



University of  
New Haven

## *Data Visualization*

### SECTION I: Course Overview

**Course Code:** BUS365EZE  
**Subject Area(s):** Business, Analytics  
**Prerequisites:** None  
**Language of Instruction:** English  
**Total Contact Hours:** 45  
**Recommended Credits:** 3

### COURSE DESCRIPTION

Data visualisation and communication is increasingly important in the field of analytics. The ability to present visual access to the huge amounts of data that business creates is an essential skill for any analyst. The creation of easily digestible visuals and graphics of business insights gained from data is often the simplest and most powerful tool that enables communication and generates a story to drive change and decision-making.

This course will focus on making sense of the world of data science. It equips students with an understanding of how the emergence of big data has expanded the power and scope of many industries and how to utilize large amounts of information. Data literacy empowers students with the tools to apply critical thinking to topics such as the integrity and purpose of the data, enabling them to reveal evidence-based insights. Students will be introduced to some key techniques for presenting, communicating, and analysing data, including data visualization and pattern discovery.

### LEARNING OBJECTIVES

Upon successful completion of this course, you will be able to:

- Recognize a range of static data visualization techniques,
- Demonstrate understanding of how data analysis enables discovery and improved decision making,
- Design and create data visualizations that facilitate the discovery and presentation of data-driven stories.
- Explore data ethics and privacy issues of data analysis, including limitations, social impacts and diversity in data.

## PREREQUISITES

None

## SECTION II: Instructor & Course Details

### INSTRUCTOR DETAILS

**Name:** TBA  
**Contact Information:** TBA  
**Term:** SEMESTER

### ATTENDANCE POLICY

This class will meet once weekly for 150 minutes each session. All students are expected to arrive on time and be prepared for the day's class session.

CEA enforces a mandatory attendance policy. You are therefore expected to attend all regularly scheduled class sessions, including any field trips, site visits, guest lectures, etc. that are assigned by the instructor. The table below shows the number of class sessions you may miss before receiving a grade penalty.

ALLOWED ABSENCES – SEMESTERS		
Courses Meeting X day(s) Per Week	Allowed Absence(s)	Automatic Failing Grade at 4 <sup>th</sup> Absence
Courses meeting 1 day(s) per week	1 Absences	4 <sup>th</sup> Absence

For every additional absence beyond the allowed number, your final course grade will drop down to the subsequent letter grade (ex: A+ to A). As a student, you should understand that the grade penalties will apply if you are marked absent due to tardiness or leaving class early. In the table below, you will find the grade penalty associated with each excessive absence up to and including automatic course failure.

ATTENDANCE DOCKING PENALTIES				
Absence	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>
Penalty	No Penalty	0.5 Grade Docked	1 Grade Docked	Automatic Failure
HIGHEST POSSIBLE GRADE AFTER ATTENDANCE PENALTIES				
Grade	A+	A	A-	F

CEA does not distinguish between excused and unexcused absences. As such, no documentation is required for missing class. Similarly, excessive absences, and the grade penalty associated with each, will not be excused even if you are able to provide documentation that shows the absence was beyond your control. You should therefore only miss class when truly needed as illness or other unavoidable factors may force you to miss a class session later on in the term.

*The instructor reserves the right to make changes or modifications to this syllabus as needed*

## GRADING & ASSESSMENT

The instructor will assess your progress towards the above-listed learning objectives by using the forms of assessment below. Each of these assessments is weighted and will count towards your final grade. The following section (Assessment Overview) will provide further details for each.

<b>Class Participation</b>	<b>10%</b>
<b>Oral Pitch Proposal</b>	<b>10%</b>
<b>Social Media Campaign Infographic</b>	<b>15%</b>
<b>Data Storytelling Presentation Slides</b>	<b>30%</b>
<b>Data Storytelling Oral Presentation</b>	<b>15%</b>
<b>Final Reflection</b>	<b>20%</b>

The instructor will calculate your course grades using the CEA Grading Scale shown below. As a CEA student, you should understand that credit transfer decisions—including earned grades for courses taken abroad—are ultimately made by your home institution.

