

SUBJECT DESCRIPTION FORMS

Subjects offered by the

Department of Industrial and Systems Engineering

<u>Subjects Code</u>	<u>Subject Title</u>
ISE520	Manufacturing Strategy
ISE525	Global Operations and Logistics Management
ISE526	Enterprise Resources Planning
ISE542	Managing Knowledge
ISE549	Management of Innovation and Technology
ISE553	Managing Six Sigma
ISE554	Systematic Innovation for Product Development
ISE559	Technology Audit and Assessment
ISE5001	Technology Transfer and Commercialisation
ISE5002	Field Study of Technology Organisations
ISE5018	Intellectual Property Management and Strategies
ISE5021	Technology Project Management
ISE5022	Financial Decision Analysis for Technology Management
ISE5601	Managing and Measuring Intellectual Capital

Subject Description Form

Subject Code	ISE520
Subject Title	Manufacturing Strategy
Credit Value	3
Level	5
Pre-requisite/Co-requisite/Exclusion	Nil
Objectives	This subject provides students with 1. an understanding of the concept and criticalness of manufacturing strategy for industrial competitiveness; 2. the ability to apply principles and techniques in the identification, formulation, and implementation of manufacturing strategy for greater competitiveness in the societal and global context.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. understand the concept and the importance of manufacturing strategy for industrial enterprise competitiveness; b. apply the appropriate techniques in the analysis and evaluation of company's opportunities for enhancing competitiveness in the local, regional and global context; c. identify, formulate and implement strategies for manufacturing and therefore enterprise competitiveness.
Subject Synopsis/ Indicative Syllabus	1. <u>World-Class Manufacturing</u> Basic principles of manufacturing strategy. Relationship of manufacturing strategy with marketing and corporate strategies. Trade-offs in manufacturing objectives. Creating competitive advantages through manufacturing strategy. Competitiveness models. Formulation and implementation of manufacturing strategy. 2. <u>Manufacturing Decisions</u> Production system design. Market-led versus technology-led approaches. Product differentiation. Mass customisation. Focused manufacturing. Economics of integration. Continuous improvement. 3. <u>Performance Measurement Framework for Analysing Manufacturing Effectiveness</u> Measurement tools and techniques. Cost accounting-based measurement and non-financial performance. World-class manufacturing and bench marking.

	4. <u>Manufacturing Strategy in the Global Context</u> Global management paradigm and the extended enterprise. Internationalisation strategies and core competencies of cooperation. Alliance advantages and technology transfer.																												
Teaching/Learning Methodology	A mixture of lectures, tutorial exercises, laboratory exercises, and case studies is used to deliver the various topics in this subject for the attainment of the learning outcomes. Some material is covered using a problem-based format where this advances the learning objectives. Other material is covered through directed study to enhance the students’ “learning to learn” ability. Case studies are used to integrate these topics and demonstrate to students how the various techniques are interrelated and applied in real-life situations. The cross fertilisation of the ideas and experiences of students regarding manufacturing strategy is encouraged through class discussions and presentations, and forms an important component in the teaching/learning process of this subject. <table><tr><td>Teaching/Learning Methodologies</td><td colspan="3">Intended Subject Learning Outcomes to be assessed</td></tr><tr><td></td><td>a</td><td>b</td><td>c</td></tr><tr><td>Lecture</td><td>✓</td><td>✓</td><td>✓</td></tr><tr><td>Tutorial</td><td>✓</td><td>✓</td><td>✓</td></tr><tr><td>Case studies</td><td>✓</td><td>✓</td><td>✓</td></tr></table>	Teaching/Learning Methodologies	Intended Subject Learning Outcomes to be assessed				a	b	c	Lecture	✓	✓	✓	Tutorial	✓	✓	✓	Case studies	✓	✓	✓								
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2. Laboratory work	10%			✓																									
3. Final examination	60%	✓	✓	✓																									
Total	100%																												

Student Study Effort Expected	Class contact:	
	▪ Lectures 2 hours/week for 13weeks	26 Hrs.
	▪ Tutorials/Case studies/Laboratory work 1 hour/week for 13weeks	13 Hrs.
	Other student study effort:	
	▪ Study and self-learning	48 Hrs.
	▪ Assignment and report writing	28 Hrs.
	Total student study effort	115 Hrs.
Reading List and References	1. Marcus, A A. 2011, <i>Management strategy: achieving sustained competitive advantage</i>, New York : McGraw-Hill/Irwin. 2. Thompson, A A, Strickland, A J Jr, Gamble, J E. 2007, <i>Crafting and executing strategy : text and readings</i>, New York : McGraw-Hill/Irwin, c2010. 3. Slack, N, Lewis, M. 2011, <i>Operations strategy, 3rd ed.</i>, Harlow, England ; New York : Financial Times/Prentice Hall. 4. Water, D. 2006, <i>Operations Strategy</i>, London: Thomson Learning 5. Hitt, M A, Ireland, R D & Hoskisson, R E. 2013, <i>Strategic Management: Competitiveness and Globalization: Concepts & Cases, 10th Edn.</i>, Mason, Ohio: South-Western Cengage Learning 6. Van Mieghem, J A. 2008, <i>Operations Strategy: Principles and Practice</i>, Belmont, Mass: Dynamic Ideas 7. Miltenburg, J. 2005, <i>Manufacturing Strategy: How to Formulate and Implement a Winning Plan</i>, New York: Productivity Press 8. Hussey, D E. 1998, <i>Strategic Management: from Theory to Implementation</i>, 4th edn, Oxford: Butterworth-Heinemann 9. Hill, T. 1993, <i>Manufacturing Strategy</i>, 2nd edn, The MacMillan Press 10. Hill, T. 2000, <i>Manufacturing Strategy: Text and Case</i>, Boston: Irwin 11. Hayes, R H & Wheelwright, S C. 1984, <i>Restoring Competitive Edge, Competing through Manufacturing</i>, John Wiley & Son 12. International Journal of Operations and Production Management 13. Journal of Business Strategy 14. Harvard Business Review	

Subject Description Form

Subject Code	ISE525
Subject Title	Global Operations and Logistics Management
Credit Value	3
Level	5
Pre-requisite/Co-requisite/Exclusion	Nil
Objectives	This subject provides students with 1. the concept of global logistics operations and a comprehensive framework to tackle typical logistics problems; 2. techniques to achieve the target of supplying the right goods at the right time at the minimum cost; 3. an in-depth knowledge of operations and logistics management and relevant techniques to optimise trade-offs.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. understand the concept of global operations and design a logistics system within a global environment; b. apply relevant techniques to solve global logistics problems; c. optimise operations parameters to achieve trade-offs.
Subject Synopsis/ Indicative Syllabus	1. <u>Introduction to Global Operations and Logistics Management</u> Logistics strategies and planning, logistics organisation, management, and control. Designing the supply base and selecting suppliers and integrated logistics support. Cost modelling in the supply chain. Supply chain relationships. Analysing supply chain performance. Supplier/vendor rating, development, and continuous improvement. Selection and use of supply chain software. 2. <u>Introduction to the Elements of Logistics</u> The system life cycle and the need for logistics management. Developing a logistics strategy, and understanding the consequences of that strategy. The impact of information technology on logistics management. 3. <u>Measures of Logistics</u> Understanding factors including reliability, maintainability, supply, support, transportation, packaging, and handling. Economic considerations.

	4. <u>Phases of Logistics</u> Design and development, production/construction, utilisation and support, system retirement and material recycling/disposal. 5. <u>Global Operations Management</u> The just-in-time philosophy, operations planning and control, the management of capacity, techniques for achieving delivery performance, the use of computers, distribution networks and the measurement and control of logistics performance, mathematical modelling of distribution in the supply chain, stochastic optimisation for logistics planning, network distribution.																																																						
Teaching/Learning Methodology	A mixture of lectures, tutorial exercises, and case studies is used to deliver the various topics in this subject. Some material is covered using a case-based format where this enhances the learning objectives. Other material is covered through directed study to enhance the students’ “learning to learn” ability. Topics are introduced in the lectures. The tutorials are conducted in groups to reinforce the material covered in the lectures. Students also have the opportunity to use the computer packages to perform analysis. <table><tr><th rowspan="2">Teaching/Learning Methodologies</th><th colspan="3">Intended Subject Learning Outcomes to be assessed</th></tr><tr><th>a</th><th>b</th><th>c</th></tr><tr><td>Lecture</td><td>✓</td><td>✓</td><td>✓</td></tr><tr><td>Laboratory work</td><td>✓</td><td>✓</td><td>✓</td></tr><tr><td>Case studies</td><td>✓</td><td>✓</td><td></td></tr></table>	Teaching/Learning Methodologies	Intended Subject Learning Outcomes to be assessed			a	b	c	Lecture	✓	✓	✓	Laboratory work	✓	✓	✓	Case studies	✓	✓																																				
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4. Test	25%	✓	✓	✓																																																			
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Student Study Effort Expected	Class contact:	
	▪ Lectures	21 Hrs.
	▪ Case study	12 Hrs.
	▪ Laboratory work	6 Hrs.
	Other student study effort:	
	▪ Case study preparation and report writing	45 Hrs.
	▪ Test preparation	28 Hrs.
	Total student study effort	112 Hrs.
Reading List and References	1. Branch, AE. 2009, <i>Global Supply Chain Management and International Logistics</i>, Routledge, New York/London 2. Gattorna, J & Friends. 2009, <i>Dynamic Supply Chain Alignment: A New Business Model for Peak Performance in Enterprise Supply Chains Across All Geographies</i>, Gower Pub., Burlington, VT/Farnham, England 3. Blanchard, BS. 2004, <i>Logistics Engineering and Management</i>, 6th edn, Prentice Hall, Inc., Upper Saddle River, N.J. 4. Christopher, M. 2000, <i>Logistics and Supply Chain Management: Strategies for Reducing Cost and Improving Service</i>, 2nd edn, Prentice Hall	

Subject Description Form

Subject Code	ISE526
Subject Title	Enterprise Resources Planning
Credit Value	3
Level	5
Pre-requisite/Co-requisite/Exclusion	Nil
Objectives	This subject provides students with 1. the basic concepts of ERP systems for manufacturing or service companies, and the differences among MRP, MRP II, and ERP systems; 2. thinking in ERP systems: the principles of ERP systems, their major components, and the relationships among these components; 3. in-depth knowledge of major ERP components, including material requirements planning, master production scheduling, and capacity requirements planning; 4. knowledge of typical ERP systems, and the advantages and limitations of implementing such systems.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. examine systematically the planning mechanisms in an enterprise, and identify all components in an ERP system and the relationships among the components; b. understand production planning in an ERP system, and systematically develop plans for an enterprise; c. use methods to determine the correct purchasing quantity and right time to buy an item, and apply these methods to material management; d. understand the difficulties of a manufacturing execution system, select a suitable performance measure for different objectives, and apply priority rules to shop floor control.
Subject Synopsis/ Indicative Syllabus	1. <u>Introduction</u> Concept of ERP, brief history of ERP systems, major components of ERP systems and their functions. Basic differences between manufacturing and services. 2. <u>Production Planning</u> Master production scheduling (MPS), rough-cut capacity planning, capacity requirements planning.

