Welcome to our journey together in achieving student development and success!

As we embark on this new semester, let us embrace this as an opportunity to develop our craft in facilitating student achievement. The effectiveness of these courseware materials that we have provided you is only as good as your commitment and passion in delivering them. May you always have the drive to pursue academic excellence through activities—even going beyond courseware provided these are aligned to learning objectives—that will continually challenge our students to tap their full potential!

We look forward to seeing you keep the fires of passion burning in making sure that our students achieve success!

Yours in the service of student development,

Academic Research Group

TOPIC TITLE: EMERGING TECHNOLOGIES

LEARNING OBJECTIVES:

At the end of the topic session, the students should be able to:

LO1: Determine the concepts of how technologies emerge in the real world;
LO2: Analyze the potential application of various emerging technologies in a wide variety of settings; and
LO3: Create reports on a topic of emerging technologies.

MATERIALS/EQUIPMENT:

- Computer
- LCD projector
- File/s (01 Emerging Technologies)
  - 01 LCD Slides 1.ppsx
  - 01 Handout 1.pdf
  - 01 Seatwork 1.pdf
  - 01 Seatwork 2.pdf
  - 01 Skills Checklist.pdf
  - 01 Group Record 1.xlsx
  - 01 Case Study Guidelines and Outline.pdf
  - 01 Case Study Grading Rubric.pdf
- Software requirement
  - MS PowerPoint
- Whiteboard marker and eraser

TOPIC PREPARATION:

- The instructor is encouraged to research for materials that will help supplement the topics in this session.
- Log on to eLMS to obtain a copy of **IT1814 Syllabus and Course Outline**, **01 Handout 1**, **01 Skills Checklist**, and other files which will be used in this session.
- Review **01 Handout 1**. Check the handout together with the slide presentation to ensure that topics will be discussed cohesively. Some slides only contain images that support the content of the handout. Thus, a careful review of related materials is required.
- Print enough copies of **01 Handout 1** for the students. For the succeeding handouts, instruct the students to access and download them from the eLMS.
- Encourage the students to take notes.

- Provide additional examples other than the ones provided in the handout and slides, if needed.
- Motivate the students to engage in all class activities and let them feel they are important. Religiously follow all activities as these are geared towards the achievement of the course learning outcomes.
- Prepare printed copies of **01 Seatwork 1**, **01 Seatwork 2**, and **01 Case Study Guidelines and Outline** for the activities.
- Anticipate possible questions that students might raise during the discussion.

PRESENTATION OVERVIEW:

A.	Introduction	30 min
B.	Instructional Input	
	Overview of Emerging Technologies	60 min
	a. Define emerging technology.	
	b. Define the characteristics of emerging technologies and how they emerge.	
	Emerging Technology Areas	60 min
	a. Introduce some emerging technologies and define their potential applications.	
	The Fourth Industrial Revolution	60 min
	a. Define what industrial revolution is, including its four (4) stages.	
	b. Introduce technologies from the building blocks of Industry 4.0.	
C.	Generalization	40 min
D.	Assignment	50 min
	Total duration	300 min

TOPIC PRESENTATION:

A. Introduction

1. Welcome the students to the class by briefly introducing yourself. Afterward, show **IT1814 – Syllabus and Course Outline** and discuss the following to guide the students about this course:
   - Course description
   - Course outcomes
   - Course requirements
   - Grading system
   - Course outline

2. Remind the class that they would extensively be using the eLMS in this course. It will be the source for their handouts and most of their

activities. There will also be reviews and quizzes given only in the eLMS, so they must ensure that their eLMS accounts are active. If necessary, walk the students through the process of activating their eLMS. The requirements in the eLMS will be part of their grade, such that:

Class Participation	20%
Task Performance	50%
Major Examination	30%
	100%

3. Tell the students the following:

   - You may download the copy of the Syllabus and Course Outline of this enrolled course on the eLMS;
   - You can use the references on the Syllabus and Course Outline to read more about this course; and
   - Students who are enrolled in this course should have the basic knowledge of basic programming and the fundamentals of object-oriented programming (OOP).

4. Show **01 Skills Checklist 1**. Tell the class that there is a checklist in each period (preliminary, midterm, pre-final, and final). This checklist will measure how well they have accomplished the goals set for the preliminary period. It will be rated by their instructor.

