software. A recent report by the Department of Commerce Information Infrastructure Task Force, Intellectual Property and the National Information Infrastructure, recommending changes in the Copyright Act, noted the pressure of software technology on the existing statutory framework. In this subject, definition of Software in legal context will be given at start of course. According to the current context environment, the following topic included: comparative importance of Taiwan and US, Current Available Protecting Legal Regimes, Extent of legal protection, and Principles of Trade secret Law, Disclosure: Data General Corp. v. Digital Computer Controls et al.

Read assigned and references.
Required:
Lemley, Menell, Merges, & Samuelson, Software and Internet Law ("SAIL") (3d ed. 2006)
Optional:
This subject except student contributed to the advancement of ideas as a course proceeds. Additional readings in articles and cases will be assigned to supplement the

regulations. The supplementary readings will be easily located on line.

Appendix B.2. Information and Service Economy

Overview

This course is to create an opportunity for reflection and debate on topics of information and services, thus providing stimuli and ideas for the increasing challenges of a continually changing worldwide economic scenario. The present initiative is therefore dedicated to the analysis of the effects of important changes, which are now taking place in the world economy: the globalization of markets, the continuous evolution in the field of information, technology and communications and the convergence of economics and international relations.

Therefore, we intend to take this course to establish a strong foundation in understanding the economics of information goods and services. We hope to generate a new, interdisciplinary field that combines information, service science, economy and organization knowledge to succeed in the shift to the service and information-based economy. Students would analyze strategic issues faced by for-profit and not-for-profit organizations, such as pricing, bundling, versioning, product differentiation and variety, network externalities, and rights management.

Part I. Course brief, in consists of course introduction, learning objectives, and overview of current adoptions

LEARNING OBJECTIVES

The students' learning objectives are to

4. Understand the paradigms of economic change
5. Know how to make the co-evolution of technology & institutions from niches to riches perspective, especially in service value networks, not in firms' viewpoint.
6. Know how can we add the value in the original product or create innovative services among the rise of service economy

Part II. Course modules and constituent subjects, it presents the structure of the course containing modules of knowledge components. In each module, several subjects can be organized to beef up the contents. In this part, we expect to give instructors an outline of the course first. The detailed description will be seen in Part III.

OVERVIEW OF CURRENT ADOPTIONS

Country	Instructor	Institution	Course Title (Date)	Description
US	Robert Glushko AnnaLee Saxenian	UC Berkeley of Information	The Information and Service Economy (Fall 2007)	An introduction to "service science" - a new, interdisciplinary field that combines social science, business, and engineering knowledge needed for organizations (private, public, or nonprofit) to succeed in the shift to the service and information-based economy.
US	John Chuang	UC Berkeley of Information	Information Technology Economics, Strategy, and Policy (Fall 2011)	Application of economic principles, from microeconomics, game theory, industrial organization, information economics, and behavioral economics, to analyze business strategies and public policy issues surrounding information technologies and IT industries. Topics include: economics of information goods, economics of search, economics of networks, economics of peer production, economics of security and privacy.
US	Michael L. Nelson	Dept. Computer Science, College of Science, Old Dominion University	Economics of Information (Fall 2011)	This seminar will cover high-level, strategic topics such as: information economy, standards, pricing & versioning, lock-in, feedback networks, switching costs, and tipping points.
US	Mark McCabe	School of Information, University of Michigan	Information Economics (Winter 2009)	This course provides a strong grounding in the economics of information goods and services.

COURSE MODULES AND CONSTITUENT SUBJECTS

Module 1: Overview of Information and Service Economy

Subject 1.1 Economics of information goods, services, and platforms

Subject 1.2The Emergence of the Information and Service Economy

Module 2: Strategy of Information Service

Subject 2.1 Differential pricing, pricing at zero, price conditioning

Subject 2.2 Versioning and bundling information for strategic

Subject 2.3 Switching costs and lock-in

Subject 2.4 Peer production, crowdsourcing, human computation: incentives, coordination

Module 3: Industry Structure Changing: Network Economy

Subject 3.1 Networks and Positive Feedback

Subject 3.2 Loci of Competition for Future Internet

Subject 3.3 Vertical Control, Network Neutrality

Subject 3.4 Network Formation and Network Structure

Module 4: Intellectual property, competition and information technology

Subject 4.1 Waging a Standards War

Subject 4.2 Power law, long tail, search and recommendation

Subject 4.3 Patents, trade secrets, and copy right

Subject 4.4 Information Policy

Part III. Detailed description and referenced materials, in this part, the information of each subject in each module is elaborated in a detailed level, which an instructor can use it for determining the constituent modules and subjects for his/her course design, and sourcing teaching materials based on the this part. Moreover, the updated information can be added based on the initial contents allocated in this part.

DETAILED DESCRIPTION AND REFERENCED MATERIALS

Module1: Overview of Information and Service Economy

Subject 1.1 Economics of information goods, services, and platforms

A prominent Silicon Valley venture capitalist described the dramatic run-up in technology stocks as the "greatest legal creation of wealth in human history." As subsequent events showed, not all of it was legal and not all of it was wealth.

But the fact that only a few companies succeeded in capitalizing on the Internet boom does not mean that there was no social value in the investment that took place during 1999–2001. Indeed, quite the opposite is true. Something quite different from the usual interpretation, namely that competition worked very well during this period, so that much of the social gain from Internet technology ended up being passed along to consumers, leaving little surplus in the hands of investors. Clearly the world changed dramatically in just a few short years. Email has become the communication tool of choice for many organizations. The World Wide Web, once just a scientific curiosum, has now become an indispensable tool for information workers. Instant messaging has changed the way our children communicate and is beginning to affect business communication. Many macroeconomists attribute the increase in productivity growth in the late 1990s to the investment in IT during the first half of that decade. So we will cut the phenomenon with the new economy perspective, which rely on the base of information service.

Read assigned and references.

Required:

- Miller, E.Golden Footballs and the Economics of Groupon, May 2009.
- McAfee, P.,Introduction to Economic Analysis. Section 4.1.8 on "Economies of Scale and Scope". [The electronic version of this book is free. It serves as a good microeconomics reference at the introductory/intermediate level.]
- Shapiro, C. and Varian, H. Network Effects, Notes to accompany *Information Rules: A Strategic Guide to the Network Economy*, Harvard Business School Press, 1998.
- Briscoe, B., Odlyzko, A., and Tilly, B. Metcalfe's Law is Wrong. *IEEE Spectrum*, July 2006, pp. 26-31.

Optional:

- Luenberger, D., Markets, Chapter 7 of *Information Science*, Princeton University Press, 2006. [Intro/refresher of basic microeconomics concepts]
- John Perry Barlow, The Economy of Ideas, *Wired* 2.03, 1994. [Visionary of his time.]
- Sundararajan, A. Network Effects, part of the Industrial Organization of Information Technology Industries web site.

- Varian, H., Section 6 "Switching costs and lock-in" inEconomics of Information Technology. Mattioli Lecture at Bocconi University, Milan, Italy, 2001.

Subject 1.2 The Emergence of the Information and Service Economy

The economic rules that governed the industrial age will continue to apply to the technological age. Information is anything that can be digitized. Baseball scores, books, databases, magazines, movies, music, stock quotes, and web pages are all examples of information goods. Production of information good involves high fixed costs but low marginal costs meaning that the cost of producing the first copy of an information good may be very high, but the cost of producing additional copies is negligible. The paradigms of economic changed as the evolution perspective of Schumpeterian model, such as entrepreneurship drives change, innovation in search of monopoly rents and continuous gale of creative destruction.

Read assigned and references.
Required:

- Carl Shapiro and Hal R. Varian, 1998a. Information Rules. Harvard Business School Press, Cambridge, MA; http://www.inforules.com, ch. 1
- Hirshleifer, J. and J. Riley (1992). The Analytics of Uncertainty and Information, Cambridge Univ. Press. Sections 1.0 – 1.4.1 (pp. 7-19), 1.5 (pp. 23-33), 5.0-5.2.2 (pp.167-187), 5.2.4-5.2.5 (pp. 200-208) (CT) http://www.worldcat.org/oclc/239767255

Optional:

- DeLong, J. B. and Froomkin, A. M. (2000). "Speculative Microeconomics for Tomorrow's Economy". First Monday, Vol 5 No. 2, February 2000 (online/CT).
- Hirshleifer and Riley, op. cit. Sections 1.6 (pp. 33-39), 5.2.3 (pp. 187-200), 5.3.0-5.3.2 (pp. 209-222) (CT). http://www.worldcat.org/oclc/174454774

Module2: Strategy of Information Service

Subject 2.1 Differential pricing, pricing at zero, price conditioning

Price discrimination is important in high-tech industries for two reasons: first the high-fixed-cost, low-marginal-cost technologies commonly observed in these industries often lead to significant market power, with the usual inefficiencies. In particular, price will often exceed marginal cost, meaning that the profit benefits to price discrimination will be very apparent to the participants. In addition, information technology allows for fine-grained observation and analysis of consumer behavior. This permits various kinds of marketing strategies that were previously extremely difficult to carry out, at least on a large scale. For example, a seller can offer prices and goods that are differentiated by individual behavior and/or characteristics. This section will review some of the economic effects that arise from the ability to use more effective price discrimination.

Read assigned and references.

Required:

- Carl Shapiro and Hal R. Varian, 1998a. Information Rules. Harvard Business School Press, Cambridge, MA; http://www.inforules.com, ch. 2
- Varian, H., Section 5 "Differentiation of products and prices" in Economics of Information Technology. Mattioli Lecture at Bocconi University, Milan, Italy, 2001.
- Nagle, T. (1984). Economic Foundations for Pricing. *Journal of Business*, 57 (pt. 1 of 2), s3-s26. (JSTOR) (CT) http://www.worldcat.org/oclc/10356279
- Sahay, A. (2007), "How to Reap Higher Profits with Dynamic Pricing", *Sloan*
- *Management Review*, 48(4/Summer): 53-60. (CT)

Optional:

- Shiller and Waldfogel, Music for a Song: An Empirical Look at Uniform Song Pricing and its Alternatives, Forthcoming, *Journal of Industrial Economics*.
- Bonn, Maria S., Wendy P. Lougee, Jeffrey K. MacKie-Mason and Juan F. Riveros (2008), "The PEAK Project: A Field Experiment in Pricing and Usage of a Digital Collection," in MacKie-Mason, J. and W. Lougee, eds. Economics and Usage of Digital Collections. University of Michigan, Scholarly Publishing Office. (CT)
- Lancaster, K. (1966). A New Approach to Consumer Theory. Journal of Political Economy, 74(2), 132-157. (CT) (JSTOR)
- Brooks, Christopher H., Robert S. Gazzale, Rajarshi Das, Jeffrey O. Kephart, Jeffrey K. MacKie-Mason, and Edmund H. Durfee (2002). "Model Selection in an Information Economy: Choosing What to Learn," Computational

Intelligence, vol. 18, no. 4 (Nov.): 566-582. (CT)

Subject 2.2 Versioning and bundling information for strategic

How should an information provider in competition with others configure the information goods or services she offers? Digital information is relatively easy to unbundle and re-bundle. If providers have imperfect information about what information consumers want, what strategies can they follow to learn about customer preferences?

Read assigned and references.

Required:

- Carl Shapiro and Hal R. Varian, 1998a. Information Rules. Harvard Business School Press, Cambridge, MA; http://www.inforules.com, ch. 3 pp. 73-78
- Bakos, Y., & Brynjolfsson, E. (1999). "Bundling Information Goods: Pricing, Profits, and Efficiency," Management Science, 45(12): 1613-1630. (CT)
- Shapiro, C. and Varian, H., Versioning: The Smart Way to Sell Information, *Harvard Busines Review*, 1998.
- Bakos and Brynjolfsson, Aggregation and Disaggregation of Information Goods: Implications for Bundling, Site Licensing and Micropayment Systems, in Varian and Kahin, Eds. *Internet Publishing and Beyond: The Economics of Digital Information and Intellectual Property*, MIT Press, 2000.

Optional:

- Brooks, Christopher H., Robert S. Gazzale, Jeffrey K. MacKie-Mason, and Edmund H. Durfee (2004). "Improving Learning Performance by Applying Economic Knowledge", Lecture Notes in Computer Science, vol. 3048 (Springer-Verlag). (CT)
- Shapiro, C. and Varian, H. Versioning, Notes to accompany *Information Rules: A Strategic Guide to the Network Economy*, Harvard Business School Press, 1998.
- Chuang, J. and Sirbu, M., Optimal Bundling Strategy for Digital Information Goods: Network Delivery of Articles and Subscriptions.*Information Economics and Policy* 11(2):147-176, 1999.

Subject 2.3 Switching costs and lock-in

Changing software environments at the organizational level is also very costly. One study found that the total cost of installing an Enterprise Resource Planning

(ERP) system such as SAP was eleven times greater than the purchase price of the software due to the cost of infrastructure upgrades, consultants, retraining programs, and the like. These switching costs are endemic in high-technology industries and can be so large that switching suppliers is virtually unthinkable, a situation known as "lock-in."Switching costs and lock-in has been extensively studied in theeconomics literature. How should an information provider in competition with others configure the information goods or services she offers? Digital information is relatively easy to unbundle and re-bundle. If providers have imperfect information about what information consumers want, what strategies can they follow to learn about customer preferences?

Read assigned and references.

Required:

- Carl Shapiro and Hal R. Varian, 1998a. Information Rules. Harvard Business School Press, Cambridge, MA; http://www.inforules.com, ch. 5, 6
- Anderson, C., Economics of free: Free! Why $0.00 Is the Future of Business. *Wired* 02.25.08.
- Gladwell, M., Priced to Sell: Is Free the Future?, *The New Yorker*, July 6, 2009.
- Loveman, G., Diamonds in the Data Mine, *Harvard Business Review*, 2003.
- Acquisti, A., Varian, H., Conditioning Prices on Purchase History, *Marketing Science* 24:3, 367-381, 2005.

Optional:

- Smith, M. D. and Telang, R., Competing with Free: The Impact of Movie Broadcasts on DVD Sales and Internet Piracy (April 2008).

Subject 2.4 Peer production, crowdsourcing, human computation: incentives, coordination

Peer production (also known by the term mass collaboration or commons-based peer production) is an ancient way of producing goods and services that relies on self-organizing communities of individuals who come together to produce a shared outcome. In these communities, the efforts of a large number of people are coordinated to create meaningful projects. Notable modern examples are Wikipedia, an online encyclopedia, and Linux, a computer operating system. Peer production refers to the production process on which the previous examples are based.

What drive community members adopted their power for sharing intelligence? How to cooperate? And can we see the limitation of this human computation?

Read assigned and references.

Required:

- Wilkinson, D., Strong Regularities in Online Peer Production, Proceedings of ACM Conference on E-Commerce, July 2008.
- Additional readings TBD

Optional:

- Axelrod, R. and Hamilton, W., The Evolution of Cooperation, *Science*, 211(4489):1390-6, 1981. http://en.wikipedia.org/wiki/The_Evolution_of_Cooperation
- Nowak and Sigmund, Evolution of indirect reciprocity by image scoring, *Nature* 393, 573 - 577 (11 June 1998) http://www.nature.com/doifinder/10.1038/31225 http://www.ped.fas.harvard.edu/people/faculty/publications_nowak/Nature98.pdf
- Resnick, Paul, Zeckhauser, Richard, Friedman, Eric, and Kuwabara, Ko. Reputation Systems. *Communications of the ACM*, 43(12), December 20000, pages 45-48.
- Chrysanthos Dellarocas, The Digitization of Word of Mouth: Promise and Challenges of Online Feedback Mechanisms, *Management Science*, 2003.
- Cohen, B. Incentives build Robustness in BitTorrent. Workshop on Economics of Peer-to-Peer Systems (P2PEcon), Berkeley CA, 2003.
- M. Feldman, K. Lai, I. Stoica, and J. Chuang, Robust Incentive Techniques for Peer-to-Peer Networks. Proceedings of 5th ACM Conference on Electronic Commerce (EC'04), New York NY, May 2004.
- M. Feldman, C. Papadimitriou, J. Chuang, and I. Stoica, Free-Riding and Whitewashing in Peer-to-Peer Systems. *IEEE Journal on Selected Areas in Communications*, Vol. 24, No. 5, May 2006.
- M. Babaioff, J. Chuang, M. Feldman. Incentives in Peer-to-Peer Systems, Chapter 23 of N. Nisan, T. Roughgarden, E. Tardos, V. Vazirani, eds.,Algorithmic Game Theory, Cambridge University Press, 2007.
- Galen Pickard, Iyad Rahwan, Wei Pan, Manuel Cebrian, Riley Crane, Anmol Madan, Alex Pentland, Time Critical Social Mobilization: The DARPA Network Challenge Winning Strategy, 2010.
- Tang et al., Reflecting on the DARPA Red Balloon

Challenge, *Communications of the ACM*,, 2011.