	3. <u>Material Requirements Planning (MRP)</u> Concept, product structure, and bill of materials (BOM), MRP logic, lot-sizing and capacity considerations. 4. <u>Manufacturing Execution Systems (MES)</u> Shop floor control, job shop scheduling and priority rules, flow shop scheduling. 5. <u>Operation of an ERP system</u> The relationships among different ERP modules, available-to-promise (ATP), time bucket. 6. <u>Inventory Management</u> Benefit and cost considerations in inventory management, basic models and their assumptions.																																																														
Teaching/Learning Methodology	A mixture of lectures, exercises, laboratories, and case studies is used to deliver the various topics in this subject. Some material is covered using a problem-based format where this advances the learning objectives. Other material is covered through directed study to enhance students’ “learning to learn” ability. Some case studies, largely based on consultancy experience, are used to integrate these topics and demonstrate to students how the various techniques are interrelated and can be applied in real-life situations. <table><tr><th rowspan="2">Teaching/Learning Methodologies</th><th colspan="4">Intended Subject Learning Outcomes to be assessed</th></tr><tr><th>a</th><th>b</th><th>c</th><th>d</th></tr><tr><td>Lecture</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr><tr><td>Seminars</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr><tr><td>Project/case studies</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr></table>	Teaching/Learning Methodologies	Intended Subject Learning Outcomes to be assessed				a	b	c	d	Lecture	✓	✓	✓	✓	Seminars	✓	✓	✓	✓	Project/case studies	✓	✓	✓	✓																																						
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5. Test	30%	✓	✓	✓	✓																																																										
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Student Study Effort Expected	Class contact:	
	▪ Lectures	27 Hrs.
	▪ Laboratories, Presentation, Test	12 Hrs.
	Other student study effort:	
	▪ Preparation and review, Self-study	63 Hrs.
	▪ Report writing	18 Hrs.
	Total student study effort	120 Hrs.
Reading List and References	1. Monk, E. F., Wagner, B. J. 2009, <i>Concepts in Enterprise Resource Planning</i>, 3rd edn, Course Technology Cengage Learning 2. Sumner, M. 2005, <i>Enterprise Resource Planning</i>, Pearson Education, Inc. 3. Vollmann, T. E., Berry, W. L. and Whybark, D. C. 1992, <i>Manufacturing Planning and Control Systems</i>, 3rd edn, Irwin 4. Plossl, G. W. 1985, <i>Production and Inventory Control: Principles and Techniques</i>, 2nd edn, Prentice Hall 5. Wallace, T. F., Kremzar, M. H. 2001, <i>ERP: Making It Happen</i>, John Wiley 6. Ferran, C., and Salim, R. 2008, <i>Enterprise Resource Planning for Global Economics: Managerial Issues and Challenges</i>, Information Science References 7. Shtub, A. 1999, <i>Enterprise Resource Planning (ERP): the Dynamics of Operations Management</i>, Kluwer Academic Publishers	

Subject Description Form

Subject Code	ISE542
Subject Title	Managing Knowledge
Credit Value	3
Level	5
Pre-requisite / Co-requisite/ Exclusion	Mutual Exclusion of ISE531 Principles of Knowledge Engineering and Management and ISE458 Introduction to Knowledge Management
Objectives	The aims of the subject are to : 1. Introduce the students the foundations of KM. 2. Provide the students with an insight and introductory working knowledge to allow them to effectively apply KM in organizations to achieve their objectives and lead and promulgate KM efforts for business effectiveness and success. 3. Equip the students with the practitioner understanding and proficiency to initiate, assess, operate, disseminate, and manage KM practices, projects, programs, and other KM efforts with an enterprise.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. understand the concepts and ethical issues in KM b. select and devise KM strategies, programmes and actions to provide effective business support c. conduct knowledge audit and use of various knowledge audit methods for analyzing and reporting findings for KM related planning d. conduct a feasibility study on the implementation of knowledge management projects in an organization.
Subject Synopsis/ Indicative Syllabus	The subject aims to introduce the students to the foundations of KM. It is designed to provide the students with KM practitioner understanding of how KM fits into, and supports business operations with the further understanding of how KM is conducted from a system approach. Some of the key topics covered in this subject include: <u><i>Knowledge Management Essentials</i></u> Evolution of knowledge, theory and concepts of KM, Type of knowledge, nature of knowledge work <u><i>Managing Knowledge Processes</i></u> Various knowledge processes and their applications, methods and tools for managing knowledge processes <u><i>Knowledge Auditing</i></u> Role and importance of knowledge audit, knowledge audit process and practices , methods and tools for conducting knowledge auditing, analysis and reporting the results of a knowledge audit

	<u><i>Knowledge Management Related Strategies</i></u> KM strategy and how to manage culture aspects, and initiatives of KM, People-centric and IT-based KM from business perspectives based on understanding that business performance results from knowledgeable (competent), motivated, and accountable human actions, in part supported by IT capabilities. <u><i>Knowledge Management Practices</i></u> KM practices in different industries, the management of KM projects, ethical issues in KM, case studies
Teaching/Learning Methodology	As shown in Table 1, this subject is offered in a blended mode of e-learning and face-to-face teaching is used to facilitate the students to learn. A mixture of e-learning, instructor-lead tutorials and workshops, and case studies will be used to deliver the topics in this subject. Case studies, largely based on real case will be used to demonstrate to students how the latest techniques can be applied to improve the real life situations. The students can access the e-learning platform which contains interactive online materials for the lessons. Each of the lessons may incorporate designated reading (chapters, sections, pages) in the textbook and recommended readings in the form of separate articles and papers which are available online or at the library. In all lessons, animations and interactive games have been added in appropriate locations to facilitate and strengthen learning and understanding. A number of self-assessment exercises are also included to enable participants to monitor their personal progress. In addition, the e-learning platform supports peer-to-peer activities in form of online chat forums and bulletin boards. This peer-to-peer interaction not only enhances knowledge sharing and learning from peers but also helps strengthen or clarify concepts delivered in lecture materials. Participants are strongly encouraged to make effective use of all learning tools available to optimise their learning in this subject. To facilitate the students to learn, the students are also expected to participate in instructor led face-to-face or on-line teaching activities which include workshop, tutorials, seminars, etc. The students will also get in touch with the facilitators through the bulletin board discussions. Some of the teaching activities will be covered in a problem-based format where this enhances the learning objectives. Others will be delivered directly through directed study in order to enhance the students' ability of "learning to learn". Workshop will be used to integrate these topics and thus demonstrate to students how the various techniques are inter-related and how they apply in real life situations. Cross fertilization of ideas and experiences of students through discussions and presentations are highly encouraged. Table 1

	Teaching/Learning Methodology	Intended subject learning outcomes					
		a	b	c	d		
	1. Lectures/Online Guest Lecture	√	√	√	√		
	2. E-learning platform and online activities via Personal Learning Environment and Network (PLE&N)	√	√	√	√		
	3. Workshops		√	√	√		
	4.In-class Case Studies and Tutorials		√		√		
Assessment Methods in Alignment with Intended Learning Outcomes	As shown in Table 2, the assessment method of the subject is composed of coursework and examination. The coursework assessment includes individual assignment, on-line bulletin board, and mini-project. Written examination will be arranged at the end of the semester. All assessment components will require students to apply what they have learnt to realistic work applications.						
	Table 2						
	Specific assessment methods/tasks	% weighti ng	Intended subject learning outcomes to be assessed				
			a	b	c	d	
	1.Individual Assignment	15%	✓	✓			
	2. Workshop Assignment	20%			✓	✓	
	3.Personal Learning Environment and Network (PLEN)	10%	✓	✓	✓	✓	
	4. Open Book Examination	55%	✓	✓	✓	✓	
	Total	100 %					
	A student is expected to perform satisfactorily in BOTH the coursework and the examination. The subject coordinator can exercise discretion to alter the final subject result should there exists significant variation in a participant's performance in these 2 components.						
The individual assignment facilitates the students to reflect what they learn in learning outcomes (a) and (b). The workshop assignment provides a team work environment for facilitates the students to apply the concepts, theory and skills learnt in the subject for a real life scenario (e.g. Learning Outcomes (c) and (d)).							
Every student is required to set up a Personal Learning Environment and Network (PLEN) and contributes to discussions and learning in this environment during the semester and beyond (Learning outcomes (a) to (d)).							

	An open book examination is held at the end-of-semester which aims at assessing students' understanding of the theory, concepts and knowledge necessary for achieving the learning outcomes (a) to (d) for the subject.	
Student Study Effort Required	Class contact:	
	On-line Lectures/Seminars 3 hours x 2 weeks, 2 hours x 1 week	8 Hrs.
	<i>Face-to-face</i> Lectures/Presentations/Tutorial/Workshop 3 hours x 8 weeks	24 Hrs.
	Personal Learning Environment and Network (PLEN) 1 hour per week x 7 weeks	7 Hrs.
	Other student study effort:	
	Study and self learning including workshop	28 Hrs.
	Preparation and revision	20 Hrs.
	Assignment and report writing	28 Hrs.
	Total student study effort	115 Hrs.
Reading List and References	Recommended Reading 1. Tiwana, A., <i>Knowledge Management Toolkit</i>, Prentice hall, 2nd Edition, 2002. 2. Despres, C. and Chauvel, D. (Editors), <i>Knowledge Horizons: The Present and the Promise of Knowledge Management</i>, Butterworth-Heinemann, Boston, 2000 3. Davenport, T.H. and Prusak, L., <i>Working Knowledge: How Organisation Manage What They Know</i>, Harvard Business School Press, 1997 4. Liebowitz, J. (Editors), <i>Knowledge Management Handbook</i>, CRC Press, Boca Raton, 1999 5. Wiig, Karl, <i>People-Focused Knowledge Management: How Effective Decision Making Leads to Corporate Success</i>, Butterworth-Heinemann, 2004. In Addition: 1. Choy, S.Y., Lee, W.B. and Cheung, C.F. "A Systematic Approach for Knowledge Audit Analysis: Integration of Knowledge Inventory, Mapping and Knowledge Flow Analysis," <i>Journal of Universal Computer Science</i>, Vol. 10, No.6, p.674-682 (2004). 2. Choy, S.Y., Lee, W.B., Cheung, C.F. and Geoffrey Shim "Development of a Knowledge Management Culture Assessment Tool (KMCAT) with Applications in Aviation Industry", <i>Journal of Information and Knowledge Management</i>, Vol. 4, No. 3, p.179-189 , 2005. 3. Cheung, C.F., Ko, K.C., Chu, K.F. and Lee, W.B. "Systemic Knowledge Auditing with Applications", <i>Journal of Knowledge Management</i>	

