IS4335: DATA VISUALIZATION

Effective Term
Semester B 2024/25

Part I Course Overview

Course Title
Data Visualization

Subject Code
IS - Information Systems
Course Number
4335

Academic Unit
Information Systems (IS)

College/School
College of Business (CB)

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
“A picture is worth a thousand words.” The human race is wired to perceive pictorial messages and discover patterns using intuitions. In a data - driven business environment, the ability to convey hard messages with clever visualization

is essential and valuable.In this course, we will explore ways to organize and derive meaning from vast amounts of data by using visual presentation tools and techniques. Students will learn concepts, methods, and applications of data visualization methods. The course will introduce interesting examples in different application areas. Students will also learn visualization tools from GUI-based software, to more advanced programmable visualization packages in R language. They will be guided in creating engaging and interactive visualizations.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Describe and gain insight into the theory of visual presentation and the use of visual report in business communication and analytics.	20	x	x	
2	Analyze and innovatively apply skills in using data visualization tools to create compelling visual report and analysis.	30	x	x	x
3	Analyze and innovatively apply skills in using programmable visualization tools (R packages) to create flexible visual presentations.	50	x	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	LTA1: Seminar	Students will attend a three-hour seminar that includes lectures and tutorials. Lectures will introduce the basic design theory for visual presentation and cases of innovative visualization applications. Lectures will also cover the basic programming techniques and use of packages. Tutorials will provide hands on experiences to use the visualization tools introduced in the lectures.	1, 2, 3	3 Hour/Week

2	LTA2: Peer Discussions	Students will apply the visualization tools to form an analytics report. They need to identify a data source and form a data driven story in the project.	1, 2, 3	

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	AT1: Continuous AssessmentStudents are encouraged to discuss and reflect on the materials covered in class.	1, 2, 3	10	
2	AT2: AssignmentsAssignments will be given to assess student’ s ability to apply the tools learned.	2, 3	30	
3	AT3: Group ProjectA group project will be assigned. Students need to apply the visualization tools to form an analytics report. They need to identify a data source and form a data driven story in the project.	1, 2, 3	20	

Continuous Assessment (%)

60

Examination (%)

40

Examination Duration (Hours)

2

Assessment Rubrics (AR)

Assessment Task

AT1:Continuous Assessment

Criterion

CILO 1-3 Demonstrate evidence of active learning through participating in the class discussion, asking critical questions and completing extra-credit activities.

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
AT2:Assignments

Criterion
CILO 2-3 Demonstrate good understanding of course content and capability to apply the skills learned to create visual presentations.

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
AT3:Group Project

Criterion
CILO 1 Apply principle learned about the design theory of visual presentation.

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

AT3:Group Project

Criterion

CILO 2-3 Demonstrate capability to apply the tools (menu-based and programmable) to explore data set and create data driven story.

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

AT4:Final Examination

Criterion

CILO 1-3 Demonstrate good understanding of visualization design principle and master the skills required for effective visualization.

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

Part III Other Information

Keyword Syllabus

Big Data; Visualization; Data Charts; Dashboard; Power View; Tableau; Infographics; Text Visualization; Social Network Visualization; Visualization on mobile devices.

Reading List

Compulsory Readings

	Title
1	Tony Fischetti and Brett Lantz, R: Data Analysis and Visualization, Packt Publishing, 2016.

Additional Readings

	Title
1	Nathan Yau, Visualize This; The Flowing Data Guide to Design, Visualization, and Statistics, Wiley, 2011.
2	Stephen Few, Show Me the Numbers: Designing Tables and Graphs to Enlighten, Analytics Press, 2012.
3	Hadley Wickham, ggplot2, Springer, 2016.
4	Daniel G. Murray, Tableau Your Data!: Fast and Easy Visual Analysis with Tableau Software, Wiley 2016.
5	Stephanie D. H. Evergreen, Effective Data Visualization: The Right Chart for the Right Data, SAGE Publication, 2016.