- Wolfers, Justin and Eric Zitzewitz. "prediction markets." *The New Palgrave Dictionary of Economics*. Second Edition. Eds. Steven N. Durlauf and Lawrence E. Blume. Palgrave Macmillan, 2008.

Module3: Industry Structure Changing: Network Economy

Subject 3.1 Networks and Positive Feedback

What are the implications for competition, efficiency and new product innovation when information goods or services are characterized by network externalities?

Read assigned and references.

Required:

- Carl Shapiro and Hal R. Varian, 1998a. Information Rules. Harvard Business School Press, Cambridge, MA; http://www.inforules.com, ch. 7
- Katz, M. L. and Shapiro, C. (1994). "Systems Competition and Network Effects". Journal of Economic Perspectives. 8(2): 93-115. (CT) (JSTOR)
- Liebowitz, S. J. and Margolis, S. E. (1994). Network Externality: An Uncommon Tragedy. Journal of Economic Perspectives. 8(2): 133-150. (CT) (JSTOR)

Optional:

- Rochet, Jean-Charles and Jean Tirole (2005). "Two-Sided Markets: A Progress Report", IDEI Working Paper, 29 November. (CT)
- Eisenmann, T., G. Parker and M. Van Alstyne (2006). “Strategies for Two-Sided Markets”. Harvard Business Review, October. (CT)
- Gilbert, R. J. and M L. Katz (2001). “An Economist’s Guide to U.S. v. Microsoft”, The Journal of Economic Perspectives, Vol. 15, No. 2. (Spring), pp. 25-44. (CT)
- Jeffrey Mackie-Mason (JMM), Case Notes.

Subject 3.2 Loci of Competition for Future Internet

Designing for competition is an important consideration for the design of future Internet architectures. Network architects should systematically consider the loci of competition in any proposed network architecture. To be economically sustainable, network architectures should encourage competition within each locus, anticipate and

manage the interactions between the loci, and be adaptable to evolution in the loci. This subject base on the long-term perspective, network architectures relative to network technologies and applications, it is important to ensure students knowing that competition is not unnecessarily foreclosed at any particular locus of competition.

Read assigned and references.
Required:

- Chuang, J. Loci of Competition for Future Internet Architectures, *IEEE Communications Magazine*, July 2011.
- McAfee, P., Introduction to Economic Analysis. Section 7.7.4 on "Mergers".
- U.S. Department of Justice and the Federal Trade Commission, Horizontal Merger Guidelines, issued August 19, 2010.

Optional:

- Clark, D., A simple cost model for broadband access: What will video cost? Telecommunications Policy Research Conference (TPRC), September 2008.
- Tirole, J. *The Theory of Industrial Organization*. Cambridge, MA: MIT Press, 1988, Chapter 4 "Vertical Control", pp. 133-152. ISBN: 9780262200714.

Subject 3.3 Vertical Control, Network Neutrality

A fundamental issue in the network neutrality debate is the extent to which network operators should be allowed to discriminate among Internet packet streams to selectively block, adjust quality of service, or adjust prices. However, a high level of vertical integration by upstream firms into the associated retail market may facilitate collusion in the upstream market by making it easier to monitor price. Retail prices are generally more visible than prices in upstream markets, and vertical mergers may increase the level of vertical integration to the point at which the monitoring effect becomes significant. This subject tends to discuss the relationship between market vertical control under the assumption of network neutrality in the internet service providing.

Read assigned and references.
Required:

- U.S. Department of Justice, Non-Horizontal Merger Guidelines, June 14, 1984.

- Peha, J., The Benefits and Risks of Mandating Network Neutrality, and the Quest for a Balanced Policy. Telecommunications Policy Research Conference (TPRC) 2006.
- Peter Eckersley, Fred von Lohmann and Seth Schoen, Packet Forgery By ISPs: A Report on the Comcast Affair, Electronic Frontier Foundation Whitepaper, Nov 2007.

Optional:

- A. Odlyzko. Network Neutrality, Search Neutrality, and the Never-ending Conflict between Efficiency and Fairness in Markets, *Review of Network Economics*, March 2009.
- A. Odlyzko. The delusions of net neutrality, Telecommunications Policy Research Conference, Sep 2008.
- Tim Wu, Network Neutrality, Broadband Discrimination*, Journal of Telecommunications and High Technology Law, Vol. 2, p. 141,* 2003.
- Papers from the Telecommunications Policy Research Conference (TPRC).

Subject 3.4 Network Formation and Network Structure

This subject introduces and overview models of the formation of networks is given, with a focus on two types of model. The first views networks as arising stochastically, and uses random graph theory, while the second views the links in a network as social or economic relationships chosen by the involved parties, and uses game theoretic reasoning.

Required:

- Jackson, Matthew O. "network formation." *The New Palgrave Dictionary of Economics*. Second Edition. Eds. Steven N. Durlauf and Lawrence E. Blume. Palgrave Macmillan, 2008.

Optional:

- Easley, D. and Kleinberg, J. Networks, Crowds, and Markets. Reasoning about a Highly Connected World. Cambridge University Press, 2010. Chapter 1, "Graphs".
- Easley, D. and Kleinberg, J. Networks, Crowds, and Markets. Reasoning about a Highly Connected World. Cambridge University Press, 2010. Chapter 13, "The Structure of the Web".
- Easley, D. and Kleinberg, J. Networks, Crowds, and Markets. Reasoning about a Highly Connected World. Cambridge University Press, 2010. Chapter

20, "The Small World Phenomenon".

- Fabrikant, Luthra, Maneva, Papadimitriou, Shenker, On a Network Creation Game, ACM Symposium on Principles of Distributed Computing, 2003
- Byung-Gon Chun, Rodrigo Fonseca, Ion Stoica and John Kubiatowicz, Characterizing Selfishly Constructed Overlay Routing Networks, IEEE INFOCOM'2004, March, 2004.

Module4: Intellectual property, competition and information technology

Subject 4.1 Waging a Standards War

If the value of a network depends on its size, then interconnection and/or standardization becomes an important strategic decision. Generally, dominant firmswith established networks or proprietary standards prefer not to interconnect. In the 1890s the Bell System refused to allow access to its new long-distance service to any competing carriers. With respect to standards wars, Besen and Farrell (1994) identify common tactics such as (1) penetration pricing to build an early lead, (2) building alliances with suppliers of complementary products, (3) expectations management such as bragging about market share or product pre-announcements, and (4) commitment to low prices in the future. Standards are a key policy variable. Under a proprietary standard, an industry may be dominated by a single firm. With an open standard, many firms can interconnect.

Read assigned and references.

Required:

- Carl Shapiro and Hal R. Varian, 1998a. Information Rules. Harvard Business School Press, Cambridge, MA; http://www.inforules.com, ch. 9
- Stanley Besen and Joseph Farrell, 1994. Choosing howto compete: Strategies and tactics in standardization. Journal of Economic Perspectives, 8 (2): 117–131
- David Dranove and Neil Gandal, 2000. The DVD vs. DIVX standard war: Empirical evidence of vaporware. Technical Report CPC00–16, University of California at Berkeley

Optional:

- Phred Dvorak, Nick Wingfield, and Sarah McBride, 2004. Technology titans battle over format of DVD successor. Wall Street Journal, 15March

- Nicholas Economides and Charles Himmelberg, 1995. Critical mass and network size with application to the US fax market. Technical report, Stern School of Business, New York University; http://raven.stern.nyu.edu/networks/papers.html

Subject 4.2 Power law, long tail, search and recommendation

What is a "long tail", and are they more important now for information goods? Why or why not? If the conditions for long tail demand apply to your information goods, what are the implications for competitive strategy: how you should price, bundle, market your products?

Read assigned and references.

Required:

- Carl Shapiro and Hal R. Varian, 1998a. Information Rules. Harvard Business School Press, Cambridge, MA; http://www.inforules.com, ch. 1,2,8
- Anderson, C., The Long Tail, *Wired* 12.10, Oct 2004.
- Brynjolfsson, E., Hu, Y. J., Smith, M. D., From Niches to Riches: The Anatomy of the Long Tail. *Sloan Management Review*, 47(4) 67-71, 2006.
- M. Cha, H. Kwak, P. Rodriguez, Y.-Y. Ahn, and S. Moon. I Tube, You Tube, Everybody Tubes: Analyzing the World's Largest User Generated Content Video System. Proceedings of ACM Internet Measurement Conference, 2007.

Optional:

- Easley, D. and Kleinberg, J. Networks, Crowds, and Markets. Reasoning about a Highly Connected World. Cambridge University Press, 2010. Chapter 18, "Power Laws and Rich-Get-Richer Phenomena".
- Adamic, L., Zipf, Power-laws, and Pareto - a ranking tutorial, 2000.
- Gabaix, Xavier. "power laws." *The New Palgrave Dictionary of Economics*. Second Edition. Eds. Steven N. Durlauf and Lawrence E. Blume. Palgrave Macmillan, 2008.
- Mitzenmacher, M., A brief history of generative models for power law and lognormal distributions, *Internet Mathematics*, 1:226-251, 2003.
- Brynjolfsson, E., Hu, Y. J., Simester, D., Goodbye Pareto Principle, Hello Long Tail: The Effect of Search Costs on the Concentration of Product Sales , MIT Center for Digital Business Working Paper, (December 2006).
- Brynjolfsson, E., Hu, Y. J., Smith, M. D., Consumer Surplus in the Digital Economy: Estimating the Value of Increased Product Variety at Online

Booksellers, *Management Science*, 2003.

Subject 4.3 Patents, trade secrets, and copy right

The main idea of this subject is to bring forth the point that the same copyright laws can be applied to digital content, the main difference lies in the way we look at it and the way we try to fit in the already existing laws to the digital content. First, we give some examples to illustrate how profoundly intellectual property rights influence competitive strategy in the information technology sector. Second, copyrights can interact with network effects/interfaces and turn what might initially have been rather "arbitrary" choices (with many alternatives) into "essential" choices (with no good alternatives) once users standardize on a product or interface. As these examples illustrate, the scope of copyright protection can have very significant implications for competition and innovation.

Read assigned and references.

Required:

- Carl Shapiro and Hal R. Varian, 1998a. Information Rules. Harvard Business School Press, Cambridge, MA; http://www.inforules.com, ch. 4
- Varian, Hal R. 2004. The Economics of Information Technology: [electronic resource]. An Introduction. Leiden : Cambridge University Press. Part II, pp. 49-72.

Optional:

- Carl Shapiro, 2000. Competition policy in the information economy. In Einar Hope, ed., Foundations of Competition Policy Analysis, vol. XXV. Routledge, New York
- 2001a.Cross licenses, patent pools,andstandard-setting. InAdamJaffe, Joshua Lerner, and Scott Stern, eds., Innovation Policy and the Economy, vol. II. MIT Press, Cambridge,MA
- 2001b. Navigating the patent thicket. In Adam Jaffe, Joshua Lerner, and Scott Stern, eds., Innovation Policy and the Economy, National Bureau of Economics,Washington, DC; http://faculty.haas.berkeley.edu/shapiro
- 2004. Patent system reform: economic analysis and critique. Berkeley Technology Law Journal, forthcoming; http://faculty.haas. berkeley.edu/Shapiro
- Pamela Samuelson and Suzanne Scotchmer, 2002. The law and economics of

reverse engineering. Yale Law Journal, 111: 1575–1663

Subject 4.4 Information Policy

This subject tends to make students understand the government's information policy and how it relates to the strategies we have discussed in the previous subjects. Previously, we were mainly concerned about information strategies in private, for-profit companies. Now the outlook is slightly different, instead of looking at strategies to increase profitability, we look at strategies to increase the net social benefits.

Readings:

- Carl Shapiro and Hal R. Varian, 1998a. Information Rules. Harvard Business School Press, Cambridge, MA; http://www.inforules.com, ch. 10
- Brandenburger, A. and Nalebuff, B., The Right Game: Use Game Theory to Shape Strategy, *Harvard Business Review*, 1995.
- Easley, D. and Kleinberg, J. Networks, Crowds, and Markets. Reasoning about a Highly Connected World. Cambridge University Press, 2010. Chapter 6, "Game Theory".
- Cusumano, M., Technology Strategy and Management: The Puzzle of Apple, *Communications of the ACM*, September 2008.
- Milian, M., Some game developers unhappy with Apple, Nintendo, CNN, March 4, 2011.
- Carmody, T., Sidestepping Apple: From Amazon to Condé Nast, Companies Rethink App Strategies, *Wired*, July 25, 2011.
- Eisenmann, T., Parker, G., Van Alstyne, M., Strategies for Two-Sided Markets, *Harvard Business Review*, 2006.
- Eisenmann, T., Parker, G., Van Alstyne, M., Platform Envelopment, *Strategic Management Journal*, 2011.
-

Optional:

- McAfee, P., Introduction to Economic Analysis. Section 7.2 on "Cournot Oligopoly".
- Tirole, J. *The Theory of Industrial Organization*. Cambridge, MA: MIT Press, 1988, Chapter 5 "Short-Run Price Competition", pp. 133-152. ISBN: 9780262200714.

Optional:

- Rochet and Tirole, Platform Competition in Two-Sided Markets, *Journal of the European Economic Association*, 2003.
- Armstrong, M. Competition in Two-Sided Markets. *RAND Journal of Economics*, vol. 37(3), pages 668-691, Autumn 2006.

APPENDIX C. SERVICE MANAGEMENT AREA

Appendix C.1. Organizational Behavior and Leadership

Overview

The course is open to students from any of the social sciences, business, education, social work and health professions (public health & nursing). Organizational Behavior is the study of human behavior within organizational settings. This encompasses micro level (interpersonal and small group) and macro level (inter-organizational) interactions. This course will examine the current theories and research within the field of organizational behavior and simulations. Focus will be on the application of these theories and empirical findings through case analyses. This course also will develop an understanding of the key issues managers need to master in order to manage the interface between people and organizations.

The course begins with a focus on the individual within the organization, including topics of attitudes, motives, and personality. The course then progresses to a broader focus on the organization as a whole, including topics of power and political concerns, group and organizational leadership, and organizational culture.

Part I. Course brief, it consists of course introduction, learning objectives, and overview of current adoptions

Learning objectives:

7. Assess personality, values and interpersonal skills and understand the implications for one's work life.
8. Implement practices that foster organizational citizenship, collaboration, and teamwork.
9. Diagnose and solve interpersonal and team problems.
10. Analyze the human resource architecture of an organization and its relationship to organizational strategy
11. Assess and develop leadership skills at the group and organizational levels
12. Foster innovation and creativity within organizations

Part II: Course modules and constituent subjects

Course Modules:

This course is loosely divided into three modules.

- **Module 1: Individual Behavior in organization**

  It focuses on the individual working within organizations and includes theories concerning the similarities and differences among individuals, how individuals learn, and what motivates their behavior. Topics include self-concept, personality, attitudes and perception, and theories of motivation with an applied focus on work behavior. By better understanding themselves, students can learn to better understand, appreciate, and manage others in organizational settings.

  1.1 What is organizational Behavior

  1.2 Diversity in Organization

  1.3 Attitudes and Job Satisfaction

  1.4 Emotions and Moods

  1.5 Personality and Values

  1.6 Perception and Individual Decision Making

  1.7 Motivation

- **Module 2: Group Level Behavior in organization**

  The second emphasis is on group level behavior and understanding how individuals work together. Topics include decision making, the dynamics of work groups and teams, reward systems, communication, negotiation, and conflict. With a better understanding of group processes, students will learn techniques for fostering effective and creative work.