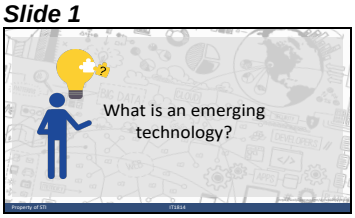
   Note: *The accomplished checklist will be required for submission before every major examination schedule.*

5. Make sure that everything is clear to the students before proceeding to the next discussion.

B. Instructional Input

Overview of Emerging Technologies

Slide 1



1. To start the discussion, show ***Slide 1*** of **01 LCD Slides 1**. Ask at least three (3) students to define what emerging technologies are in their own understanding.

   Note: *Acknowledge and assess the answers coming from the class.*

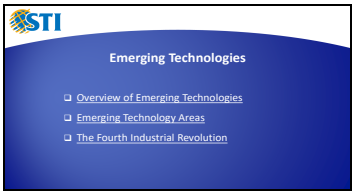
2. Tell the students the following statements:

   The term “emerging technology” has a considerable growing interest in the area of research in the IT industry, market, and academe. Emerging technology has different definitions for different people. Some consider emerging technology as new

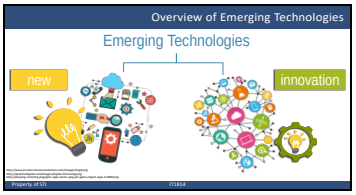
technologies, while some define them as technologies of the future. There are also people who consider them as continuous innovation of previous technologies.

In this course, we will discuss what emerging technology is and examine the characteristics of an emerging technology to consider how technology emerges in our world. I will introduce some emerging technologies that are considered to reshape our daily lifestyle and industry in the near future.

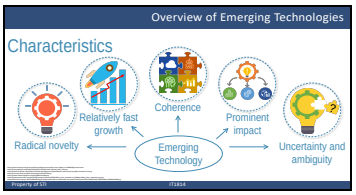
Slide 2



Slide 3



Slide 4



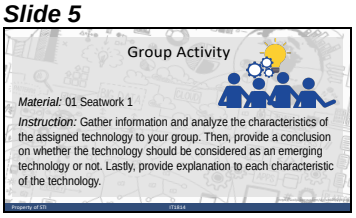
3. Display ***Slide 2*** and present the topic coverage. Define each subtopic if necessary.

4. Show ***Slide 3***. Explain the different considered definition of emerging technologies. Refer students to ***Page 1*** of **01 Handout 1**.

5. Show ***Slide 4***. Define the five (5) characteristics of emerging technologies and how these emerge. Refer to ***Pages 1-2*** of the handout.

Steps 6–12
Activity: Group Activity
Learning Objective(s): LO1

Slide 5



6. Display ***Slide 5***. Divide the class into groups with four (4) members each. Then, distribute a copy of **01 Seatwork 1** to each group.

7. Instruct them to write their names on the file. Tell them that this activity will help them analyze whether a certain technology should be considered as an emerging technology or not. Select from the topics below to assign to each group.

   Note: *Depending on the number of groups, there might be two (2) or more groups that will share the same topic, you may include additional technology trends to assign to the groups.*

   a. Virtual reality
   b. Internet of Things (IoT)
   c. Virtual assistants (such as Apple's Siri, Amazon's Alexa, and Google Assistant)
   d. Big data
   e. Blockchain technology
   f. 5G technology

8. Ask each group to perform the following:

   - Write the technology assigned to their group on the seatwork;
   - Gather information about the technology assigned to them;

- Analyze the information about the technology if it can be an emerging technology or not by determining its characteristics;
- Evaluate and explain each characteristic of the technology; and
- Create a conclusion based on the defined explanations on the characteristics if it should be considered as an emerging technology or not.

Notes:

- Students may use their smartphones to gather information online about the technology.
- Encourage the students to contribute maximum participation to their group.
- Students may use the following websites to read and gather information about the technology:
  - World Economic Forum – https://www.weforum.org/
  - CNET– https://www.cnet.com/

9. Allot 20 minutes for the groups to perform the seatwork.

10. Call on at least three (3) groups to present their answers to the class. Process their answers using the following questions:
    a. Explain the analyzed characteristics of the technology assigned to your group.
    b. Is the technology considered as an emerging technology? Why or why not?

