SM6351: INFORMATION VISUALIZATION

Effective Term
Semester A 2025/26

Part I Course Overview

Course Title
Information Visualization

Subject Code
SM - School of Creative Media
Course Number
6351

Academic Unit
School of Creative Media (SM)

College/School
School of Creative Media (SM)

Course Duration
One Semester

Credit Units
3

Level
P5, P6 - Postgraduate 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 introduces the principles and practices of information visualization, grounded in Tamara Munzner's Visualization Analysis and Design framework. Students will learn to analyze, design, and evaluate effective visual

representations of complex data. The course emphasizes hands-on learning, using D3.js as the primary programming language to create interactive visualizations. Key topics include data wrangling, visual encoding, and visualization systems. Through lectures, student-led presentations, and a semester-long project, students develop skills to solve real-world visualization challenges. The course fosters critical thinking by evaluating existing visualizations and iterating designs based on user feedback. By the end of the course, students will efficiently analyze data, effectively design and implement visualizations, and clearly communicate data insights. This course will support students pursuing careers in data science, UX design, or any field requiring data-driven decision-making. **It involves essential web programming in JavaScript and Python, so a basic programming background is expected before taking this course.**

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Analyze visualization problems using the nested model for visualization design and validation (domain, data, task, idiom).	25	x	x	
2	Design and implement interactive visualizations using D3.js according to principles of perception and cognition.	25		x	x
3	Evaluate visualization effectiveness through quantitative and qualitative methods.	25		x	x
4	Communicate data insights effectively to technical and non-technical audiences.	25	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	Lectures	Teaching theoretical foundations, visualization tools (D3.js, Tableau), data wrangling, and visualization prototyping.	1, 2, 3	Week 1-3: 3 hours/week Week 4-12: 1.5-2 hours/week
2	Student-led learning and presentation	Individual/small groups learning how to implement a specific type of graph using D3.js and present in-class.	2, 3, 4	1-1.5 hours/week

3	Course project	Semester-long project for small group (2-3 students/group): Design, prototype, and validate an interactive visualization for real-world data from https://www.kaggle.com	1, 2, 3, 4	2 hours/week

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	Student-led learning and presentation	2, 3, 4	30	For LTA 2	Yes
2	Course project - midterm report	1, 2	20	For LTA 3	No
3	Course project - final presentation	2, 3, 4	30	For LTA 3	Yes
4	In-class Participation	2	20	For LTA 1 and 2	No

Continuous Assessment (%)

100

Examination (%)

0

Minimum Continuous Assessment Passing Requirement (%)

0

Minimum Examination Passing Requirement (%)

0

Assessment Rubrics (AR)

Assessment Task

Student-led learning and Presentation (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

- Deep understanding of implementation in D3.js
- Presentation quality
- Q&A quality

Excellent

(A+, A, A-)
Polished delivery, clear articulation of D3 source code, insightful Q&A engagement.

Good

(B+, B, B-)
Organized presentation, adequate explanation of D3 code, responds to questions.

Fair

(C+, C, C-)
Basic structure, some gaps in explaining technical details or answering questions.

Marginal

(D)
Disjointed flow, minimal explanation of code logic or wrong answer to some questions.

Failure

(F)
Incomplete or irrelevant presentation, fail to answer all questions.

Assessment Task

Course project - midterm report (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

- Topic proposal
- Dataset relevance
- Basic Figures Implementation

Excellent

(A+, A, A-)
- Original, well-scoped topic
- High-quality dataset
- Three D3.js figures implemented without errors

Good

(B+, B, B-)
- Relevant topic
- Appropriate dataset
- Two D3.js figures implemented without errors

Fair

(C+, C, C-)
- Generic topic but partially aligned with course goals
- Basic dataset with limited relevance
- One D3.js figure implemented without errors

Marginal

(D)
- Topic lacks focus or relevance.
- Dataset is poorly chosen
- All D3.js figures implemented with errors

Failure

(F)
- No coherent topic proposed
- Dataset irrelevant or missing
- No D3.js figures implemented at all

Assessment Task

Course project - final presentation (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

- Implementation comprehensiveness

- Solution creativity
- Presentation quality

Excellent

(A+, A, A-)
- Full-featured solution covering all project goals, advanced D3.js techniques applied
- Highly original approach, novel visual encodings, or innovative interaction design
- Professional delivery, clear storytelling, insightful reflection on challenges/results

