Statistical Modelling (MSM4254)

Course Code	MSM4254			
Course Name	STATISTICAL MODELLING			
Credit Hour	4			
Prerequisite Course	Industrial Statistics (MSM4213)			
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	Statistical modelling is an important aspect of the study in sciences, engineering and social sciences. Statistical 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 variables. It is important for students to recognise the relevance and application of their knowledge of statistical modelling to practical applications.			
Course Objective	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 statistical modelling using different methods. After studying this course student should understand how statistical models are formulated, solved and interpreted. Appreciate the power and limitations of statistical modelling to solve practical problems.			
Course Synopsis	In this course, the linear model is generalized in several directions, and the resulting framework is investigated from a theoretical and practical perspective, in an intention to develop core skills in statistical data analysis. The course is in three parts. Part A: Model Selection including linear model and Bayesian Inference. Part B: Beyond Generalised Linear Model including Random and mixed effects models. Part C: Missing Data and Latent Variables. The R statistical package will be used throughout. Discussion on real life problems such as in medical, agriculture, economy and engineering will be covered.			

Program Outcomes	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**
	/	/	/		/				/

Soft Skills	**Code**	**CTPS**	**CS**	**TS**	**LL**	**ES**	**EM**	**LS**
	KIM	4		3				3

Course Outcomes	By the end of semester, students should be able to:	
	CO1	Compare various approaches of statistical modelling which enables students to choose the appropriate models for any given problems.
	CO2	Adapt existing statistical software R to solve the given problems.
	CO3	Construct statistical models for various problems in science, engineering and industry.
	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.

	Methods	**Weighting**	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**
Assessment Methods	Test	25%	/	/			/
	Project	35%	/	/	/	/	/
	Final Exam	40%	/	/			/
	Total	**100%**					

Learning References	1	Davison, A.C. (2008). Statistical Models. (latest version)
	2	Faraway, J. (2014). Linear Models with R, (2nd Edn). Chapman and Hall/CRC. (latest version)
	3	Gelman, Andrew, and Jennifer Hill. (2006) Data analysis using regression and multilevel/hierarchical models. Cambridge University Press. (latest version)
	4	Wood, S.N. (2006). Generalized Additive Models: An Introduction with R. Chapman and Hall/CRC.
	5	Davison, A.C. (2008). Statistical Models. (latest version)