

Subject Description Form

Subject Code	BRE4281
Subject Title	Construction Engineering Management
Credit Value	3
Level	4
Pre-requisite	BRE350
Objectives	This subject is intended to develop the students' ability to apply decision making theories and operational research techniques in the management of construction projects.
Intended Learning Outcomes	<p>Upon completion of the subject, students will be able to:</p> <ol style="list-style-type: none"> a. identify and diagnose management problems accurately and effectively across a wide range of construction engineering activities, including management practices, human resources and plant management, operations, and strategic management. b. formulate construction engineering management problems into analytical models. c. find out and plan sound solutions from various analytical models by using quantitative (operational research) techniques.
Subject Synopsis/ Indicative Syllabus	<p>Construction productivity measurement and analysis Decision theory and applications Inventory control theory and applications Monte Carlo simulation and applications Fast track construction systems Risk management for construction projects Value management for construction projects Linear programming techniques and applications Green labelling schemes for buildings and construction International construction management practices</p>
Teaching/Learning Methodology	<p>Student learning will be facilitated through a combination of self-study and class contact sessions. The self-study will include guided reading, library searching skills, problem solving, reflection and textual & graphical communication as individuals and as part of a group. Some assignments will involve the training and development of problem analysis and presentation of results. Class contact will include lectures for providing an overall framework to topic areas and for those areas where textbooks do not provide adequate coverage. Small group sessions will be used for a combination of student-led seminars, role plays and workshop exercises for skills development and the raising of ethical awareness.</p>

Assessment Methods in Alignment with Intended Learning Outcomes	Specific assessment methods/tasks		% weighting		Intended subject learning outcomes to be assessed (Please tick as appropriate)					
					a	b	c			
	1. Continuous assessment		50%		√	√	√			
	2. Examination (2 hours)		50%		√	√	√			
	Total		100 %							
<p>The subject will be assessed on both a continuous basis and a close-book written examination. Coursework (50%) and examination (50%) will constitute equal parts of the overall marks of the subject (100%). The coursework mark will be based on a portfolio comprising role play, seminar discussion, group verbal presentation, group written report and individual tutorial participation. Marks will be allocated on group and individual basis. To complete the whole subject successfully, students have to achieve a pass in both the coursework component and the examination component.</p> <p>The individual in-class problem-based assignments and group assignment presentations attempt to test the level of students' knowledge and application of various decision making theories and operational research techniques to construction projects, and then to determine the best option or the most optimal solution for implementation with strong justifications or sound recommendations.</p> <p>Typical coursework assessment criteria include:</p> <ul style="list-style-type: none"> • logical structure; • clarity and depth of thought; • quality of written presentation; • knowledge and information; • problem analysis skills; • oral and visual presentation skills; • participation and leadership. <p>The examination questions attempt to test students' knowledge and understanding of various decision making theories and operational research techniques to construction projects, and then to suggest the most desirable strategies with justified arguments.</p>										
Student Study Effort Expected	Class contact:									
	▪ Lectures								26 Hrs.	
	▪ Tutorials / Seminars								13 Hrs.	
	Other student study effort:									
	▪ Self learning and recommended reading								80 Hrs.	
	Total student study effort								119 Hrs.	
Reading List and References	<p>Recommended:</p> <p>Chan, D.W.M. and Chan, A.P.C. (2002) "Public Housing Construction in Hong Kong:</p>									

A Review of its Design and Construction Innovations”. *Architectural Science Review*, 45(4), December, 349-359.

Chan, D.W.M., Chan, A.P.C., Lam, P.T.I., Yeung, J.F.Y. and Chan, J.H.L. (2011) “Risk Ranking and Analysis in Target Cost Contracts: Empirical Evidence from the Construction Industry”. *International Journal of Project Management*, 29(6), August, 751-763.

Chan, D.W.M., Chan, A.P.C., Lam, P.T.I. and Lau, E.W.K. (2015) “Predicting Construction Durations and Enhancing Construction Productivity: A Taxonomic Review”. *Innovation in Construction – Creating Impacts through Innovation*, Research Journal of Construction Industry Council, Hong Kong, Issue 2, November, 31-44, ISSN 2312-8291 (URL: http://www.cic.hk/cic_data/files/inno_construction_issue2_nov_2015/mobile/index.html#p=1)

Chan D.W.M. and Kumaraswamy M.M. (1995) “A Study of the Factors Affecting Construction Durations in Hong Kong”. *Construction Management and Economics*, 13(4), July, 319-333.