	Practice, August, http://www.tlinc.com/articl97.htm, 2005. 4. Cheung, C.F., Li, M.L., Shek, W.Y., Lee, W.B. and Tsang, T.S. "A Systematic Approach for Knowledge Auditing: A Case Study in Transportation Sector", <i>Journal of Knowledge Management</i>, Vol. 11, No. 4, p. 140-158 (2007). 5. <i>Harvard Business Review on Knowledge Management</i>, Harvard Business Review Series, 1998 6. Nonaka, I. and Takeuchi, H., <i>The Knowledge-Creating Company</i>, Oxford University Press, 1995 7. Ruggles, R.L.E., <i>Knowledge Management Tools: Resources for the Knowledge-Based Economy</i>, Butterworth-Heinemann, Boston, 1997 8. Shek, W.Y., Lee, W.B., Cheung, C.F. and Chong, Y.Y. "Systematic Knowledge Auditing: A Case Study in a Power Utility Company", <i>Journal of Information and Knowledge Management</i>, Vol.6, No. 4, p.231-239 (2007). 9. Skyrme, D.J., <i>Measuring the Value of Knowledge: Metrics for the Knowledge-Based Business</i>, Business Intelligence, London, 1998. 10. Wiig, K.M., <i>Knowledge Management Foundations: Thinking about Thinking – How People and Organisations Create, Represent, and Use Knowledge</i>, Schema Press, Arlington, 1993. 11. Wiig, K.M., <i>Knowledge management: The Central Management Focus for Intelligent-Acting Organisations</i>, Schema Press, Arlington 1994.
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Subject Description Form

Subject Code	ISE549
Subject Title	Management of Innovation and Technology
Credit Value	3
Level	5
Pre-requisite/Co-requisite/Exclusion	Nil
Objectives	This course starts with the assumption that technology always evolves. It is often observed that when technology changes, some firms dominate the market, while many others lose their market share; some deteriorate to the point where they totally exit the market. This course is designed to provide an understanding of the relationships between technology evolution and firm strategies and their influence on firm/market performance. In particular, this course focuses on the analysis of technology evolution, industry evolution, and attempts to provide insights on firm strategies. Students will learn about a variety of tools and concepts to address firm strategies in the face of technology evolution, and to approach them from industry-level perspectives. Through readings, lectures, class discussions, and individual/group projects, students will learn to apply the tools and concepts to decisions related to technology, and will develop an understanding of their potentials and limitations in various contexts.
Intended Learning Outcomes	Upon successful completion of the subject, students will be able to - comprehend and analyse the fundamental issues and challenges of technology management, new product development, and innovation management within an organisational context; - follow an organisational process model for managing technology, and new product or innovation management; - possess the insights necessary to function as an effective general manager in managing the innovation process and avoid common errors and misperceptions; - link technology and innovation decisions to a company's strategic planning and operational management processes; - identify and formulate managerial strategies applicable to new venture projects that involve technology and innovation.
Subject Synopsis/ Indicative Syllabus	<u>Importance of Technology and Innovation in Economic and Social Development</u> Risks and rewards of technological innovation; role of government policy in promoting technology and innovation; role of firm-level strategy in the global market <u>Importance of Technological Evolution</u> Lessons regarding the evolution of technology; the main concept of competition changes in accordance with the technological evolution <u>Importance of Innovation Diffusion and Innovation Types</u>

	Understanding on factors affecting innovation adoption; Diverse types of innovations; the heterogeneous impact of diverse innovations on firm performance 4. <u>Compatibility and Network Effects</u> Understanding on the origin of network effects; Characteristics of in study showing strong network effects; firm strategies to survival in the network-effect markets 5. <u>Firm Boundary Decisions</u> Understanding on firm boundary; the impact of firm boundary decisions on performance; key reasons that firms change their boundaries; relationship between firm boundary decision and firm capability; relationship between firm boundary decision and industry structure 6. <u>Technology Adoption Timing</u> Understanding on differences between early vs. late adoption and its performance heterogeneity 7. <u>Organizational Learning</u> Understanding why firms show heterogeneous learning processes and routines in dealing with new innovations; why some firms are faster than others in learning new innovations																																														
Teaching/Learning Methodology	A mixture of lectures, tutorial exercises, and case studies is used to deliver the various topics. Some material is covered using a problem-based format where this advances the learning objectives. Case discussion and project activities take place against a background of conceptual materials, which include selected readings and brief lectures pertaining to the theme of each session. <table><tr><th>Teaching/Learning Methodologies</th><th colspan="5">Intended Subject Learning Outcomes to be assessed</th></tr><tr><td></td><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td></tr><tr><td>Group Presentation</td><td></td><td></td><td>✓</td><td></td><td></td></tr><tr><td>Individual Presentation</td><td></td><td>✓</td><td></td><td></td><td></td></tr><tr><td>Individual Report</td><td></td><td></td><td></td><td>✓</td><td>✓</td></tr><tr><td>Test</td><td>✓</td><td></td><td></td><td></td><td></td></tr></table>	Teaching/Learning Methodologies	Intended Subject Learning Outcomes to be assessed						a	b	c	d	e	Group Presentation			✓			Individual Presentation		✓				Individual Report				✓	✓	Test	✓														
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Assessment Methods in Alignment with Intended Learning Outcomes	<table><tr><th rowspan="2">Specific assessment methods/tasks</th><th rowspan="2">% weighting</th><th colspan="6">Intended subject learning outcomes to be assessed</th></tr><tr><th>a</th><th>b</th><th>c</th><th>d</th><th>e</th><th>--</th></tr><tr><td>1. Literature Critique (Group Assessment)</td><td>20%</td><td></td><td>✓</td><td>✓</td><td></td><td></td><td></td></tr><tr><td>2. Individual Report</td><td>40%</td><td></td><td></td><td></td><td>✓</td><td>✓</td><td></td></tr><tr><td>3. Test I and II</td><td>40%</td><td>✓</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>Total</td><td>100%</td><td colspan="6"></td></tr></table> Assessment comprises individual and group assignments, tests, and a group project. The individual tests are designed to assess students’ understanding of the lecture materials and application of the knowledge learnt. Individual participation	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed						a	b	c	d	e	--	1. Literature Critique (Group Assessment)	20%		✓	✓				2. Individual Report	40%				✓	✓		3. Test I and II	40%	✓						Total	100%						
Specific assessment methods/tasks	% weighting			Intended subject learning outcomes to be assessed																																											
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2. Individual Report	40%				✓	✓																																									
3. Test I and II	40%	✓																																													
Total	100%																																														

	in class discussions is used to evaluate the students' course preparation work. This also helps students to develop analytical and organisational communication skills in technology and innovation management. Interactive case analyses, group-based exercises, and assignments are used to develop and assess the students' group problem-solving process and work collaboration skills. The field project components require students to apply what they have learnt to realistic work scenarios.	
Student Study Effort Expected	Class contact:	
	▪ Lectures	21 Hrs.
	▪ Tutorials/Seminars/Case studies	18 Hrs.
	Other student study effort:	
	▪ Conducting projects and project discussions	20 Hrs.
	▪ Studying the materials covered by lectures for tests	30 Hrs.
	▪ Preparation for seminars/case studies	21 Hrs.
	▪ Preparation for project presentations and report writing	20 Hrs.
	Total student study effort	130 Hrs.
Reading List and References	1. Burgelman, Robert, Christensen Clayton and Wheelwright Steven, <i>Strategic Management of Technology and Innovation</i>, McGraw-Hill/Irwin (ISBN: 0-07-2536950), latest edition 2. Chesbrough, Henry, <i>Open Innovation</i>, Harvard Business Press, latest edition 3. Christensen, Clayton, <i>Innovation and the General Manager</i>, Irwin/McGraw Hill, latest edition 4. Tushman, Michael and Anderson, Philip, <i>Managing Strategic Innovation and Change</i>, Oxford Press, latest edition 5. Utterback, James, <i>Mastering the Dynamics of Innovation</i>, Harvard Business Press, Boston, MA, latest edition 6. Schilling, Melissa, <i>Strategic Management of Technological Innovation</i>, McGraw Hill, latest edition	

Subject Description Form

Subject Code	ISE553
Subject Title	Managing Six Sigma
Credit Value	3
Level	5
Pre-requisite/Co-requisite/Exclusion	Students must be aligned with an organisation to complete a mini-project with real objectives and data collection and analysis. Experience in QC, QA, quality management, process control, or other operational activities is desirable.
Objectives	This subject will provide students with 1. the basic Six Sigma skills for identifying and defining improvement projects that will have significant positive impacts on sustainable business performance; 2. skills in the measurement and analysis of process data and a basic understanding of the techniques and importance of process modelling in manufacturing and service industries to improve the existing processes; 3. the ability to use Six Sigma practices and techniques so that they can effectively support the implementation of a company-wide improvement programme; 4. knowledge of the alternative and latest Six Sigma methodologies, to enable them to evaluate and determine the best choices for a company.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. examine the existing work situation in a manufacturing or service organisation to identify Six Sigma projects that will significantly improve customer satisfaction, and quality and productivity; b. apply appropriate Six Sigma techniques to improve existing or design new work methods and procedures for a business process; c. select appropriate Six Sigma measurement and data analysis techniques and apply them to improve the value of products and services delivered to customers while enhancing the organisation's financial performance; d. apply appropriate Six Sigma techniques to support the implementation of a company-wide improvement programme; e. understand the concepts and applicability of alternative Six Sigma methodologies with a view to determining the appropriate one for application in specific settings.
Subject Synopsis/ Indicative Syllabus	1. <u>Background and Fundamentals</u> What Six Sigma is; Six Sigma goals and metrics including customer satisfaction, process efficiency, and time-to-market; Six Sigma applications; models of improvement: DMAIC, DFSS. 2. <u>Implementation</u> Six Sigma leadership; enterprise-wide deployment; business process management; project charter; project selection and evaluation; team work.

