CADT IDT វិទ្យាស្ថានបច្ចេកវិទ្យាឌីជីថល Institute of Digital Technology

CAMBODIA ACADEMY OF DIGITAL TECHNOLOGY

INSTITUTE OF DIGITAL TECHNOLOGY

School of Digital Engineering

Course Information			
Course Title	Information Visualization		
Department			
Course Code		**Hour:** 45h	**Credit:**
Level	Beginner	**Prerequisite**	
Course Type	Major ☐ Core ☑ Elective ☐ Other ☐		
Offer in Academic Year	Term 2 2023		
Revision	Version 1.1, 13/September/2023		
Instructor Information			
Instructor	Mr. CHAN Sophal	**Qualification**	MSIT
Mobile	095 201434	**Email**	Sophal.c@phuket.psu.ac.th
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Office Hour	Tuesday (9:00-16:40)		

Course Description

In the age of big data, the ability to effectively visualize and communicate information is a crucial skill. This course introduces students to the principles and practices of information visualization with a specific focus on using Power BI, one of the industry's leading visualization tools. Students will learn the art and science of transforming raw data into meaningful insights,

using a combination of charts, graphs, maps, and other visual elements. Through hands-on exercises, case studies, and real-world projects, participants will become proficient in creating interactive dashboards, reports, and visual stories that resonate with audiences and drive decision-making.

Beyond the mechanics of Power BI, students will be exposed to foundational concepts in data visualization, ensuring they understand the importance of accuracy, integrity, and context in the presentation of data. By the end of the course, participants will be equipped with the knowledge and skills to harness the power of Power BI and create compelling, informative visualizations that can inform and inspire.

Course Learning Outcomes

By the end of the course, learners should gain the following *knowledge*:

- CLO1: Understand the foundational principles of data visualization, emphasizing context, accuracy, and the ethical implications of presenting data.
- CLO2: Demonstrate proficiency in using Power BI, transforming raw data into interactive and insightful visualizations, from sourcing to visual selection.
- CLO3: Understand Power BI's integration with other platforms like Excel, SQL Server, and Azure to enhance data processing and analysis.

By the end of the course, learners should be able to use the following *skills*:

- CLO4: Design and create effective dashboards and reports tailored for specific audience needs, ensuring information clarity and actionability.
- CLO5: Apply advanced visualization techniques in Power BI, including drill-throughs, custom visuals, and Q&A functionalities.
- CLO6: Develop skills in data storytelling, creating visual narratives that resonate with audiences, supported by data and its visual representation.
- CLO7: Optimize Power BI reports for performance and understand best practices for publishing and sharing with diverse stakeholders.

By the end of the course, learners should develop the following *attitudes*:

- CLO8: Cultivate a mindset for continuous learning in the evolving field of data visualization, staying updated with emerging trends and tools.
- CLO9: Exhibit ethical responsibility in data representation, ensuring that visualizations are not misleading and respect data privacy and integrity.
- CLO10: Value the importance of audience-centric design, recognizing that effective visualizations are tailored to the needs and understanding of their intended viewers.

Learning Level

Course Learning Outcomes		**Bloom Taxonomy**					
KSA	**CLOs**	**Remember**	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Create**
Knowledge	**CLO1**		✓				
	CLO2		✓				
	CLO3		✓				
Skill	**CLO4**			✓			
	CLO5			✓			
	CLO6			✓			
	CLO7				✓		
Attitude	**CLO8**						✓
	CLO9					✓	
	CLO10						✓

Course Outline/Schedule

RL: P: BL: SDL denotes *Recap Lecture hours*, *Practical hours*, *Blended Learning hours*, *Self-directed learning hours* respectively

Session	***Topic***	***Contact Hours***				***Required Reading***	***Homework/ Lab/ Assignments***
		RL	**P**	**BL**	**SDL**		
1	Introduction to Data Visualization and Power BI	1.5	1	0.5		Chapter 1: Data Visualization Basics	Initial setup of Power BI

