Title (Units): **COMP7800 Analytic Models in IT Management (3,2,1)**

Course Aims: To learn different analytic models and quantitative techniques used in the management of information technology.

Prerequisite: Nil

Course Intended Learning Outcomes (CILOs):
Upon successful completion of this course, students should be able to:

No.	Course Intended Learning Outcomes (CILOs)
	Knowledge
1	Describe the diverse quantitative techniques applicable to IT management
2	Identify IT management situations that lend themselves to analytic modeling
3	Develop specific models for the evaluation and optimization of IT resources and objectives
	Skill
4	Apply probabilistic, mathematical programming, network and decision models to predict IT resources, cost, usage, and technological trends and formulate propriate IT Management problems using quantitative models and apply solutions to them
5	Apply computational software tools to solve analytic problems in IT management
	Attitude
6	Appreciate the importance of quantitative techniques in IT management

Calendar Description: This course aims to introduce different analytic models used in the management of information technology. These include practical applications of quantitative analysis techniques in business decision making, process modeling, planning and evaluation. The course focuses on the ability to recognize the appropriate models applicable to diverse information technology management situations, and to identify solutions to them. Emphasis will be placed on problem formulation and solution application rather than mathematical derivations.

Teaching and Learning Activities (TLAs):

CILOs	Type of TLA
1-3,6	Students will learn quantitative techniques and analytic modeling for IT management through lectures and case studies
4-6	Students will practice the techniques learned in tutorials, labs and in-class group discussions

Assessment:

No.	Assessment Methods	Weighting	CILOs to be addressed	Description of Assessment Tasks
1	Assignments	20%	1-6	Continuous assessments are designed to measure how well students have learned the basic concepts of quantitative analysis techniques and analytic modeling. A set of assignments designed to measure how well students have acquired the techniques to solve management problems.
2	Lab tasks	20%	4-6	A set of lab tasks are designed to apply quantitative techniques using software tools.
3	Examination	60%	1-6	Final examination questions are designed to see how far students have achieved in understanding of analytic models.

Assessment Rubrics:

	Excellent (A)	Good (B)	Satisfactory (C)	Fail (F)
Concepts of management science of information technology	Demonstrate thorough understanding on the management science of information technology	Demonstrate sufficient understanding on the management science of information technology	Demonstrate partially understanding on the management science of information technology	Unable to demonstrate understanding on some concepts in the management science of information technology
Recognition of analytical techniques in IT management	Demonstrate an ability to apply analytical techniques in IT management	Demonstrate some ability to apply analytical techniques in IT management	Demonstrate some ability to apply some analytical techniques in IT management	Unable to demonstrate an ability to apply analytical techniques in IT management
Applications of analytical models	Able to correctly solve well-defined problems of forecasting model, regression model, network model, project management and other models covered in the course	Able to correctly solve most of the well-defined problems of forecasting model, regression model, network model, project management and other models covered in the course	Able to correctly solve some of the well-defined problems of forecasting model, regression model, network model, project management and other models covered in the course	Unable to solve well-defined problems of forecasting model, regression model, network model, project management and other models covered in the course
Software tools	Able to use software tool(s) to perform quantitative analysis with a high degree of effectiveness	Able to use software tool(s) to perform quantitative analysis with a considerable degree of effectiveness	Able to use software tool(s) to perform quantitative analysis with some degree of effectiveness	Unable to use software tool(s) to perform quantitative analysis

Course Content and CILOs Mapping:

Content		CILO No.
I	Management Analytics	1,2
II	Probabilistic and Statistical Models	3-6
III	Mathematical Programming Models	3-6
IV	Network Models	1-6
V	Decision models	1-6
VI	Case studies	6

References:

- Render B, Stair R. M. Jr., Hanna M. E., and Hale T. S. Quantitative Analysis for Management, 13rd Edition, Prentice Hall, 2018.
- Taylor, B. W. Introduction to Management Science, 13th Edition. Pearson, 2018

Course Content:

Topic

I. Management Analytics
   A. Analytic problems in IT management
   B. Problem formulations and solutions: science and art
   C. Computational software tools

II. Probabilistic and Statistical Models
   A. Basic probability models
   B. Regression models
   C. Time series models
   D. Simulation
   E. Applications to IT management, including but not limited to IT service demand forecasting, software reliability growth models, software cost estimation, performance tuning for servers, IT resource management.

III. Mathematical Programming Models
   A. Linear programming
   B. Non-linear programming
   C. Dynamic programming
   D. Multi-objective programming
   E. Applications to IT management, including but not limited to: resource allocation for software development projects, capacity planning of IT resources, IT portfolio management, staff scheduling for IT support, resource optimization in data center

IV. Network Models
   A. Graph algorithms: shortest path, minimum spanning tree, travelling salesman
   B. IT Project scheduling: PERT, CPM, project crashing, time-cost tradeoff
   C. Applications to IT management, including but not limited to: social network analysis, IT task scheduling with dependency constraints

V. Decision models
   A. Decision under risk and uncertainty
   B. Game theory
   C. Applications to IT management, including but not limited to: pricing for cloud services, IT outsourcing decisions

VI. Case studies