**AI in the Era of Digital Transformation**

**Course Syllabus**

**(2022 Spring)**

1. **Course Information**

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| --- | --- |
| Course Title | AI in the Era of Digital Transformation |
| Course No. |  |
| Credit Hours | 3 |
| Class Schedule | * **Regular Class Schedule:**

Monday & Wednesday, 7:00-8:00 pm (Indonesia, Thailand, Vietnam) / 8:00-9:00 pm (China, Malaysia) / 9:00-10:00 pm (Korea)\*Exceptions:On Mar 21st(Mon) and 23rd(Wed):6:30-8:00 pm (Indonesia, Thailand, Vietnam) / 7:30-9:00 pm (China, Malaysia) / 8:30-10:00 pm (Korea)On Jun 6th(Mon): Presentation & End-of-semester Celebration5:00-8:00pm (Indonesia, Thailand, Vietnam)/ 6:00-9:00pm (China, Malaysia)/ 7:00-10:00pm (Korea)* **Project Preparation Session Schedule:** There will be meetings with corporate partner representatives. Meeting schedules need to be discussed with the corporate partners.
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| Class Location | Online course |
| Pre-requisites | * 1 Statistics Course
* Some understanding in basic business subjects preferred
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| Lecturer(s) | Team-teaching by professors from 4 different Asian universities and guest lecturers –Sun Yat-sen University (China), Universitas Gadjah Mada (Indonesia), Universiti Kebangsaan Malaysia (Malaysia), and Woosong University (Korea) |

1. **Course Overview**

This is an online course jointly developed by five representative universities in Asia - Foreign Trade University (Vietnam), Sun Yat-sen University (China), Universitas Gadjah Mada (Indonesia), Universiti Kebangsaan Malaysia (Malaysia), and Woosong University (Korea). The five universities have gathered to design this innovative course which can create a truly unique experience for all students taking this course. The students will be able to learn from an international group of professors and also interact with a diverse pool of students with different nationalities. By taking this course, students will not only accumulate knowledge in the field of AI (artificial intelligence) and digital transformation, but also build capabilities to communicate and collaborate in a global environment.

The topic of this course is AI in the era of digital transformation. The world has been experiencing a massive change with the rapid development in digital technology. With the development of computer technology and the internet, companies nowadays are witnessing a massive exponential increase of data in most existing industries. By adapting to the digital transformation, companies can discover unmet needs of current and potential consumers, find ways to improve products and services, forecast the direction of business environment changes, and so on. Especially the field of AI (artificial intelligence) is the most promising area of expertise, gaining attention from various academic and business areas. As AI expert Andrew Ng has once explained, artificial intelligence is the new electricity. In other words, AI will soon change the way everything functions in our economy and society as the invention of electricity did, drastically changing the ways we work and live. Of course, AI is going to change the way business is done in most industries as well. While AI is still in an early stage of developing, it will soon become the language of the future.

This course is designed to introduce basic knowledge about digital transformation, with a more specific focus on AI. Students will learn how digital technologies including AI are and will be applied to various business settings, and how to adapt business strategy and operation in the era of digital transformation. This course is designed to develop innovative leaders in the business world.

Another exciting aspect of this course is that students are going to work on company projects with the involvement of actual companies in different Asian countries. The companies are going to suggest project topics for student teams to tackle, involving real issues they are currently facing. Student teams will work on the projects over the semester and present their outcomes on the student presentation day.

1. **Learning Goals**

Through this course, students will learn:

* What AI technology is and how it is and will be applied in business settings
* How to make digital strategy in the era of digital transformation
* How digital data is used in business to formulate and solve business problems and to support managerial decision making
* How big data is used in making marketing decisions
* How digital transformation is applied to industries, especially in the finance industry (blockchain & fintech)
* How to work in teams to solve real-world problems in companies
1. **Course Outline**

To deliver both fundamental knowledge and practical applications of AI and digital transformation, this course has four sub-modules, and the modules will be taught by professors from different universities. This is a tentative outline and the order of the modules may be modified.

|  |  |  |
| --- | --- | --- |
| **Week** | **Topic** | **Modules** |
| Week 1 | Introduction to AI in the era of digital transformation |  |
| Week 2 | Understanding the use of AI in business | Module 1 taught by WSU guest speakers |
| Week 3 | Understanding the use of AI in business (continued) |
| Week 4 | Understanding the use of AI in business (continued) |
| Week 5 | Smart Factory |
| Week 6 | Understanding digital innovation; Platformification in business and industries | Module 2 taught by UGM |
| Week 7 | Network externalities and standard in digital innovation; Strategies for adoptions of innovation |
| Week 8 | Big Data Marketing: Demand estimation, Product line design optimization | Module 3 taught by SYSU |
| Week 9 | Big Data Marketing: E-coupon promotion decision, Ad delivery planning |
| Week 10 | Blockchain | Module 4 taught by UKM |
| Week 11 | Fintech |
| Week 12 | Student Team Project Presentation |  |

\* Student Team Project Presentation: More details about the student team project will be discussed on Mar 23rd.

