**Lesson Plan**

**Course Code & Title :** ANL201 Data Visualisation for Business

**Semester & Year :** January 2022

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| **Name of HoP :** Dr James Tan Swee Chuan  **Name of Associate Faculty :** Lam Vee Tat  **Name of Course Coordinator :** Dr Priyanka Gupta |

**Special Instructions for Instructors**

1. **In January 2022 Semester, we will use Tableau Desktop 2021.4 for teaching, assessments and exam. This software can be downloaded from Tableau website (**[**http://www.tableausoftware.com/products/desktop/download**](http://www.tableausoftware.com/products/desktop/download)**). If a student does not know how to install this software, the student must contact the Lab Support (CITS) unit to arrange a date to install this software as soon as possible.**
2. **Students will attempt one graded online Pre-Course Quiz and 2 Pre-Class quizzes. Make sure this is communicated to students well before the semester starts.**
3. It is important not to lecture all the time. You should craft some activities to make learning more meaningful for our students. Case Analysis is a good way to teach how to construct a Strategy Map. Another good idea is to run hands-on sessions on using Tableau Desktop software, as mentioned in the next point.
4. We find that it is highly effective to teach the fundamental concepts of data visualisation and business performance dashboard using Tableau Desktop software. This can be achieved by:
   1. Running hands-on sessions on loading data files and charting. Use the Tableau sample files, like Superstore Sales (Excel).xls and the coffee chain.mdb, to teach the data loading concept, and use the Tableau Desktop to create charts.
   2. As Tableau Desktop is evolving over the years, some of the textbook examples use outdated interface. It is important to guide students on the use of updated interface in the version of Tableau used in the course.
5. Promote the use of e-learning materials:
   1. For students who need revision or have missed the class, they can visit Canvas and access the e-learning materials. They can also find examples of software usage and demonstrations on Tableau Online Help. A good website for beginners is <https://help.tableau.com/current/guides/get-started-tutorial/en-us/get-started-tutorial-home.htm>

**Seminar Sessions: 1**

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| **Topics to be Covered** | **Learning Outcomes to be Achieved\*** | **Summary and Discussion of Key Concepts, Theories, Principles\*\*** | **Class Activities to Enhance Learning** |
| Study Unit 1: Overview of Business Performance Measurement | 1. Describe the concepts of Business Performance Measurement. 2. Explain the benefits of Business Performance Measurement. 3. Explain what effective Business Performance Measurement is. 4. Describe the principles of strategy-focused organisations. 5. Explain the concepts of the Balanced Scorecard model. 6. Explain the four Balanced Scorecard Perspectives. 7. Explain the relationship between mission statement, vision statement and strategy within an organisation. 8. Explain why strategy needs to be translated into strategic goals within the framework of a Balanced Scorecard model. 9. Describe the Strategy Map and its cause-and-effect relationships. 10. Construct a Strategy Map. 11. Explain how Business Performance Measures are selected. 12. Illustrate methodology in which organisation strategy is linked to Business Performance Measures. 13. Construct appropriate Business Performance Measures. 14. Set the right targets for Business Performance Measures. 15. Explain the success factors for implementing and sustaining Business Performance Measurement systems. | In-Class.  Revise Study Unit 1 and ask students if they have any questions. | Instructor to post a general Canvas announcement giving details on:   1. Online summative quiz and time window; 2. Online e-learning materials related to Study Unit 1; 3. ECA, GBA and TMA dates and details if possible;   Asks students to create a Strategy Map in group and present their strategy map in front of class.  Access e-learning material on Study Unit 1. |
| Quiz activity in Week 1 | Learning Outcomes in Study Unit 1. | Self Concepts in SU1. | Remind student to complete the Pre-Course Quiz 01. |

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| **Usage of case** | |
| 1. Do you use any case in the seminar? | ~~Yes~~ / No |
| 1. If your answer for question (1) is ‘Yes’, please specify the case use. |  |

**Seminar Sessions: 2**

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| **Topics to be Covered** | **Learning Outcomes to be Achieved\*** | **Summary and Discussion of Key Concepts, Theories, Principles.\*\*** | **Class Activities to Enhance Learning** |
| Study Unit 2: Foundation of the Science of Data Visualisation | 1. Describe what Data Visualisation is. 2. Describe the benefits of Data Visualisation. 3. Explain the four basic stages of Data Visualisation process. 4. Illustrate how Data Visualisation can be used in everyday life. 5. Describe what Semiotics of Data Visualisation is. 6. Compare the properties of Sensory and Arbitrary Representations. 7. Illustrate the concepts of Perceptual Processing Model. 8. Describe what data can represent. 9. Explain the two fundamental forms of data. 10. Explain data attributes. 11. Compare the four measurement levels of data quality attribute. 12. Explain what metadata is. 13. Prepare data using Data Visualisation software. | In-Class.  Revise Study Unit 2 and ask students if they have any questions. | Practice using Tableau Desktop software to prepare data.  Ask students to load data from Tableau sample files in group and present their final data model in front of class.  Instructor to remind students to submit TMA by stipulated deadline.  Access e-learning material on Study Unit 2. |
| Quiz activity in Week 2 | Learning Outcomes in Study Unit 2. | Self.  Concepts in SU2. | Remind student to complete formative Online Pre-Class Quiz. |