  2.1 Foundations of Group Behavior

  2.2 Understanding the Work Teams

  2.3 Communication

  2.4 Leadership

  2.5 Power and Politics

  2.6 Conflict and Negotiation

- **Module 3: The Organization System**

  The third emphasis is on how the structure or human resource architecture of the organization facilitates or inhibits individuals as they work toward organizational goals. Specific topics include the principles of organizational design, approaches

to leadership, power and influence in organizations, organizational culture, ethics, and managing change and innovation. Students are encouraged to develop an integrated and holistic view of individuals working within multiple groups within larger organizational systems and to acquire the tools for creating more effective organizations

3.1 Foundations of Organizational Structure

3.2 Organization Culture

3.3 Human Resource Policies and Practices

3.4 Organizational Change and Stress Management

Part III: Detailed description and referenced materials

Detailed description <<Need to be developed>>

Module 1: Individual Behavior in organization

Module 2: Group Level Behavior in organization

Module 3: Human Resource Architecture in Organization

Referenced Materials:

1. Stephen P. Robbins¸ Timothy A. Judge, Organizational Behavior, 14th edition. Pearson/Prentice Hall, 2011
2. Kreitner & Knicki, Organizational Behavior, 7th edition , McGraw Hill, 2006.
3. Peter G. Northouse, Leadership: Theory and Practice, 4th edition, SAGE Publications, Thousand Oaks, CA, 2007.
4. J. Thomas Wren, The Leader's Companion: Insights on Leadership Through the Ages, , The Free Press, New York, 1995.
5. Block, P.. Flawless consulting: A guide to getting your expertise used (2nd. Ed.). San Francisco: Jossey-Bass/Pfeiffer, 2001
6. Patterson, J., Peek, C. J., Heinrich, R. L., Bischoff, R. & Scherger, J.. Mental health professionals in medical settings: A primer. New York: W. W. Norton & Company, 2002
7. Caplow, T.. Managing an organization (2nd ed.). New York: Holt, Rinehart, & Winston. (Out of print but the TCL copy will be on reserve, 1983
8. Putman, A.. Communities. In K. E. Davis (Ed.), Advances in descriptive psychology, Greenwich, CT: JAI Press, 1981

9. Putman, A. O.. Organizations. In A. O. Putman & K. E. Davis (Eds.), Advances in descriptive psychology Ann Arbor, MI: Descriptive Psychology Press, 1990
10. Weick, K.. Organizational redesign as improvisation. In K. Weick (Ed.) Making sense of the organization. Malden, MA: Blackwell Publisher, 2001
11. Weick, K.. The collapse of sensemaking in organizations: The Mann Gulch Disaster. Ditto, 2001
12. Weick, K.. The vulnerable system: An analysis of the Tenerife air disaster. Ditto, 2001
13. Davis, K. E. Using paradigm as a tool for organizational change. Paper presented at the annual conference of the Society for Descriptive Psychology, Boulder, CO., 1984
14. Levinson, H. Appendices A-D. from his Organizational assessment: A step-by-step guide to effective consulting, 2002

Appendix C.2. Service Marketing

Overview

Service marketing poses special challenges for managers due to the differences between goods and services. These challenges include customer satisfaction measurement and management; coordination of marketing and operations in the design and implementation of service delivery; the development of human and technical skills of employees that deliver services; and the utilization of emerging technology. This course informs students of basic modifications to marketing concepts as the economy changes in emphasis from physical products to services. It also will distinguish between function, organization, and structure in product- (versus service-) oriented firms. Finally, it will concentrate on identifying difficulties in developing marketing plans and strategies in the service environment. Cases and projects with businesses will be used to demonstrate these concepts. Services marketing will familiarize students with service marketing concepts.

Part I. Course brief, consists of course introduction, learning objectives, and overview of current adoptions.

LEARNING OBJECTIVES

5. Understand knowledge of current service marketing concepts, theories and applications.
6. Can analyze service marketing problems, developing marketing solutions and applying service marketing principles to a broad range of situations.
7. Develop abilities to identify services decision problems, ascertain alternatives, define crucial issues, analyze and plan the implementation of these issues.
8. Understand about relationship marketing and service failure/recovery issues in the service sector.

OVERVIEW OF CURRENT ADOPTIONS

Country	Instructor	Institution	Course Title (Date)	Description
US	Joe Dodson	University of Washington Business School	Service Marketing (Autumn 2007)	service quality, service encounter; relationship marketing strategies.
US	Sharon Beatty	University of Alabama	Services Marketing (Spring 2011)	Service Audit, Customers for Life
US	Leonard Berry	Texas A&M University	Services Marketing (Spring 2011)	The improvement of service quality; and the drivers of sustainable success in service businesses.
US	Mary Jo Bitner	Arizona State University	Services Marketing and Management (Spring 2011)	service quality; service design; Servicescapes and Physical Evidence of Service
US	Mary Jo Bitner	Arizona State University	Excel at Service(s) (Fall 2007) (*Executive Course*)	service quality; Customer issues; Service Recovery
US	Michael Bowers	Rollins College	Services Marketing (Fall 2006)	service quality; Relationship Marketing
US	Larry Cunningham	University of Colorado at Denver	Services Marketing (Fall 2001)	service quality; service design; Relationship Marketing
US	Dwayne Gremler	Bowling Green State University	Services Marketing Management (Summer 2007)	service quality; service design; Relationship Marketing
Finland	Christian Grönroos	Hanken Swedish School of Economics (Helsinki, Finland)	Service and Relationship Marketing (Fall 2010)	service quality; Service-Profit Chain; service culture
US	Susan Keaveney	University of Colorado Denver	Services Marketing (Spring 2009)	service quality; Service Recovery; service design

US	Carolyn Massiah	University of Central Florida	Services Marketing (Spring 2008)	service quality; Service Recovery; Relationship Marketing
Switzerland.	Stefan Michel	International Institute for Management Development (IMD)	Service Marketing and Management (Fall 2010)	Service Star; Distributing and Pricing
US	Mark Rosenbaum	Northern Illinois University	Introduction to Marketing: Focus on Services Marketing (Fall 2007) (*Executive Course*)	service quality; Clue management; Relationship Marketing; Service Recovery; service design
Australia	Jill Sweeney	University of Western Australia	Marketing of Services (Fall 2010)	service quality; service design
Dubai	Prakash Vel	University of Wollongong at Dubai	Managing Services and Relationship Marketing (Fall 2010)	Relationship Marketing; Service Recovery; service design
US	Janet Wagner	University of Maryland	Service Marketing (Spring 2011)	CRM; Service Recovery Service-Profit Chain
Singapore	Jochen Wirtz	National University of Singapore	Services Marketing (2004)	Customer Loyalty; Servicescapes and Physical Evidence of Service; Growth Strategies for Service Organisations
Singapore	Jochen Wirtz	National University of Singapore	Contemporary Issues in Business – Services Management and Customer Asset Management (2010) (*Executive Course*)	Service Segmentation; Customer Loyalty; CRM; Service Experiences; service quality
US	Valarie Zeithaml	University of North Carolina	Services Marketing (Fall 2010)	Service Segmentation; service encounter; service quality

Part II. Course modules and constituent subjects, it presents the structure of the course containing modules of knowledge components. In each module, several subjects can be organized to beef up the contents. In this part, we expect to give instructors an outline of the course first. The detailed description will be seen in Part III.

COURSE MODULES AND CONSTITUENT SUBJECTS

The course design is built around several key concepts. The emphasis is on strategic marketing issues. The focus is on business decisions at real companies. The content is driven by a review and discussion of the concepts, tool, and ideas that will shape marketing decisions in service businesses. In this course you will learn the critical skills and gain knowledge needed to implement quality service and service marketing strategies for competitive advantage across industries. You will learn frameworks for customer-focused service management, and how to increase customer satisfaction and retention through service strategies. You will 1earn about service quality, how customer expectations affect customer perceptions of service quality and how to develop relationship marketing strategies. Throughout the course an emphasis is placed on the total organization and how effective marketing and customer focus must be coordinated across multiple functions in service companies.

Module 1. Overview of the Services Marketing

Subject 1.1. New Perspectives on Marketing in the Service Economy

Subject 1.2. Customer Behavior in Service Encounters

Module 2. Building the Service Model

Subject 2.1. Positioning Services in Competitive Markets

Subject 2.2. Developing Service Concepts

Subject 2.3. Distributing Services Through Physical and Electronic Channels

Subject 2.4. Exploring Business Models; Pricing and Revenue Management

Subject 2.5. Educating Customers and Promoting the Value Proposition

Module 3. Managing the Customer Interface and Relationship

Subject 3.1. Designing and Managing Service Processes

Subject 3.2. Balancing Demand and Productive Capacity

Subject 3.3. Crafting the Service Environment

Subject 3.4. Managing People for Service Advantage

Subject 3.5. Customer Research and Building Customer Loyalty

Subject 3.6. Achieving Service Recovery and Obtaining Customer Feedback

Module 4. Contemporary Issues in Service Marketing

Subject 4.1.Service Logic in Contemporary Business

Subject 4.2.Globalization

Part III. Detailed description and referenced materials, in this part, the information of each subject in each module is elaborated in a detailed level, which an instructor can use it for determining the constituent modules and subjects for his/her course design, and sourcing teaching materials based on the this part. Moreover, the updated information can be added based on the initial contents allocated in this part.

DETAILED DESCRIPTION AND REFERENCED MATERIALS

Module 1. Overview of the Services Marketing

Service marketing is a form of marketing which focuses on selling services. Services can be tricky to sell and the marketing approach for them is much different than the

approach for products. Some companies offer both products and services and must use a mixture of styles; for example, a store which sells computers also tends to offer services such as helping people select computers and providing computer repair. Such a store must market both its products and the supporting services it offers to appeal to customers. When people market services, the goal is not to get customers to buy a product, but to get people to do business with a particular company, often in a specific location. As with the marketing of products, the marketing of services covers issues like what is being offered, what the price point is, how it compares to similar things, and why people should choose that particular iteration over other options. With services, which are often intangible in nature, consumers must also be convinced through services marketing that the service is something they need which will have some sort of benefit.

Subject 1.1. New Perspectives on Marketing in the Service Economy

The field of services marketing is relatively young, tracing its beginnings to the late 1970s and early 1980s. In this session we will look at the history of the field, and get a rounding in some of its foundations and central topics. We will also look at recent articles that suggest trends and directions for the field.

Referenced materials

1. Textbook: Lovelock, C. & Wirtz, J. (2007). Services Marketing: People, Technology, Strategy – Chapter 1.
2. Zeithaml, V. A., Bitner, M. J. & Gremlerr, D. (2009). Services Marketing: Integrating Customer Focus Across the Firm, 5th edition, McGraw-Hill.
3. Raymond, F. P., Brown, S. W. & Bitner, M. J. (1993). Tracking the Evolution of the Services Marketing Literature, *Journal of Retailing,* 69, 61-103.
4. Berry, Leonard & Parasuraman, P. (1993). Building a New Academic Field—the Case of Services Marketing, *Journal of Retailing,* 69, 13-60.
5. Ostrom, A. L. et al. (2010). Moving Forward and Making a Difference: Research Priorities for the Science of Service, *Journal of Service Research,* 13 (1), 4-36.
6. HBS case 9-607-129: Westin Hotels and Resorts: Operations of a Lifestyle Experience (2007).

Subject 1.2. Customer Behavior in Service Encounters

Service encounters mean that a period of time during which customers interact directly with a service. Consumers rarely involved in manufacture of goods but often participate in service creation and delivery. Therefore, challenge for service marketers is to understand how customers interact with service operations.

Referenced materials

1. Textbook: Lovelock, C. & Wirtz, J. (2007). Services Marketing: People, Technology, Strategy – Chapter 2.
2. Cialdini, R. B. (2001). Harness Science of Persuasion, *HBR*, 79(9), 72-79.
3. Chase, R. B. & Dasu, S. (2001). Use Behavioral Science, *HBR,* 79(6), 78-84.
4. MIT Sloan (2010). Designing the Soft Side of Customer Service, 7, 33-39.
5. Bitner, M. J., Booms, B. H., & Mohr, L. A. (1994). Critical service encounters: The employee's viewpoint. *Journal of Marketing*, 58, 95-106.
6. Lin, C.-H., & Peng, C.-H. (2005). The cultural dimension of technology readiness on customer value chain in technology-based service encounters. *Journal of American Academy of Business*, Cambridge, 7(1), 176.
7. Svensson, G. (2006). New aspects of research into service encounters and service quality. *International Journal of Service Industry Management*, 17(3), 245.
8. Winsted, K. F. (2000). Patient satisfaction with medical encounters - a cross-cultural perspective. *International Journal of Service Industry Managemen*t, 11(5), 399.

Module 2. Building the Service Model

We stress the importance of creating a meaningful value proposition, and the value proposition must address and integrate two components: creation of a service concept and delivery of its different elements through physical and electronic channels. Then, it needs to develop a business model for recovering all costs through realistic pricing strategies. Finally, the strategy must stake out a distinctive and defensible position in the market against competing alternatives.

Subject 2.1. Positioning Services in Competitive Markets

Companies use positioning strategies to distinguish their services from competitors and to design communications that convey their desired position to customers and prospects in the chosen market segments. Marketers often use a combination of these

positioning approaches. Whatever strategy a firm chooses, the primary goal is to differentiate itself from competitors by emphasizing the distinctive advantages of its service offerings. If the core benefits are similar to those of the competition, the company may decide to stress different advantages in its promotional efforts.

Referenced materials

1. Textbook: Lovelock, C. & Wirtz, J. (2007). Services Marketing: People, Technology, Strategy – Chapter 7.
2. Shostack, G. L. (1987). Service Positioning through Structural Change, *Journal of Marketing*, 51(1), 34-43.
3. Collier, D.A., & Meyer, S.M. (1998). A service positioning Matrix, I*nternational Journal of Operations & Production Management*, 18(12), 1223-1244.e

Subject 2.2. Developing Service Concepts

The service concept consists of the core product, the supplementary services and the delivery processes. Supplementary services help to differentiate core products and create competitive advantage by facilitating use of core product (a service or a good) and enhancing the value and appeal of the core product. Firms with different levels of service often add extra supplementary services for each upgrade in service level.

Referenced materials

1. Textbook: Lovelock, C. & Wirtz, J. (2007). Services Marketing: People, Technology, Strategy – Chapter 3.
2. Lee, C., Song, B. & Park Y. (2009). Generation of New Service Concepts: A Morphology Analysis and Genetic Algorithm Approach, *Expert Systems with Applications*, 36(10), 12454-12460.
3. Kuo, G.S. (1999). Broadband Service Concepts, Markets, Technologies, and Trials, *IEEE Communication Magazine,* 10, 54-55.
4. Fitzsimmons, J. A., & Fitzsimmons, M. J. (2001). Service Management. New York: McGraw-Hill.
5. Goldstein, S. M., Johnston, R., Duffy, J., & Raod, J. (2002). The service concept: the missing link in service design research? *Journal of Operations Management,* 20, 121-134.

Subject 2.3. Distributing Services Through Physical and Electronic Channels

Marketing channels exist to create utility for customers. Channels are made up of a

coordinated group of individuals or firms that perform functions that add utility to a product or service. The advantages of a combined physical and virtual channel strategy can be derived from early predictions about the death of distance caused by electronic commerce (Cairncross, 1997).

Referenced materials

1. Textbook: Lovelock, C. & Wirtz, J. (2007). Services Marketing: People, Technology, Strategy – Chapter 4.
2. Cairncross, F. (1997). The Death of Distance. Boston, Massachusetts: Harvard Business School Press.
3. Otto, J. & Chung, Q. (2000). A framework for cyber-enhanced retailing: Integrating e-commerce retailing with brick and mortar retailing, *Electronic Markets*, 10 (4), 185-191.
4. Smith, M., Bailey, J. & Brynjolfsson, E. (2000). Understanding digital markets: Review and assessment. In Brynjolfsson, E. and Kahin, B. (eds.), Understanding the Digital Economy, Cambridge, MA: MIT Press.
5. Steinfield, C., Mahler, A., & Bauer, J. (1999). Electronic commerce and the local merchant: Opportunities for synergy between physical and web presence, *Electronic Markets*, 9 (1/2), 51-57.

Subject 2.4. Exploring Business Models; Pricing and Revenue Management

It is difficult to define a “unit of service”, so services were hard to evaluate. Predicts how many customers will use a given service at a specific time at each of several different price levels and then allocates capacity at each level or price bucket. This helps companies restrict lower prices to customers willing to accept certain restrictions.

Referenced materials

1. Textbook: Lovelock, C. & Wirtz, J. (2007). Services Marketing: People, Technology, Strategy – Chapter 5.
2. Agrawal, V. & Ferguson, M. (2007). Optimal customized pricing in competitive settings, *Journal of Revenue and Pricing Management*, 6, 212–228.
3. Boyd, J. (2006). FedEx earnings soar: ‘Revenue management’ discipline boosts balance sheet, $32.3 billion carrier eyes ‘growth opportunities. Traffic World 3 July.

4. Cooper, W., Homem-de-Mello, T. & Kleywegt, A. (2006). Models of the spiral-down effect in revenue management, *Operations Research,* 54(5), 968–987.
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7. Cross, R. & Dixit, A. (2005). Customer-centric pricing: The surprising secret for profitability, Business Horizons, 48(6), 483–491.
8. Cross, R., Higbie, J. & Cross, D. (2009). Revenue management's renaissance: A rebirth of the art and science of profitable revenue generation, *Cornell Hospitality Quarterly*, 50, 56–81.

Subject 2.5. Educating Customers and Promoting the Value Proposition

As it is difficult to communicate service benefits to customers, especially when intangible. As a result, using metaphors to communicate value propositions more dramatically and emphasize key points of difference. There are four ways to work with the issues of intangibility in addition to using metaphors. The communications mix is very rich including additional areas such as instruction manuals, corporate design and Word of Mouth. All of this needs a good integrated communications strategy.

