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## NISOM 3330 – Data Visualization and Visual Analytics (2023-24 Spring Term)

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### General Information

- 1 Credit (Pass or Fail Grades)
  - Teaching Mode: Face-to-Face
  - Lecture + Lab (L1): 8 classes in total
    - Mon 12:00pm – 1:20pm (week 1, 4, 6, 8) LSK-G021
    - Wed 12:00pm – 1:20pm (week 1, 4, 6, 8) LSK-G021
  - Instructor: Prof. Jean WANG <[jeanwang@ust.hk](mailto:jeanwang@ust.hk)> Rm: LSK 5050A (office hour by appointment)
  - TA: Miss Anson WAN <[imanson@ust.hk](mailto:imanson@ust.hk)> Rm: LSK 4065 (office hour by appointment)
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### Course Description

A clear and concise communication of results is essential to a successful business analytics endeavor. In the context of business communication, data visualization could help deliver analytics results or tell stories by curating data into a representation easy to understand and navigate, with the valuable information and insights explicitly highlighted. Furthermore, interactive visualization could also be combined with automated analysis to provide business decision makers an effective way to explore a large data set, make interpretation, drill down to uncover hidden patterns and deeper insights, so as to leverage their domain knowledge to guide the data analytics process.

This course is intended to train students to understand and learn the human-centered approach in designing static or interactive visual presentation materials. Students will learn basic design principles to produce their own visual stories that address the business need of reporting and performance monitoring. Students will also be introduced with basic visual analytics techniques that integrate with machine learning models to reveal insights from large datasets. By completing the weekly hands-on exercises, students will also gain some practical experience of using modern Business Intelligence tools for data visualization and visual analytics.

### Course Intended Learning Outcomes

- Understand the impact of data visualization for business decision making and strategic planning
  - Identify the design principles in data visualization
  - Recognize the applicability of different types of visual elements in various application scenarios
  - Apply exploratory and explanatory data analysis to real business data sets and provide meaningful interpretation by relevant and effective visualization
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### Assessments and Weighting

- **Attendance and Class Participation (10%)**  
Students are required to attend all lectures and are strongly encouraged to interact with the instructor and peers during the lectures.
- **Lab Submission (40%):** 4 submissions in total  
These are individual continuous assessments. Each week, students are given real-world business data sets and a series of instructions. They are required to follow the instructions to complete some data visualization tasks, which utilize visual elements to provide an accessible way to see and understand trends, outliers, and patterns. After finishing, students need to demonstrate in class or submit the design to present the visualization/analytics results.
- **Group Projects (50%):** end of semester  
Students will work in a group of 2 to 3 to create an interactive dashboard that explores a real business data set in depth and derives meaningful insights. The groups also need to submit a slide deck to present the business scenario, a description of the data set in use, the needs of the intended audience, the

intended outcomes of such data visualization, and the applied visual analytics techniques. The assessment criteria are based on business values, the dashboard design, and the type of analytics used. Each group should also include a workload distribution table in the slides indicating the contribution of each member in %.

The project submission deadline is **Apr 21 (Week 12 Sunday) 11:59pm**.

### Teaching Schedule (tentative)

WK	Lecture Topic	Lab Exercise
1	<p>[Jan 31, Feb 5]</p> <ul style="list-style-type: none"> <li>- Course Overview</li> <li>- Data Visualization: What, Why and When</li> <li>- Data Visualization: Input, Output and Tools</li> <li>- Tableau Overview</li> </ul>	<p>Lab1 – Basic Chart Types in Tableau</p> <p>Exercise 1– Employee Retention</p>
4	<p>[Feb 19, 21]</p> <ul style="list-style-type: none"> <li>- Effectiveness of Data Visualization</li> <li>- Visual Encoding: Marks and Channels</li> <li>- Use of Color in Visualization</li> <li>- Tableau Marks and Colors</li> </ul>	<p>Lab2 – Advanced Chart Types in Tableau</p> <p>Exercise 2 – Airbnb Listing</p>
6	<p>[Mar 4, 6]</p> <ul style="list-style-type: none"> <li>- Dashboards and Examples</li> <li>- Dashboard Design Principles</li> <li>- Choosing the Right Chart Type</li> <li>- Tableau Dashboards</li> </ul>	<p>Lab3 – Dashboards in Tableau</p> <p>Exercise 3 – Shared Bike Rentals</p>
8	<p>[Mar 18, 20]</p> <ul style="list-style-type: none"> <li>- Visual Analytics: What and When</li> <li>- Visual Analytics for Data Exploration</li> <li>- Visual Analytics for Model Building and Understanding</li> <li>- Visual Analytics Techniques in Tableau</li> </ul>	<p>Lab4 – Visual Analytics in Tableau</p> <p>Exercise 4 – Flight Delay</p>

### Books & References

- Visualization Analysis & Design  
Authors: Tamara Munzner and Eamonn Maguire (Illustrator)  
Publisher: A K Peters/CRC Press  
Release Date: 2014  
ISBN: 978-1-4665-0891-0
- Fundamentals of Data Visualization  
Author: Claus O. Wilke  
Publisher: O'Reilly Media  
Release Date: 2019  
ISBN: 978-1-4920-3108-6
- The Big Book of Dashboards: Visualizing Your Data Using Real-World Business Scenarios  
Authors: Steve Wexler, Jeffrey Shaffer, Andy Cotgreave  
Publisher: Wiley  
Release Date: 2017  
ISBN: 978-1-1192-8308-9
- Tableau - Data Visualization Beginner's Guide: a Definition, Examples, and Learning Resources  
<https://www.tableau.com/learn/articles/data-visualization>