| 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 network flow models to the management of IT projects
5	Apply forecasting and regression models to predict IT resources, cost, usage, and technological trends and formulate appropriate IT Management problems using quantitative models and apply solutions to them
	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
4-5,6	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	30%	1-5	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	10%	4-5	A set of lab tasks are designed to apply quantitative techniques using software tools.
3	Examination	60%	1-5	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 Science	1,2
II	Forecasting and Regression Models	3,5,6
III	Network Flow Models and Project Management	3,4,6
IV	Applicable Quantitative Models and Techniques	1-3,5,6
V	Case Studies and Software Tools	1-3,6

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 Science
      A. The Management Science Approach to Problem Solving
      B. Developing a Quantitative Analysis Model
      C. Business Analytics

II.   Forecasting and Regression Models
      A. Scatter Diagrams and Time Series
      B. Time Series Forecasting Models
      C. Monitoring and Controlling Forecasts
      D. Simple Linear Regression
      E. Testing Regression Models for Significance
      F. Multiple and Nonlinear Regression Analysis
      G. Applications to the Forecasting of IT Resources, Cost, Usage, and Technological Trends

III.   Network Flow Models and Project Management
      A. Minimal-Spanning Tree Technique
      B. Maximal-Flow Technique
      C. Shortest-Route Technique
      D. Project Networks
      E. Probabilistic Activity Time
      F. Activity-on-Node Networks
      G. Project Crashing and Time-Cost Trade-Off
      H. Applications to IT Project Management

IV.   Applicable Quantitative Models and Techniques
      A. Mathematical Programming Models
      B. Dynamic Programming and Multi-objective Programming Models
      C. Stochastic Models and Congestion Analysis
      D. Simulation Models
      E. Decision Making through Game Theory
      F. Applications to the evaluation and optimization of IT resources and objectives

V.   Case Studies and Software Tools