CEA GRADING SCALE			
Letter Grade	Numerical Grade	Percentage Range	Quality Points
A+	9.70 – 10.0	97.0 – 100%	4.00
A	9.40 – 9.69	94.0 – 96.9%	4.00
A-	9.00 – 9.39	90.0 – 93.9%	3.70
B+	8.70 – 8.99	87.0 – 89.9%	3.30
B	8.40 – 8.69	84.0 – 86.9%	3.00
B-	8.00 – 8.39	80.0 – 83.9%	2.70
C+	7.70 – 7.99	77.0 – 79.9%	2.30
C	7.40 – 7.69	74.0 – 76.9%	2.00
C-	7.00 – 7.39	70.0 – 73.9%	1.70
D	6.00 – 6.99	60.0 – 69.9%	1.00
F	0.00 – 5.99	0.00 – 59.9%	0.00
W	Withdrawal	N/A	0.00
INC	Incomplete	N/A	0.00

## ASSESSMENT OVERVIEW

This section provides a brief description of each form of assessment listed above. Your course instructor will provide further details and instructions during class time.

**Class Participation (10%):** Student participation is mandatory for all courses taken at a CEA Study Center. The instructor will use the rubric below when determining your participation grade. All students should

understand that attendance and punctuality are expected and will not count positively toward the participation grade.

CLASS PARTICIPATION GRADING RUBRIC	
Student Participation Level	Grade
You make major & original contributions that spark discussion, offering critical comments clearly based on readings, research, & theoretical course topics.	<b>A+</b> (10.0 – 9.70)
You make significant contributions that demonstrate insight as well as knowledge of required readings & independent research.	<b>A/A-</b> (9.69 – 9.00)
You participate voluntarily and make useful contributions that are usually based upon some reflection and familiarity with required readings.	<b>B+/B</b> (8.99 – 8.40)
You make voluntary but infrequent comments that generally reiterate the basic points of the required readings.	<b>B-/C+</b> (8.39 – 7.70)
You make limited comments only when prompted and do not initiate debate or show a clear awareness of the importance of the readings.	<b>C/C-</b> (7.69 – 7.00)
You very rarely make comments and resist engagement with the subject. You are not prepared for class and/or discussion of course readings.	<b>D</b> (6.99 – 6.00)
You make irrelevant and tangential comments disruptive to class discussion. You are consistently unprepared for class and/or discussion of the course readings.	<b>F</b> (5.99 – 0.00)

**Oral pitch of proposal (10%):** You will prepare a five minute pitch of your final project. This will form the basis of the final report and presentation. Key aspects of the final project will be identified and presented in a structured pitch presentation.

**Social Media Campaign Infographic (15%):** You will create a data infographic for a social media campaign using Canva. This will be on a topic of your choice. The infographic will be assessed on clarity, composition and effectiveness in the social media platform chosen.

**Data Storytelling Presentation Slides (30%):** You will build a professional report of data visualizations using storytelling methods critical to contemporary data visualization practice. In this assessment you will gradually build a portfolio using techniques in data analysis and visualization that you will learn through the course and labs. This is a progressive portfolio task that will be completed over the term. It will consist of 15 to 20 slides on the project chosen by the student.

**Data Storytelling Oral Presentation (15%):** You will give a 10-minute oral presentation of your final project. This will be held in the final class of the semester. You will use your presentation and storytelling skills to discuss the visual representation of your data story. More details will be provided in class.

**Final Reflection (20%):** Students critically reflect on their data visualization experience through the completion of the final reflection. The reflection will be a 1,500-word assessment. The reflection will also be forward-looking and comment on how the student intends to build upon the material learned and the experience in their next academic and career professional path. The reflection will also outline how the student will continue to develop their data visualization and other skills to prepare for the future of work.

