UNIVERSITI TEKNOLOGI MARA

BCM524: CONSTRUCTION SYSTEMS AND ANALYSIS

Course Name (English)	CONSTRUCTION SYSTEMS AND ANALYSIS APPROVED
Course Code	BCM524
MQF Credit	4
Course Description	This course introduces to students to the field of production management and it represents a mixed concept of scientific and quantitative methods. Production and operation activities start from forecasting, planning for facilities and equipment, designing the best work system, procuring materials and equipment, measuring productivity levels and operational research.
Transferable Skills	Research and Analytical skills, Numeracy Skills, Problem Solving
Teaching Methodologies	Lectures, Blended Learning, Tutorial
CLO	CLO1 Appraise quantitative analysis and production management in construction industry CLO2 Solve problems using quantitative analysis CLO3 Design work system to improve job methods and productivity level
Pre-Requisite Courses	No course recommendations

Topics
1. Introduction to Quantitative Analysis/Operational Research 1.1) What is quantitative analysis 1.2) The quantitative analysis approach 1.3) How to develop a quantitative analysis approach 1.4) The role of computers and Spreadsheet Models in the quantitative analysis approach
2. Probability Concepts and Application 2.1) Bayes' Theorem 2.2) The Normal Distribution 2.3) The Exponential Distribution 2.4) The Poisson Distribution
3. Linear Programming : The Graphical Method & Simplex Method 3.1) Solving minimization problems with two or more constraints 3.2) Solving maximization problems with two or more constraints
4. Transportation Method 4.1) Setting up a transportation problem 4.2) Solving a problem using the shadow costs method 4.3) Solving an unbalanced transportation problem 4.4) Explanation on degeneracy in transportation problem
5. Assignment Model 5.1) Approach of the assignment model 5.2) Using Konig Method & Hungarian Method to solve minimization and balanced 5.3) problem 5.4) Solving a maximization problem and unbalanced problem
6. Decision Theory 6.1) Explanation on the six steps in decision theory 6.2) Discussion on the types of Decision-Making Environment 6.3) Decision making under risk 6.4) Decision making under uncertainty

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7. Decision Tree and Utility Tree
7.1) Explanation on the five steps of Decision Tree analysis
7.2) Develop accurate and useful decision trees
7.3) Solving a problem by computing expected monetary values
7.4) (EMVs)
7.5) Solving a more complex or multi-stage problem
7.6) Application of utility theory to solve problems using decision
7.7) tree model

8. Introduction to Production Management
8.1) Introduction
8.2) Functions within business organization
8.3) Operations
8.4) Finance
8.5) Marketing
8.6) Other functions
8.7) Operations management function
8.8) Designing and operating production system
8.9) Classifying production systems
8.10) Types of operation
8.11) Implications for production system

9. Design of Production System
9.1) Capacity Planning : Facilities and equipment
9.2) Introduction
9.3) Product or service choices
9.4) Importance of capacity decisions
9.5) Defining and measuring capacity
9.6) Determinants of effective capacity
9.7) Determining of capacity requirements
9.8) Long-term
9.9) Short-term
9.10) Design Work System
9.11) Introduction
9.12) Work systems design
9.13) Human factors
9.14) Work system measures
9.15) Reliability
9.16) Availability
9.17) Maintainability
9.18) Job Design
9.19) Job design factors
9.20) Method analysis
9.21) Working environment
9.22) Work Measurement
9.23) Time study
9.24) Motion study
9.25) Work sampling
9.26) Labour standards and incentives
9.27) Learning curves
9.28) Inventory planning

10. Forecasting
10.1) Introduction
10.2) Steps in the forecasting process
10.3) Approaches to forecasting
10.4) Forecasts based on judgement and opinion
10.5) Forecasts based on historical data
10.6) Associative forecast techniques
10.7) Accuracy and control of forecasts
10.8) Elements of good forecasts

11. Aggregate Planning
11.1) Aggregate Planning
11.2) Introduction and overview of aggregate planning
11.3) The concepts of aggregate planning
11.4) Purpose and scope of aggregate planning
11.5) Demand and capacity
11.6) Inputs to aggregate planning
11.7) Decision variables and costs
11.8) Basic strategies for meeting uneven demand
11.9) Choosing a strategy
11.10) Techniques for aggregate planning
11.11) Informal techniques
11.12) Mathematical techniques
11.13) Disaggregating the aggregate plan

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12. Material Requirements Planning (MRP)
12.1) Introduction
12.2) Independent versus dependent demand items
12.3) Just-in-time philosophy
12.4) The approach of MRP
12.5) Inputs and outputs
12.6) Bills of materials
12.7) Master production plan
12.8) Inventory record files
12.9) MRP processing
12.10) Lots sizing
12.11) Safety stock
12.12) Extension of MRP
12.13) Business requirement planning (MRPII)
12.14) Capacity requirement planning (CRP)

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Assessment Breakdown	%
Continuous Assessment	40.00%
Final Assessment	60.00%

Details of Continuous Assessment

Assessment Type	Assessment Description	% of Total Mark	CLO
Assignment	Calculation tutorial	20%	CLO2
Assignment	Assignment on production management	20%	CLO3

Reading List

Recommended Text

- **Lau Too Kya 2011, *Quantitative Business Analysis for UiTM*, 9, Oxford Fajar Sdn Bhd Selangor Darul Ehsan [ISBN: 9789834509842]**
- **Alan Griffith; Paul Watson 2013, *Construction Management: Principles and Practice*, Palgrave Macmillan [ISBN: 978033396878]**

Reference Book Resources

- **Barry Render;Ralph M. Stair; Michael E; Hanna; Trevor S. Hale 2014, *Quantitative Analysis for Management*, 12 Ed., 15, Prentice Hall [ISBN: 978013350733]**
- **Jon Curwin; Roger Slater; David Eadson 2013, *Quantitative Methods for Business Decisions*, 7 Ed., Cengage Learning Bedford Row London [ISBN: 1408060191]**

Article/Paper List: This Course does not have any article/paper resources

Other References: This Course does not have any other resources

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