Chan D.W.M. and Kumaraswamy M.M. (1995) “Effects of Technology and Site Productivity on Construction Times of Building Projects in Hong Kong”. *Proceedings of the 16th Annual ASEM Conference*, American Society for Engineering Management, 21-23 September 1995, Washington DC, USA, 309-316.

Chan, D.W.M. and Kumaraswamy, M.M. (2002) “Compressing Construction Durations: Lessons Learned from Hong Kong Building Projects”. *International Journal of Project Management*, 20(1), 23-35.

Dai J.K., Goodrum P.M. and Maloney W.F. (2007) “Analysis of Craft Workers’ and Foremen’s Perceptions of the Factors Affecting Construction Labour Productivity”. *Construction Management and Economics*, 25(11), November, 1137-1150.

Harris F., McCaffer, R. and Edum-Fotwe, F. (2013) *Modern Construction Management*, 7th Edition, Wiley-Blackwell, West Sussex.

Kumaraswamy M.M. and Chan D.W.M. (1995) “Determinants of Construction Duration”. *Construction Management and Economics*, 13(3), May, 209-217.

Olomolaiye P.O., Jayawardane A.K.W. and Harris F.C. (1998) *Construction Productivity Management*, Longman, Essex, England: Chartered Institute of Building.

Render, B. and Stair, R.M. Jr (2006) *Quantitative Analysis for Management*. 12th Edition, Pearson Education, India.

Shen G.Q.P. and Yu A.T.W. (2016) *Value Management in Construction and Real Estate: Methodology and Applications*. New York: Routledge.

Shen L.Y., Lu W.S., Li H. and Shen Q.P. (2003) “Computer-aided decision support system for assessing contractor’s competitiveness”, *Automation in Construction*, 12(5), 577-587.

Shen L.Y., Li Q.M. and Li H. (2002) ‘Alternative concession model for BOT-contract project’, *Journal of Construction Engineering and Management*, ASCE, 128(4), 326-331.

Shen L.Y, Wu M. and Wang J.Y. (2002) ‘A model for assessing the feasibility of construction project in contributing to the attainment of sustainable development’, *Journal of Construction Research*, 3(2), 255-271.

Shen L.Y., Wu W.C. and Ng S.K. (2001) 'Risk Analysis for Construction Joint Ventures in China' *Journal of Construction Engineering and Management*, ASCE, 127(1), 76-82.

Shen L.Y., Drew D. and Zhang Z.H. (1999) 'An Optimal Bidding Model for Price-Time Bi-parameter Construction Contracts' *Journal of Construction Engineering and Management*, ASCE, 125(3), 204-209.

Fisher N. and Shen L.Y. (1992) *Information Management within a Contractor - a Model for the Flow of Data* Thomas Telford Publications, U.K., ISBN 0-7277-1666-2 (This book is based on the research studies 'information management system for construction companies'), pp. 260.

Shen L.Y. (1999) 'Risk Management', *Building in Value: Pre-design Issues*, (Ed., Best & De Valence) Arnold Publishers, ISBN: 0340741600, 248-267.

Tang S.L., Ahmad I.U., Ahmed S.M. and Lu M. (2004) *Quantitative Techniques for Decision Making in Construction*, Hong Kong University Press: Hong Kong.

Xu Yelin, Yeung J.F.Y., Chan A.P.C., Chan D.W.M., Wang Shouqing and Ke Yongjian (2010) 'Developing a Risk Assessment Model for PPP Projects in China - A Fuzzy Synthetic Evaluation Approach' *Automation in Construction*, 19(7), 929-943.

Journals:

Hong Kong Engineer: The Journal of The Hong Kong Institution of Engineers, Printers' Circle Ltd

Construction Management and Economics, Routledge, Taylor & Francis

Engineering, Construction and Architectural Management, Emerald

Facilities, Emerald

Journal of Construction Engineering and Management, ASCE

Journal of Facilities Management, Emerald

Journal of Management in Engineering, ASCE

International Journal of Construction Management, Routledge, Taylor & Francis

International Journal of Project Management, Elsevier

Building and Environment, Elsevier

Building Research and Information, Routledge, Taylor & Francis

Built Environment Project and Asset Management, Emerald

Automation in Construction, Elsevier