2	Principles of Effective Visualization	1.5	1	0.5		Chapter 2: Principles of Visual Representation	Analyze sample visualizations
3	Sourcing and Cleaning Data in Power BI	1.5	1	0.5		Chapter 3: Data Preparation Techniques	Import and clean a sample dataset
4	Basic Visualizations: Charts and Graphs	1.5	1	0.5		Chapter 4: Power BI Visualization Toolkit	Create basic visualizations with provided data
5	Advanced Visualization Techniques	1.5	1	0.5		Chapter 5: Going Beyond Basic Charts	Implement custom visuals & drill-throughs
6	Integrating Power BI with Excel, SQL Server, and Azure	1.5	1	0.5		Chapter 6: Power BI Integrations	Connect Power BI to an external database
7	Designing Dashboards and Reports	1.5	1	0.5		Chapter 7: Effective Dashboard Design	Design a dashboard based on a given scenario
8	Data Storytelling in Power BI	1.5	1	0.5		Chapter 8: Crafting a Data Narrative	Develop a visual story using a dataset
9	Optimization and Publishing	1.5	1	0.5		Chapter 9: Sharing and Distributing Reports	Optimize and publish a Power BI report
10	Ethics in Data Visualization	1.5	1	0.5		Chapter 10: Ethical	Evaluate visualizations

						Considerations in Visualization	for ethical considerations
11	***Final Exam***						

Learning Resource:

- **Core Textbook**
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    https://www.amazon.com/Mastering-Microsoft-Power-techniques-intelligence/dp/1788297237
- **Additional Reading Materials**
  - https://www.udemy.com/topic/microsoft-power-bi/

Student Responsibilities

- Attend all scheduled classes, labs, and tutorials.
- Complete and submit assignments and projects by the due date.
- Actively participate in class discussions and group activities.
- Regularly check the course platform for updates, announcements, and feedback.
- Adhere to all academic policies, including those on plagiarism and cheating.
- Seek assistance when concepts are unclear or when falling behind.

Academic Policy: (Assessment Policy, Plagiarism, and Cheating Policy….)

- **Attendance**:
  - Students are expected to attend all scheduled sessions.
  - More than three unexcused absences may result in a grade reduction.
- **Academic Integrity & Collaboration**:
  - All submitted work should be the original work of the student.

    - Collaborative work is encouraged during group assignments, but individuals must contribute equally.
    - Plagiarism, or presenting someone else's work as one's own, will result in disciplinary action.
- **Lab & Homework**:
    - Lab assignments should be completed during the lab period unless otherwise instructed.
    - Homework should be submitted by the deadline. Late submissions may incur a penalty.
- **Exam**:
    - Exams must be taken on the scheduled date and time.
    - Any student caught cheating will receive a zero for the exam.
- **Final project**:
    - The final project is a culmination of the course learnings and should reflect the student's understanding and application of the course content.
    - Group projects should clearly indicate the contributions of each member.
- **Penalty**:
    - Late assignment submissions will have a 10% reduction for each day late.
    - Repeated academic misconduct will result in the student being reported to the academic board.

Grading Policy

Activities	***Percentage (%)***
Attendance & Class Participation	10
Quiz	10
Problem Sets	10
Final Project	40
Final exam	30

- **Attendance**
    - Regular attendance is crucial for grasping the course material.
    - Each unexcused absence after the third may result in a deduction from the final grade.

- **Class participation**
  - Active participation in class discussions and activities is expected.
  - Students are encouraged to ask questions, share insights, and engage in constructive debates.
- **Quizzes**
  - Quizzes will be administered periodically to assess understanding of recent topics.
  - They may be announced or unannounced.
  - No makeup quizzes will be given unless a valid reason is provided.
- **Problem sets**
  - Problem sets will test the practical application of course concepts.
  - They should be completed individually unless otherwise specified.
  - Late submissions may incur a penalty.
- **Final project:**
  - The final project is an opportunity to apply the knowledge and skills acquired throughout the course.
  - Clear guidelines and expectations will be provided.
  - Projects should be original and reflect a deep understanding of the chosen topic.
- **Final exam**
  - The final exam will cover all topics discussed during the course.
  - It will be a closed-book exam unless otherwise specified.
  - Cheating or academic misconduct during the exam will result in a zero.