## EXPERIENTIAL LEARNING ACTIVITIES (AICAP)

CEA courses are designed to include a variety of experiential learning activities that will take you out of the classroom and allow you to explore your local, host city. These activities may include field studies, guest lectures and/or activities offered through our Academically Integrated Cultural Activities Program (AICAP).

## REQUIRED READINGS

Reading assignments for this course will come from the required text(s) and/or the selected reading(s) listed below. All required readings—whether assigned from the text or assigned as a selected reading—must be completed according to the due date assigned by the course instructor.

- I. **REQUIRED TEXT(S):** You may purchase the required text(s) prior to departure or upon program arrival. The required text(s) are listed below:

Badiu A (2021) Gestalt Principles: Understanding Its Importance in Report Design,  
<https://blog.enterprisedna.co/gestalt-principles-understanding-its-importance/>

Knaflig, C (2014) Exploratory vs Explanatory Analysis, Storytelling Data,  
<https://www.storytellingwithdata.com/blog/2014/04/exploratory-vs-explanatory-analysis>

Franconeri S (2020) 4 Keys to Effective and Honest Data Visualizations, Kellogg Insight,  
[https://insight.kellogg.northwestern.edu/article/data-visualization-honesty-infographics?utm\\_source=piano&utm\\_medium=onsite&utm\\_campaign=364](https://insight.kellogg.northwestern.edu/article/data-visualization-honesty-infographics?utm_source=piano&utm_medium=onsite&utm_campaign=364)

McGurgan K (2015) Data-ink Ratio and Task Complexity in Graph Comprehension, Thesis, Rochester Institute of Technology

Rodgers T (2022) What Type of Chart or Graph is Right for You?  
<https://www.tableau.com/learn/whitepapers/which-chart-or-graph-is-right-for-you>

Campbell, J (2008) The Hero With a Thousand Faces, 3rd Edition, Prologue, Pages 1-37, New World Library, Novato.

Gatterbauer W (2005), The Minto Pyramid Principle or the Case for Hierarchically Structured Thinking and Communication, The Proseminar Quadrology, Vol. 2, Iss. 4, Vienna.

Yang L et al (2022) A Design Space for Applying the Freytag's Pyramid Structure to Data Stories, IEEE Transactions on Visualization and Computer Graphics, Vol 28, Iss 1, pages 922-932.

Nussbaumer Knaflig C (2015) Storytelling With Data: A Data Visualization Guide for Business Professionals, 1st Edition, Chapter 2 and 3.

Winston, Wayne L. (2014), Marketing Analytics: Data-Driven Techniques with Microsoft Excel, John Wiley & Sons, Indianapolis, IA. Chapter 3 and 4. Gindham A (2023) How To Write the Perfect ChatGPT Prompt

<https://writersonic.com/blog/how-to-write-chatgpt-prompts/>

Parsons G (2023) The DALL E Prompt Book, DALLery GALLERY, <https://dallery.gallery/the-dalle-2-prompt-book/>

Gallo C (2020) What it Takes to Give a Great Presentation,

<https://hbr.org/2020/01/what-it-takes-to-give-a-great-presentation>

Vogel W (2018) Presenting With Confidence, Journal of Advanced Oncology, Vol. 9, Iss 5, pages 545-548.

Price, James H. and Judy Murnan. "Research Limitations and the Necessity of Reporting Them." American Journal of Health Education 35 (2004): Pages 66-67.

Theofanidis, Dimitrios and Antigoni Fountouki. "Limitations and Delimitations in the Research Process." Perioperative Nursing 7 (September-December 2018): Pages 155-163.

Required Readings & Resources

Think With Google (2023) Diversity in Advertising Trends

<https://www.thinkwithgoogle.com/consumer-insights/trending-data-shorts/diversity-in-advertising-trends>

Zamith R (2019) Transparency, Interactivity, Diversity and Information Provenance in Everyday Data Journalism, Digital Journalism, Vol 7, Iss 4, Pages 470-489.

