Subject Description Form

Subject Code	AMA542
Subject Title	Advanced Operations Research Methods
Credit Value	3
Level	5
Pre-requisite/ Co-requisite/ Exclusion	**Pre-requisite:** AMA502 Operations Research Methods
Objectives	This subject aims at preparing students to be able to (i) Model real life problems with operations research models; and (ii) Solve operations research problems with mathematics techniques.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: (a) Establish operations research models for practical problems. (b) Describe operations research solution structures. (c) Appreciate operations research methods. (d) Solve the operations research problems.
Subject Synopsis/ Indicative Syllabus	Dynamic programming: forward and backward recursion, characteristics of dynamic programming problems, deterministic dynamic programming, probabilistic dynamic programming. Integer optimization problem: integer linear optimization models, branch-and-bound method, cutting plane method. Game theory: two-person zero-sum game, graphic solution, games with mixed strategies, solving by linear programming. Queuing theory: examples of queuing systems, role of exponential distribution, birth-and-death process, queuing models based on the birth-and-death process, queuing models involving nonexponential distributions.
Teaching/Learning Methodology	The subject will be delivered mainly through lectures and tutorials. The teaching and learning approach is mainly problem-solving oriented. The approach aims at the development of mathematical techniques and how the techniques can be applied to solving problems. Students are encouraged to adopt a deep study approach by employing high level cognitive strategies, such as critical and evaluative thinking, relating, integrating and applying theories to practice.

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	d
	1.Assignments	20%	✓	✓	✓	✓
	2. Mid-term test	20%	✓	✓	✓	✓
	3. Examination	60%	✓	✓	✓	✓
	Total	100 %				

Student Study Effort Required	Class contact:	
	▪ Lecture	26 Hrs.
	▪ Tutorial	13 Hrs.
	Other student study effort:	
	▪ Assignment	20 Hrs.
	▪ Case study/mini project	38 Hrs.
	▪ Self-study	40 Hrs.
	Total student study effort	137 Hrs.

Reading List and References	Textbook:		
	Hillier, F.S., and Lieberman, G.J.	Introduction to Operations Research, 10th Edition	McGraw-Hill, 2014
	References:		
	Taha, H.A.	Operations Research: An Introduction, 10th Edition	Pearson, 2017
	Ravindran, A., Phillips, D.T., and Solberg, J.J.	Operations Research: Principles and Practice, 2nd Edition	Wiley, 2007
	Jensen, P.A. ,and Bard, J.F.	Operations Research: Models and Methods	Wiley, 2002
	Winston, W.L.	Operations Research: Applications and Algorithms 4th Edition	Duxbury Press, 2003
	Wolsey, A.L., and Nemhauser, G.L.	Integer and Combinatorial Optimization	Wiley, 1999