Referenced materials

1. Textbook: Lovelock, C. & Wirtz, J. (2007). Services Marketing: People, Technology, Strategy – Chapter 6.
2. Harris, K. & Baron, S. (2004). Consumer-to-Consumer Conversations in Service Settings, *Journal of Service Research*, 6(3), 287-303.
3. Wirtz, J. & Chew, P. (2002). The effects of incentives, deal proneness, satisfaction and tie strength on word-of-mouth behaviour, *International Journal of Service Industry Management*, 13(2), 141- 162.

Module 3. Managing the Customer Interface and Relationship

Customers are obviously of strategic importance. Poor management of interactions with customers can imperil future business opportunities. Every company wants to have a good relationship with their customers but this becomes harder as the customer

is more tightly integrated into the producing company's activities. One of the interfaces between the producing company and the consuming company is the formal review. Requirements reviews, design reviews, test reviews, and schedule reviews are all points at which the customer and producer come together.

Subject 3.1. Designing and Managing Service Processes

Identify key activities in creating and delivering service is very important, and blueprinting is a fundamental tool used for service design and re-design. Service process redesign encompasses reconstitution, rearrangement, or substitution of service processes. Customers undertake specific activities using facilities or systems provided by service supplier. Customers will accept Self-Service Technologies (SSTs) if they are accessible and easy to use.

Referenced materials

1. Textbook: Lovelock, C. & Wirtz, J. (2007). Services Marketing: People, Technology, Strategy – Chapter 8.
2. Beatson, A., Coote, L. V. & Rudd, J. M. (2006). Determining Consumer Satisfaction and Commitment through Self-Service Technology and Personal Service Usage, *Journal of Marketing Management*, 22, 853-882.
3. Bateson, J.E.G. (1985). Self-Service Consumer: An Exploratory Study, *Journal of Retailing*, 61 (Fall), 49-76.
4. Curran, J.M., Matthew L. M. & Carol, F. S. (2003). Intentions to Use Self-Service Technologies: A Confluence of Multiple Attitudes, J*ournal of Service Research*, 5 (3), 209–24.
5. Berkley, B.J. (1996). Analyzing service blueprints using phase distributions, *European Journal of Operational Research*, 88, 152-164.
6. Bitner, M.J., Ostrom, A.L., & Morgan, F.N. (2008). Service blueprinting: a practical technique for service innovation, *California Management Review*, 50(3), 66-94.

Subject 3.2. Balancing Demand and Productive Capacity

Having historical data on demand level and composition, noting responses to marketing variables, and demand forecasts by segment under specified conditions are very important. Variations in demand can be predicted through good record keeping and analysis. Service capacity can be adjusted to match demand by using temporary

employees, cross-training employees etc. Firms have many options on how they can match capacity to variations in demand. Marketing strategies can smooth out fluctuations in demand by deploying the four traditional Ps of the marketing mix.

Referenced materials

1. Textbook: Lovelock, C. & Wirtz, J. (2007). Services Marketing: People, Technology, Strategy – Chapter 9.
2. Klassen, K.J. & Rohleder, T.R. (2001). Combining Operations and Marketing to Manage Capacity and Demand in Services, *The Service Industries Journal,* 21(2), 1-30.
3. Irene, C.L. Ng, Wirtz, J., Lee, K. S. (1999). The strategic role of unused service capacity, *International Journal of Service Industry Management*, 10(2), 211 – 244.
4. Lovelock, C. H. (1984). Strategies for Managing Demand in Capacity-Constrained Service Organisations, *The Service Industries Journal*, 4(3), 12-30.

Subject 3.3. Crafting the Service Environment

Service environments (servicescape) are very important to service marketers, because it affects buyer behaviour in three ways. First, message-creating medium means symbolic cues to communicate the distinctive nature and quality of the service experience. Second, attention-creating medium make servicescape stand out from competition and attract customers from target segments. Finally, effect-creating medium is using colours, textures, sounds, scents and spatial design to enhance desired service experience.

Referenced materials

1. Textbook: Lovelock, C. & Wirtz, J. (2007). Services Marketing: People, Technology, Strategy – Chapter 10.
2. Aubert-Gamet, V. (1997), Twisting Servicescapes: Diversion of the Physical Environment in a Re-appropriation Process, *International Journal of Service Industry Management*, 8(1), 26-41.
3. Harris, L. C. & Ezeh, C. (2008). Servicescape and loyalty intentions: an empirical investigation, *European Journal of Marketing*, 42(3/4), 390-422.

4. Kim, K., & Bae, S. (2005). The servicescape in golf courses: the effects of physical environment on the consumers' internal response and behavior outcome, *Research Quarterly for Exercise and Sport*, 76(1), 127.
5. Lin, I. Y. (2004). Evaluating a servicescape: the effect of cognition and emotion, *Hospitality Management*, 23, 163-178.
6. Lio, H.-L. M. & Rody, R. (2009). The Emotional Impact of Casino Servicescape, *UNLV Gaming Research & Review Journal*, 13(2), 17-25.

Subject 3.4. Managing People for Service Advantage

Service employees are a key competitive differentiator and driver of customer loyalty. However, frontline work can be difficult due to role conflict, emotional labor and need to serve both marketing and operations. Therefore, organizations use the integrated and progressive human resources management approaches to determine their fate through cycles of failure, mediocrity, and success.

Referenced materials

1. Textbook: Lovelock, C. & Wirtz, J. (2007). Services Marketing: People, Technology, Strategy – Chapter 11.
2. Guiry, M. (1992). Consumer and employee roles in service encounters, *Advances in Consumer Research*, 19(1), 666-672.
3. Thorsten, H.T. (2004), Customer Orientation of Service Employees: Its Impact on Customer Satisfaction, Commitment, and Retention, *International Journal of Service Industry Management*, 15(5), 460-478.
4. Kelley, S. W. (1992). Developing Customer Orientation among Service Employees, *Journal of the Academy of Marketing Science*, 20(1), 27-36.
5. Bowen, D. E., & Lawler, E. E. (1995). Empowering service employees, *Sloan Management Review*, 36(4), 73-84.

Subject 3.5. Customer Research and Building Customer Loyalty

Customer loyalty as an important driver of profitability for service firms so firms need to assess value of loyal customer and narrow gap between actual and potential customer value. To understand the customer-firm relationship, firms should establish a relationship with customers by creating “membership” relationships. Customer relationship management (CRM) is a whole process by which relations with

customers are built and maintained.

Referenced materials

1. Textbook: Lovelock, C. & Wirtz, J. (2007). Services Marketing: People, Technology, Strategy – Chapter 12.
2. Dick, A. S. & Basu, K. (1994), Customer Loyalty：Toward an Integrated Conceptual Framework, *Journal of the Academy of Marketing Science*, 22, 99-113.
3. Reichheld, F. F, Markey, R. G. Jr, & Hopton, C. (2000). E-customer loyalty-applying the traditional rules of business for online success, *European Business Journal*, 12 (4), 134-139.
4. Jones, T. & Taylor, S.F. (2007). The conceptual domain of services loyalty: how many dimensions?, *Journal of Services Marketing*, 21 (1), 36-51.
5. Berry, L. L. & Carbone, L. P. (2007). Build Loyalty through Experience Management, Quality Progress, 40(9), 26.
6. Evanschitzky, H., Gopalkrishnan, R.I., Plassmann, H.,Niessing, J. & Meffert, H. (2007). The Relative strength of affective Commitment in securing loyalty in Service Realtionships, *Journal if Business Research*, 59 (12), 1207-1213.

Subject 3.6. Achieving Service Recovery and Obtaining Customer Feedback

Research has shown that service recovery is critically important from a managerial perspective in terms of maintaining customer relationships. Yet few firms excel at handling service failures. Over the years there have been many strong empirical and conceptual contributions that shape our understanding of service recovery's dimensions, its causes, and its consequences. Research on complaining and complaint management is closely aligned to the study of service recovery.

Referenced materials

1. Textbook: Lovelock, C. & Wirtz, J. (2007). Services Marketing: People, Technology, Strategy – Chapter 13.
2. Tax, Stephen, S. & Stephen, W. B. (1998). Recovering and Learning From Service Failure, *Sloan Management Review*, 75-88.
3. Maxham, James, G. & Richard, G. N. (2002). A Longitudinal Study of Complaining Customers' Evaluations of Multiple Service Failures and Recovery Efforts, *Journal of Marketing*, 57-71.

4. Ward, J. C. & Amy, L. O. (2006). Complaining to the Masses: The Role of Protest Framing in Customer-Created Complaint Web Sites, *Journal of Consumer Research,* 220-230.
5. Gregoire, Yany, Thomas, M. T. & Legoux, R. (2009). When Customer Love Turns into Lasting Hate: The Effects of Relationship Strength and Time on Customer Revenge and Avoidance, *Journal of Marketing.*
6. Sajtos, Laszlo, Brodie, R. J. & Whittome, J. (2010). Impact of Service Failure: The Protective Layer of Customer Relationships, *Journal of Service Research,* 13 (2), 216-229.
7. Voorhees, Clay, M., Michael, K. B. & David, M. H. (2006). A Voice From the Silent Masses: An Exploratory and Comparative Analysis of Non complainers, *Journal of the Academy of Marketing Science,* 514-527.
8. HBR: Singapore Airlines Balancing Act (2010). 145-149 (15).

Module 4. Contemporary Issues in Service Marketing

Real world marketing can be more challenging than what is presented in the textbooks. We should expose to state-of-the-art thinking and tools in the analysis of these issues and learn to appreciate and expect sophisticated analysis of marketing problems. The module is unique in having key issues they are researching and focusing on today.

Subject 4.1.Service Logic in Contemporary Business

Service-dominant logic (SDL) posits that all economies are service economies and are now becoming more apparent with increased specialization and outsourcing (Vargo & Akaka, 2009). SDL has been posed as the theoretical foundation for the study of service systems (Maglio & Spohrer, 2008; Lusch, Vargo & Wessels, 2008; Vargo & Akaka, 2009). Service systems are "value co-creation configurations of people, technology, value propositions connecting internal and external service systems, and shared information," (Maglio & Spohrer , 2008).

Referenced materials

1. Vargo, S. & Akaka, M. (2009). Service-dominant Logic as a Foundation for Service Science: Clarifications. *Service Science Journal*, 1(1), 32-41.

2. Maglio, P. & Spohrer. J. (2008). Fundamentals of Service Science. *Journal of the Academy of Marketing Science,* 36(1), 18-20.
3. Lusch, F., Vargo, S. & Wessels, G. (2008). Toward a Conceptual Foundation for Service Science: Contributions from Service-dominant Logic. *IBM Systems Journal,* 47(1), 5-14.

Subject 4.2.Globalization

Marketing globalization is a synergistic term combining the promotion and selling of goods and services with an increasingly interdependent and integrated global economy. Understanding consumer needs within target countries helps formerly ethnocentric companies build a global marketing mix where product, price, place and promotion are geared toward specific country needs.

Referenced materials

1. Cadogan & Diamantopoulos. (1995). Narver and Slater, Kohli and Jaworski, and the market orientation construct: integration and internationalization, J*ournal of Strategic Marketing,* 3, 41-60.
2. Susan, D. P. & Craig, C. S. (1989). Evolution of Global Marketing Strategy: Scale, Scope, and Synergy, *Columbia Journal of World Business*, 24 (3), 47-58.
3. Johansson, J.K. (1997). Global Marketing: Foreign Entry, Local Marketing, and Global Management. Chicago: Richard D. Irwin.
4. Saeed Samiee & Kendall Roth. (1992). The influence of Global Marketing Standardization on Performance, *Journal of Marketing*, 56 (2), 1-17.
5. Quelch, J. A. & Hoff, E. J. (1986). Customizing Global Marketing, *Harvard Business Review*, 64, 59-68.

Appendix C.3. Service Innovation

Overview

This course examines how value creation occurs in a range of fast-growing service sectors, including retailing, hospitality, financial services, professional services, travel, logistics, and healthcare. The course emphasizes that services are diverse, and explicitly distinguishes traditional and high-value services. Students will be able to assess the service portfolio of their organization, evaluate opportunities and emerging service trends, and learn the formal analysis and modeling techniques that are essential to realize new service offerings. The course primarily addresses the needs of public and private organizations with service offerings. The course makes use of real-world case studies to illustrate specific aspects of service analysis, specification, and implementation.

Part I. Course brief, it consists of course introduction, learning objectives, and overview of current adoptions

LEARNING OBJECTIVES

11. Understand the fundamental principles of creativity, design thinking and innovation in designing new products, services and business models.
12. Understand prevailing practical methods for developing and aligning the service innovation models, processes and operations with both the espoused enterprise strategy and customer value proposition to achieve sustainable competitive advantage.
13. Understand how firms can undertake strategic renewal through product and service innovation.
14. Acquire knowledge about context of application, relate and assess the suitability of the strategy-aligned service innovation concepts, models and methods for their own organizations.

OVERVIEW OF CURRENT ADOPTIONS

Country	Instructor	Institution	Course Title (Date)	Description
US	Michael zur Muehlen	Stevens Institute of Technology Howe School of Technology Management	Service Innovation	Product-, Technology-, Process- and People-centric Services
South Korea	Sung Joo Bae	Yonsei School of Business	Product and Service Innovation	Design-Driven Product Innovation; Open and User Innovation
Thailand	Yodmanee Tepanon	Thammasat university	Research Methods for Service Innovation (2010)	Research methods, design, and ethics
Canada	Rajesh K Tyagi	HEC Montréal	Operations strategy and innovation	Plant and service tours in operations
US		HARVARD BUSINESS SCHOOL	Managing Innovation (2010)	Design Thinking; Sources of Innovation
Taiwan	Ruey-Shan Andy Guo	National Taiwan University	Operations Management Service Innovation Management (2008)	Operations strategy; SCM
US	Drew Boyd	University of Cincinnati	Applied Marketing Innovation	Marketing Strategy; Measuring Innovation
US	Harun Asad	NYU Polytechnic Institute Graduate Program	Services Innovation (Spring 2009)	Marketing Strategy; Process-Centric Services
Hong Kong		The Hong Kong Polytechnic University	Knowledge Based Service Innovation (2011)	Marketing Strategy; Service-Dominant Logic
Sweden		Karlstad University	Service Innovation (2009)	Development for improving service performance
Taiwan	HsiuJu Rebecca Yen	National Tsing Hua University	Service Innovation	Service design; customer co-creation

Part II. Course modules and constituent subjects, it presents the structure of the course containing modules of knowledge components. In each module, several subjects can be organized to beef up the contents. In this part, we expect to give

instructors an outline of the course first. The detailed description will be seen in Part III.

COURSE MODULES AND CONSTITUENT SUBJECTS

A service is a means of delivering customer value by providing certain outcomes that customers want to achieve without the need to own specific assets, costs, or risks. There is a fundamental shift for goods- and parts-producing organizations to restructure their offerings around the needs of their customers and to include supply, maintenance, and in-field operations to their services portfolio. Professional service organizations are increasingly taking over roles that members of their client organizations used to play, and within companies shared service centers allow for the effective deployment of service solutions that otherwise would have required large training or contracting expenditures. It seems that anything can be made a service, but few know in detail how this can be done. As organizations are shifting from requirements-driven product design to needs-focused service design, they need to understand the full lifecycle of service identification, design, transition, and operation, supported by continual service improvement. They need to synchronize the different lifecycles of products, customers, and services. The course highlights case studies of organizations that have successfully engineered service offerings in product-centric, technology-centric and people-centric environments. Students will learn how to identify and realize innovative service opportunities and how modern information technology enables service innovation.

Module 1. New Perspectives on Service Economy and Innovation

Subject 1.1. Service Economy

Subject 1.2. Building and Managing Innovation Systems

Module 2. Managing Service Innovation: Concepts and Techniques

Subject 2.1. Integration of Service Innovation into Business Strategy

Subject 2.2. People-, Product-, Technology-, and Process- Centric Services Innovation

Subject 2.3. New Service Development

Subject 2.4. Techniques for Service Innovation

Module 3. Service Business Innovation: New Models for Growth

Subject 3.1. Business Model Innovation in Services

Subject 3.2. Growing a Platform for External Innovation

Subject 3.3. Service Value Networks

Subject 3.4. Use of Global and Local Service Innovation Cases

Part III. Detailed description and referenced materials, in this part, the information of each subject in each module is elaborated in a detailed level, which an instructor can use it for determining the constituent modules and subjects for his/her course design, and sourcing teaching materials based on the this part. Moreover, the updated information can be added based on the initial contents allocated in this part.

DETAILED DESCRIPTION AND REFERENCED MATERIALS

Module 1. New Perspectives on Service Economy and Innovation

Due to changes in the international division of labor and strong productivity improvements in manufacturing, service industries went through a rapid growth and the western countries converted into service economies, where service industries provide much more job opportunities than classic industries. In the new service economy, services dominate value systems and services are integrated into every stage of the value chain. Moreover, productivity growth has also become possible in services mainly through ICT-tools and network arrangements.