    Note: *Acknowledge and assess the answers coming from the class. Provide comments and recommendations to the students about their answers.*

11. Use the following rubric for grading the output and the presentation of each group:

GRADING RUBRIC:

Criteria	2 points	3 points	4 points	5 points
Organization and logical flow of analysis (×2)	The key points were not identified and supported with a well thought out rationale based on the data provided.	The key points were poorly identified and supported with a well thought out rationale based on the data provided.	The key points were partially identified but were supported with a well thought out rationale based on the data provided.	The key points were clearly identified and supported with a well thought out rationale based on the data provided.
Conclusions (×2)	There were no provided data or facts to	Provided a poor amount of data or	Provided a considerable amount of	Provided specific data or facts to

	support the conclusion.	facts to support the conclusion.	data or facts to support the conclusion.	support the conclusion.
Presentation (×2)	Only one (1) member of the group is active in the presentation.	Only a few of the group members are active in the presentation.	Some of the group members are active in the presentation, showcasing a comprehensive knowledge of their work.	All group members are active in the presentation, showcasing a comprehensive knowledge of their work.
			TOTAL	**30 points**

12. Collect the seatwork of each group for grading and recording. Return their seatwork as their reference or reviewer once their scores are recorded.

13. Ask the students if they have any clarifications before proceeding to the next topic.

Emerging Technology Areas

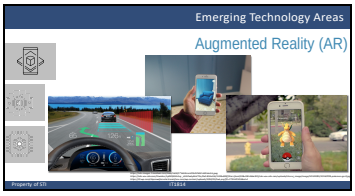
1. Flash ***Slides 6–8***. Introduce some of the emerging technologies defined by the World Economic Forum. Define what the potentials of these emerging technologies are. Refer to ***Page 2*** of the handout.

   Note: *Emerging technologies change every year.*

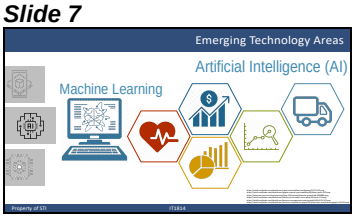
2. Encourage the students to read news about emerging technologies. Tell them they can read the latest news about emerging technologies on these links:

   - World Economic Forum – https://www.weforum.org/
   - CNET – https://www.cnet.com/

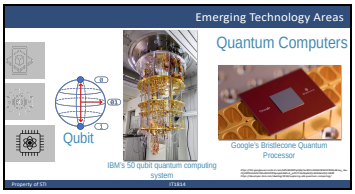
Slide 6



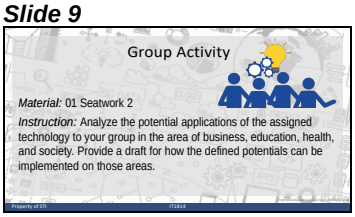
Slide 7



Slide 8



Slide 9



Steps 3–8
Activity: Group Activity
Learning Objective(s): LO2

3. Display ***Slide 9***. Using the groupings from the previous activity, distribute a copy of **01 Seatwork 2** to each group.

4. Instruct them to write their names on the sheet. Tell them that this activity will exercise them to analyze the potential application of cutting-edge technologies in different areas. Select from the topics below to assign to each group.

   Note: *Depending on the number of groups, there might be two (2) or more groups that will have the same topic. Thus, additional technology trends may be added to lessen having identical topics.*

a. Augmented reality (AR)
b. Virtual reality (VR)
c. Machine learning
d. Internet of Things (IoT)
e. Quantum computers
f. Cloud computing

5. Ask each group to perform the following:

   - Write the technology assigned to their group on the seatwork;
   - Gather information about the technology assigned to them;
   - Provide potential application of the technology on four (4) different areas: business, education, health, and society; and
   - Provide a recommendation of how the potential application of technology can be implemented in a specific area. Include hardware devices, software, facilities, etc. on the implementation.

   Notes:
   - Students may use their smartphones to gather information about the technology online.
   - Encourage the students to contribute maximum participation in their group.
   - Students may use the following websites to read and gather information about the technology:
     - World Economic Forum – https://www.weforum.org/
     - CNET – https://www.cnet.com/

6. Allot 20 minutes for the groups to perform the seatwork.

7. Call on at least three (3) groups to present their answers to the class. Process their answers using the following questions:

   a. Explain the potential of their assigned technology in the area of business, education, health, or society.

   b. How can this potential application be implemented?