	3. <u>Techniques</u> Critical to quality (CTQ); objective function; quality function deployment (QFD); process mapping; capability studies and statistical process control; multivariate analysis; failure mode, effects, and criticality analysis (FMECA); visual management brainstorming tools. 4. <u>Latest Advances</u> Lean Six Sigma; Kaizen events; conquering complexity; beyond Six Sigma.																																														
Teaching/Learning Methodology	A mixture of lectures, tutorial exercises, and case studies is used to deliver the various topics in this subject. Some material is covered using a problem-based format where this advances the learning objectives. Other material is covered through directed study to enhance students’ self-learning ability. External speakers are invited to deliver some case studies, largely based on consultancy experience, to integrate the topics covered and demonstrate how the various tools are applied in real-life situations.																																														
Assessment Methods in Alignment with Intended Learning Outcomes	<table><tr><th rowspan="2">Specific assessment methods/tasks</th><th rowspan="2">% weighting</th><th colspan="6">Intended subject learning outcomes to be assessed</th></tr><tr><th>a</th><th>b</th><th>c</th><th>d</th><th>e</th><th></th></tr><tr><td>1. Mini-project</td><td>50%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td></tr><tr><td>2. Case studies</td><td>20%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td></tr><tr><td>3. Tests</td><td>30%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td></tr><tr><td>Total</td><td>100%</td><td colspan="6"></td></tr></table> Assessment comprises tasks with individual and group components, usually tests, case studies, and one individual mini-project. All assessment components require students to apply what they have learnt to address real-world issues.	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed						a	b	c	d	e		1. Mini-project	50%	✓	✓	✓	✓	✓		2. Case studies	20%	✓	✓	✓	✓			3. Tests	30%	✓	✓	✓	✓	✓		Total	100%						
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2. Case studies	20%	✓	✓	✓	✓																																										
3. Tests	30%	✓	✓	✓	✓	✓																																									
Total	100%																																														
Student Study Effort Expected	<table><tr><td>Class contact:</td><td></td></tr><tr><td>▪ Lectures/Seminars (block mode)</td><td>27 Hrs.</td></tr><tr><td>▪ Tutorials/Case studies/Tests</td><td>12 Hrs.</td></tr><tr><td>▪ Other student study effort:</td><td></td></tr><tr><td>Studying and self-learning; test preparation</td><td>40 Hrs.</td></tr><tr><td>▪ Mini-project work; case study report writing</td><td>40 Hrs.</td></tr><tr><td>▪ Total student study effort</td><td>119 Hrs.</td></tr></table>	Class contact:		▪ Lectures/Seminars (block mode)	27 Hrs.	▪ Tutorials/Case studies/Tests	12 Hrs.	▪ Other student study effort:		Studying and self-learning; test preparation	40 Hrs.	▪ Mini-project work; case study report writing	40 Hrs.	▪ Total student study effort	119 Hrs.																																
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Reading List and References	1. Pende, Peter S., Neuman, Robert P. and Cavanagh, Roland R. 2000, <i>The Six Sigma Way: How GE, Motorola, and Other Top Companies are Honing their Performance</i>, McGraw Hill 2. Bill Wortman 2007, <i>Six Sigma Black Belt Primer</i>, Quality Council of Indiana 3. Devane, Tom 2004, <i>Integrating Lean Six Sigma and High Performance Organizations</i>, Pfeiffer Publishing 4. Eckes, George 2001, <i>Making Six Sigma Last: Managing the Balance between Cultural and Technical Change</i>, Wiley 5. <i>Six Sigma Forum Magazine</i>, ASQ
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Subject Description Form

Subject Code	ISE554																						
Subject Title	Systematic Innovation for Product Development																						
Credit Value	3																						
Level	5																						
Pre-requisite/Co-requisite/Exclusion	Background in Engineering and Science																						
Objectives	To enable students to practice lateral and logical thinking and create product designs/undertake development innovation through a systematic approach in real-life scenarios.																						
Intended Learning Outcomes	Upon completion of the subject, students should be able to - understand the stages of the new product development process and the choice of a new product development model; - apply lateral and logical thinking to new product creation; - use systematic innovation tools for product development and innovation.																						
Subject Synopsis/ Indicative Syllabus	<u>New Product Development</u> Design methodology models; solution evaluation and selection techniques. <u>Creative Problem Solving</u> Creativity; lateral thinking; mind mapping. Invention case studies. <u>Systematic Innovation</u> Theory of systematic innovation (TRIZ), ideal final result (IFR), 40 principles, trends/evolution. <u>Innovation Management</u> Stage-Gate; Innovation Quotient.																						
Teaching/Learning Methodology	A mixture of lectures, laboratories, tutorial exercises, and case studies is used to deliver the various topics in this subject. Some material is covered using a problem-based format where this advances the learning objectives. Other material is covered through directed study to enhance the students' "learning to learn" ability. Some case studies, largely based on consultancy experience, are used to integrate these topics and demonstrate to students how the various techniques are interrelated and applied in real-life situations. <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="width: 33%;">Teaching/Learning Methodologies</th><th colspan="3">Intended Subject Learning Outcomes to be assessed</th></tr> <tr> <th></th><th>a</th><th>b</th><th>c</th></tr> </thead> <tbody> <tr> <td>Lecture</td><td>✓</td><td>✓</td><td>✓</td></tr> <tr> <td>Tutorial</td><td>✓</td><td>✓</td><td>✓</td></tr> <tr> <td>Case studies</td><td>✓</td><td>✓</td><td>✓</td></tr> </tbody> </table>			Teaching/Learning Methodologies	Intended Subject Learning Outcomes to be assessed				a	b	c	Lecture	✓	✓	✓	Tutorial	✓	✓	✓	Case studies	✓	✓	✓
Teaching/Learning Methodologies	Intended Subject Learning Outcomes to be assessed																						
	a	b	c																				
Lecture	✓	✓	✓																				
Tutorial	✓	✓	✓																				
Case studies	✓	✓	✓																				

Assessment Methods in Alignment with Intended Learning Outcomes	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed		
			a	b	c
	1. Assignments/Tutorials/Laboratories	40%	✓	✓	✓
	2. Case studies	30%	✓	✓	✓
	3. Test	30%	✓	✓	✓
	Total	100%			
	The assignments, which are administered throughout the course, are designed to facilitate students to reflect on and apply the knowledge learnt. Continuous assessment comprises laboratories, tutorials, assignments, one mini-project with individual and group assessment components, and a final examination. All assessment components require students to apply what they have learnt to realistic work scenarios.				
Student Study Effort Expected	Class contact:				
	▪ Lectures		16 Hrs.		
	▪ Tutorials		8 Hrs.		
	▪ Laboratory work		6 Hrs.		
	▪ Case studies		9 Hrs.		
	Other student study effort:				
	▪ Preparation for assessment and case studies		78 Hrs.		
	Total student study effort		117 Hrs.		
Reading List and References	1.	Masahiro Takahashi 1999, <i>From Idea to Product – The Integrated Design Process</i> , Hong Kong Productivity Council			
	2.	Altshuller, G.; et al. 1997, <i>40 Principles: TRIZ Keys to Technical Innovation</i> , Technical Innovation Center			
	3.	Altshuller, G. 1999, <i>The Innovation Algorithm: TRIZ, Systematic Innovation and Technical Creativity</i> , Technical Innovation Center			
	4.	Buzan, Tony & Buzan, Barry 1995, <i>The Mind Map Book</i> , BBC Books			
	5.	de Bono Edward 1977, <i>Lateral Thinking</i> , Penguin Books			
	6.	Mann, D. 2002, <i>Hands-On Systematic Innovation</i> , CREAX Press			
	7.	Pugh, S. 1999, <i>Total Design: Integrated Methods for Successful Product Engineering</i> , Addison Wesley/Longman			
	8.	Rantanen, K. and Domb, E. 2000, <i>Simplified TRIZ</i> , Saint Lucie Press			
	9.	Savransky, S. D. 2000, <i>Engineering of Creativity: Introduction to TRIZ Methodology of Inventive Problem Solving</i> , CRC Press			
	10.	Terninko, J.; et al. 1998, <i>Systematic Innovation: An Introduction to TRIZ (Theory of Inventive Problem Solving)</i> , Saint Lucie Press			

Subject Description Form

Subject Code	ISE559
Subject Title	Technology Audit and Assessment
Credit Value	3
Level	5
Pre-requisite/Co-requisite/Exclusion	One of: ISE549 Management of Innovation and Technology, ISE5001 Technology Transfer and Commercialisation or ISE5602 Management of Innovation and Technology
Objectives	This subject provides students with the opportunity to 1. understand the importance of technology audit and assessment in corporate strategic planning; 2. understand the critical elements needed to conduct a comprehensive technology audit and assessment; 3. develop the skills needed to carry out a technology audit and assessment.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. recognise the practical role of technology audit and assessment and their benefits to organisations; b. understand the methodologies and tools required for technology audit and assessment; c. apply the proper tools and techniques to conduct a technology audit and assessment.
Subject Synopsis/ Indicative Syllabus	1. <u>The Technology Audit</u> Understanding the technology portfolio; technology fitness audit; audit process. 2. <u>Implementing and Sharing Technology Audit Results</u> Sharing audit results; assessing technology gaps. 3. <u>Technology Assessment and Technology Intelligence</u> Technology assessment process; assessing the present technology base; performance measurement tools; technology strategy and intelligence. 4. <u>Technology Forecasting and Technology Roadmapping</u> Mapping the produce-market technology linkage; forecasting tools for technological decision making; technology road-mapping tools.
Teaching/Learning Methodology	A mixture of lectures, tutorials, and case studies is used to deliver the various topics in this subject. The lectures supplemented with interactive questions and answers which are aligned with subject learning outcomes <i>a</i> and <i>b</i> are used to introduce students with the knowledge of technology audit and assessment. Whereas tutorials and case studies which are aligned with subject learning outcome <i>c</i> are used to develop students' ability to apply what they have learnt to realistic work scenarios.

Assessment Methods in Alignment with Intended Learning Outcomes	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed		
			a	b	c
	1. In-class individual tests	25%	✓	✓	
	2. Individual assignments	40%		✓	✓
	3. Individual final project presentation	8%			✓
	4. Final field project report	27%			✓
	Total	100%			
Assessment comprises assignments, tests, and a group project. The tests are designed to assess the understanding of students of the concepts, methodologies, and tools of technology audit and assessment. Whereas, the assignment and group project are designed to assess the ability of students in applying the knowledge they have learnt in real situations.					
Student Study Effort Expected	Class contact:				
	▪ Lectures				21 Hrs.
	▪ Tutorials/Case studies				18 Hrs.
	Other student study effort:				
	▪ Revision and preparation for assignments and the group project				81 Hrs.
	Total student study effort				120 Hrs.
Reading List and References	There is no recommended textbook for this course. A number of reference books and journal articles are used to provide the necessary background materials of relevance to this course. Potential references include, but are not limited to: 1. Lindsay, J. 2000, The Technology Management Audit, Cambridge Strategy Publications Ltd. 2. Angelis, D. 2002, An Optimal Model for R&D Valuation, Int. J of Technology Management, vol. 24, no. 1, pp. 44-56 3. Barrel, R, Mason, G and O’Mahony, M. 2000, Productivity, Innovation and Economic Performance, Cambridge University Press 4. Farrukh, C.J.P., Phaal R. and Probert D.R. 2000, Technology Management Assessment Procedure: a guide for supporting technology management in business, University of Cambridge and Institute of Electrical Engineers. 5. Phaal, R, Farrukh CJP and Probert DR 2001, Technology Management Process Assessment: A Case Study, Int. J. of Operations & Production Management, vol. 21, no. 8, pp. 1116-1132 6. NeNew Venture Tools at: http://www.newventuretools.net 7. Kerr, C. I. V.; Mortara, L.; Phaal, R. & Probert, D. R. (2006) A conceptual model for technology intelligence. International Journal of Technology Intelligence and Planning, Volume 2, Number 1, pp. 73-93. 8. Phaal, R. and Muller, G. (2009) ‘An architectural framework for roadmapping: Towards visual strategy’ Technological Forecasting and Social Change Vol. 76 pp.39-49.				

