

Mathematical Modelling (MSM4434)

Course Code	MSM4434								
Course Name	Mathematical Modelling								
Credit Hour	4								
Prerequisite Course	Computational Methods in Industry (MSM4413)								
Contact Hours	Lecture:	3	units	(3 hour(s) per week)					
	Tutorial:	0	unit	(0 hour(s) per week)					
	Laboratory:	2	units	(2 hour(s) per week)					
Course Rationale	<p>Mathematical modelling is an important aspect of the study of science, engineering and social science. Since mathematical modelling involves a diverse range of skills and tools, this course focus on the techniques that would be of particular interest to engineers, scientists and others who use models to describe the discrete and continuous systems. This course consider the complete picture as far as modelling with differential equation is concerned. It is important for students to recognise the relevance and application of their knowledge of mathematics to practical applications.</p>								
Course Objective	<p>The objective of the course is to bridges the gap between the student's abilities and modelling and would prepare students to venture forth on their own to solve problems on mathematical modelling using differential equations. After studying this course student should understand how mathematical models are formulated, solved and interpreted. Appreciate the power and limitations of mathematics to solve practical problems.</p>								
Course Synopsis	<p>This course discusses variety of mathematical methods and techniques to solve mathematical models that arise in engineering and industrial applications. Students will model practical problems which involve the interpretation of data, the mathematical formulation of the problem, an analysis of the mathematical model, a numerical solution, and an interpretation of the results. The mathematical modelling is this course cover with all kinds of differential equations namely ordinary, partial and delay. Discussion on real life problems such as cancer immune system in medical and healthcare applications will be covered.</p>								
Program Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
	/	/	/		/				/
Soft Skills	Code		CTPS	CS	TS	LL	ES	EM	LS
	KIM		4		1				3
Course Outcomes	By the end of semester, students should be able to:								
	CO1	Compare various approaches of mathematical modelling.							
	CO2	Formulate mathematical models for various problems in science, engineering and industry.							
CO3	Adapt existing mathematical software to solve a given problem.								

	CO4	Perform the works collaboratively and promote teamwork among group members to solve the given projects.					
	CO5	Develop leadership and management skills through solving real industrial problems to meet industrial needs.					
Assessment Methods	Methods	Weighting	CO1	CO2	CO3	CO4	CO5
	Project	60%	/	/	/	/	/
	Final Exam	40%	/	/			
	Total	100%					
Learning References	1	B. Barnes and G. R. Fulford, Mathematical Modelling with Case Studies using Maple and Matlab, 3rd Edition, Taylor & Francis Group, 2014 (Main Reference)					
	2	Mark M. Meerschaert, Mathematical Modelling, 4th Edition, Academic Press, 2013.					
	3	Ismael Herrera and George Francis Pinder, Mathematical Modeling in Science and Engineering: An Axiomatic Approach, John Wiley, 2012 (latest version).					
	4	Frank R. Giordano, A First Course in Mathematical Modelling, 4th Edition, Cengage Learning, 2009 (latest version).					
	5	Dilwyn Edwards and Mike Hamson, Guide to Mathematical Modelling, 2nd Edition, New York Industrial Press, 2007 (latest version).					