Good

(B+, B, B-)
- Most features implemented with minor errors
- Creative use of standard techniques with some unique elements
- Organized presentation with adequate explanation of work

Fair

(C+, C, C-)
- Basic functionality achieved
- Conventional solution with minor creative tweaks
- Some gaps in explaining technical or design choices

Marginal

(D)
- Limited functionality, critical features missing
- Derivative design, minimal creativity
- Disjointed flow, minimal engagement with audience

Failure

(F)
- Minimal or no working components
- No creative effort; entirely template-based
- Unprepared or irrelevant content

Assessment Task

In-Class participation (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

- Implementation correctness
- Submission on time

Excellent

(A+, A, A-)
Flawless code submissions, adherence to best practices, and error-free execution.

Good

(B+, B, B-)
Mostly correct code with minor bugs resolved promptly.

Fair

(C+, C, C-)
Code functional but contains significant errors or inefficiencies.

Marginal

(D)

Frequent errors requiring major revisions.

Failure

(F)
Non-functional code or repeated failures to follow instructions.

Assessment Task

Student-led learning and Presentation (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

- Deep understanding of implementation in D3.js
- Presentation quality
- Q&A quality

Excellent

(A+, A, A-)
Polished delivery, clear articulation of D3 source code, insightful Q&A engagement.

Good

(B+, B)
Organized presentation, adequate explanation of D3 code, responds to questions.

Marginal

(B-, C+, C)
Basic structure, some gaps in explaining technical details or answering questions.

Failure

(F)
Incomplete or irrelevant presentation, fail to answer all questions.

Assessment Task

Course project - midterm report (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

- Topic proposal
- Dataset relevance
- Basic Figures Implementation

Excellent

(A+, A, A-)
- Original, well-scoped topic
- High-quality dataset
- Three D3.js figures implemented without errors

Good

(B+, B)
- Relevant topic
- Appropriate dataset
- Two D3.js figures implemented without errors

Marginal

(B-, C+, C)

- Generic topic but partially aligned with course goals
- Basic dataset with limited relevance
- One D3.js figure implemented without errors

Failure

(F)
- No coherent topic proposed
- Dataset irrelevant or missing
- No D3.js figures implemented at all

Assessment Task

Course project - final presentation (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

- Implementation comprehensiveness
- Solution creativity
- Presentation quality

Excellent

(A+, A, A-)
- Full-featured solution covering all project goals, advanced D3.js techniques applied
- Highly original approach, novel visual encodings, or innovative interaction design
- Professional delivery, clear storytelling, insightful reflection on challenges/results

Good

(B+, B)
- Most features implemented with minor errors
- Creative use of standard techniques with some unique elements
- Organized presentation with adequate explanation of work

Marginal

(B-, C+, C)
- Basic functionality achieved
- Conventional solution with minor creative tweaks
- Some gaps in explaining technical or design choices

Failure

(F)
- Minimal or no working components
- No creative effort; entirely template-based
- Unprepared or irrelevant content

Assessment Task

In-Class participation (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

- Implementation correctness
- Submission on time

Excellent

(A+, A, A-)
Flawless code submissions, adherence to best practices, and error-free execution.

Good

(B+, B)
Mostly correct code with minor bugs resolved promptly.

Marginal

(B-, C+, C)
Code functional but contains significant errors or inefficiencies.

Failure

(F)
Non-functional code or repeated failures to follow instructions.

Part III Other Information

Keyword Syllabus

- Data abstraction & task analysis
- Data types and visual encoding
- Model, taxonomy, design spaces
- Color
- Interactive visualization, visualization interface
- Animated visualization
- Text/document/software visualization
- Trees/hierarchies/graphs
- Visual analytics
- Design study and evaluation
- Machine learning and visualization
- Immersive visualization

Reading List

Compulsory Readings

	Title
1	Munzner, T. (2014). Visualization Analysis and Design. CRC Press.
2	Online resources: D3.js documentation.

Additional Readings

	Title
1	Heer, J., Bostock, M., & Ogievetsky, V. (2010). A Tour Through the Visualization Zoo.
2	Ware, C. (2020). Information Visualization: Perception for Design.
3	Kirk, A. (2016). Data Visualisation: A Handbook for Data Driven Design.