Subject 1.1. Service Economy

A service economy refers to a financial concept that says that service is becoming more and more important in product offerings. Services account for over 60% of total economic activity in most OECD countries. Growth has outpaced overall economic growth in the OECD area, a trend which is expected to continue. Services are playing a greater role in business cycles, and knowledge-based services linked to information technology (IT) may be an important engine in overall growth

Referenced materials

1. Fitzsimmons, J. A. & Fitzsimmons, M. J. (2004). Service Management: Operations, Strategy, and Information Technology, Irwin Professional Pub, 4th edition.

2. Metters, King-Metters, Pullman & Walton, (2006). Successful Service Operations Management by, Thomson Learning.

Subject 1.2. Building and Managing Innovation Systems

We will begin the course by reviewing IDEO -- one of the world's leading product development firms, and its innovation culture and process. You have seen the case before but it is important to know it well since the course builds on the insights from IDEO.

Referenced materials

1. Lafley, A.G. & Charan, R. (2008). The Game-Changer: How You Can Drive Revenue and Profit Growth with Innovation, Crown Business, 1 edition.
2. Lenny, T. M. & Rao, H. (2008). Lessons from innovation's front lines: An interview with IDEO's CEO, The McKinsey Quarterly.
3. Brown, Tim (2008). Design Thinking, Harvard Business Review, 85-92.
4. Maglio, P. P., Kieliszewski, C. A. &Spohrer, J. C. (2010). Handbook of Service Science, Springer New York.
5. Gallouj F. & Windrum, P. (2009). Services and services innovation, J*ournal of Evolutionary Economics,* 19, 141–148.
6. Frei, F. X. (2008). The four things a service business must get right, Harvard business review, 86, 70－80.
7. Maglio, P. P. et al. (2006). Service systems, service scientists, SSME, and innovation, *Communications of the ACM*, 49, 81－85.

Module 2. Managing Service Innovation: Concepts and Techniques

It is highly important to understand different supporting techniques in the service innovation (Menor et al. 2002). A structured approach will help us to reach the goal of developing and launching a new service. In addition, Johnston (1999) also suggested that good design techniques in service development must be further explored. Useful techniques can help the companies' service innovation to keep up with the competition.

Subject 2.1. Integration of Service Innovation into Business Strategy

More broadly, the business and research communities have awakened to the fact that services dominate most economies; that technology provides new infrastructure for service innovation. For service enterprises, service innovation strategy is the overall plan and key design in the field of service innovation, which is in accordance with the actual situation of enterprises, and make for its long-term development. Innovative strategies have the need of more scientific performance evaluation system, which is not only pay attention to the short term, and also can measure the potential ability ,such as learning ability of enterprises, internal processes. Only thus can the enterprise ensure the long-term sustainable development.

Referenced materials

1. Alam, I. (2006). Service innovation strategy and process: a cross-national comparative analysis. *International Marketing Review*, 23(3), 234-254.
2. Bask, A. H., Tinnila, M., and Rajahonka, M. (2008). Matching service strategies, business models and modular business processes, *Business Process Management Journal*, 16(1), 153-180.

Subject 2.2. People-, Product-, Technology-, and Process- Centric Services Innovation

Innovation generally refers to the creation of better or more effective products, processes, technologies, or ideas that are accepted by markets, governments, and society. Innovation differs from invention or renovation in that innovation generally signifies a substantial positive change compared to incremental changes. Service Design is a topic that is drawing more and more attention in the business world and in academics. Stanford University's "d.school" and University of Toronto's Rotman School of Management are two prominent examples of how design is reflected in academic institutions. As another example, recently ASU combined our Design and Arts programs into a unique interdisciplinary school called the Herberger Institute for Design and the Arts. The UK even has a well-established national design council that has a current focus around service design. Another very interesting organization focused on service design is the Service Design Network, headed by Professor Birget Mager from Cologne, Germany.

Referenced materials

1. Paswan, D. & Zolfagharian, M. A. (2009). Towards a Contextually Anchored Service Innovation Typology, *Decision Sciences,* 40(3), 513-540

2. Joe, T. & Frank, M. H. (2003). Service Innovation: Organizational Responses to Technological Opportunities & Market Imperatives, Imperial College Press.
3. Hemp, P. (2002). My week as a room service waiter at the Ritz, Harvard Business Review, 80, 54.
4. HBS Case: Sandra, J. S. & Stacy, M. (2010). Ritz Carlton Hotel Co.
5. HBS Case: Norton, Villanueva, & Wathieu (2009). elBulli: The Taste of Innovation.
6. HBS Case: Digital China Holdings Ltd.
7. HBS Case: IDEO Product Development
8. Shankar, V., Berry, L. L. & Dotzel, T. (2009). A Practical Guide to Combining Products and Services, Harvard business review.
9. Vargo, S. L. & Lusch, R. F. (2008). From goods to service(s): Divergences and convergences of logics, *Industrial Marketing Management*, 37, 254–259.
10. HBS Case: F-Secure
11. UHK Case: Tecnovate
12. Komssi, M. et al. (2009). Transforming a Software Product Company into a Service Business: Case Study at F-Secure, 61-66.
13. Davenport, T. H. (2005). The coming commoditization of processes, Harvard Business Review, 83, 100-108.
14. Muehlen, M. & Ho, D. T. (2008).Service process innovation: a case study of BPMN in practice, Proceedings of the Hawai'i International Conference on System Sciences 2008, IEEE Computer Society.
15. Yadav,V., Sangeeta, S. Bharadwaj & Saxena, K.B.C. (2006). Tecnovate: Challenges of Business Process Outsourcing. University of Hong Kong Teaching Case HKU611.

Subject 2.3. New Service Development

NSD refers to an overall process of developing new services, from idea generation to market launch. We redefine the final stage of an NSD process to include "service commercialization" in order to consider the sustainability of the newly developed service. In the final stage, it is necessary to monitor the customers' responses or employees' feedback after a service is launched (Lin & Hsieh, 2011).

Referenced materials

3. Lin, F.R. & Hsieh, P.S. (2011). A SAT View on New Service Development, *Service Science*, 3(2), 141-157.
4. Booz, Allen & Hamilton. (1982). New Products Management for the 1980s. New York: Booz, Allen and hamilton Inc.
5. Shostack, G. L. (1984). Service design in the operating environment, In W. R. George & C.E. Marshall (Eds.), Developing new services, Chicago:American Marketing Association.
6. Cowell, D. W. (1988). New service development, *Journal of Marketing Managemen,t* 3(3), 296-312.
7. Mohammed-Salleh, A. & Easingwood, C. (1993). Why European financial institution do not test-market new consumer products. *International Journal of Bank Marketing,* 11(3), 23-27.
8. Cooper, R. G. & Edgett, S. J. (2000). Product Development for the Service Sector: Lessons from Market Leaders, Cambridge. MA: Preseus Books.
9. Johnson, S.P., Menor, L.J., Roth, A.V. & Chase, R.B. (2000). A critical evaluation of the new service development process: integrating service innovation and service design, In: Fitzsimmons, J.A., Fitzsimmons, M.J. (Eds.), New Service Development- Creating Memorable Experiences. Sage Publications, Thousand Oaks, CA 1-32.
10. Kuo, C.L. (2008). Toward an Methodology for Service Innovation – The Industrial-oriented perspective (in Chinese).
11. Kung, J.W. (2008). Service Experience Engineering, Institute for Information Industry (in Chinese).

Subject 2.4. Techniques for Service Innovation

Useful techniques should be noted that these techniques are not limited to a specific time during the service design process, and may cross different activities in different stages.

Referenced materials

1. Bitner, M. J., Ostrom, A. L. &Morgan, F. N. (2008). Service blueprinting: A practical technique for service innovation, *California Management Review*, 50.

2. Cook, L.S., Bowen, D.E., Chase, R.B., Dasu, S., Stewart, D.M. & Tansik, D.A. (2002). Human issues in service innovation, *Journal of Operations Management,* 20, 159-174.
3. Richard, B. C. & Dasu, S. (2001). Want to Perfect Your Company's Service? Use Behavioral Science, Harvard Business Review, 79, 8-84.
4. Saco & Goncalves (2008). Service Design: An Appraisal, *Design Management Review*, 10-19.
5. Stuart, F. I. (2006). Designing and Executing Memorable Service Experiences: Lights, Camera, Experiment, Integrate, Action! *Business Horizons,* 49, 149-159.
6. Zomerdijk, Leonieke & Christopher, V. (2010). Service Design for Experience-Centric Services, *Journal of Service Research,* 13 (1), 67-82.
7. Wilson, A. M. (1998). The Use of Mystery Shopping in the Measurement of Service Delivery, *The Service Industries Journal,* 18(3), 148-162.

Module 3. Service Business Innovation: New Models for Growth

Service business innovation comes from the belief that new opportunities reside at the intersection of emerging trends and customer needs (either articulated needs but more importantly unarticulated needs). When insights gleaned at this intersection are overlaid with a lens focused on business model innovation, it becomes possible to define new approaches for capturing and deliver value. These approaches, of course, must be supported by specific organizational capabilities that lead to tangible innovation.

Subject 3.1. Business Model Innovation in Services

Business model innovation (BMI) means more than a brilliant insight coming at the right place and the right time. To confer a reliable competitive advantage, BMI must be systematically cultivated, sufficiently supported, and explicitly managed. A business model consists of two essential elements—the value proposition and the operating model.

Referenced materials

1. Zhenya Lindgardt, Martin Reeves, George Stalk, & Michael, S. D. (2009). Business Model Innovation: When the Game Gets Tough, Change the Game. The Boston Consulting Group, Inc.
2. IBM Global Business Services. (2007). Paths to Success: Three ways to innovate your business model.
3. Clayton, M. Christensen. (2003). The Innovator's Solution: Creating and Sustaining Successful Growth. Harvard Business School Press.
4. Jody, H. G. (2011). The Southwest Airlines Way. McGraw-Hill. New York.
5. Johnson, M.W., Christensen, C. M. & Henning Kagermann. (2008). Reinventing Your Business Model. Harvard Business Review.
6. Chesbrough, H., Rosenbloom, R. S. (2002). The role of the business model in capturing value from innovation. *Industrial and Corporate Change,* 11(3), 529-555.
7. Deloitte & Touche, Deloitte Consulting. (2002). Deconstructing the formula for Business Model Innovation, Deloitte Research.
8. Chesbrough, H. (2006). Open Business Models: How to Thrive in the New Innovation Landscape, Boston: Harvard Business School Press.

Subject 3.2. Growing a Platform for External Innovation

To offset the trends of rising development costs and shorter product life cycles, companies must experiment with creative ways to open their business models by using outside ideas and technologies in internal product development and by allowing inside intellectual property to be commercialized externally.

Referenced materials

1. Ballon, P., Pierson, J. & Delaere, S. (2005), Test and experimentation platforms for broadband innovation: examining European practice, in: Conference Proceedings of 16th European Regional Conference by the International Telecommunications Society (ITS), Porto, Portugal.
2. Semolic, B. (2009), Lessons Learned by the Business Case of LENS Living Lab - High Performance Manufacturing1 Living Laboratory, Towards a manifesto of Living Lab co-creation, INTERACT 2009.
3. Chesbrough, H. (2004), Managing Open Innovation: Chess and Poker, *Research-Technology Management*, 47(1), 23-26.

4. Sarkar, S. & Costa, A. I.A. (2008). Dynamics of open innovation in the food industry, *Trends in Food Science & Technology,* 19(11), 574-580.
5. Coveyduc, J., Legregni, L., Li, S., Reif, J., Sheng, L. & Zhu, J. (2008). Creating a platform for innovation by leveraging the IBM Idea Factory solution.

Subject 3.3. Service Value Networks

The total value created in the service network directly depends on how well the partners' objectives are aligned with each other and on the commitment of the partners to invest in complementary assets (Teece 1986, Moore 1991). Many firms define new strategies for developing the principles of open innovation because external resources can fill gaps in their current businesses. These firms looked at how their internal resources could be extended to outside organizations (Chesbrough, 2003). The focus should be extended to include other key stakeholders that are interdependent on the decision-making.

Referenced materials

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2. Teece, D.J. (1986). Profiting from technological innovation: Implications for integration, collaboration, licensing and public policy. *Research Policy,* 15, 285-305.
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APPENDIX D. SERVICE DESIGN AREA

Appendix D.1. Service Design

Overview

The target students of this course are those who mostly haven't had regular design training offered by existing design discipline and would like to equip the abilities to conduct service design. Therefore, the course will start with the introduction of some basic knowledge, tools, and process of design, and then explore necessary concepts and techniques used for design services. This course will be delivered through lecture and hands-on projects, so that students can develop their design attitude and abilities by dealing with real world issues. This course will also serve as the basis for students to move forward to take other service design related learning subjects, such as service experience design, interaction design, etc.

Part I. Course brief, it consists of course introduction, learning objectives, and overview of current adoptions

LEARNING OBJECTIVES

6. Understand the characteristics and unique qualities of services and service experiences.
7. Evaluate service systems and experiences for quality and value.
8. Identify opportunities for service design.
9. Design the elements of a service experience.
10. Visualize and present services and document designs for service experiences.

OVERVIEW OF CURRENT ADOPTIONS

Service Design (RISD ID)

Service Design for Public Space (NYU)

Design and the Service Experience (SVA)

Part II. Course modules and constituent subjects, it presents the structure of the course containing modules of knowledge components. In each module, several subjects can be organized to beef up the contents. In this part, we expect to give instructors an outline of the course first. The detailed description will be seen in Part III.

COURSE MODULES AND CONSTITUENT SUBJECTS

Module 1. Introduction to Service Design

Subject 1.1. What is service?

Subject 1.2. What is Service Design?

Subject 1.3. Principles of Service Design

Module 2. Practicing Service Design

Subject 2.1. Service Design Process

Subject 2.2. Service Experience Story

Module 3. Exploration

Subject 3.1. Discover

Subject 3.2. Define the gap

Subject 3.3. From context to concept

Module 4. Creation and Reflection

Subject 4.1. Concept Development

Subject 4.2. Conceptual Prototype

Subject 4.3. Concept Evaluation

Module 5. Implementation

Subject 5.1. Service Blueprint

Subject 5.2. Service Design Demonstration

Subject 5.3. Modification and Service Menu

Part III. Detailed description and referenced materials, in this part, the information of each subject in each module is elaborated in a detailed level, which an instructor can use it for determining the constituent modules and subjects for his/her course design, and sourcing teaching materials based on the this part. Moreover, the updated information can be added based on the initial contents allocated in this part.

DETAILED DESCRIPTION AND REFERENCED MATERIALS

Module 1. Introduction to Service Design

This course is the default setting for interdisciplinary students. They may not be familiar with service and service design. Therefore, this course starts from the basic knowledge for them to adjust mindsets to be ready for this course.

Subject 1.1. What is service?

Introduce the nature of service and the service economy and service industries.

Subject 1.2. What is Service Design?
Introduce the definitions of service design from different approaches. Service design as an interdisciplinary approach, so that we also discuss the relationship between varied fields and service design.
Textbook: (Stickdorn & Schneider, 2010)

Subject 1.3. Principles of Service Design
Textbook: (Stickdorn & Schneider, 2010)
Forum Slides: (Dubberly, 2011)

Module 2. Practicing Service Design

This course is designed for learning by doing. Let students get into the whole process of service design and feel the progress that service concept growth from none to all. Before we hand on the service design project, we have to go through the basic knowledge.

Subject 2.1. Service Design Process
Introduce the basic process of service design that students can understand the whole picture of what we have to do.
Textbook:(Stickdorn & Schneider, 2010)
Book:(Best, 2006; Miettinen & Koivisto, 2009)

Subject 2.2. Service Experience Story
Let student experience services and share with the class. It helps them to understand the importance of experience.

Module 3. Exploration

To face the problem and ask good questions are really important to start the design task.

Subject 3.1. Discover

Techniques for discovering customers' needs can be used include shadowing, contextual interviews, culture probes, environment description, ecology map, front/ back stage interaction, business goals and needs, societal trends, relevant technology, competitive landscape.
Textbook:(Beyer & Holtzblatt, 1998)

Subject 3.2. Define the gap
Techniques used for defining the gap from customers' needs include gap analysis, affinity diagram, priority matrix, LEGO serious play, service specification, etc.
Paper: (Cantoni, Botturi, Faré, & Bolchini, 2009; Cantoni et al., 2009)

Subject 3.3. From Context to Concept
The task is to generate and develop solutions based on the identified problems and in-depth insights generated in the exploration; the identification of customers' needs, motivations, expectations, the service providers' processes and constraints, and the illustration of customer journey, consisting of a sequence of touch points. (Stickdorn & Schneider, 2010)
Textbook: (Beyer & Holtzblatt, 1998)

Module 4. Creation & Reflection

The process turns your findings to ideas that can help to solve the problem. This is an iterative process that needs to experience the setback progress and take it.

