SDSC3027: SMART LOGISTICS AND TRANSPORTATION

Effective Term
Semester A 2022/23

Part I Course Overview

Course Title
Smart Logistics and Transportation

Subject Code
SDSC - School of Data Science
Course Number
3027

Academic Unit
School of Data Science (DS)

College/School
School of Data Science (DS)

Course Duration
One Semester

Credit Units
3

Level
B1, B2, B3, B4 - Bachelor's Degree

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
Nil

Precursors
Nil

Equivalent Courses
Nil

Exclusive Courses
Nil

Part II Course Details

Abstract

This course offers classical contents and principles in the supply chain management, inventory control, as well as transportation systems and networks. Meanwhile, recent advancement of machine learning and artificial intelligence techniques for realizing smart logistics and supply chain will also be included.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	describe the activities involved and key decisions made in combining various firms to make a final product and delivering to a customer	20	x	x	
2	apply analytical methods for making decisions of managing inventories and supply chains as well as optimizing the logistics network	30		x	
3	utilize data-driven techniques to better solve emerging issues in logistics and supply chain management	30	x	x	
4	Identify emerging trends and issues in logistics development	20	x	x	

A1: Attitude
Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability
Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments
Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Teaching and Learning Activities (TLAs)

	TLAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Lecture	Learning through teaching is primarily based on lectures. Mini-lectures and small-group exercises will be used to facilitate conceptual understanding logistics problems and methodologies.	1, 2, 3, 4	26 hours/semester

2	Laboratory	The team-based laboratory sessions provides students with the opportunities to learn logistics management problems and methodologies through simulation.	2, 3	13 hours/semester

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Test	1, 2	20	
2	Laboratory Work	2, 3	20	
3	Assignments	1, 2, 3, 4	20	

Continuous Assessment (%)

60

Examination (%)

40

Examination Duration (Hours)

2

Assessment Rubrics (AR)

Assessment Task

Test

Criterion

2 hour test to assess students understanding of basic concepts in logistics, and numerical calculation of logistics solutions.

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

Laboratory Work

Criterion

Students' ability to apply logistics management methods to solve simulated logistics problems.

Excellent (A+, A, A-)
High

Good (B+, B, B-)
Significant

Fair (C+, C, C-)
Moderate

Marginal (D)
Basic

Failure (F)
Not even reaching marginal levels

Assessment Task
Assignments

Criterion
Students' ability to understand concepts and theory taught in class.

Excellent (A+, A, A-)
High

Good (B+, B, B-)
Significant

Fair (C+, C, C-)
Moderate

Marginal (D)
Basic

Failure (F)
Not even reaching marginal levels

Assessment Task
Examination

Criterion
Examination questions are designed to assess student's level of achievement of the intended learning outcomes, with balanced emphasis placed on both conceptual understanding of logistics problems, applications of the various logistics management methods, and numerical calculation of logistics solutions.

Excellent (A+, A, A-)
High

Good (B+, B, B-)
Significant

Fair (C+, C, C-)
Moderate

Marginal (D)
Basic

Failure (F)
Not even reaching marginal levels

Additional Information for AR
Examinations, and participation and exercises will be numerically-marked.

Part III Other Information

Keyword Syllabus
Introduction of Logistics and Supply Chain Systems
Advanced Methods for Demand Forecasting (such as ARIMA, LASSO techniques, Spatial-temporal time series analysis, artificial neural networks, etc.)
Inventory and supply chain management
Bullwhip effect, square root law for bullwhip effect
Transportation systems and networks
Mathematical programming techniques in logistics and supply chain
Vehicle Routing Problems, Traveling Salesman Problems
Reversed Logistics, quantitative models for reversed logistics
Data-driven technologies in autonomous driving systems
Real-time traffic monitoring and control problems and techniques
Computer vision techniques in smart transportation systems

Reading List

Compulsory Readings

	Title
1	Lecture notes

Additional Readings

	Title
1	SUNIL CHOPRA & PETER MEINDL, Supply Chain Management, 4th Edn., Pearson Education, 2010.
2	SIMCHI-LEVI, KAMINSKY & SIMCHI-LEVI, Designing and Managing the Supply Chain: Concepts, Strategies and Case Studies, 3rd Edn., McGraw-Hill, 2009.
3	EDWARD ALLEN SILVER, DAVID F. PYKE & REIN PETERSON, Inventory Management and Production Planning and Scheduling, 3rd Edn., Wiley, 1998.
4	DAVID J. BLOOMBERG, STEPHEN LEMAY & JOE B. HANNA, Logistics, Prentice-Hall, Inc., 2002.
5	DONALD J. BOWERSOX, DAVID J. CLOSS & M. BIXBY COOPER, Supply Chain Logistics Management, McGraw-Hill Book Companies Inc., 2003.
6	Moritz Fleischmann, Quantitative Models for Reverse Logistics, Spinger, Berlin, 2001