Subject Description Form

Subject Code	ISE5001
Subject Title	Technology Transfer and Commercialization
Credit Value	3
Level	5
Pre-requisite / Co-requisite/ Exclusion	none
Objectives	This subject is aimed to provide the students with: 1. the theory and practice of technology transfer and commercialization. 2. working knowledge and skills to plan and implement technology assessment, market assessment, alignment of technology in technology transfer and transmission process. 3. understanding on issues concerning roles of various intellectual property rights, patent search, sustainability and competitive advantage, science and technology policy, start-up, and licensing and spin-off companies.
Intended Learning Outcomes	Upon completion of the subject, students will be able: a. to apply appropriate mechanisms of technology transfer and commercialization b. to understand and assess customer-needs driven technology specifications, technology alignment, and technology transfer process c. to assess technology licensing agreement and to evaluate start-up and spin-off companies d. to recognise the importance and role of intellectual property rights, government, research institutes and commercial institutions in technology transfer and commercialization
Subject Synopsis/ Indicative Syllabus	The topics to be covered include: <u>1. Theory and practice</u> Technology Entrepreneurship and Innovation; Technology Transfer & Transmission Process; Technology Commercialization Process; Role of Intellectual Property in Protecting Innovation <u>2. Technology and Market Assessment</u> Customer Needs Driven Product Specifications; Negotiating the Deal and Marketing the Innovation; Financial Plan and Selection of Innovation Projects; Innovation and Risk Management; Technology Valuation and Impact Analysis; Market Assessment and Alignment of Technology. <u>3. Commercialization Strategy</u> Coming Full Circle in the Commercialization Loop; Business Plan Science and Technology Policy; Negotiating and Monitoring the Licensing Agreement; Start-Up and Spin-Off Companies; Joint Venture. <u>4. Case Studies</u> Case studies drawn from commercial, industrial and research applications.

Teaching/Learning Methodology	This subject is offered in block mode format on weekends, usually spread over a month. A mixture of lectures, tutorial exercises, and case studies will be used to deliver the various topics in this subject. Some of the topics will be covered in a problem-based format where this enhances the learning objectives. Others will be run as project-based, whereby students will learn and apply the knowledge and techniques to solving real problems. The subject also emphasizes experiential learning offered by industrial leaders. <table><tr><td>Teaching/Learning Methodologies</td><td colspan="4">Intended Subject Learning Outcomes to be assessed</td></tr><tr><td></td><td>a</td><td>b</td><td>c</td><td>d</td></tr><tr><td>Lecture</td><td></td><td>✓</td><td></td><td>✓</td></tr><tr><td>In class activities</td><td>✓</td><td></td><td>✓</td><td></td></tr><tr><td>Case studies</td><td></td><td>✓</td><td></td><td>✓</td></tr></table>	Teaching/Learning Methodologies	Intended Subject Learning Outcomes to be assessed					a	b	c	d	Lecture		✓		✓	In class activities	✓		✓		Case studies		✓		✓															
Teaching/Learning Methodologies	Intended Subject Learning Outcomes to be assessed																																								
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Lecture		✓		✓																																					
In class activities	✓		✓																																						
Case studies		✓		✓																																					
Assessment Methods in Alignment with Intended Learning Outcomes	<table><tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="4">Intended subject learning outcomes to be assessed</td></tr><tr><td>a</td><td>b</td><td>c</td><td>d</td></tr><tr><td>1. Individual Assignment</td><td>15 %</td><td></td><td>✓</td><td></td><td>✓</td></tr><tr><td>2. In-class exercises</td><td>30 %</td><td>✓</td><td></td><td>✓</td><td></td></tr><tr><td>3. Quiz and Test</td><td>45 %</td><td>✓</td><td>✓</td><td>✓</td><td></td></tr><tr><td>4. Reflection on the learning</td><td>10 %</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr><tr><td>Total</td><td>100 %</td><td colspan="4"></td></tr></table> This is a 100% continuous assessment subject which is comprised of assignments with individual and group components, mini-project and usually two tests. All assessment components will require students to apply what they have learnt to realistic work applications. The individual assignment allows the students to reflect their understanding of the topics expected in learning outcome (b) and (d). The in-class exercises allow the students to give quick feedback on applying and practicing the techniques learnt in the classes for learning outcomes (a) and (c). There are a quiz and a test which aim to assess the overall understanding of the student for the concepts and knowledge necessary for achieving learning outcomes (a) to (d)	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed				a	b	c	d	1. Individual Assignment	15 %		✓		✓	2. In-class exercises	30 %	✓		✓		3. Quiz and Test	45 %	✓	✓	✓		4. Reflection on the learning	10 %	✓	✓	✓	✓	Total	100 %				
Specific assessment methods/tasks	% weighting			Intended subject learning outcomes to be assessed																																					
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4. Reflection on the learning	10 %	✓	✓	✓	✓																																				
Total	100 %																																								
Student Study Effort Expected	<table><tr><td>Class contact:</td><td></td></tr><tr><td>▪ Lectures</td><td>26 Hrs.</td></tr><tr><td>▪ In-class activities/Tutorial</td><td>13 Hrs.</td></tr><tr><td>Other student study effort:</td><td></td></tr><tr><td>▪ Study and self learning including mini-project and preparation for mini-project presentation</td><td>38 Hrs.</td></tr><tr><td>▪ Assignment and report writing</td><td>25 Hrs.</td></tr><tr><td>Total student study effort</td><td>102 Hrs.</td></tr></table>	Class contact:		▪ Lectures	26 Hrs.	▪ In-class activities/Tutorial	13 Hrs.	Other student study effort:		▪ Study and self learning including mini-project and preparation for mini-project presentation	38 Hrs.	▪ Assignment and report writing	25 Hrs.	Total student study effort	102 Hrs.																										
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Reading List and References	1. Clifford, M. Gross and Joseph P. Allen, (2003) “Technology Transfer for Entrepreneurs – A Guide to Commercializing Federal Laboratory Innovation”, Praeger Publishers, USA. 2. Cohen, M. W., “Patents and Appropriation_ Concerns and Evidence”, Journal of Technology Transfer, 30(1&2): 57-71, 2005. 3. Cooke, I. and Mayes, P. (1996), Introduction to Innovation and Technology Transfer, Norwood: Artech House. 4. Dorf, R.C. (1999), The Technology Management Handbook, Boca Raton, Fla.: CRC Press. 5. Eskelin, A. (2001), Technology Acquisition: Buying the Future of your Business, Boston, Mass.: Addison-Wesley. 6. Farris, G.F., “Research in Innovation Management and Technology Transfer in China”, The Journal of Technology Transfer, 32(1-2) 123-126, April 2007. 7. Iansiti, M. (1998), Technology Integration: Making Critical Choices in a Dynamic World, Mass.: Harvard Business School. 8. Inzelt, A. and Hilton, J. (1999), Technology Transfer: From Invention to Innovation, Kluwer Academic, Norwell. 9. Jolly, V.K (1997), Commercialisation of New Technologies, Greeting from Mind to Market, Boston, Mass.: Harvard Business School Press. 10. Melissa, A. Schilling (2008), Strategic Management of Technology Innovation, Micraw-Hill International Edition, 2nd Edition, Singapore. 11. Muir, A.E. (1997), The Technology Transfer System, New York: Latham Book Publishing. 12. Parr, R.L. and Sullivan, P.H. (1996), Technology Licensing: Corporate Strategies for Maximizing Value, New York: John Wiley & Sons. 13. Paulson, E. (2001), The Technology M&A Guidebook, New York: John Wiley & Sons. 14. Megantz, R.C. (2002), Technology Management: Developing and Implementing Effective Licensing Programs, New York: John Wiley & Sons. 15. Spencer, R.H. (2003), Technology Best Practices, New York: John Wiley & Sons. 16. Timmons, J.A. (2003), New Venture Creation, Sixth edition, Chicago: Irwin. 17. Protecting Innovations by Utility Models (http://www.wipo.int/sme/en/ip_business/utility_models/utility_models.htm). 18. NASA’s Technology Transfer Spin-Out Process (http://ipp.gsfc.nasa.gov/resources-ttprocess2.html). 19. Ramsey. W.S., “Financing a New Venture”, http://www.williamramseylaw.com/pages/Pfinancing.html
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Subject Description Form

Subject Code	ISE5002
Subject Title	Field Study of Technology Organizations
Credit Value	3
Level	5
Pre-requisite/Co-requisite/Exclusion	Students must have completed any two of the following three compulsory subjects: ISE549 Management of Innovation and Technology, ISE559 Technology Audit and Assessment, and ISE5001 Technology Transfer and Commercialization.
Objectives	This subject will provide students with the opportunity to 1. Study and conduct real case studies of technology organizations in China, Taiwan or overseas, which is participating in the field study; 2. Perform a competitive benchmark evaluation and put into practice some of the key concepts and frameworks that they have learnt in two of the three compulsory subjects, namely, ISE549, ISE559, and ISE5001; 3. Understand the implementation issues of proposed solutions to specific technological problems in organizations.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. Conduct a technology portfolio analysis; b. Identify the technology gaps in an organization; c. Devise a road map for solutions to specific problems facing technology organizations; d. Integrate technology into a company's business strategy.
Subject Synopsis/ Indicative Syllabus	1. <u>Review of Basic Concepts Important to the Field Trips</u> Technology and economic performance; science and technology infrastructure; industrial research and development; technology development and geographical considerations; technology and education/training; government's roles in IP and technology commercialization. 2. <u>Technology Field Trip Study</u> Observations of and reporting of study visits to technology organizations in China, Taiwan or overseas. 3. <u>Problem-Solving Skills</u> Observations and reporting; mapping solutions.