Subject 4.1. Concept Development
Techniques can be used for concept development include brainstorming, body-storming, experience sketching, group sketching, open space technology, idea interview, etc.

Subject 4.2. Conceptual Prototype
The main task is to build the ideas and concepts to communicate and test it with user to get the feedback. It is a iteration process between creation and reflection. It is uneasy for prototype intangible services rather than tangible products. To prototype

services that are necessary to incorporate the emotionally important aspects of personal interactions with the service proposition.
Paper:(Buchenau & Suri, 2000)

Subject 4.3. Concept Evaluation
Techniques can be used include card sorting, cognitive walkthrough, constructive interaction, diagnostic evaluation, expert evaluation, feasibility check, heuristic evaluation, pluralistic walkthrough, retrospective testing, sticker vote, etc.

Module 5. Implementation

Subject 5.1. Service Blueprint
The blueprint is an operational tool that describes the nature and the characteristics of the service interaction in enough detail to verify, implement and maintain it.
Paper:(Mary Jo Bitner, 2008)
Book:(Kalakota & Robinson, 2004)

Subject 5.2. Service Design Demonstration
Mock-ups, Role-play, Storyboarding, Scenario.

Subject 5.3. Modification and Service Menu
Techniques include service specification, role script, guidelines, business plan, templates, service prototyping, etc.

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Extended References

Books

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2. Bill Buxton. (2007). Sketching User Experiences: Getting the Design Right and the Right Design.
3. John Thackara. (2005). In the Bubble: Designing in a Complex World.
4. Joe Kolko. (2011). Exposing the Magic of Design: A Practitioner's Guide to the Methods and Theory of Synthesis.
5. Mike Kuniavsky. (2003). Observing the User Experience: A Practitioner's Guide to User Research.
6. Thomas Tullis, William Albert. (2008). Measuring the User Experience: Collecting, Analyzing, and Presenting Usability Metrics.
7. Donald A. Norman. (2002). The Design of Everyday Things.

Papers

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2. Stefan Thomke(2003). R&D Comes to Services: Bank of America's Pathbreaking Experiments. Harvard Business Review.
3. Mary Jo Bitner(1990). The Service Encounter: Diagnosing Favorable and Unfavorable Incidents. Journal of Marketing.
4. Nicola Morelli(2002). Designing product/service systems: A methodological exploration. Design Issues.
5. Sabine Flie(2004). Blueprinting the Service Company: Managing the Service Processes Efficiently. Journal of Business Research.
6. Susan Goldstein(2002). The Service Concept: The Missing Link in Service Design Research?. Journal of Operations Management.

Appendix D.2. Service Experience Design

Overview

Experience design is not driven by a single design discipline. Instead, it requires cross-disciplinary perspectives that consider multiple aspects of the brand, business, environment, and experience from product, packaging and retailing environment to the attitude and behavior of employees. Experience design seeks to develop the scenarios for exchanging values via product, service, or event. This course aims to cover various touch points which compose the scenario of service experience which could be defined by different sensational sources and cognitive judgments. This course could be conducted both by lecture and hands-on practice in order to equip students' abilities in dealing with real world issues in service experience design, so that they can internalize their knowledge and skills.

Part I. Course brief, it consists of course introduction, learning objectives, and overview of current adoptions

Learning objectives:

1. Understand users' experience, such as how they live, what they need and want.
2. Envision new opportunities with brainstorming, opportunity mapping.
3. Conduct "Just-enough" prototyping to model in revealing the quality of the experience
4. Design solutions, such as what is the role of the product or service in the people's lives? what is the right mental model for the user? what is the look and feel fro the interaction? what are the technical issues to solve?
5. Craft the interactive experience, such as what will people see, hear and feel
6. Present and test the outcomes.

Part II: Course modules and constituent subjects

Course Modules:

Module 1: Experience Profile

Understanding and reviewing the value and importance of experience and senses as it relates to business and the larger cultural agenda.

1.1 Understanding experience)

1.1.1 Philosophy and Anthropology

1.1.2 Technology

1.2 Experience Design

Module 2: Experience Exploration

Researching existing companies, systems, infrastructures, and events. Field notes and real time observation gathering data as it happens.

2.1 Touch and Feeling

2.2 Taste

2.3 Sight

2.4 Smell

2.5 Hear

2.6 Synthesis

2.7 Customer and Design Research

Module 3: Scenario Development

Creating an experiential solution (either product, service, event, or environment) which functions within the audience context as well as the market and other forces within a system.

3.1 Information Design

3.2 Interface Design

3.3 Interaction Design

3.4 Sensorial Design

3.5 Service Design

3.6 Experience Design

3.6.1 User Research

3.6.2 Prototyping

3.6.3 User Experience Evaluation

Module 4: Behavior Prototyping and Testing

Evaluation of projects based on market conditions and outside events, including innovation and development processes.

4.1 Interaction Criticism

4.2 Critical Strategies

Part III: Detailed description and referenced materials

Detailed description <<need to be developed>>

Module 1: Experience Profile

Module 2: Experience Exploration

Module 3: Scenario Development

Module 4: Behavior Prototyping & Testing

Referenced Materials:

1. Nathan Shedroff, Experience Design 1.1, Experience Design Books, 2009, ISBN: 978-0982233900
2. Diane Ackerman, A Natural History of the Senses, 1991, Vintage Press, ISBN: 978-0679735663
3. Luca Turin, Harper Perennial, The Secret of Scent, ISBN: 978-0-06-113384-8
4. David Abram, The Spell of the Sensuous, Experience Vintage Books, 1997, ISBN: 978-0679776390
5. Thomas McCraw, Prophet of Innovation, Harvard University Press, ISBN: 978-0674025233
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12. Csikszentmihalyi, M. & Robinson, R.. The Art of Seeing: AnInterpretation of the Aesthetic Encounter. Los Angeles: Getty Publications, 1990

Appendix D.3. Service Interaction Design

Overview

Interaction design defines product behavior, mediating relationships between people and people, people and products, people and environments, and people and services across a variety of contexts. The model of designing for interaction involves multi-disciplinary teams engaged in the planning, conception, design, implementation, and support of products, services, and systems that meet human needs and desires. This human-centered model considers psychological, social, and cultural factors on the one hand, and technical, economic, and environmental factors on the other. Service interaction design aims to design service interfaces in order to facilitate the interaction between service provision and reception. This course can be taught by lecture and hands-on practice, so that students can equip the abilities to face issues in real world settings.

Part I. Course brief, it consists of course introduction, learning objectives, and overview of current adoptions

Learning objectives:

4. Demonstrate design skills, with a focus on interaction, interface design, and mechanization, through the completion of technical exercises, presentation of conceptual plans, creation of project prototypes.
5. Create dynamic strategies for organizing and presenting digital information, through oral/visual presentations of conceptual project proposals, the completion of technical exercises and the submission of original project work.
6. Explain the significance of the key developments in the history of digital media, with a focus on how the precursors to interactivity led to contemporary practices, through participation in group discussions and writing of project texts.

Part II: Course modules and constituent subjects

Course Modules:

- **Module 1. (Entitative Interaction) Interface and Activities**

Student should discuss the difference between the immediate experience of interaction and the selection of data or evidence on which to base further study of interaction.

1.1 Introduction: The History of Design and the Problem of Interaction

1.2 Mechanisms of Behavior: Communication Theory

1.3 Cognitive Science and Information Processing

- **Module 2. (Existential Interaction) Reinterpretation & Contextual Transaction and Development**

  Student will explore the different meanings of "interaction" among a variety of authors who have had important influence on our understanding of the concept. As well as study literature from a wide variety of fields and explore different interpretations that have given the concept of interaction rich meaning in contemporary life. Student also will study how other concepts in the arts and sciences are related to interaction and how they deepen its significance.

  2.1 Social Life: Semantics and Pragmatics

  2.2 Personal Perspective in the Creation and Projection of Meaning

  2.3 Audience and Users

  2.4 Human Cognition

  2.5 Transactions

  2.6 Problematic Perspective on the Relationships of Character, Arts, and Action and Experience:

  2.7 Spiritual and Rational Perspective on Reality

- **Module 3. Prototyping & Refining**

  The goal is to provide a common framework and language for discussing interaction design in the programs of the School of Design and in the varieties of practice that one encounters in the professional world. An art is a systematic discipline for thinking, doing, and making. It provides principles and strategic guidance for the use of the many specific methods and techniques that are employed in design. In contrast, methods provide tactical support in addressing design problems. Methods are characterized by a particular intellectual, disciplinary, or scientific framework. They typically bring special knowledge

into practical use for the designer. Finally, techniques are individual tools and ways of working to solve technical design problems. The creative work of the designer lies in organizing ideas and information into expressive narratives and arguments that bring about changes in the attitudes and behavior of people. Poetics emphasizes the creation of intelligent and emotionally satisfying experiences as artistic expressions.

3.1 The Threads of Culture: Formal and Material Themes

3.2 What is a Product?

- 3.2.1 Traditional Model of Products
- 3.2.2 Interactive Model of Products: Communications, Artifacts, Activities, and Environments

3.3 What is a Information?

- 3.3.1 Information and Experience: Data, Facts, Connections, and Principles
- 3.3.2 Information Mapping

3.4 The Arts of Communication and Interaction Design

- 3.4.1 Design Language: Rhetoric and Poetics
- 3.4.2 Grammar, Semiotic, and Dialectic

3.5 Practicing Interaction Design

- 3.5.1 Design Process and Practice
- 3.5.2 Methods of Invention
- 3.5.3 Methods of Visualization - Schemata for Navigating Information Environments
- 3.5.4 Methods of Visualization - *Discovery,* Learning, & Memory in Information Environments
- 3.5.5 Summary: Design & New Product Development

■ **Module 4. Principles & Values**

Student will explore the problem of principles and values in interaction design. What are the grounds for judging effective interaction design and what values should guide interaction designers in their work? These are questions that go beyond art and methodology. We will explore the place of interaction and interaction design in personal life, organizational life, social and economic life,

and cultural well-being. Our goal is to raise productive questions about the nature of principles and values in a world of diversity and conflict, where pluralism is an objective fact of human experience and where values are essentially contested in practical action.

4.1 Principles and Values in Interaction Design

4.2 Pluralism and Objectivity

Part III. Detailed description and referenced materials, in this part, the information of each subject in each module is elaborated in a detailed level, which an instructor can use it for determining the constituent modules and subjects for his/her course design, and sourcing teaching materials based on the this part. Moreover, the updated information can be added based on the initial contents allocated in this part.

DETAILED DESCRIPTION AND REFERENCED MATERIALS

<< Need to be **developed>>**

- Module 1: (Entitative Interaction) Interface and Activities
- Module 2: (Existential Interaction) Reinterpretation & Contextual Transaction and Development
- Module 3: Prototyping & Refining
- Module 4: Principles & Values

Extended references:

- Aristotle. Introduction to Aristotle (Modern Library Series) by Richard McKeon (Editor). Hardcover, Modern Library. ISBN: 0679600272
- Richard Buchanan and Victor Margolin (eds.). Discovering Design : Explorations in Design Studies. Paperback, University of Chicago Press. ISBN: 0226078159
- Seamus Heaney. Crediting Poetry : The Nobel Lecture. Hardcover, Farrar Straus & Giroux. ISBN: 0374131384
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- Richard A. Lanham. The Electronic Word : Democracy, Technology, and the Arts. Paperback, University of Chicago Press. ISBN: 0226468852

- Brenda Laurel. Computers As Theatre. Paperback, Addison-Wesley. ISBN: 0201550601
- Victor Margolin and Richard Buchanan (eds.). The Idea of Design. Paperback, MIT Press. ISBN: 0262631660
- Geoffrey A. Moore. Crossing the Chasm: Marketing and Selling High-Tech Products to Mainstream Customers. Paperback, Harperbusiness. ISBN: 0887307175
- Plato. Phaedrus. (Hackforth translation). Paperback, Cambridge University Press. ISBN: 0486277984
- Wayne C. Booth, Gregory G. Colomb, Joseph M. Williams. The Craft of Research : From Planning to Reporting. Paperback, University of Chicago Press. ISBN: 0226065847
- Kate L. Turabian, John Grossman, Alice Bennett. A Manual for Writers of Term Papers, Theses, and Dissertations. Paperback, University of Chicago Press. ISBN: 0226816273
- Bill Moggridge, Designing Interactions
- Reas, Casey and Ben Fry. Processing: A Programming Handbook for Visual Designers and Artists. MIT Press, 2007.
- Reas, Casey, Chandler McWiliams, and Jeroen Barendse. Form+Code in Design, Art, and Architecture. Princeton Architectural Press, 2010.

Appendix E. Service Engineering Area

Appendix E.1. Service Process Modeling and Analysis

Overview

Business Process Modeling is the activity of representing processes of an enterprise, so that the current process may be analyzed and improved. This course not only focuses on modeling but also emphasizing the business process change management, which helps organizations master change successfully and create immediate as well as durable competitive advantage.

Part I. Course brief, it consists of course introduction, learning objectives, and overview of current adoptions

Learning Objectives

7. Be conversant in the terms used to describe, analyze, and improve business processes in organizations.
8. Understand business process modeling languages.
9. Model business processes for subsequent implementation.
10. Identify weaknesses in a given process design and suggest improvements that will benefit organizational performance.
11. Redesign a given process using improvement patterns and outside best practices.
12. Develop an implementation and integration strategy for processes that leverages organizational and technical capabilities of an organization.

Overview of Current Adoptions

Business Process Management

Business Process Modeling, Design and Simulation

Business Process Design and Implementation

Value-driven Business Process Management – From Strategy to People and IT based Execution

Part II: Course modules and constituent subjects

Module 1. Preparing the Enterprise

Subject 1.1. Business Model

Subject 1.2. People-Centric and System-Centric Processes

Subject 1.3. Business Process Management

Module 2. Managing the Service Operation

Subject 2.1. Managing Capacity and Demand

Subject 2.2. Service Quality Management

Subject 2.3. Managing service process

Subject 2.4. Service Failure Recovery

Subject 2.5. Service Supply Chain Management

Module 3. Business Process Analysis

Subject 3.1. Business Process Modeling Technology

Subject 3.2. Process Architecture

Subject 3.3. Process Modeling

Subject 3.4. Process analysis

Module 4. Technology Support for Business Processes

Subject 4.1. Process Simulation

Subject 4.2. Process Design

Subject 4.3. Process Transformation

Module 5. Process Innovation

Subject 5.1. Business Process Evaluation

Subject 5.2. Business Process Improvement

Subject 5.3. Business Process Reengineering

Part III. Detailed description and referenced materials, in this part, the information of each subject in each module is elaborated in a detailed level, which an instructor can use it for determining the constituent modules and subjects for his/her course design, and sourcing teaching materials based on the this part. Moreover, the updated information can be added based on the initial contents allocated in this part.

DETAILED DESCRIPTION AND REFERENCED MATERIALS

Module 1. Preparing the Enterprise

Subject 1.1Business Model

Asking (1) what is business model; (2) what is business process.

Referenced materials

Paper: (Magretta, 2002)

Book: (Weill & Vitale, 2001)

Book section: (Bergholtz, Jayaweera, Johannesson, & Wohed, 2003)

Subject 1.2. People-Centric and System-Centric Processes

Asking (1) how do we analyze human performance; (2) how does BPM help improve performance; (3) value-adding versus value-preserving activities.

Referenced materials

Book: Harmon Ch.10 (Harmon, 2007)

Subject 1.3 Business Process Management

Asking (1) what is BPM; (2) value of BPM; (3) typical business situations where BPM delivers most value; (4) the process of process management.

Referenced materials

Book:(Kirchmer, 2011)

Module 2. Managing the Service Operation

Subject 2.1. Managing Capacity and Demand

<<Need to be added>>

Referenced materials

Textbook: Fitz, Ch. 11(Fitzsimmons & Fitzsimmons, 2011)

Case: The Yield Management Analyst(Fitzsimmons & Fitzsimmons, 2011)

Case: (University Health Services: Walk-In Clinic, 1980)

Subject 2.2. Service Quality Management

<<Need to be added>>

Referenced materials

Paper: Aligning service strategy through Super-Measure management(Morgan & Rao, 2002)

Case: (Measure of Delight: The Pursuit of Quality at AT&T Universal Card Services (A), 1993)

Subject 3.3. Managing Service Process

<<Need to be added>>

Subject 3.4. Service Failure Recovery

<<Need to be added>>

Referenced materials

Paper: The Profitable Art of Service Recovery(Hart, Heskett, & Sasser Jr, 1990)

Case: (Federal Express: The Money Back Guarantee (A), 1989)

Subject 2.5. Service Supply Chain Management

<<Need to be added>>

Module 3. Business Process Analysis

Subject 3.1. Business Process Modeling Technology

Covering:

(1) Business Process Modeling Notation (BPMN)

(2) Cognition enhanced Natural language Information Analysis Method (CogNIAM)

(3) Extended Business Modeling Language (xBML)

(4) Event-driven process chain (EPC)

(5) ICAM DEFinition (IDEF0)

(6) Unified Modeling Language (UML)

Referenced materials

<<Need to be added>>

Subject 3.2. Process Architecture

Covering:

(1) Introduction to process modeling.