1. **Pre-class Work**

Pre-class videos & Quiz

This course adopts flipped-learning method on most sessions, which means that the professors will upload pre-class videos that students need to watch before coming to class. There will be a simple quiz to check student understanding of the videos, and occasionally, a team assignment related to what has been discussed in the pre-class videos. These are very important part of this course, making up 30% of the student evaluation. Videos and quizzes will be provided in Woosong University’s LMS system (smart.wsu.ac.kr).

Readings

There is no required textbook for this course, but the professors teaching this course will announce readings and learning materials prior to the sessions. The learning materials are also listed in the course schedule at the end of this syllabus, and will be provided through LMS system as well.

1. **Different Types of Session Structures**

Depending on the kind of pre-class work each professor chooses for their own session, there are going to be different types of session structures, as shown in the following figure.



1. **Assessment Method**

There are four components to the assessment in this course. More information about each components of the assessment will be given to you in-class.

|  |  |
| --- | --- |
| Component | Weight \* |
| 1. Attendance
 | 20% |
| 1. Class Contribution
* Class Activities
* Comments verbally made in class
* Comments made in online group chat
 | 20% |
| 1. Pre-Class Participation
 |  | 30% |
| * Quiz after watching pre-class video learning materials
 | 20% |
| * Team assignment after watching pre-class video learning materials
 | 10% |
| 1. Team Project
 |  | 30% |
| * Peer Evaluation
* Project Preparation Sessions
* Final Presentation
 | 5% |
| 5% |
| 20% |
| **Total** | **100%** |

\* Since this is a team-teaching course among four different universities and each university may have different evaluation policies, the exact weight may be modified for each university.

1. **Student Etiquettes for Online Learning**
* All students need to be in class on time. If you are late for class, please immediately write in the group chat that you’re in. If you come in later than 10 minutes, you will be marked as late.
* Please keep your camera on with your identifiable face showing on screen.
	+ If you’re not visible on Zoom, you are recorded as absent. If you have any technical problems with the camera, please let the instructor know in the beginning of the session.
	+ If you show your face in the beginning of the class but turn the camera off during the class, you are recorded as absent.
* If you do not respond to the instructor’s cold call for more than 2 times, you are recorded as absent.
* Please actively participate in in-class activities and exercises (poll, group chat, team breakout, mini exercises, games, simple quiz, etc.)
	+ All in-class activities are monitored and recorded. Raw scores for your in-class participation will be sent to your institution and used as a basis for evaluation.
* Please do not record, capture, take picture of any part of the online class screen. Doing so may result in legal problems regarding intellectual property rights and portrait rights.
1. **Course Schedule**