Teaching/Learning Methodology	This subject includes lectures, case studies, and experiential learning based on best practices. The students are required to formulate a study plan to focus on achieving the goal of the field trip. Desktop research is required to gather information about the organization to be visited, its competitors, and the markets concerned. Through direct observation and interviews with organizational members, students have the opportunity to conduct real-life studies of technological issues facing companies and put into practice the knowledge that they have gained in other subjects offered in this programme. These activities allow students to achieve the learning outcomes of the subject. This subject is offered in block mode format. Two lectures are arranged by (i) local government officials or distinguished industrial association member or (ii) a partner university, to cover relevant innovation strategy topics related to the industries of the location to be visited.					
	Teaching/Learning Methodologies	Intended Subject Learning Outcomes to be assessed				
		a	b	c	d	
	Lecture	✓	✓		✓	
	Seminars	✓	✓		✓	
	Case studies	✓	✓	✓	✓	
Assessment Methods in Alignment with Intended Learning Outcomes	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed			
			a	b	c	d
	1. Individual write-up of background knowledge	10%	✓	✓	✓	✓
	2. Individual research report	40%	✓	✓	✓	✓
	3. Individual reflective journal	10%				✓
	4. Oral presentation	10%	✓	✓	✓	✓
	5. Group study plan & project report	30%	✓	✓	✓	✓
	Total	100%				
Reports and presentation are used to assess the knowledge acquired by the students and their ability to apply such knowledge to achieve the learning outcomes of the subject.						
Student Study Effort Expected	Class contact:					
	▪ Lectures				6 Hrs.	
	▪ Tutorials/Seminars/Case studies				12 Hrs.	
	▪ Site visits				21 Hrs.	
	Other student study effort:					
	▪ Preparation for visits and information gathering				20 Hrs.	
	▪ Preparation for the project presentation and report writing				63 Hrs.	
	Total student study effort				122 Hrs.	

Reading List and References	There is no recommended textbook for this subject. A number of books and journals include materials of some relevance to this subject as referenced in ISE549, ISE559, and ISE5001. The web-based material includes numerous references to online journal articles and websites that provide an abundance of relevant, detailed, and current information supporting the content. Potential readings include, but are not limited to: 1. Robert Grant, 2013, <i>Contemporary Strategy Analysis</i>, 8th edition, John Wiley & Sons, UK 2. Melissa Schilling, 2012, <i>Strategic Management of Technological Innovation</i>, 4th edition, McGraw-Hill, New York 3. Burgelman, Christensen, and Wheelwright, 2008 <i>Strategic Management of Technology and Innovation</i>, 5th edition, McGraw-Hill, New York 4. Angelis, Diana 2002, <i>An Optimal Model for R&D Valuation</i>, Int. J of Technology management, Vo. 24, No. 1, pp. 44-56 5. Barrel, Ray, Geoff Mason and Mary O'Mahony 2000, <i>Productivity, Innovation and Economic Performance</i>, Cambridge University Press 6. Gregory, M.J., D.R. Probert and D.R. Cowell 1996, <i>Auditing Technology Management Processes</i>, Int. J. of Technology management, Vo. 12, No. 3, pp. 3-6-319 7. Phaal, R., C.J.P. Farrukh and D.R. Probert 2001, <i>Technology Management Process Assessment: A Case Study</i>, Int. J. of Operations & Production Management, Vol. 21, No. 8, pp. 1116-1132 8. New Venture Tools at: http://www.newventuretools.net 9. Lester, Richard 1998, <i>The Productive Edge – How U.S. Industries are Pointing the Way to a New Era of Economic Growth</i>, Norton, New York
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Subject Description Form

Subject Code	ISE5018
Subject Title	Intellectual Property Management and Strategies
Credit Value	3
Level	5
Pre-requisite / Co-requisite/ Exclusion	none
Objectives	The subject aims to provide an overview of methods and approaches to manage intellectual property as strategic resources for enhancing the competitiveness for organizations. Upon completion of this subject, students should be able to accomplish the following objectives: 1. Understanding, defining and differentiating different types of intellectual properties (IPs) and their roles in contributing to organizational competitiveness 2. Understanding the Framework of Strategic Management of Intellectual Property (IP). 3. Appreciating and appraising different IP management (IPM) approaches and describing how pioneering firms initiate, implement and manage IPM programs, 4. Explaining how to derive value from IP and leverage its value in new product and service development 5. Exposing to the Legal management of IP and understanding of real life practice of IPM.
Intended Learning Outcomes	Upon completion of the subject, students will be able to : a. identify different types of Intellectual Properties (IPs), the right of ownership, scope of protection as well as the ways to create and to extract value from IP b. recognize the crucial role of IP in organizations of different industrial sectors for the purposes of product and technology development c. identify activities and constitute IP infringements and the remedies available to the IP owner and describe the precautions steps to be taken to prevent infringement of proprietary rights in products and technology development d. Be familiar with the processes of Intellectual Property Management (IPM) and various approaches for IPM and conducting IP and IPM auditing and explain how IP can be managed as a strategic resource and suggest IPM strategy.

Subject Synopsis/ Indicative Syllabus	The subject shows the critical important of various IP management activities and approaches to leverage the value of the IP for organization success. The following topics are covered; <u>Basic Concepts of IPs</u> Types of Intellectual Properties (IPs), the right of ownership and scope of protection, Value creation and value extraction for IPs, Legal Aspect of IP: Application, Appropriation, Infringement & Design Around, Licensing <u>IP Management Strategies and Implementation</u> Overview of IP Management & Strategy, IP Management Audit, Patent Portfolio & Patent Intelligence, Technology Strategy & Patent Analysis, Patent Dispute Management & Strategy, Co-opetition & IP Strategy IP Strategy & Open Business Model, IP Valuation, Royalty & Damage <u>Case Studies</u> Case Studies are drawn from commercial, industrial, legal and technological aspects for product and technology development																																									
Teaching/Learning Methodology	As shown in Table 1, this subject is offered in block mode format on weekends, usually spread over a month. A mixture of lectures, tutorial exercises, and case studies will be used to deliver the various topics in this subject. Some of which will be covered in a problem-based format where this enhances the learning objectives. Others will be delivered directly through directed study in order to enhance the students’ ability of “learning to learn”. A mini-project will be used to integrate these topics and the students will demonstrate how to apply various techniques are inter-related and how they apply in real life situations. Cross fertilization of ideas and experiences of students through discussions and presentations are highly encouraged. Table 1 <table><tr><th rowspan="2">Teaching/Learning Methodology</th><th colspan="5">Intended subject learning outcomes</th></tr><tr><th>a</th><th>b</th><th>c</th><th>d</th><th></th></tr><tr><td>2. Lectures/Guest lecture</td><td>√</td><td>√</td><td>√</td><td>√</td><td></td></tr><tr><td>2. In-class activities</td><td>√</td><td>√</td><td>√</td><td></td><td></td></tr><tr><td>3. Laboratory</td><td></td><td></td><td></td><td>√</td><td></td></tr><tr><td>4. Case studies</td><td>√</td><td>√</td><td>√</td><td></td><td></td></tr><tr><td>5. Mini-project</td><td>√</td><td>√</td><td>√</td><td>√</td><td></td></tr></table>	Teaching/Learning Methodology	Intended subject learning outcomes					a	b	c	d		2. Lectures/Guest lecture	√	√	√	√		2. In-class activities	√	√	√			3. Laboratory				√		4. Case studies	√	√	√			5. Mini-project	√	√	√	√	
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2. In-class activities	√	√	√																																							
3. Laboratory				√																																						
4. Case studies	√	√	√																																							
5. Mini-project	√	√	√	√																																						
Assessment Methods in Alignment with Intended Learning Outcomes	As shown in Table 2, this is a 100% continuous assessment subject which is comprised of assignments with individual and group assignments, mini-project, a short quiz and an open-book test. All assessment components will require students to apply what they have learnt to realistic work applications. To reflect what the student’s learning for topics in learning outcomes (c) and (d), an individual assignment is provided which allows the students to apply the theory and concepts in IPM to address real life problems. The group assignment aims to allow the students to prepare for a proposal for the mini-project through the identification of the IPs and IP management problems in																																									

organizations (Learning Outcome (a)) and develop their skill to formulate a plan to address the problems (Learning Outcome (d)). The short quiz aims to assess the understanding of the students for the topics in learning outcomes (a) and (b).

The students are required to present the results and write a report for their mini-project which allow the students to integrate and apply the concept, theory, methods and approaches to manage intellectual property as strategic resources for enhancing the competitiveness for organizations. (learning outcomes (a) to (d)),

There is an open book test which aims to assess the students' capability for applying the theory and concepts learnt in the class for analyzing and solving problems related to related to the subject (learning outcomes (a) to (d)).

Table 1 Summary of Assessment Components

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d		
1. Individual assignment	25%			✓	✓		
2. Group Assignment	10%		✓		✓		
3. Presentation for mini-project	10%	✓	✓	✓	✓		
4. Written report for mini-project	15%	✓	✓	✓	✓		
5. Short Quiz	15%	✓	✓				
6. Open-book Test	25%	✓	✓	✓			
Total	100 %						

Student Study Effort Required

Class contact:	
▪ Lectures	26 Hrs.
▪ In-class activities/Tutorial/ Laboratory	13 Hrs.
Other student study effort:	
▪ Study and self learning including mini-project and preparation for mini-project presentation	38 Hrs.
▪ Assignment and report writing	25 Hrs.
Total student study effort	102 Hrs.

Reading List and References

1. Cheung, C.F., Wang, W.M., Tse, Y.L. and Ma Ricky "Knowledge-based Intellectual Property Management for Technology Development Industry", *Journal of Knowledge Management Practice*, Vol. 14, No. 2, <http://www.tlinc.com/articl335.htm> (2013).
2. Cheung, C.F., Wang, W.M., Xu, X. and Willoughby, Kelvin W. "A Knowledge-Based System for Assessing and Managing Intellectual Property Managerial Risks for Small-and-Medium Sized Technological Enterprises", *International Journal of Intellectual Property Management*, Vol. 7, No. 1/2, p.57-83 (2014).