(2) What are the components of a process model?

(3) How can we capture business reality in a model?

(4) Core versus support processes

Referenced materials

Book: Harmon Ch.4 (Harmon, 2007)

Subject 3.3. Process Modeling

Covering:

(1) How do process models look in BPMN?
(2) What is the difference between an analytical and an implementable process model?
(3) How do computers understand process model?
(4) Components of Process Models

Referenced materials

Book: Harmon Ch. 9(Harmon, 2007)

Subject 3.4. Process analysis

<<Need to be added>>

Module 4. Technology Support for Business Processes

Subject 4.1. Process Simulation

<<Need to be added>>

Subject 4.2. Process Design and Facility planning

<<Need to be added>>

Referenced materials

Textbook: Fitz, Ch. 7(Fitzsimmons & Fitzsimmons, 2011)

Case: (Shouldice Hospital Ltd, 1983)

Subject 4.3. Process Transformation

Covering:

(1) How do you ensure that the best performer does the job?
(2) Organization models
(3) Task allocation strategies
(4) Mobile performers
(5) External participants

Referenced materials

Paper: (Muehlen, 2004)

Module 5. Process Innovation

Subject 5.1. Business Process Evaluation

<<Need to be added>>

Subject 5.2. Business Process Improvement

Covering:

(1) How can we redesign our processes?

(2) Patterns for process improvement

Referenced materials

Paper: (Hammer, 1990)

Subject 5.3. Business Process Reengineering

Covering:

(1) How can we reinvent our processes?

(2) Leveraging technology to create innovative processes

Referenced materials

Case: (US Military Entrance Command (USMEPCOM), 2009)

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2. Advanced Conceptual Modeling Techniques. In A. Olivé, M. Yoshikawa & E. Yu (Eds.), (Vol. 2784, pp. 364-377): Springer Berlin / Heidelberg.
3. Federal Express: The Money Back Guarantee (A), bth 1, Harvard Business School Cases (1989).
4. Fitzsimmons, J. A., & Fitzsimmons, M. J. (2011). *Service management : operations, strategy, information technology* (7th ed.). New York: McGraw-Hill.
5. Harmon, P. (2007). *Business process change : a guide for business managers and BPM and six sigma professionals* (2nd ed.). Amsterdam ; Boston: Elsevier/Morgan Kaufmann Publishers.
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7. Kirchmer, M. (2011). *High performance through process excellence : from strategy to execution with business process management*. New York: Springer.
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Appendix E.2. Service System Engineering

Overview

Service System Engineering (SSE) is a graduate-level introductory course to bring in the cross-disciplinary components from engineering, computer science, business and cognitive sciences. This course aims to equip students with the design and implement service information systems to realize the information flows of business processes which realize service value exchange and creation. SSE focuses on facilitating students to access various engineering methodologies and conducting real world projects to internalize knowledge and skills in implementing service systems.

Part I. Course brief, in consists of course introduction, learning objectives, and overview of current adoptions

LEARNING OBJECTIVES

This course learning objectives and outcomes are shown as below:

1 Build sound technical foundation with a disciplinary focus and the flexibility to pursue professional interests in areas outside of engineering that could lead to a wide variety of career paths.

2 Learn how to function on multidisciplinary teams that extend the traditional boundaries of engineering.

3 Learn to apply problem-solving techniques to system's problems that involve human-based uncertainties.

4 Learn design and improve systems and processes that provide services by applying a system perspective coupled with a thorough understanding of the customer.

5 Understand functional specifications in programming methodology; moreover, to learn modularization in program design and development.

6 Understand and implement the software development process, software requirements specifications. Moreover, learn the risks and liabilities of applications development.

OVERVIEW OF CURRENT ADOPTIONS

Country	Instructor	Institution	Course Title (Date)	Description
US	William Y. Arms	Computer Science, Cornell University	Software Engineering (Fall 2011)	It is an introduction to the practical problems of specifying, designing, building, testing, and delivering reliable software systems.
US	Steve Thebaut	Computer & Information Science & Engineering, University of Florida	Software Engineering (Fall 2011)	Software project management and the development of tools, methods, and theories to support software development.
US	David T Roberts	Texas A&M University Central Texas	Software Engineering (Fall 2011)	The study of the organization, management, and development of software projects large and small.
US	Robbie Cohen	Stevens Institute of Technology (S3course description)	Software Engineering (Fall 2011)	Providing a working knowledge of the terms, principles and methods of Software Engineering, with emphasis on the topics described in the IEEE's Software Engineering Body of Knowledge.
US	Dana M. Johnson	Michigan Technological University	Introduction to Service Systems Engineering	Providing a strong foundation and fundamentals of service system engineering analysis and design.
TW	黃慶育	國立清華大學資工系	軟體工程	State-of-practice and state-of-the-art principles, methods, and tool for planning, design, coding, validation and maintenance of software systems will be studied and discussed.

Part II. Course modules and constituent subjects, it presents the structure of the course containing modules of knowledge components. In each module, several subjects can be organized to beef up the contents. In this part, we expect to give instructors an outline of the course first. The detailed description will be seen in Part III.

COURSE MODULES AND CONSTITUENT SUBJECTS

Module 1. Emerging Technology Overview

Subject 1.1 Sense Technology: mobile

Subject 1.2 Social Technology: Network & Social Media

Subject 1.3 Virtual Reality Technologies

Subject 1.4 Cloud Computing

Module 2. Software Engineering Overview

Subject 2.1 Introductions to Software Engineering

Subject 2.2 Software Processes

Subject 2.3 Requirements Engineering

Subject 2.4 Architectural Designs

Subject 2.5 Designs and Implementation

Subject 2.6 Software Testing

Module 3. Service System Management

Subject 3.1 Project Management

Subject 3.2 Project Planning

Subject 3.3 Quality Management

Subject 3.3 Configuration Management

Subject 3.4 Process Improvement

Part III. Detailed description and referenced materials, in this part, the information of each subject in each module is elaborated in a detailed level, which an instructor can use it for determining the constituent modules and subjects for his/her course design, and sourcing teaching materials based on the this part. Moreover, the updated information can be added based on the initial contents allocated in this part.

DETAILED DESCRIPTION AND REFERENCED MATERIALS

Module 1. Emerging Technology Overview

Subject 1.1 Sense Technology: mobile

As MIT deployed the Sixth Sense prototype comprises a pocket projector, a mirror and a camera contained in a pendant like, wearable device. Both the projector and the camera are connected to a mobile computing device in the user's pocket. It shows the trend of sense technology use in mobile applications is expected to increase, as enterprises emerge from the global recession. In this subject, most popular sense mobile technology will be introduced to all students. Most of these technologies had affected big corporate strategies, address mobile challenges. All information from people interact, such as visual information enabling surfaces, walls and physical objects around us to be used as interfaces; while the camera recognizes and tracks

users' hand gestures. How to connect multi-touch and multi-user interaction into service industry strategy and service behavior enhancement? We will interact with all students about the most important issues of sense mobile technology impact.

Subject 1.2 Social Technology: Network & Social Media

This subject will take an overview in “social technology” from a cultural perspective-the network & social media, with a focus on how media technologies figure in practices of everyday life and in the construction of social relationships and identities. We will work from an expansive definition of what constitutes “social media,” considering social network sites, smartphone apps, and online games, among other technologies. The course itself will involve communication in social media channels in addition to the traditional seminar format, thus we will be actively participating in the phenomena under study as we go.

Subject 1.3 Virtual Reality Technologies

You will be taught about five senses of you (vision, hearing, smell, touch, and taste) were control where you are and what you're doing at any given moment. We have two specific purposes with this subject. Learn about how the computers model the 3D environment and apply this knowledge in a specialized package and on ordinary PCs. Students will look at the Virtual Reality Markup Language (VRML) as an example of a three-dimensional modeling environment and knowing several models using this language. We will also demonstrate transformation of shapes, including translation, rotation, and scaling and the use of textures, light, and sound to enhance the immersive effect. Then the animation of worlds in real time through user interactive sensors, timed animations, and customized scripts will be introduced. Some typical VRML tool (Cosmo's builder on the SGI) are going to look at how VR looks in a number of environments.

Subject 1.4 Cloud Computing

Our aim in this subject is to introduce students to the basics of the emerging cloud computing paradigm. It is important for you to learn how this paradigm came about and understand its enabling technologies. For this to happen, we start by an overview of basic system's ideas as well as an introduction to parallel and distributed

computing. It is important to cover parallel and distributed systems, their advantages and disadvantages. Understanding these systems is critical to understanding cloud computing systems. In the end, you would be able to understand the computer systems constraints, tradeoffs and related concept of the computing needs for different types of data and applications.

Module 2. Software Engineering Overview

Subject 2.1 Introductions to Software Engineering

To understand the professional software development and software engineering ethics. To introduce software engineering and to explain its importance. To introduce ethical and professional issues and to explain why they are of concern to software Engineers.

Subject 2.2 Software Processes

Topic covered Software process models, Process activities, Coping with change and the Rational Unified Process. To describe a number of different process models and when they may be used. To understand outline process models for requirements engineering, software development, testing and evolution.

Subject 2.4 Requirements Engineering

To understand functional and non-functional requirements. What is the software requirements document? To describe the requirements specification, engineering processes, elicitation and analysis, validation and management.

Subject 2.5 Architectural Designs

To introduce architectural design and to discuss its importance. To explain why multiple models are required to document software architecture. To describe types of the architectural model that may be used. To discuss how domain-specific reference models may be used as a basis for product lines and to compare software architectures.

Subject 2.6 Designs and Implementation

To introduce Object-oriented design using the UML and what design patterns is. To understand the service system with the Open source development and related Implementation issues. To know the software designer and implementer can get valuable feedback from the users early in the project in prototyping method. The client and the contractor can compare if the software made matches the software specification, according to which the software program is built. It also allows the software engineer some insight into the accuracy of initial project estimates and whether the deadlines and milestones proposed can be successfully met.

Subject 2.7 Software testing

Which is an investigation conducted to provide stakeholders with information about the quality of the service under test. Software testing can also provide an objective, independent view of the software to allow the business to appreciate and understand the risks of software implementation. Understanding the test techniques concepts include, but are not limited to, the process of executing a program or application with the intent of finding software bugs (errors or other defects).

Software testing, depending on the testing method employed, can be implemented at any time in the development process. However, most of the test effort occurs after the requirements have been defined and the coding process has been completed. As such, the methodology of the test is governed by the software development methodology adopted.

Module 3. Service System Management

Subject 3.1 Project Management

This course is intended to be an introduction to the field of project management. The primary objective of this course is to acquaint students with a broad basic overview of project management, and the role of a project manager throughout the five primary processes of managing projects. The other three required core courses will provide a more comprehensive coverage. Understand the traditional and innovative approach of project management.

Subject 3.2 Project planning

To understand Service System (SS) Project planning related issues, which involves the SS development of action items and scheduling that will keep the project moving forward on a consistent basis. When executed properly, project planning will also include target dates for the completion of each action item, making it possible to move forward with other pending items in an orderly manner. An actual project plan is referred to as an escalation list in some business settings. So that the necessary resources can be estimated and costs for each activity can be allocated to each resource, giving the total project cost. The project plan may be optimized to achieve the appropriate balance between resource usage and project duration to comply with the project objectives. Once established and agreed, the plan becomes what is known as the service system development baseline.

Subject 3.3 Service Quality management

Students have an overview of the most relevant quality management methods & approaches in the service sector and are able to use their knowledge in practice. The purpose and benefits of a QM-system like ISO 9000:2000, EFQM, 2Q and relevant methods of Service Management and Customer Satisfaction like SERVQUAL, Kano, and GAP are understood. This subject will describe the need for service quality management and unveils future development initiatives in domain.

Subject 3.4 Configuration management

This subject presents different methodologies for the software configuration management process, and introduces software configuration control, status accounting and configuration auditing and their application. After completing this subject, students should be able to understand the software configuration management process; basic concept of configuration identification and configuration control, audit and knowing some common configuration management tools.

Subject 3.5 Process improvement

This subject will overview concepts and methods related to performing process improvement for improving the quality of software systems developed/maintained within organizations. Various process improvement models will be considered with an emphasis on the Capability Maturity Model Integration model. Upon successful

completion of the course, students will know the purpose and history of service system engineering process improvement. Then analyze the characteristics of various process improvement models and the process improvement infrastructure within an organization.

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2. Pfleeger, Shari Lawrence, Software Engineering Theory and Practice, fourth edition. Prentice- Hall 2009.
3. Grady Booch, Robert A. Maksimchuk, Michael W. Engel, and Bobbi J. Young, Object-Oriented Analysis and Design with Applications, third edition. Benjamin/Cummings 2007.
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12. Sheehan, Jerry, Understanding Service Sector Innovation, *Communications of the ACM*, Vol. 49, No. 7, July, 2006, pp 43-48

Appendix E.3. Service Oriented Technology

Overview

Service-Oriented Technology (SOT) is a newly developed design philosophy of modern information systems for ever-increasing demands. The service orientation approach connects business process and IT capability to enable a holistic view of problem solving. This course is designed to provide a thorough introduction to SOT, which refers to a design pattern made up of components and interconnections that stress interoperability and location transparency. This course covers both the design of SOT systems as well as practical hands-on programming of a distributed based system. Also, looks at the impact of SOT on software quality, efficiency, security, performance and flexibility.

Part I. Course brief, in consists of course introduction, learning objectives, and overview of current adoptions

LEARNING OBJECTIVES

5. Understand what SOT is about and realize SOT principles.
6. Be able to problem solve and develop program logic for distributed based systems.
7. Understand how distributed systems are evolving and how that may change the way business is conducted in the future.
8. Understand the impact of SOT on software quality, efficiency, security, performance and flexibility.

OVERVIEW OF CURRENT ADOPTIONS

[Describe the current status of the course taught in institutes around the world, including the statistics of course number, the names used by different educational programs, and the important milestone worthy to highlight.]

Country	Instructor	Institution	Course Title (Date)	Description
Czech	Jan Pavlovič	Masaryk University	Business Process Management (Spring 2011)	SOA & BPM by IBM server
India	Virtual Tutor	Anna University of Technology	service oriented architecture	SOA, Web Services, SOA platform basics, WS-BPEL

		Coimbatore		basics
India		University of PUNE	Service Oriented Architecture (2008-2009)	SOA Planning and Analysis, Design and implementation, Managing SOA Environment
India		University of Mumbai	SERVICE ORIENTED ARCHITECTURE (2007-2008)	SOA, Web Services, Service Layers, SOA Governance
US	Prabhash Shrestha	Georgetown University	Service Oriented Architecture (Spring 2011)	SOA Analysis, Planning and Design and platforms
US	Dawn Gregg	University of Colorado Denver	Service Oriented Architecture	Understand the impact of SOA on software quality, efficiency, security, performance and flexibility.
Taiwan	Ci-Wei Lan	National Tsing Hua University	Introduction to Service-Oriented Architecture (2008)	SOA, Web Services, WS-BPEL basics, WS-Security
Taiwan	Soumya Ray	National Tsing Hua University	Introduction to Service-Oriented Analysis and Design (Sep 13, 2010 – Jan 10, 2011)	This course is an introduction to how we can restructure and codify businesses as interrelated services, and how we can design and develop IT systems to automate and scale these services.
Taiwan	S.-Y. Hwang	National Sun Yat-Sen University	Process Management in Service Computing (Sep, 2008- Jan, 2009)	XML Features, Web Services,WS-BPEL,WS-CDL,WS-* Security

Part II. Course modules and constituent subjects, it presents the structure of the course containing modules of knowledge components. In each module, several subjects can be organized to beef up the contents. In this part, we expect to give

instructors an outline of the course first. The detailed description will be seen in Part III.

COURSE MODULES AND CONSTITUENT SUBJECTS

Service-Oriented Technology (SOT) means that modern software development paradigms include highly distributed applications that are implemented in distributed based systems. Rather than discrete, disparate programs, SOT combines these programs into interoperable systems that map directly to business processes. This course establishes a strong understanding of the concepts needed to have an effective working knowledge of SOT methodologies, modeling, design, service implementation, orchestration and architectural frameworks. SOT package business processes as services, enabling organizations to become more agile by integrating internal and external systems, regardless of their platform. In this course, you gain the skills necessary to design, model and implement SOT by applying SOT related methodologies, technologies and standards.