   Note: *Acknowledge and assess the answers coming from the class. Provide comments and recommendations to the students about their answers.*

8. Use the following rubric for grading the output and the presentation of each group.

GRADING RUBRIC:

Criteria	2 points	3 points	4 points	5 points
Organization and logical flow of analysis (×2)	The key points were not identified and supported with a well thought out rationale based on the data provided.	The key points were poorly identified and supported with a well thought out rationale based on the data provided.	The key points were partially identified but were supported with a well thought out rationale based on the data provided.	The key points were clearly identified and supported with a well thought out rationale based on the data provided.
Recommendations (×2)	There were no provided data or facts to support the recommendations.	Provided a poor amount of data or facts to support the recommendations.	Provided a considerable amount of data or facts to support the recommendations.	Provided specific data or facts to support the recommendations.
Presentation (×2)	Only one (1) member of the group is active in the presentation.	Only a few of the group members are active in the presentation.	Some of the group members are active in the presentation, showcasing a comprehensive knowledge of their work.	All group members are active in the presentation, showcasing a comprehensive knowledge of their work.
			TOTAL	**30 points**

9. Collect each group's seatwork for grading and recording. Return their seatwork as their reference or reviewer once their scores are recorded.

10. Ask for any clarifications before proceeding to the next topic.

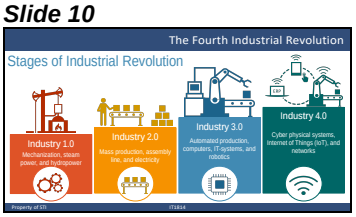
The Fourth Industrial Revolution

1. Tell the students the following statements:

   Every technology has corresponding impacts in our life, in businesses, in the environment, and in the government among others. As a BSIT, BSCS, or BSIS student, you need to recognize the technologies that have an enormous impact and that change the way our industry operates.

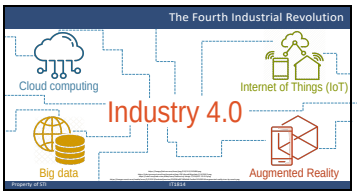
   In this topic, we will discuss the industrial revolutions and its stages.

Slide 10



2. Display ***Slide 10***. Define what industrial revolution is, as well as its four (4) stages. Refer to ***Page 2*** of the handout for information.

Slide 11

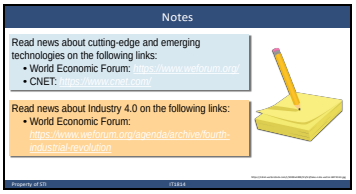


3. Flash ***Slide 11***. Introduce some of the technologies from the building blocks of Industry 4.0. Refer to ***Page 3*** of the handout.

4. Encourage the students to read news about the Fourth Industrial Revolution. Tell them that they can read the latest news about it on this link:

   https://www.weforum.org/agenda/archive/fourth-industrial-revolution.

Slide 12



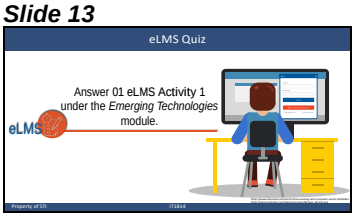
5. Display the links on ***Slide 12***. Encourage the students to browse and read news about cutting-edge and emerging technologies, as well as on the updates about industry 4.0.

6. Ask for any clarifications before closing the topic.

C. Generalization

Steps 1–5
Tool: eLMS (Neo - LMS)
Learning Objective: LO1 and LO2

Slide 13



1. Display ***Slide 13***. To assess the students' understanding of the topic, facilitate an activity through the eLMS.

2. Log on to the eLMS and give **01 eLMS Activity 1** to the students under the *Emerging Technologies* module.

3. For the laboratory session, ask the students to log on to their eLMS account and answer **01 eLMS Activity 1**.

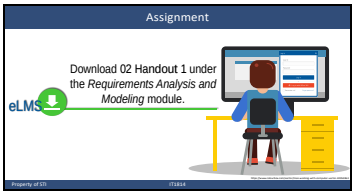
4. Give them ample time to perform the activity.

5. View their scores, along with the summary of their answers, on the eLMS. Discuss each item so that they understand the questions better.

D. Assignment

Steps 1–10
Activity: Group Activity
Learning Objective(s): LO1, LO2, and LO3

Slide 14



1. Show ***Slide 14***. Group the students with four (4) members each. The assigned groupings from the previous activities may also be used.

2. Tell the students that their final assigned groupings will be their groupings for the activities and case studies for the whole period of this course.