3. Cornish, William Rodolph & Llewelyn, David. Intellectual property: patents, copyright, trade marks and allied rights. Sweet & Maxwell, 8/e, 2013.
4. Cornish, William Rodolph. Cases and materials on intellectual property. Sweet & Maxwell, 5/e, 2006.
5. Lo, Jack and Pressman, David. How to make patent drawings: a patent it yourself companion. Nolo, 5/e 2007.
6. Gruner, Richard S., Ghosh, Shubha and Kesan, Jay P. Intellectual Property in Business Organizations: Cases and Materials 2006 <http://www.lexisnexis.com/store/catalog/productdetail.jsp?pageName=relatedProducts&catId=&prodId=58918>
7. Sullivan, P.H., Value-Driven Intellectual Capital: How to Convert Intangible Corporate Assets into Market Value. John Wiley & Sons, Inc., Hoboken, New Jersey, 2000.
8. Kieff, F. Scott, Newman, Pauline, Schwartz, Herbert F. and Smith, Henry E., Principles of Patent Law, 6th ed., Foundation Press, 2013.
9. Merges, Robert Patrick and Duffy John Fitzgerald, Patent Law and Policy: Cases and Materials, LEXISNEXIS, 2013.
10. Ventose, Eddy, Medical Patent Law - The Challenges of Medical Treatment, Edward Elgar, 2011.
11. Grubb, Philip W. and Thomsen, Peter L., Patents for Chemicals, Pharmaceuticals and Biotechnology: Fundamentals of Global Law, Practice and Strategy, Peter L. Thomsen, 2010.
12. Wang, W.M. and Cheung, C.F. "A Semantic-based Intellectual Property Management System (SIPMS) for Supporting Patent Analysis", Engineering Applications of Artificial Intelligence, Vol. 24, No. 8, p.1510-1520 (2011).

Subject Description Form

Subject Code	ISE5021
Subject Title	Technology Project Management
Credit Value	3
Level	5
Pre-requisite/Co-requisite/Exclusion	Students who have taken Project Management or equivalent are not advised to take this subject.
Objectives	This subject aims to equip the students with 1. theory and practices of leaderships in Project Management in different industrial areas and the methods and skills for applying project management tools; 2. working knowledge of the Project Management in industry in terms of time-cost relationships, resources, processes and risks to the projects and the ability to select the essential elements and practices needed to develop and implement projects using system approach; 3. the ability to carry out analysis and evaluation of the best practices of projects.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. apply advanced project management tools in managing technology projects; b. apply the working knowledge of the project methodologies to the projects; c. select the essential elements and practices needed to develop and implement projects using system approach; d. evaluate of the best practices in managing technology projects.
Subject Synopsis/ Indicative Syllabus	1. <u>Project management fundamentals</u> Project concepts, scope, objectives, agreements and the relationship with other stakeholders; Project management and people skills; Project formulation and implementation strategy; Projects in Organizations 2. <u>Project time/cost management</u> The methodology in terms of work breakdown structure (WBS), organizational breakdown structure (OBS), controlling and managing of time, cost and resources; Overall project scheduling, budgeting, resource planning and monitoring; Software tools (e.g. MS Project); Project life cycle; Providing service monitoring and performance indicators. 3. <u>Control and Evaluation</u> Fundamental purposes of control; control process and systems; Control projects according to plan; evaluating a project and project audit. Essentials of Audit and Evaluation 4. <u>Project Risk management</u> Risk identification, response development and control; emergency change response and control. 5. <u>Case study and management report</u>

Teaching/Learning Methodology	A mixture of lectures, tutorial exercises, and case studies will be used to deliver the various topics in this subject for the attainment of learning outcomes. Cross fertilization of ideas and experiences of subject lecturers and students in project strategy through class discussions and presentations will be highly encouraged and should form an important component in the teaching/learning process of this subject. Two major portions: Lectures will cover the direct study of the various topics in this subject to enhance students’ “ability to learn”. Problem-based Learning approach will be applied to the case studies and tutorial exercises and include industrial technology applications. An integrated group project will be conducted and presented by students to demonstrate the ability to integrate various techniques of project management in industry, and how they can be applied in real life situations. <table><tr><th>Teaching/Learning Methodologies</th><th colspan="4">Intended Subject Learning Outcomes to be assessed</th></tr><tr><td></td><td>a</td><td>b</td><td>c</td><td>d</td></tr><tr><td>Lecture</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr><tr><td>Tutorial</td><td>✓</td><td>✓</td><td></td><td></td></tr><tr><td>Case studies</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr></table>	Teaching/Learning Methodologies	Intended Subject Learning Outcomes to be assessed					a	b	c	d	Lecture	✓	✓	✓	✓	Tutorial	✓	✓			Case studies	✓	✓	✓	✓															
Teaching/Learning Methodologies	Intended Subject Learning Outcomes to be assessed																																								
	a	b	c	d																																					
Lecture	✓	✓	✓	✓																																					
Tutorial	✓	✓																																							
Case studies	✓	✓	✓	✓																																					
Assessment Methods in Alignment with Intended Learning Outcomes	<table><tr><th rowspan="2">Specific assessment methods/tasks</th><th rowspan="2">% weighting</th><th colspan="4">Intended subject learning outcomes to be assessed</th></tr><tr><th>a</th><th>b</th><th>c</th><th>d</th></tr><tr><td>1. Group project and report</td><td>30 %</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr><tr><td>2. Individual assignment</td><td>30 %</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr><tr><td>3. Quiz and tests</td><td>30 %</td><td>✓</td><td>✓</td><td>✓</td><td></td></tr><tr><td>4. Project presentation</td><td>10 %</td><td></td><td>✓</td><td>✓</td><td></td></tr><tr><td>Total</td><td>100%</td><td></td><td></td><td></td><td></td></tr></table> The coursework of this subject involves students to work as individual and in groups (role play) to study cases that mimic the realities of project management situations in industry (Learning outcomes; a, b, c, and d). Through such exercises and tests (Learning outcomes: b, c, and d), students’ ability to apply and synthesize acquired knowledge can be assessed on the basis of their performance (role play) in group discussion, oral presentations (Learning outcomes: c, and d), and the quality of their written reports on these case studies.	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed				a	b	c	d	1. Group project and report	30 %	✓	✓	✓	✓	2. Individual assignment	30 %	✓	✓	✓	✓	3. Quiz and tests	30 %	✓	✓	✓		4. Project presentation	10 %		✓	✓		Total	100%				
Specific assessment methods/tasks	% weighting			Intended subject learning outcomes to be assessed																																					
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3. Quiz and tests	30 %	✓	✓	✓																																					
4. Project presentation	10 %		✓	✓																																					
Total	100%																																								

Student Study Effort Expected	Class contact:	
	▪ Lectures and discussion	27 Hrs.
	▪ Tutorial and case study	12 Hrs.
	Other student study effort:	
	▪ Research and preparation	60 Hrs.
	▪ Report writing	17 Hrs.
	Total student study effort	116 Hrs.
Reading List and References	1. Garton, C. 2005, <i>Fundamentals of Technology Project Management</i>, MC Press 2. Ghattas, R.G. & McKee S. L 2001, <i>Practical Project Management</i>, Prentice Hall 3. Gray, C. & Larson, E. 2003, <i>Project Management</i>, McGraw-Hill 4. Heizer, J. & Render, B. 1993, <i>Production and Operations Management – Strategies and Tactics</i>, 6th edn, Allyn and Bacon 5. Kerzner, H. 2009, <i>Project Management: A Systems Approach to Planning, Scheduling, and Controlling</i>, John Wiley & Sons Inc 6. Morse, L. et al. 2006, <i>Managing Engineering and Technology</i>, Prentice Hall 7. Project Management Institute 2013, <i>A Guide to the Project Management Body of Knowledge</i>, 5th ed., Project Management Institute (PMI) 8. Smith, N.J. 2008, <i>Engineering Project Management</i>, Oxford: Blackwell Science	

Subject Description Form

Subject Code	ISE5022
Subject Title	Financial Decision Analysis for Technology Management
Credit Value	3
Level	5
Pre-requisite/Co-requisite/Exclusion	Background in Accounting
Objectives	This subject aims to provide students with 1. an understanding of the criticalness of financial analysis for decision making in technology management and the fundamentals of financial planning and resource allocation in technology-based companies; 2. the ability to apply the knowledge of financing technological innovation, related entrepreneurial ventures and techniques in performing business and financial analysis in support of management decisions and in the growth and development of technology-based companies or projects.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. apprehend the fundamentals of financing technological innovation and the decision making process in assessing investments in technology-based projects; b. perform business and financial analysis in order to evaluate overall strategic business performance and financial position of a firm driven by technological innovation; c. perform financial modeling for planning and analysis and hence to develop financial plan for technology-based companies or projects; d. identify various sources of finances in the growth and development of technology-based companies or projects; e. apprehend the application of real options for evaluation of technology ventures and other valuation techniques.

Subject Synopsis/ Indicative Syllabus	1. <u>Process of Financing Technological Innovation</u> Introduction to entrepreneurial finance and venture capital in the context of technology management. 2. <u>Fundamentals of Business Finance</u> Financial statements interpretation and analysis. Sources of finance. Types of financial capital. Working capital management. 3. <u>Challenges in Management Decisions for Financing Technological Innovation</u> Feasibility studies and financial analysis of technology-based projects. Projection of future cash flow. Cost of capital. 4. <u>Business Valuation Methods</u> Real options approach; staging of investment and investment decisions; choice of financing; financial planning; risk and return analysis. 5. <u>Resources allocation</u> Resources allocation into R&D and other intangible assets. Business performance measurement in early-stage and expansion-stage. Incentive issues. 6. <u>Business Plan Development</u> Business plan development and related financial analysis. Capital raising. Case studies.																														
Teaching/Learning Methodology	A mixture of lectures, tutorial exercises, computer lab and case studies will be used to deliver the various topics in this subject for the attainment of learning outcomes. Some of which will be covered in a problem-based format where this enhances the learning objectives. Others will be covered through directed study in order to enhance the students’ ability of “learning to learn”. Case studies will be used to integrate these topics and thus demonstrate to students how the various techniques are inter-related and how they apply in real life situations. Cross fertilization of ideas and experiences of students in financing technological innovation through class discussions and presentations will be highly encouraged and should form an important component in the teaching/learning process of this subject. <table><tr><th>Teaching/Learning Methodologies</th><th colspan="5">Intended Subject Learning Outcomes to be assessed</th></tr><tr><td></td><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td></tr><tr><td>Lecture</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr><tr><td>Tutorial</td><td></td><td>✓</td><td>✓</td><td></td><td></td></tr><tr><td>Case studies</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr></table>	Teaching/Learning Methodologies	Intended Subject Learning Outcomes to be assessed						a	b	c	d	e	Lecture	✓	✓	✓	✓	✓	Tutorial		✓	✓			Case studies	✓	✓	✓	✓	✓
Teaching/Learning Methodologies	Intended Subject Learning Outcomes to be assessed																														
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Lecture	✓	✓	✓	✓	✓																										
Tutorial		✓	✓																												
Case studies	✓	✓	✓	✓	✓																										
Assessment Methods in Alignment with Intended Learning Outcomes	<table><tr><th rowspan="2">Specific assessment methods/tasks</th><th rowspan="2">% weighting</th><th colspan="5">Intended subject learning outcomes to be assessed</th></tr><tr><th>a</th><th>b</th><th>c</th><th>d</th><th>e</th></tr></table>	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed					a	b	c	d	e																		
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	8. Drucker, P.F. 1993. <i>Innovation and Entrepreneurship</i> , First Harper Business 9. Grove, A. S. 1996. <i>Only the Paranoid Survive</i> , Doubleday 10. Entrepreneurship Theory and Practice 11. International Entrepreneurship and Management Journal 12. Journal of Business Venturing 13. Journal of Intellectual Capital 14. Harvard Business Review
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Subject Description Form