Module 1. Service-Oriented Technology Fundamentals

Subject 1.1. Introduction to Distributed Computing

Subject 1.2. Introduction to SOA

Subject 1.3. Introduction to Cloud Computing

Module 2. Service-Oriented Technology Planning and Analysis

Subject 2.1. Stages of the Lifecycle Analysis

Subject 2.2. Delivery Models Planning

Subject 2.3. Basic Modeling Building Blocks

Module 3. Service-Oriented Technology Design and implementation

Subject 3.1. Mapping Business Processes to Technology

Subject 3.2. Designing Service Integration Environment

Subject 3.3. Tools Available for Appropriate Designing

Subject 3.4. Implementation of Integration Patterns

Module 4. Service-Oriented Technology Management

Subject 4.1. QoS Compliance and Governance

Subject 4.2. Service Level Agreement (SLA) and Policy

Part III. Detailed description and referenced materials, in this part, the information of each subject in each module is elaborated in a detailed level, which an instructor can use it for determining the constituent modules and subjects for his/her course design, and sourcing teaching materials based on the this part. Moreover, the updated information can be added based on the initial contents allocated in this part.

DETAILED DESCRIPTION AND REFERENCED MATERIALS

Module 1. Service-Oriented Technology Fundamentals

Service-oriented technologies create the basis for agility so that companies can deliver new, more flexible business processes that harness the value of the services approach from a customer's perspective. Service-oriented approaches are used for developing software applications and software-as-a-service that can be sourced as virtual hardware resources, including on-demand and utility computing.

Subject 1.1. Introduction to Distributed Computing

Various vendors of distributed computing have created and marketed distributed computing systems for years, and have developed numerous initiatives and architectures to permit distributed processing of data and objects across a network of connected systems. Scalability is a great advantage of distributed computing. Though they provide massive processing power, super computers are typically not very scalable once they're installed.

Referenced materials

1. Braun, T. D. et al. (2001). A Comparison of Eleven Static Heuristics for Mapping a Class of Independent Tasks onto Heterogeneous Distributed Computing Systems, *Journal of Parallel and Distributed computing*, 61, 810-837.
2. Xin, L., Chunming, Q., Dantong, Y., & Tao, J. (2010). Application-specific resource provisioning for wide-area distributed computing, *IEEE Network*, 24(4), 25–34.
3. Coulouris, G., Dollimore, J., Kindberg, T. (2005). Distributed Systems: Concepts and Design, 4th Edition, Addison-Wesley.

4. Birman, K. (2005). Reliable Distributed Systems: Technologies, Web Services and Applications, Springer Verlag.

Subject 1.2. Introduction to SOA

To understand common characteristics of contemporary SOA, misperceptions of SOA, benefits of SOA, evolution of SOA.

Referenced materials

1. Demirkan, H., Kauffman, R., Vayghan, J.A., Fill, Hans-Georg, Karagiannis, D., Maglio, P. P. (2008). Service-oriented technology and management: Perspectives on research and practice for the coming decade, *Electronic Commerce Research and Applications,* 7, 356–376.
2. Bell, Michael. (2010). *SOA Modeling Patterns for Service-Oriented Discovery and Analysis*, Wiley & Sons.
3. WinterGreen Research (2008). *Services Oriented Architecture (SOA) Infrastructure Market Shares, Market Strategy, and Market Forecasts.*
   Web site: http://www.wintergreenresearch.com
4. Erl. T. (2007). *SOA Principles of Service Design*, Prentice Hall PTR.
5. Afshar, M., & Das, M. (2007). *Oracle Service Oriented Architecture Suite,*
   Web site: http://www.Oracle.com/technology/tech/SOA/pdf/SOA-suite-wp.pdf
6. Erl. T. (2005). *Service-Oriented Architecture: Concepts, Technology and Design*, Prentice Hall PTR.

Subject 1.3. Introduction to Cloud Computing

Cloud computing is Internet-based computing, whereby shared resources, software, and information are provided to computers and other devices on demand, like the electricity grid. The cloud is simply a metaphor for the internet, based on the symbol used to represent the worldwide network in computer network diagrams.

Referenced materials

1. Maggiani, R. (2009). Cloud computing is changing how we communicate, IEEE International Professional Communication Conference, pp. 1–4, 2009.
2. Armbrust et al. (2010). A view of cloud computing. Communications of the ACM, 53(4), 50-58.

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4. Catteddu, D. (2010). Cloud Computing: benefits, risks and recommendations for information security. Web Application Security.
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Module 2. Service-Oriented Technology Planning and Analysis

Service-Oriented Technology planning and analysis minimize related crises, use staff time efficiently, and avoid wasting money on equipment. The technology planning process will help create a plan to help you think through your priorities in order to use technology in a way that directly furthers your organization.

Subject 2.1. Stages of the Life Cycle Analysis

Because the term "life cycle analysis" is becoming a more frequently used phrase in multiple industries, it is important to understand the process. Life cycle analysis (LCA) is the systematic approach of looking at a product's complete life cycle, from raw materials to final disposal of the product. It offers a "cradle to grave" look at a product or process, considering environmental aspects and potential impacts.

Referenced materials

1. Atlantic Consulting and IPU. (1998). LCA Study of the Product Group Personal Computers in the EU Ecolabel Scheme. European Commission.
2. Feng, C., & Ma, X.Q. (2009). The Energy Consumption and Environmental Impacts of a Color TV Set in China. *Journal of Cleaner Production*, 17 (1): 13-25.

3. Scientific Applications International Corporation (SAIC). (2006). Life Cycle Assessment: Principles and Practice. Cincinnati: National Risk Management Research Laboratory, Office of Research and Development, US Environmental Protection Agency.
4. Choi, B.C., Shin, H.S., Lee, S.Y. & Hur, T. (2006). Life Cycle Assessment of a Personal Computer and Its Effective Recycling Rate. *International Journal of Life Cycle Assessment,* 11 (2), 122-128.
5. Lu, L.T., Wernick, I.K., Hsiao, T.Y., Yu, Y.H., Yang, Y.M. & Ma., H.W. (2006). Balancing the Life Cycle Impacts of Notebook Computers: Taiwan's Experience. *Resources, Conservation and Recycling*, 48 (1), 13-25.

Subject 2.2. Delivery Models Planning

Delivery model combines technology running with value-added services delivered by supply chain professionals that may be on-shore, off-shore or both. The managed service provider integrates with the customer's business process and uses technology to provide on-demand reports and analysis to make better decisions. With the hosted delivery model, the actual deployment and delivery of the solution are the same or very similar to a deployment that would occur on-premise, with the exception that it all occurs using computing resources in the cloud, outside a company's firewall.

Referenced materials

1. Subashini, S. & Kavitha, V. (2011). A survey on security issues in service delivery models of cloud computing, *Journal of Network and Computer Applications*, 34(1), 1-11.
2. Rodero-Merino, L., Vaquero, L. M., Gil, V., Ferm, et al. (2010). From infrastructure delivery to service management in clouds, Future Generation Computer Systems, 26(8), 1226-1240.
3. Foster, I., Zhao, Y., Raicu, I., & Lu, S. (2008). Cloud computing and grid computing 360-degree compared. Proceedings of the Grid Computing Environments Workshop, 1-10.
4. Buyya, R., Yeo, C. S., & Venugopal, S. (2008). Market-oriented cloud computing: Vision, hype, and reality for delivering IT services as computing utilities. Proceedings of the 10th Inter-national Conference on High Performance Computing and Communications, 5-13.

Subject 2.3. Basic Modeling Building Blocks

Cloud is a business model and grid is an access model. Both are implemented using similar (or even the same) technology components, which can be thought of as building blocks – depends on what you need. So if a standard exists for a particular service-oriented technology building block, it might be applicable to building service-oriented technology.

Referenced materials

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3. Brynjolfsson, E., Hofmann, P. & Jordan, J. (2010). Economic and Business Dimensions - Cloud Computing and Electricity: Beyond the Utility Model. Communications of the ACM, 53(5), 32-34.
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Module 3. Service-Oriented Technology Design and implementation

SOT can transform organizations through a service-oriented architectural approach that addresses the three most important drivers of enterprise IT success: people, process, and technology. It supports true software and business process alignment, and helps businesses shape their own processes instead of having process dictated by the constraints of an arbitrary piece of software.

Subject 3.1. Mapping Business Processes to Technology

The challenge is identifying the most effective technology to support a particular business process. For example, when servers are migrating to the cloud, performance

of the servers was trumped by bandwidth and latency. And now, what was an "imperceptible, but somewhat unnatural use of Exchange" became a perceptible problem. There is nothing wrong with the cloud service, and there is nothing wrong with the platform.

Referenced materials

1. Federico, E. (2009). The Economic Impact of Cloud Computing on Business Creation, Employment and Output in Europe, forthcoming on Review of Business and Economics, 27-28.
2. Leimeister, S. F., Riedl, C., & Krcmar, H. (2010). The Business Perspective Of Cloud Computing: Actors, Roles, And Valve Networks, Proceedings of 18th European Conference on Information Systems (ECIS 2010).
3. Khajeh-Hosseini, A., Greenwood, D. & Sommerville, I. (2010a). Cloud Migration: A Case Study of Migrating an Enterprise IT System to IaaS. ArXiv preprint, submitted to 3rd IEEE International Conference on Cloud Computing.
4. Lindner, M. A., Vaquero, L. M., Rodero-Merino, L. & Caceres, J. (2010). Cloud economics: Dynamic Business Models for the Cloud Market. *International Journal of Business Information Systems*, 5(4), 373-392.

Subject 3.2. Designing Service Integration Environment

Designing services integration environment provides the strategy, design, development and implementation services you need to move to a service-oriented technology; or to integrate applications, allowing the speed, agility and flexibility your business demands.

Referenced materials

1. Greenberg, A., Hamilton, J., Maltz, D. A. & Patel, P. (2009). The cost of a cloud: research problems in data center networks. *Computer Communication Review*, 39(1), 68-73.
2. Zhang, Q., Cheng, L. & Boutaba, R. (2010). Cloud computing: state-of-the-art and research challenges. *Journal of Internet Services and Applications*, 1(1), 7-18.

Subject 3.3. Tools Available for Appropriate Designing

We are considering the origin of Web services and the evolution of Java Messaging Service (JMS) as the precursor for the event-driven architecture. While SOA should be able to consume any well-formed Web service, the majority of enterprise Web services are Java or .NET based. We can design SOT systems as well as practical hands-on programming of a distributed based system with an open Eclipse tools.

Referenced materials

1. Mike, R. (2005). Special Guide to SOA Tools: Beyond the Buzz. http://drdobbs.com/web-development/184415443

Subject 3.4. Implementation of Integration Patterns

When doing SOT implementation is to ensure users and data remain secure after transitioning data, applications, an infrastructure, or all of the above to the SOT. Prior to moving any data or applications to the SOT, it is essential to take stock of the current state of internal network security. This is an ideal time to undertake a network audit to see how your network defenses match up to your own data security, integrity and availability policies, regulatory requirements and industry best practices.

Referenced materials

1. Chen, H. -M., Kazman, R., & Perry, O. (2010). From Software Architecture Analysis to Service Engineering: An Empirical Study of Methodology Development for Enterprise SOA Implementation, *IEEE Transactions on Services Computing*, 3(2), 145-160.
2. Parveen, T. & Tilley, S. (2008). A Research Agenda for Testing SOA-Based Systems, The 2nd Annual IEEE Systems Conference, Montreal, Que., 7-10.
3. Vouk, M. A. (2008). Cloud computing - Issues, Research and Implementation, *Journal of Computing and Information Technology*, 16(4), 235-246.
4. Jansen, W. & Grance, T. (2011). Guidelines on Security and Privacy in Public Cloud Computing, National Institute of Standards and Technology-Draft Special Publication, 800-144.

Module 4. Service-Oriented Technology Management

Over the last few years, Service-Oriented Technology (SOT) has received a lot of attention, bringing with it a new age of software development and business agility. However, we still need solid and effective software engineering practices, as a poorly managed SOT implementation can go as wrong (if not more so) as any other architectural approach.

Subject 4.1. QoS Compliance and Governance

SOT providers will execute and deliver satisfactory quality of service (QoS) in areas such as reliability, availability, scalability, and security (RASS). For example, many enterprise users are wary of public clouds' QoS and RASS limitations but curious about the possibility of adopting the technologies, designs, and best practices of public clouds for their own data centers. The situation is evolving rapidly with both public and private clouds, as vendors and users are struggling to keep up with new developments. In addition, the concept of "governance" in the cloud means the same as governance in SOA, except service level is 1,000 times more important," said Ross Mason, CTO and founder of MuleSource. Moreover, SOA governance consists of three major components: a registry, a policy and a testing procedure.

Referenced materials

1. Keahey , K. , Foster, I., Freeman , T., & Zhang , X. (2005). Virtual workspaces: Achieving quality of service and quality of life in the Grid, *Scientific Programming*, 13(4), 265-275.
2. Farzin, Y. (2009). IBM, SOA Governance How Best To Embrace it, Part 3: Governance Maturity, Tooling, Vitality and Success Patterns.
3. Muhammed, Y. M. (2008). SOA governance framework and solution architecture, IBM.
4. Mohamad, A. (2007). SOA Governance: Framework and Best Practices, An Oracle White Paper.

Subject 4.2. Service Level Agreement (SLA) and Policy

A service-level agreement (SLA) is a contract between a network service provider and a customer that specifies, usually in measurable terms, what services the network service provider will furnish. Many Internet service providers (ISP)s provide their

customers with an SLA. More recently, IS departments in major enterprises have adopted the idea of writing a service level agreement so that services for their customers (users in other departments within the enterprise) can be measured, justified, and perhaps compared with those of outsourcing network providers. Moreover, WS-Policy is a specification that allows web services to use XML to advertise their policies (on security, Quality of Service, etc.) and for web service consumers to specify their policy requirements.

Referenced materials

1. Ameller, D. & Franch, X. (2008). Service Level Agreement Monitor (SALMon), Proceedings of the Seventh International Conference on Composition-Based Software Systems (ICCBSS), Madrid, Spain, 224-227.
2. Ludwig, H., Keller, A., Dan, A., Franck, R. & King, R. P. (2002). Web Service Level Agreement (WSLA) Language Specification, IBM Corporation.
3. Microsoft and IBM and VeriSign. (2004). Web Services Policy Framework (WS-Policy). Web Site: http://ifr.sap.com/ws-policy/ws-policy.pdf

APPENDIX F. Service Case Study

Overview

In the master program of service science, a capstone course is expected in order to allow students to exercise their inter-disciplinary abilities to deal with real world issues in service. The service case study serves as a capstone course to adopt case teaching methods to facilitate students to tackle real service cases. In the selection of cases, we aim to include those cases emphasizing the multiple perspectives of service phenomena which require students to exercise knowledge and abilities learned from different disciplines, such as management, technology, design, etc.

Part I. Course brief, it consists of course introduction, learning objectives, and overview of current adoptions

LEARNING OBJECTIVES

15. Students can apply concepts, methods, and tools learned to tackle issues in case studies
16. Students can solve the case problems by integrating knowledge from various disciplines.
17. Students can express properly the opinions and solutions to the problems in case studies.
18. Students can interact effectively during the case teaching activities.

Part II. Course modules and constituent subjects, it presents the structure of the course containing modules of knowledge components. In each module, several subjects can be organized to beef up the contents. In this part, we expect to give instructors an outline of the course first. The detailed description will be seen in Part III.

COURSE MODULES AND CONSTITUENT SUBJECTS

In case study, we specify several modules containing corresponding issues in service science, such as service management, engineering, design, and related economic, law, and regulation topics. The teaching cases can be retrieved from various repositories, such as Harvard Business School, Ivey School of Business, 光華管理個案, etc.

Module 1. Cases in service management

Subject 1.1 Cases in service marketing

Subject 1.2 Cases in service recovery

Subject 1.3 Cases in business process modeling and reengineering

Module 2. Cases in service innovation

Subject 2.1 Cases in service open innovation

Subject 2.2 Cases in managing new service development

Subject 2.3 Cases in adopting service experience engineering methods

Subject 2.4 Cases in sustainable service innovation

Module 3. Cases in modern services

Subject 3.1 Cases in technology enabled services

Subject 3.2 Cases in knowledge intensive services

Subject 3.3 Cases in people-oriented professional services

Module 4. Cases in various service domains

Subject 4.1 Cases in governmental service

Subject 4.2 Cases in healthcare service

Subject 4.3 Cases in non-governmental organizational service

Subject 4.4 Cases in emergency response

Subject 4.5 Cases in product service system

Subject 4.6 Cases in social innovation

Part III. Detailed description and referenced materials, in this part, the information of each subject in each module is elaborated in a detailed level, which an instructor can use it for determining the constituent modules and subjects for his/her course design, and sourcing teaching materials based on the this part. Moreover, the updated information can be added based on the initial contents allocated in this part.

DETAILED DESCRIPTION AND REFERENCED MATERIALS

<<Need to be developed>>