Lund S et al (2021) The Future of Work after COVID-19 McKinsey Global Institute,

<https://www.mckinsey.com/featured-insights/future-of-work/the-future-of-work-after-covid-19>

Monkey Learn (2022) 5 Data Visualization Trends of 2022 and Beyond,

<https://monkeylearn.com/blog/data-visualization-trends/>

## RECOMMENDED READINGS

The recommended reading(s) and/or text(s) for this course are below. These recommended readings are not mandatory, but they will assist you with research and understanding course content.

### Recommended Books

Card, S. K., MacKinlay, J. D., Shneiderman, B., (2000) Readings in Information Visualization: Using Vision to Think, Morgan Kaufmann, ISBN 1-55860-533-9

Chaomei Chen (1999) Information Visualization and Virtual Environments, Springer-Verlag, London, ISBN 1-85233-136-4

Colin Ware (2000) Information Visualization: Perception for Design, Morgan Kaufmann, ISBN 1-55860-511-8

Geroimenko, V. & Chen, C., (2002) Visualizing the Semantic Web, Springer-Verlag, London, ISBN 1-85233-576-9

Grigsby, Mike (2018), Marketing Analytics, 2nd Edition, Koganpage, UK.

Huang, M. L., Huang, W. (2013) Innovative Approaches of Data Visualization and Visual Analytics. IGI Global, ISBN13: 9781466643093

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Simoff, S., Bohlen, M., Mazeika A. (2008) Visual Data Mining: Theory, Techniques and Tools for Visual Analytics , Springer

Winston, Wayne L. (2014), Marketing Analytics: Data-Driven Techniques with Microsoft Excel, John Wiley & Sons, Indianapolis, IA. (EBook is also available from publisher's site)

## ADDITIONAL RESOURCES

In order to ensure your success abroad, CEA has provided the academic resources listed below. In addition to these resources, each CEA Study Center provides students with a physical library and study areas for group work. The Academic Affairs Office at each CEA Study Center also compiles a bank of detailed information regarding libraries, documentation centers, research institutes, and archival materials located in the host city.

- **UNH Online Library:** As a CEA student, you will be given access to the online library of CEA's School of Record, the University of New Haven (UNH). You can use this online library to access databases and additional resources while performing research abroad. You may access the UNH online library [here](#) or through your MyCEA Account. You must comply with UNH Policies regarding library usage.
- **CEAClassroom – Moodle:** CEA instructors use Moodle, an interactive virtual learning environment. This web-based platform provides you with constant and direct access to the course syllabus, daily schedule of class lectures and assignments, non-textbook required readings, and additional resources. Moodle includes the normal array of forums, up-loadable and downloadable databases, wikis, and related academic support designed for helping you achieve the learning objectives listed in this syllabus.

During the first week of class, CEA academic staff and/or faculty will help you navigate through the many functions and resources Moodle provides. While you may print a hard copy version of the syllabus, you should always check Moodle for the most up-to-date information regarding this course. The instructor will use Moodle to make announcements and updates to the course and/or syllabus. It is your responsibility to ensure that you have access to all Moodle materials and that you monitor Moodle on a daily basis in case there are any changes made to course assignments or scheduling.

To access Moodle: Please log-in to your MyCEA account using your normal username and password. Click on the "While You're Abroad Tab" and make sure you are under the "Academics" sub-menu. There you will see a link above your schedule that says "View Online Courses" select this link to be taken to your Moodle environment.

