

The Hong Kong Polytechnic University

Subject Description Form

Subject Code	LGT6204
Subject Title	Inventory and Supply Chain Management
Credit Value	3
Level	6
Normal Duration	1-semester
Pre-requisite / Co-requisite/ Exclusion	Basic knowledge in Optimization and Game Theory
Role and Purposes	<ul style="list-style-type: none"> • Provide a fundamental knowledge base of inventory management • Provide an overview over current research trends in supply chain management • Train advanced theoretical research methods common in the field of inventory and supply chain management • Provide a forum for interactive discussions of research methods and results derived from recent studies in the field
Subject Learning Outcomes	<p>Upon completion of the subject, students will be able to:</p> <ol style="list-style-type: none"> a) Develop their abilities to apply the analytical methods to solve the complex research problems. b) Identify promising research questions in the field of inventory and supply chain management. c) Effectively and instructively communicate with their peers.
Subject Synopsis/ Indicative Syllabus	<p>The course is divided into two parts. The first part lays the foundation of inventory management and the second part introduces the current research issues in the field of supply chain management.</p> <p>The first part covers selected classical models in inventory management and the methodologies used to analyze the corresponding optimization problems. The details are listed below.</p> <ul style="list-style-type: none"> - EOQ model - One warehouse multi-retailer model - Introduction to dynamic programming - Dynamic economic lot size model - Stochastic inventory models - Stochastic inventory and pricing models

	<p>The second part discusses the evolving research topics and issues in supply chain management and stimulates students to formulate their own research topics. The topics of in-class discussion and selected articles include, but are not limited to the following:</p> <ul style="list-style-type: none"> - Supply chain sourcing, contracting and coordination - Channel management - Social responsible operations - Firm/consumer behavior and its impact on supply chain management 																																																							
<p>Teaching/Learning Methodology</p>	<p>This subject is based on a series of lectures and interactive discussions between the lecturers and the students.</p>																																																							
<p>Assessment Methods in Alignment with Intended Learning Outcomes</p>	<table border="1" data-bbox="534 824 1481 1384"> <thead> <tr> <th rowspan="2">Specific assessment methods/tasks</th> <th rowspan="2">% weighting</th> <th colspan="6">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th> </tr> <tr> <th>a</th> <th>b</th> <th>c</th> <th></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>1. Continuous Assessment</td> <td>100%</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Homework</td> <td>35%</td> <td>✓</td> <td>✓</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Class presentation</td> <td>35%</td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Course project</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></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</p> <p>The homework and class presentation intend to test the students' understanding of the inventory and supply chain management issues discussed in the class and covered in the reading list.</p> <p>The course project motivates the student to conduct the preliminary study to identify a potential promising research topic related to inventory and supply chain management.</p> <p><i>To pass this subject, students are required to obtain Grade D or above in the Continuous Assessment components.</i></p>		Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)						a	b	c				1. Continuous Assessment	100%							Homework	35%	✓	✓					Class presentation	35%	✓	✓	✓				Course project	30%	✓	✓	✓				Total	100 %						
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<p>Student Study Effort Expected</p>	<p>Class contact:</p> <ul style="list-style-type: none"> ▪ Lecture/ Tutorial <p>Other student study effort:</p>	<p>39 Hrs.</p>																																																						