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| 1. Do you use any case in the seminar? | ~~Yes~~ / No |
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**Seminar Sessions: 3**

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| **Topics to be Covered** | **Learning Outcomes to be Achieved\*** | **Summary and Discussion of Key Concepts, Theories, Principles.\*\*** | **Class Activities to Enhance Learning** |
| Study Unit 3: Foundation of the Art of Data Visualisation | 1. Compare the eight components of Visual Cues. 2. Explain Trichromatic Theory. 3. Compare CIE, RGB and HSV colour systems. 4. Illustrate the applications of Visual Cues in Data Visualisation. 5. Compare Cartesian, Polar and Geographic Coordinate Systems. 6. Illustrate the applications of Coordinate Systems in Data Visualisation. 7. Compare Linear, Algorithmic, Categorical, Ordinal, Percent and Time Scales. 8. Illustrate the applications of Scales in Data Visualisation. 9. Illustrate the applications of Context in Data Visualisation. 10. Explain Focus-context problem. 11. Compare Distortion, Rapid Zooming, Elision and Multi-Windows techniques to solve Focus-Context problem. | In-Class.  Revise Study Unit 3 and ask students if they have any questions. | Ensure students have formed their GBA groups.  Class discussion on good and bad visualization examples.  Access e-learning material on study unit 3. |

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**Seminar Sessions: 4**

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| **Topics to be Covered** | **Learning Outcomes to be Achieved\*** | **Summary and Discussion of Key Concepts, Theories, Principles. \*\*** | **Class Activities to Enhance Learning** |
| Study Unit 4: Basic Data Visualisation Techniques | 1. Explain the best practices to visualise categorical data. 2. Create bar, stacked bar, and side-by-side bar charts using Data Visualisation software. 3. Create pie charts and area-fill charts using Data Visualisation software. 4. Create heat maps and treemaps using Data Visualisation software. 5. Explain the best practices to visualise time series data. 6. Create line and spark-line charts using Data Visualisation software. 7. Create gantt chart using Data Visualisation software. 8. Create trend and reference lines to charts using Data Visualisation software. | In-Class.  Revise Study Unit 4 and ask students if they have any questions. | Practice using Tableau Desktop software to create   * Simple report   + Two measures report   + Pie chart   + Bar chart with reference line   + Stacked bar chart   + Line chart with trend line   + Line chart with 2 axis   + Area chart   + Bullet chart   + Gantt chart   + Heat Map   Instructor to remind students to submit their GBA by stipulated deadlines.  Access e-learning material on Study Unit 4. |
| Quiz activity in Week 4 | Learning Outcomes in Study Unit 4. | Self.  Concepts in SU4. | Remind student to complete formative Online Pre-Class Quiz 02. |

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**Seminar Sessions: 5**

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| **Topics to be Covered** | **Learning Outcomes to be Achieved\*** | **Summary and Discussion of Key Concepts, Theories, Principles.\*\*** | **Class Activities to Enhance Learning** |
| Study Unit 5: Advanced Data Visualisation Techniques | 1. Explain the best practice to visualise spatial data. 2. Show spatial data on a map using Data Visualisation software. 3. Prepare data to enable point-to-point mapping using Data Visualisation software. 4. Explain the best practice to visualise multi-variable and distribution of data. 5. Create scatter, circle and side-by-side circle plots using Data Visualisation software. 6. Create bullet chart, bubble chart and histogram using Data Visualisation software. 7. Create box plot and pareto chart using Data Visualisation software. 8. Create parameters using Data Visualisation software. 9. Create forecast using Data Visualisation software. | In-Class.  Revise Study Unit 5 and ask students if they have any questions. | Practice using Tableau Desktop software to create   * + Map View   + Scatterplot with filter   + Histogram   + Boxplot   + Create Parameter   + Forecast chart   Access e-learning material on Study Unit 5. |

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**Seminar Sessions: 6**

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| **Topics to be Covered** | **Learning Outcomes to be Achieved\*** | **Summary and Discussion of Key Concepts, Theories, Principles.\*\*** | **Class Activities to Enhance Learning** |
| Study Unit 6: Business Performance Dashboard | 1. Explain the concepts and benefits of a Business Performance Dashboard. 2. Compare Strategic, Tactical and Operational Dashboards. 3. Explain the wrong and right ways in building a dashboard. 4. Illustrate dashboard design principles. 5. Arrange the objects in the dashboard workspace. 6. Use actions to create advanced dashboard navigation. | In-Class.  Revise Study Unit 6 and ask students if they have any questions. | Practice using Tableau Desktop software to create storyboard with filters and actions.  Instructor to remind students to submit their ECA by stipulated deadline.  Access e-learning material on Study Unit 6. |

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\***Note: Some Learning Outcomes may be left to students for self-study if you feel no further discussion or class activities are needed to reinforce students’ understanding of the subject matter.**

\*\* **Not to exceed 50% of Seminar time.**