**COURSE CALENDAR**  
*Data Visualization*

SESSION	TOPICS	ACTIVITY	READINGS & ASSIGNMENTS
1	<p style="text-align: center;"><b>Course Introduction</b></p> <p style="text-align: center;"><b>Review of Assessment tasks</b></p>	<p style="text-align: center;"><b>Course Overview</b> (Syllabus &amp; Policies)</p> <p style="text-align: center;">Lecture &amp; Discussion</p>	<p>Badiu A (2021) Gestalt Principles: Understanding Its Importance in Report Design, <a href="https://blog.enterprisedna.co/gestalt-principles-understanding-its-importance/">https://blog.enterprisedna.co/gestalt-principles-understanding-its-importance/</a></p>
2	<b>Explore the principles governing perception</b>	Interpret in class case studies of data visualizations	<p>Knaflig,C (2014) Exploratory vs Explanatory Analysis, Storytelling Data, <a href="https://www.storytellingwithdata.com/blog/2014/04/exploratory-vs-explanatory-analysis">https://www.storytellingwithdata.com/blog/2014/04/exploratory-vs-explanatory-analysis</a></p>
3	<b>Visualizing Data with Graphs Principles</b>	<p style="text-align: center;">Lecture &amp; instruction</p> <p style="text-align: center;">Power Point Fundamentals</p>	<p>Franconeri S (2020) 4 Keys to Effective and Honest Data Visualizations, Kellogg Insight, <a href="https://insight.kellogg.northwestern.edu/article/data-visualization-honesty-infographics?utm_source=piano&amp;utm_medium=onsite&amp;utm_campaign=364">https://insight.kellogg.northwestern.edu/article/data-visualization-honesty-infographics?utm_source=piano&amp;utm_medium=onsite&amp;utm_campaign=364</a></p> <p>McGurgan K (2015) Data-ink Ratio and Task Complexity in Graph Comprehension, Thesis, Rochester Institute of Technology</p> <p>Rodgers T (2022) What Type of Chart or Graph is Right for You? <a href="https://www.tableau.com/learn/whitepapers/which-chart-or-graph-is-right-for-you">https://www.tableau.com/learn/whitepapers/which-chart-or-graph-is-right-for-you</a></p>
4	<b>Organize ideas to communicate storytelling effectively</b>	<p style="text-align: center;">Construct an effective Minto Pyramid</p> <p style="text-align: center;">Apply Freytag</p>	<p>Campbell, J (2008) The Hero With a Thousand Faces, 3rd Edition, Prologue, Pages 1-37, New World Library, Novato.</p> <p>Gatterbauer W (2005), The Minto Pyramid Principle or the Case for Hierarchically Structured Thinking and Communication, The Proseminar Quadrology, Vol. 2, Iss. 4, Vienna.</p>



		storytelling framework workshop	Yang L et al (2022) A Design Space for Applying the Freytag's Pyramid Structure to Data Stories, IEEE Transactions on Visualization and Computer Graphics, Vol 28, Iss 1, pages 922-932.
5	<b>Sourcing Data Sets, Data Cleaning and Graphics in Excel, Data Benchmarking</b>	In class workshops on Excel  Data benchmarking	Nussbaumer Knaflig C (2015) Storytelling With Data: A Data Visualization Guide for Business Professionals, 1st Edition, Chapter 2 and 3.  Winston, Wayne L. (2014), Marketing Analytics: Data-Driven Techniques with Microsoft Excel, John Wiley & Sons, Indianapolis, IA. Chapter 3 and 4.
6	<b>Data Analysis Representation</b>	Tableau workshop	Tableau Tutorial: Getting Started with Tableau Desktop, <a href="https://help.tableau.com/current/guides/get-started-tutorial/en-us/get-started-tutorial-home.htm">https://help.tableau.com/current/guides/get-started-tutorial/en-us/get-started-tutorial-home.htm</a>  <b>Oral pitch of proposal for Final Report</b>
7	<b>Data Storyboards</b>	Tableau workshop	Tableau Tutorial: Creating a Story, <a href="https://help.tableau.com/current/guides/get-started-tutorial/en-us/get-started-tutorial-home.htm">https://help.tableau.com/current/guides/get-started-tutorial/en-us/get-started-tutorial-home.htm</a>
8	<b>Infographics and Social Media Posts</b>	Canva workshop for infographics  Canva design for social media posting	Canva Design School: How to Make An Infographic <a href="https://www.canva.com/learn/how-to-make-an-infographic/">https://www.canva.com/learn/how-to-make-an-infographic/</a>  Canva Design School: Design For Social Media <a href="https://www.canva.com/designschool/tutorials/designing/design-social-media/">https://www.canva.com/designschool/tutorials/designing/design-social-media/</a>
9	<b>Implementing Generative Artificial Intelligence in Data Storytelling</b>	Open AI and Dall E workshops  Tableau and Canva workshops	Gindham A (2023) How To Write the Perfect ChatGPT Prompt <a href="https://writersonic.com/blog/how-to-write-chatgpt-prompts/">https://writersonic.com/blog/how-to-write-chatgpt-prompts/</a>  Parsons G (2023) The DALL E Prompt Book, DALLery GALLERY, <a href="https://dallery.gallery/the-dalle-2-prompt-book/">https://dallery.gallery/the-dalle-2-prompt-book/</a>