	<ul style="list-style-type: none"> ▪ After-class homework 	20 Hrs.
	<ul style="list-style-type: none"> ▪ Reading assignment 	33 Hrs.
	<ul style="list-style-type: none"> ▪ Course project 	34 Hrs.
	Total student study effort	126 Hrs.
Reading List and References	<p>Inventory Management</p> <ol style="list-style-type: none"> 1. Simchi-Levi, D., Chen, X., & Bramel J. 2014. <i>The Logic of Logistics</i>. Springer. 2. Zipkin, P. 2000. <i>Foundations of Inventory Management</i>. McGraw-Hill. 3. Porteus, E. 2002. <i>Foundations of Stochastic Inventory Theory</i>. Stanford Business Books. 4. Bertsekas, D. 2012. <i>Dynamic Programming and Optimal Control, Vol. 1</i>. Athena Scientific. 5. Roundy, R. 1985. 98% effective integer-ratio lot-sizing for one warehouse multi-retailer systems. <i>Management Science</i> 35, 1433-1442. 6. Wagner, H.M. & Whitin, T.M. 1958. Dynamic version of the economic lot size model. <i>Management Science</i> 5, 89-96. 7. Florian, M. & Klein, M. 1971. Deterministic production planning with concave costs and capacity constraints. <i>Management Science</i> 18, 12-20. 8. Scarf, H. 1960. The optimalities of (s, S) policies in the dynamic inventory problem. In K. Arrow, S. Karlin, P. Suppes (Eds) <i>Mathematical Methods in the Social Sciences</i>, Stanford University Press. 9. Clark, A. & Scarf, H. 1960. Optimal policies for a multi-echelon inventory problem. <i>Management Science</i> 6, 475-490. 10. Federgruen, A. & Heching, A. 1999. Combined pricing and inventory control under uncertainty. <i>Operations Research</i> 47(3), 454-475. 11. Chen, X. & Simchi-Levi, D. 2004a. Coordinating inventory control and pricing strategies with random demand and fixed ordering cost: the finite horizon case. <i>Operations Research</i> 52, 887-896. 12. Chen, X. & Simchi-Levi, D. 2004b. Coordinating inventory control and pricing strategies with random demand and fixed ordering cost: the infinite horizon case. <i>Mathematics of Operations Research</i> 29, 698-723. <p>Supply Chain Management</p> <ol style="list-style-type: none"> 1. A. Tsay, S Nahmias, N Agrawal. 1999. Modeling supply chain contracts: A review. <i>Quantitative models for supply chain management</i>, 299-336. 2. A Tsay. 1999. The quantity flexibility contract and supplier-customer incentives. <i>Management science</i>, 45 (10), 1339-1358 3. G. Cachon. 2003. Supply chain coordination with contracts. <i>Handbooks in operations research and management science</i> 11, 227-339. 4. G. Cachon and M. Lariviere, 2005. Supply Chain Coordination with Revenue-Sharing Contracts: Strengths and Limitations. <i>Management science</i>, 47 (5), 629-646 	

	<ol style="list-style-type: none"> 5. F. Bernstein, G. DeCroix and Y. Wang. 2007. Wang. Incentives and Commonality in a Decentralized Multi-Product Assembly System. <i>Operations Research</i>, 55, 630-646. 6. Dong, L. and K. Zhu. 2007. Two-wholesale-price Contracts: Push, Pull, and Advance-Purchase Discount Contracts. <i>Manufacturing & Service Operations Management</i>, 9(3), 291-311. 7. Y. Wang, B. Niu and P. Guo. 2013. On the Advantage of Quantity Leadership when Outsourcing Production to a Competitive Contract Manufacturer. <i>Production and Operations Management</i>, 22, 104–119. 8. Y. Wang, B. Niu and P. Guo. 2014. The Comparison of Two Vertical Outsourcing Structures under Push and Pull Contracts. <i>Production and Operations Management</i>, 23, 4, 610–625. 9. Q. Feng, L. X. Lu. 2012. The strategic perils of low-cost outsourcing. <i>Management Science</i>, 58(6) 1196-1210. 10. Cuihong Li and Zhixi Wan. 2015. Supplier Competition and Cost Improvement. forthcoming in <i>Management Science</i> 11. W. Xiao, V. Hsu and Q. Hu. 2015. Manufacturing Capacity Decisions under Demand Uncertainty and Tax Cross-Crediting. <i>M&SOM</i>, 17(3), 384-398. 12. F. Gao, X. Su. 2016. Omnichannel Retail Operations with Buy-Online-and-Pickup-in-Store, <i>Management Science</i>, Forthcoming. 13. Y Wang, W Gilland, B Tomlin. 2010. Regulatory trade risk and supply chain strategy. <i>Production and Operations Management</i>, 20 (4), 522-540. 14. M Schweitzer, G Cachon. 2000. Decision bias in the newsvendor problem with a known demand distribution: Experimental evidence. <i>Management Science</i>, 46 (3), 404-420 15. T. Cui, J. Raju and Z. Zhang. 2007. Fairness and Channel Coordination. <i>Management Science</i>, 53(8) 1303-1314. 16. X. Su. 2008. Bounded Rationality in Newsvendor Models, <i>Manufacturing & Service Operations Management</i>, 10 (4) 566-589. 17. T. Ho, X. Su, Y. Wu. 2014. Distributional and Peer-induced Fairness in Supply Chain Contract Design, <i>Production and Operations Management</i>, 23(2), 161-175. 18. M Li, N Petruzzi, and J Zhang. 2016. Overconfident Competing Newsvendors. <i>Management Science</i>, Forthcoming. 19. Y Zhang, K. Donohue and T. Cui. 2016. Contract Preferences and Performance for the Loss Averse Supplier: Buyback versus Revenue Sharing. <i>Management Science</i>, 62 (6), 1734-1754. 20. L. Yang, P. Guo and Y. Wang. Service Pricing with Loss Averse Customers. Working paper.
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