Subject Code	ISE5601
Subject Title	Managing and Measuring Intellectual Capital
Credit Value	3
Level	5
Pre-requisite / Co-requisite/ Exclusion	None
Objectives	This subject aims to provide students with: 1. Working knowledge of different elements of intellectual capital and deriving values from intellectual capital 2. The theory and practice for the strategic management of intellectual capital and its life cycle of implementation 3. Understanding with different approaches for measuring and reporting value of intellectual capital
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. identify and differentiate fundamental elements of intellectual capital and intellectual capital management b. familiarize with the value chain of intellectual capital and activities for deriving values from intellectual capital c. apply, justify and implement appropriate approach for the management of intellectual capital as a strategic resource d. apply appropriate approaches for measuring and reporting value of intellectual capital
Subject Synopsis/ Indicative Syllabus	This subject is to provide an overview of methods and approaches to manage and measure knowledge-based assets, and show the critical importance of various intellectual capital and intangible assets management approaches to the success of knowledge management initiatives and strategies. The following topics are covered: <u><i>Intellectual capital management foundations</i></u> • Evolution of intellectual capital and its business value • Definitions and conceptual differences of intangible assets, knowledge-based assets and intellectual capital • Legal management of intellectual capital <u><i>Converting Intellectual Capital to Value</i></u> • Value chain of intellectual capital

	• Value creation and value extraction activities for converting intellectual capital to value • Major types of intellectual capital management activities that facilitate value creation and extraction <u>Measuring and Reporting Intellectual Capital</u> • Established models for measuring intellectual capital and corporate performance e.g. Balanced Score Cards, intellectual capital statement, intangible asset monitor, Skandia Navigator, etc. • Methods and tools for reporting intellectual capital in organizations <u>Implementation of Intellectual Capital Management Programme</u> • Intellectual capital implementation approaches with emphasis on Comprehensive Intellectual Capital Management (CICM) model and its implementation • Case studies
Teaching/Learning Methodology	As shown in Table 1, this subject is offered in a blended mode of online learning and face-to-face teaching. A mixture of e-learning, instructor-lead tutorials and workshops, and case studies will be used to deliver the topics in this subject. Case studies, largely based on real case will be used to demonstrate to students how the latest techniques can be applied to improve the real life situations. The students can access the e-learning platform which contains interactive online materials for the lessons. Participants are strongly encouraged to make effective use of all learning tools available to optimise their learning in this subject. To facilitate the students to learn, the students are also expected to participate instructor lead face-to-face teaching activities which include workshop, tutorials, etc. Some of the teaching activities will be covered in a problem-based format where this enhances the learning objectives. Others will be delivered directly through directed study in order to enhance the students' ability of "learning to learn". Mini-project will be used to integrate these topics and thus demonstrate to students how the various techniques are inter-related and how they apply in real life situations. Cross fertilization of ideas and experiences of students through discussions and presentations are highly encouraged. Table 1

	Teaching/Learning Methodology	Intended subject learning outcomes																																																										
		a	b	c	d																																																							
	3. Lectures/Online Guest Lecture	√	√	√	√																																																							
	2. Interactive Online Materials	√	√	√	√																																																							
	3. Workshops	√			√																																																							
	4.In-class Case Studies and Tutorials	√	√		√																																																							
	5.Mini-project	√	√	√	√																																																							
Assessment Methods in Alignment with Intended Learning Outcomes	As shown in Table 2, the assessment method of the subject is composed of coursework and examination. The coursework assessment includes workshop assignment and group mini-project. Written examination will be arranged at the end of the semester. All assessment components will require students to apply what they have learnt to realistic work applications.																																																											
	The workshop assignment is provided to assess the technical competency and skills of the students to use and practice the methods and tools learnt during the workshop and classes which reflect their learning outcomes (a), (c) and (d). The group mini-project provides a team work environment for facilitates the students to apply the concepts, theory and skills learnt in analyzing and solving problems in managing and measuring IC for a real life scenario (e.g. Learning Outcomes (a) to (d)).																																																											
	A participant is expected to perform satisfactorily in BOTH the coursework and the examination. The subject coordinator can exercise discretion to alter the final subject result should there exists significant variation in a participant's performance in these 2 components.																																																											
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	<table><tr><th rowspan="2">Specific assessment methods/tasks</th><th rowspan="2">% weighting</th><th colspan="6">Intended subject learning outcomes to be assessed</th></tr><tr><th>a</th><th>b</th><th>c</th><th>d</th><th></th><th></th></tr><tr><td>1. Workshop assignment</td><td>15%</td><td>√</td><td></td><td>√</td><td>√</td><td></td><td></td></tr><tr><td>2. Presentation of mini-project</td><td>10%</td><td>√</td><td>√</td><td>√</td><td>√</td><td></td><td></td></tr><tr><td>3. Written report for mini-project</td><td>15%</td><td>√</td><td>√</td><td>√</td><td>√</td><td></td><td></td></tr><tr><td>4. Open book examination</td><td>60%</td><td>√</td><td>√</td><td>√</td><td>√</td><td></td><td></td></tr><tr><td>Total</td><td>100 %</td><td colspan="6"></td></tr></table>						Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed						a	b	c	d			1. Workshop assignment	15%	√		√	√			2. Presentation of mini-project	10%	√	√	√	√			3. Written report for mini-project	15%	√	√	√	√			4. Open book examination	60%	√	√	√	√			Total	100 %						
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Total	100 %																																																											

Student Study Effort Required	Class contact:	
	Face-to-face Lectures/ Tutorials/Workshops/Presentations 3 hours x 13 weeks	39 Hrs.
	Other student study effort:	
	Individual Assignment and Workshop Assignment	30 Hrs.
	Study and self learning	22 Hrs.
	Mini-project and assignments	24 Hrs
	Total student study effort	115 Hrs
Reading List and References	1. Al-Ali, N. (2003) Comprehensive Intellectual Capital Management: Step-by-Step. John Wiley & Sons, Inc., Hoboken, New Jersey. 2. Andriessen, D. & Stam, C. (2004). The Intellectual Capital of the European Union. Measuring the Lisbon Agenda Centre for Research in Intellectual Capital, Inholland University. 3. Andriessen, D. (2003). Making Sense of Intellectual Capital. Designing a Method for the Valuation of Intangibles. Butterworth Heinemann. 4. Andriessen, D. and Boom, M. van den (2006). Asia and Europe, knowledge economies in encounter. INA Magazine, Vol.XVII, 15-18. 5. Andriessen, D. G. and Boom, M. van den (2007). East is East, and West is West, and (n)ever its intellectual capital shall meet. Journal of Intellectual Capital, 8. 6. Cai, Linlin, Tsui, Eric and Cheung, Chi Fai "An Exploratory Study on an Intellectual Capital Eco-system", <i>Proceedings of IFKAD 2014-International Forum on Knowledge Asset Dynamics</i>, June 11-June 13, Matera, Italy, p.2952-2966 (2014). 7. Cai, Linlin, Tsui, Eric and Cheung, Benny "A Critical Analysis of Intellectual Capital Reports in Banking Industry from 1994 to 2011", <i>Proceedings of 10th International Conference on Intellectual Capital, Knowledge Management and Organisational Learning (ICICKM2013)</i>, October 23- October 25, Washington, DC, USA, pp.667-673 (2013). 8. Cai, L, Tsui, E, Cheung, C.F. "A Taxonomic Approach to the Identification of Intellectual Capital from Company Reports", <i>Proceedings of IEEE International Conference on Software Engineering and System Science</i>, May 23- May 25, Beijing, China, pp.338-341 (2013). 9. Cheung, C.F., Lee, W.B., Eric Tsui and Chan, W.K. "Auditing Intellectual Capital: A Case Study in a Supply Chain Integrator", <i>Proceedings of 3rd International Conference on Intellectual Capital, Knowledge Management and Organisational Learning (ICICKM</i>	

	2006), October 19-20, Pontificia Universidad Católica de Chile, Santiago, Chile, p.99-105 (2006). 10. Tsui, E., Wang, W.M., Cai, L.L. and Cheung C.F., and Lee, W.B. "Knowledge-based Extraction of Intellectual Capital-related Information From Unstructured Data, <i>Expert Systems with Applications</i>, Vol. 41, No. 4, p.1315-1325 (2014). 11. Intellectual Property Department, The Government of the Hong Kong SAR. (2009). Intellectual Capital Statement (2009), http://www.ipd.gov.hk/eng/pub_press/publications/IC_Statement.pdf. 12. Intellectual Property Department, The Government of the Hong Kong SAR (2009). Intellectual Capital Statements of Organisations in Hong Kong in 2009, http://www.ipd.gov.hk/eng/ICM/intellectual_capital_statements_09.htm. 13. Intellectual Property Department, The Government of the Hong Kong SAR. (2010). Intellectual Capital Statements of Organisations in Hong Kong in 2010, http://www.ipd.gov.hk/eng/ICM/intellectual_capital_statements_10.htm. 14. Stam, C. D. (2007). Knowledge productivity. Designing and testing a method to diagnose knowledge productivity and plan for enhancement. 15. Sullivan, P. H. (2000). Value-Driven Intellectual Capital: How to Convert Intangible Corporate Assets into Market Value. John Wiley & Sons, Inc., Hoboken, New Jersey 16. Sveiby, K. E. (1997). The New Organizational Wealth: Managing & Measuring Knowledge-Based Assets. Berrett-Koehler Publishers, San Francisco. 17. Edvinsson, L. and Malone, M.S. (1997). Intellectual Capital: Realizing Your Company's True Value by Finding its Hidden Brainpower, Harper, New York. 18. Low, J. and Kalafut, P.C. (2002). Invisible advantage: How Intangibles are Driving Business Performance, Perseus Publishing, Cambridge 19. Stewart, T.A. (1998). Intellectual Capital: The New Wealth of Organizations, Nicholas Brealey, London. 20. Tissen, R. and Andriessen, D. and Deprez, F.L. (2000). The Knowledge Dividend: Creating High-Performance Companies through Value-Based Knowledge Management, Financial Times Prentice Hall, London.
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