3. Assign names for each group so that they will easily be recognized.

4. Record the names of the groups and members using **01 Group Record 1**. This file will be used for recording their selected topics for the succeeding periods (midterms, pre-finals, and finals).

5. Once the students are arranged by group, provide each group a copy of **01 Case Study Guidelines and Outline**. Tell the students that they can download this file on their eLMS under the *Emerging Technologies* module.

6. Tell them the following statements:

   Ideas and innovations being developed today will become the technologies used daily in our future society. As a BSIT, BSIS, or BSCS student, you should know the current trends and acquire the knowledge base to explore the applicability of cutting-edge and emerging technologies on business, society, education, and more.

   For you to practice reviewing, analyzing, and evaluating a technology trend, you will be having a group case study every period on this course.

   This activity involves selecting cutting-edge or emerging technology for detailed analysis and scanning the research materials and other related literature about a certain technology.

   Here are the suggested topic areas to research on:

   - Artificial Intelligence (AI)
   - Machine Learning
   - Robotics
   - Cloud Computing
   - Internet of Things (IoT)
   - Big Data
   - Augmented Reality (AR)
   - Virtual Reality (VR)
   - Mixed Reality (MR)
   - Quantum Computers
   - Data Mining

   Note that technology or innovation should not be older than four (4) years. Select an area of technology to analyze the potential application in different settings—for instance, business, health, society, and education.

   Note: The students may choose other cutting-edge or emerging technology topics as long as the technology or innovation is not older than four (4) years.

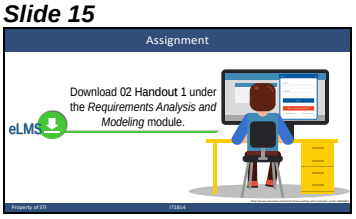
7. Refer to ***Page 1*** of **01 Case Study Guidelines and Outline** and remind the students that they can use the readings from the provided links of digital libraries as reference.

8. Discuss how the case study will be graded using **01 Case Study Grading Rubric**. When checking the case studies, use this grading rubric and attach it on their checked papers. Provide comments that will help the students understand what area of their papers they need to improve on. The scores of their case studies will serve as one (1) of the component their grade in task performances for each period, which is 50% of the total grade.

9. Give the students a specific timeline (date and time) to select and create a topic for the prelim period including submission. Record the selected title of the students on **01 Group Record 1**.

10. Give the students another specific timeline (date and time) to submit their case studies. Encourage them to read the guidelines of the case study carefully and to have a group study so they can brainstorm ideas.

Slide 15



11. Ask for any clarifications about the discussion.

12. Show ***Slide 15***. Ask the students to log on to their eLMS account and download **02 Handout 1** under the *Requirements Analysis and Modeling* module for the next session.

REFERENCES:

Artificial Intelligence (n.d.). In *TechTarget*. Retrieved from https://searchenterpriseai.techtarget.com/definition/AI-Artificial-Intelligence

Augmented Reality (n.d.). In *Techopedia*. Retrieved from https://www.techopedia.com/definition/4776/augmented-reality-ar

Big Data Analytics (n.d.). In *Webopedia*. Retrieved from https://www.webopedia.com/TERM/B/big_data_analytics.html

Boston Consulting Group (n.d.). Rediscovering growth. Retrieved from https://www.bcg.com/capabilities/operations/embracing-industry-4.0-rediscovering-growth.aspx

Cann, O. (2018). These are the top 10 emerging technologies of 2018 [Web log post]. Retrieved from https://www.weforum.org/agenda/2018/09/top-10-emerging-technologies-of-2018/

Cloud Computing (n.d.). In *Techtarget*. Retrieved from https://searchcloudcomputing.techtarget.com/definition/cloud-computing

Desoutter Industrial Tools (n.d.). Industrial revolution – From industry 1.0 to 4.0 In Retrieved from https://www.desouttertools.com/industry-4-

0/news/503/industrial-revolution-from-industry-1-0-to-industry-4-0

Halaweh, M. (2013). Emerging technology: What is it?. *Journal of technology management & innovation, 8,* 1-8. doi: 10.4067/S0718-27242013000400010

Internet of Things (IoT) (n.d.). In *Techopedia*. Retrieved from https://www.techopedia.com/definition/28247/internet-of-things-iot

Rotolo, D., Hicks, D., & Martin, B. (2015). What is an emerging technology?. *SPRU Working Paper Series*, *44,* 1-34. doi: 10.6084/M9.FIGSHARE.1335986