

<b>Department</b> : Engineering Department  <b>Faculty/ School</b> : Razak School of Engineering and Advanced Technology	<b>Page</b> : 1 out of 5
<b>Code &amp; Course Name</b> : MRSL 1143 Systems Optimization and Analysis for Operations  <b>Total Contact Hour</b> : 42 hours	<b>Semester</b> : I <b>Academic Session</b> : 2015/2016
<b>Lecturer</b> : Assoc. Prof. Dr. Maslin Binti Masrom & Haslaile Binti Abdullah  <b>E-mail</b> : <a href="mailto:maslin.kl@utm.my">maslin.kl@utm.my</a> ; <a href="mailto:haslaile.kl@utm.my">haslaile.kl@utm.my</a>  <b>Synopsis</b> : This course provides the students with modeling, optimization and simulation of systems engineering for decision support. The introduction of optimization models and algorithms provide a framework of a wide range issues in engineering systems. Probabilistic simulation methods are also a powerful tool for analyzing and designing engineering system.	

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**Learning outcomes:** At the end of the course, students should be able to:

No.	Course Learning Outcomes	Programme Outcomes	Taxonomy Level	Assessment Methods
1.	Analyze the theory underlying discrete event simulation methodologies	PO1	C4	Assignment, Test, Final Exam
2.	Integrate the skills necessary for discrete event simulation systems	PO2, PO5	C5, A4 CTPS1, CTPS2, CTPS5, LL3	Assignment, Test, Final Exam
3.	Synthesize simulation output in managerial environment	PO2, PO5	C5, A4 CTPS1, CTPS2, CTPS3, CTPS4, CTPS5, TS1, TS2	Assignment, Test, Final Exam

<b>Prepared By:</b>  Name : Dr Hairi Zamzuri  Signature :  Date :	<b>Certified By (Course Panel Head):</b>  Name : PM Dr Abdul Rahman Abdul Rahim  Signature :  Date :
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#### STUDENTS LEARNING TIME (SLT)

Teaching and Learning Activities	Students Learning Time (Hour)
1. Face to Face Learning	
a. Lecturer Centered Learning	
i. Lecture	30
ii. Post Lecture Discussion	
b. Student Centered Learning (SCL)	
i. Practical/ Tutorial	
ii. Student centered learning activities (SCL)	12
2. Self-Directed Learning	
a. Non Face to Face Learning or Student Centered Learning (SCL) such as manual, assignment, module, e-Learning etc.	53
b. Revision	10
c. Assessment Preparation	10
3. Formal Assessment	
a. Continuous Assessment	1
b. Hourly Test	1
c. Final Exam - Summative Assessment	3
<b>TOTAL SLT</b>	<b>120</b>

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### TEACHING METHODOLOGY

Lectures and discussions, test, assignment.

### WEEKLY SCHEDULE

<b>Week 1</b>	Linear programming
<b>Week 2</b>	Sensitivity analysis of linear programs
<b>Week 3</b>	Network flow problems
<b>Week 4</b>	Introduction to integer and non-linear programming
<b>Week 5</b>	
<b>Week 6</b>	Lagrange multipliers, simulation and computer application Examples from manufacturing process and manufacturing systems
<b>Week 7</b>	
<b>Week 8</b>	<b><i>Mid-Semester Break</i></b>
<b>Week 9</b>	Simulation process and stochastic modeling
<b>Week 10</b>	Monte-Carlo theory, examples and modeling
<b>Week 11</b>	
<b>Week 12</b>	Discrete-event Modeling and Simulation Tutorial
<b>Week 13</b>	Discrete-event case
<b>Week 14</b>	Experimental design and simulation analysis

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<b>Week 15</b>	Advanced Modeling
<b>Week 16 - 18</b>	<b><i>Revision Week &amp; Final Examination</i></b>

<b>REFERENCES :</b>	<b>Course Text:</b> 1) Ragsdale, C.T. Spreadsheet Modeling and Decision Analysis – A Practical Introduction to Business Analytics, Cengage Learning Asia Edition, Singapore, 2015 2) Montgomery, D. C. and Runger, G. C. Applied Statistics and Probability for Engineers, John Wiley & Sons, 4 <sup>th</sup> Ed., New York, 2007. <b>Other References:</b> 3) Montgomery, D. C., Runger, G. C. and Hubele, N.F. Engineering Statistics, John Wiley & Sons 4 <sup>th</sup> ed., New York, 2007. 4) Ledolter, J., Hogg, R. V. Applied Statistics for Engineers and Physical Scientists, Pearson Prentice Hall, 3 <sup>rd</sup> ed., New Jersey, 2010. 5) Walpole, R.E and Myers, R.H. Probability and Statistics for Engineers and Scientists, Prentice Hall, 8 <sup>th</sup> ed. New Jersey, 2006.
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### GRADING

No.	Assessment	Number	% each	% total
1	Test	1	20	20
2	Assignment	2	25	50
3	Final Exam	1	30	30
<b>Overall Total</b>				<b>100%</b>