

Subject Description Form

Subject Code	AMA545
Subject Title	Risk Analysis for Epidemics
Credit Value	3
Level	5
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	<p>Enables students to understand the principles of risk analysis in epidemiology, risk modeling theory and techniques, and theory and practical methods to model the spread of diseases in populations.</p> <p>Enables students to familiarize with risk analysis modeling environments (the statistical software R)</p>
Intended Learning Outcomes	<p>Upon completion of the subject, students will be able to:</p> <ol style="list-style-type: none"> (a) Describe the basic principles of risk analysis in epidemiology; Describe the concepts used in the mathematical modeling of infectious diseases (b) Understand how models are used to guide control and prevention measures (c) Construct simple dynamic models and apply generic models to specific disease systems (d) Make predictions about controlling disease based on models (e) Choose among approaches and methods for risk assessment (f) Incorporate data and expert opinion and present risk analysis results.
Subject Synopsis/ Indicative Syllabus	<p>Probability concepts, Graphical representations of risk events, Probability distributions, Basic stochastic processes.</p> <p>Risk modeling, Monte Carlo simulation, Typical risk analysis results.</p> <p>Simple compartmental (Susceptible-Infectious-Recovered) models, Dynamics of infectious diseases in populations, Basic reproductive number, Effective reproductive number, Herd immunity, Critical vaccination coverage.</p>
Teaching/Learning Methodology	<p>A two-hour lecture will be conducted every week to motivate students with risk analysis and diseases transmission examples to understand and learn the theory and techniques. Besides, an one-hour tutorial designed to consolidate and develop students knowledge through practical examples and discussions.</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	d	e	f
	a. Assignments	20%	✓	✓	✓	✓	✓	✓
b. Tests	20%	✓	✓	✓	✓	✓	✓	
c. Examinations	60%	✓	✓	✓	✓	✓	✓	
Total	100 %							
Student Study Effort Required	Class contact:							
	▪ Lecture						26 Hrs.	
	▪ Tutorial						13 Hrs.	
	Other student study effort:							
	▪ Assignment						42 Hrs.	
	▪ Self-study						56 Hrs.	
	Total student study effort							137 Hrs.
Reading List and References	Marcelo, C. 2004	Operational Risk Modelling and Analysis: Theory and Practice	Risk Books,					
	Ayyub, B.M., and McCuen, R.H.	Probability, Statistics, and Reliability for Engineers and Scientists	CRC Press, 2002					
	Paustenbach, D.J. D., and Peterson, R.	Human and Ecological Risk Assessment: Theory and Practice	John Wiley & Sons Inc., 2002					
	Bedfore, T., and Cooke, R.	Probabilistic Risk Analysis: Foundations and Methods	Cambridge University Press, 2001					
	Cox, L.A.	Risk Analysis: Foundations, Models and Methods	Kluwer Academic, 2001					
	Vose, D.	Risk Analysis: A Quantitative Guide	John Wiley & Sons Inc., 2000					
	Keeling M.J., and Rohani, P.	Modeling Infectious Diseases in Humans and Animals	Princeton University Press 2007					