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10	<b>Presenting for Maximum Impact</b>	Tableau and Canva workshops	Gallo C (2020) What it Takes to Give a Great Presentation, <a href="https://hbr.org/2020/01/what-it-takes-to-give-a-great-presentation">https://hbr.org/2020/01/what-it-takes-to-give-a-great-presentation</a> Vogel W (2018) Presenting With Confidence, Journal of Advanced Oncology, Vol. 9, Iss 5, pages 545-548. <b>Social Media Campaign Infographic due</b>
11	<b>Identifying Limitations and Gaps</b>	Tableau and Canva workshops	Price, James H. and Judy Murnan. "Research Limitations and the Necessity of Reporting Them." American Journal of Health Education 35 (2004): Pages 66-67.
12	<b>Identifying Limitations, Gaps and Future Research</b>	Tableau and Canva workshops	Theofanidis, Dimitrios and Antigoni Fountouki. "Limitations and Delimitations in the Research Process." Perioperative Nursing 7 (September-December 2018): Pages 155-163.
13	<b>Ethics, Social and Diversity Impacts of Visualization</b>	Tableau and Canva workshops	Think With Google (2023) Diversity in Advertising Trends <a href="https://www.thinkwithgoogle.com/consumer-insights/trending-data-shorts/diversity-in-advertising-trends">https://www.thinkwithgoogle.com/consumer-insights/trending-data-shorts/diversity-in-advertising-trends</a> Zamith R (2019) Transparency, Interactivity, Diversity and Information Provenance in Everyday Data Journalism, Digital Journalism, Vol 7, Iss 4, Pages 470 489. <b>Data Storytelling Presentation Slides due</b>
14	<b>Future Careers and Data Visualization in the Future of Work</b>	Lecture & Discussion	Lund S et al (2021) The Future of Work after COVID-19 McKinsey Global Institute, <a href="https://www.mckinsey.com/featured-insights/future-of-work/the-future-of-work-after-covid-19">https://www.mckinsey.com/featured-insights/future-of-work/the-future-of-work-after-covid-19</a> Monkey Learn (2022) 5 Data Visualization Trends of 2022 and Beyond, <a href="https://monkeylearn.com/blog/data-visualization-trends/">https://monkeylearn.com/blog/data-visualization-trends/</a>
15	<b>Data Storytelling Oral Presentations</b>  <b>Final Reflection Due</b>		

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## SECTION III: CEA Academic Policies

The policies listed in this section outline general expectations for CEA students. You should carefully review these policies to ensure success in your courses and during your time abroad. Furthermore, as a participant in the CEA program, you are expected to review and understand all CEA Student Policies, including the academic policies outlined on our website. CEA reserves the right to change, update, revise, or amend existing policies and/or procedures at any time. For the most up to date policies, please review the policies on our website.

Class & Instructor Policies can be found [here](#)

General Academic Policies can be found [here](#)