SDSC3027: SMART LOGISTICS AND TRANSPORTATION

Effective Term
Semester B 2024/25

Part I Course Overview

Course Title
Smart Logistics and Transportation

Subject Code
SDSC - Data Science
Course Number
3027

Academic Unit
Data Science (DS)

College/School
College of Computing (CC)

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

In this course, students will learn classical contents and principles in supply chain management, inventory control, transportation systems and networks. Furthermore, students will have the opportunities to explore recent advancement of machine learning and artificial intelligence techniques for the development of smart cities, such as ride sharing, autonomous driving, electrical vehicles, drone logistics, etc..

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.

Learning and Teaching Activities (LTAs)

	LTAs	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	39 hours/semester including group projects.

2	Group project	Student groups work on a logistic / transportation problem inspired from real-world challenges, applying the knowledge and methods learned from the lectures to solve real problems.	1, 2, 3, 4	13 hours/semester (included in the lecture hours)

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Assignments	1, 2, 3, 4	30	
2	Group project	1, 2, 3, 4	30	

Continuous Assessment (%)

60

Examination (%)

40

Examination Duration (Hours)

2

Additional Information for ATs

Note: To pass the course, apart from obtaining a minimum of 40% in the overall mark, a student must also obtain a minimum mark of 30% in both continuous assessment and examination components.

Assessment Rubrics (AR)

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

Group projects

Criterion

Based on presentation and submitted written work to evaluate understanding of subject matter, evidence of knowledge base, capacity to analyse and synthesize, and evidence of original and critical thinking.

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.)

- Transportation systems and networks
- Mathematical programming techniques in logistics and supply chain
- Vehicle Routing Problems, Traveling Salesman Problems
- Data-driven technologies in autonomous driving systems

Traffic monitoring and control problems

Reading List

Compulsory Readings

	Title
1	Lecture notes

Additional Readings

	Title
1	SIMCHI-LEVI, KAMINSKY & SIMCHI-LEVI, Designing and Managing the Supply Chain: Concepts, Strategies and Case Studies, 3rd Edn., McGraw-Hill, 2009.
2	Cascetta, Ennio, Transportation Systems Engineering: Theory and Methods, 2nd Edition, Springer, 2001
3	Larson, Richard C., and Amedeo R. Odoni. Urban Operations Research. Belmont, MA: Dynamic Ideas, 2007. ISBN: 0975914634.
4	SUNIL CHOPRA & PETER MEINDL, Supply Chain Management, 4th Edn., Pearson Education, 2010.
5	EDWARD ALLEN SILVER, DAVID F. PYKE & REIN PETERSON, Inventory Management and Production Planning and Scheduling, 3rd Edn., Wiley, 1998.
6	DAVID J. BLOOMBERG, STEPHEN LEMAY & JOE B. HANNA, Logistics, Prentice-Hall, Inc., 2002.
7	DONALD J. BOWERSOX, DAVID J. CLOSS & M. BIXBY COOPER, Supply Chain Logistics Management, McGraw-Hill Book Companies Inc., 2003.
8	Moritz Fleischmann, Quantitative Models for Reverse Logistics, Spinger, Berlin, 2001