Rating Scale

Letter Grade	Grade Point	Score	Explanation
A	4.00	85-100	Excellent
B+	3.50	80-84	Very Good
B	3.00	75-79	Good
C+	2.50	70-74	Fairly Good
C	2.00	65-69	Fair
D+	1.50	60-64	Satisfactory
D	1.00	55-59	Pass
F	0.00	0-54	Fail

1. STUDENT LEARNING EXPERIENCE ACTION PLANNING

** Sample are available in the annex below*

Week	Contents/Topics	Intended Learning outcomes Describe what the student should be able to know (Think), do, behave, demonstrate (do), and fee, reflect (feel) in terms of a particular discipline, knowledge, skill and attitude at the end of the learning experience	Teaching Approach Appropriate teaching-learning approach or combination of approaches-used to help students to learn and achieve the intended learning outcomes	Delivery modes Relevant delivery mode or combination of delivery modes that best support the main teaching approach	Teaching-Learning Activities Describe the specific teaching-learning activities you plan to deploy to better engage students in active learning	Assessment Strategy and methods • Formative and/or summative assessments • Individual or group Assessment types and weightage	Student Behaviors (Think-feel-do) How do you hope this learning experience will impact your students' felling, thinking, and doing – individually and as a group?
1	Introduction to Data Visualization and Power BI	▪ Understand the foundational principles of data visualization and the basics of Power BI.	Lecture and Demonstration	In-person Lecture	Introduction to course, setup of Power BI	**Role plays, Quiz,**	**Teamwork and Collaboration: Experience collaboration and effective teamwork** **Open-minded: demonstrate how computer hardware and software works together** **Synthesis: experience how computer works**
2	Principles of Effective Visualization	▪ Grasp the core principles that make a visualization effective.		Blended Learning	Analysis of effective and poor visualizations	**Role plays, Quiz,**	**Teamwork and Collaboration: Experience collaboration and effective teamwork**

							Open-minded: demonstrate how computer hardware and software works together **Synthesis: experience how computer works**
3	Sourcing and Cleaning Data in Power BI	▪ Learn to source and preprocess data within Power BI.		In-person Workshop	Data import and cleaning exercise	**Role plays, Quiz,**	**Teamwork and Collaboration: Experience collaboration and effective teamwork** **Open-minded: demonstrate how computer hardware and software works together** **Synthesis: experience how computer works**
4	Basic Visualizations: Charts and Graphs	▪ Develop skills in creating basic charts and graphs in Power BI.		Online Tutorial and In-person Lecture	Creation of basic visualizations	**Role plays, Quiz,**	**Teamwork and Collaboration: Experience collaboration and effective teamwork** **Open-minded: demonstrate how computer hardware and software works together** **Synthesis: experience how computer works**
5	Advanced Visualization Techniques	▪ Delve into advanced visualization techniques available in Power BI.		In-person Lecture	Development of advanced visualizations	**Role plays, Quiz,**	**Teamwork and Collaboration: Experience collaboration and effective teamwork** **Open-minded: demonstrate how**

							computer hardware and software works together **Synthesis: experience how computer works**
6	Integrating Power BI with Excel, SQL Server, and Azure	▪ Integrate Power BI with other platforms like Excel, SQL Server, and Azure.		Online Workshop	Integration exercise with Excel	**Role plays, Quiz,**	**Teamwork and Collaboration: Experience collaboration and effective teamwork** **Open-minded: demonstrate how computer hardware and software works together** **Synthesis: experience how computer works**
7	Designing Dashboards and Reports	▪ Design effective and informative dashboards and reports.		Blended Learning	Dashboard design activity	**Role plays, Quiz,**	**Teamwork and Collaboration: Experience collaboration and effective teamwork** **Open-minded: demonstrate how computer hardware and software works together** **Synthesis: experience how computer works**
8	Data Storytelling in Power BI	▪ Craft compelling data narratives using Power BI.		In-person Lecture	Data storytelling exercise	**Role plays, Quiz,**	**Teamwork and Collaboration: Experience collaboration and effective teamwork** **Open-minded: demonstrate how**

							computer hardware and software works together **Synthesis: experience how computer works**
9	Ethics in Data Visualization, Ethic in Data Visualization	▪ Optimize and publish Power BI reports. ▪ Understand and apply ethical considerations in data visualization.		Online Tutorial	Optimization and publishing activity Discussion on ethics in data visualization	**Role plays, Quiz,**	**Teamwork and Collaboration: Experience collaboration and effective teamwork** **Open-minded: demonstrate how computer hardware and software works together** **Synthesis: experience how computer works**
10	**Final Exam Week**						