| **Session** | **Date** | **Time** | **Module / Instructor** | **Discussion Topic** | **Pre-Class Activities** |
| --- | --- | --- | --- | --- | --- |
| **1****\* This session is a 1.5-hr session.** | Mar. 21 (Mon) | 6:30-8:00pm (I, T, V)/7:30-9:00pm (C, M)/8:30-10pm (K)I: IndonesiaT: ThailandV: VietnamC: ChinaM: MalaysiaK: Korea | **Introduction:**YT Lee (WSU) | **Introduction to the course provided by:*** YT Lee (WSU)
 |  |
| **2****\* This session is a 1.5-hr session.** | Mar. 23 (Wed) | 6:30-8:00pm (I, T, V)/7:30-9:00pm (C, M)/8:30-10pm (K) | **Introduction:**Trevor Bryon | **Student team project topic selection****Team project Q&A** | * Read syllabus
* Think about the project topics and the order of preference
 |
| **3** | Mar. 28 (Mon) | 7:00-8:00pm (I, T, V)/8:00-9:00pm (C, M)/9:00-10pm (K) | **Module 1:**AI in Business / Dr. Müller-Seitz | *Special Lectures by Guest faculty:***Dr. Gordon Müller-Seitz****Introduction to AI for Business:**By the end of the session you should:* Be familiar with the multifaceted nature of AI applications
* Have a basic understanding of AI
* Be aware of the relevance of AI for business and managerial purposes
 | *Readings** McKinsey 2020: [An Executive’s Guide to AI](https://www.mckinsey.com/business-functions/mckinsey-analytics/our-insights/an-executives-guide-to-ai)
* Iansiti, M., Lakhani, K.R. 2020: [Competing in the Age of AI](https://hbr.org/2020/01/competing-in-the-age-of-ai)
* McKinsey 2020: Global survey: [The state of AI in 2020](https://www.mckinsey.com/~/media/McKinsey/Business%20Functions/McKinsey%20Analytics/Our%20Insights/Global%20survey%20The%20state%20of%20AI%20in%202020/Global-survey-The-state-of-AI-in-2020.pdf)
 |
| **4** | Mar. 30 (Wed) | 7:00-8:00pm (I, T, V)/8:00-9:00pm (C, M)/9:00-10pm (K) | **Module 1:**AI in Business / Dr. Müller-Seitz | **AI in Industries and the Workplace:**By the end of the session you should:* Understand some of the key AI applications being used in some industries
* Comprehend how workplace settings are affected by AI
* Have a sense of how transformative (or not) AI will be for those aspects of business
 | *Assignment*Prepare a short (5 minute) presentation on AI in a specific function or industry. Focus on topics such as typical use cases for AI, i.e. what technologies are used, challenges to implementation, and present vs. future AI use. Each group will present in the class session.* + Human Resources (Group 1 & 2)--Readings:
* Meister, J. 2019: [Ten HR Trends in the Age of Artificial Intelligence](https://www.forbes.com/sites/jeannemeister/2019/01/08/ten-hr-trends-in-the-age-of-artificial-intelligence/#234fa0be3219)
* SAP: AI for HR: [Practical Solutions for a Modern Workforce](https://insights.sap.com/ai-for-hr/)
	+ Finance (Group 3 &4)--Readings:
* Ernst & Young 2019: [Six ways the CFO can use artificial intelligence, today](https://www.ey.com/en_gl/ai/six-ways-the-cfo-can-use-artificial-intelligence-today)
* Shinde, S. 2020: [Three Ways AI Is Transforming Business Finance Management](https://www.forbes.com/sites/theyec/2020/12/01/three-ways-ai-is-transforming-business-finance-management/?sh=30be99fe400a)
	+ Health Care (Group 5&6)--Readings:
* Davenport, T., Kalakota, R. 2019: [The potential for artificial intelligence in healthcare](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6616181/)
* Habibi, S. 2021: [Three Ways Artificial Intelligence Is Changing Healthcare – And Six Principles To Ensure Its Success](https://www.forbes.com/sites/forbestechcouncil/2021/09/01/three-ways-artificial-intelligence-is-changing-healthcare--and-six-principles-to-ensure-its-success/?sh=2dc139fbcd9b)
	+ Retail Industry (Group 7&8)--Readings:
* Chatterjee, S.C. 2018: [Algo Retailing:The New Frontier to Unlocking Exponential Value](https://s3.amazonaws.com/marketing.mitsmr.com/custom/CSTCSNative1118/MITSMR-TCS-Algo-Retailing-Exec-Scholar-Exchange.pdf)
* Forgan, B. 2020: [What Robots Can Do for Retail](https://hbr.org/2020/10/what-robots-can-do-for-retail)
	+ Automotive Industry (Group 9&10)--Readings:
* FutureBridge 2020: [Artificial Intelligence Reshaping the Automotive Industry](https://www.futurebridge.com/industry/perspectives-mobility/artificial-intelligence-reshaping-the-automotive-industry/)
* Breunig, M., Kässer, M., Klein, H., Stein, J.P. 2017: [Building smarter cars with smarter factories: How AI will change the auto business](https://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/building-smarter-cars)
 |
| **5** | Apr.4 (Mon) | 7:00-8:00pm (I, T, V)/8:00-9:00pm (C, M)/9:00-10pm (K) | **Module 1:**AI in Business / Dr. Müller-Seitz | **Human AI Interaction at Work:**By the end of the session you should:* Give examples of some jobs and job types for which AI-related technologies have already automated key tasks
* Understand the concepts of ‘augmentation’ versus ‘automation’
* Define strategies for humans to add value when collaborating with AI
 | * Davenport, T.H., Kirby, J. 2015: [Beyond Automation](https://hbr.org/2015/06/beyond-automation)
* Osborne, M., Frey, C.B. 2018: [Automation and the Future of Work: Understanding the Numbers](https://www.oxfordmartin.ox.ac.uk/blog/automation-and-the-future-of-work-understanding-the-numbers/)
* Wingfield, N. 2017: [As Amazon Pushes Forward With Robots, Workers Find New Roles](https://www.nytimes.com/2017/09/10/technology/amazon-robots-workers.html)
 |
| **6** | Apr.6(Wed) | 7:00-8:00pm (I, T, V)/8:00-9:00pm (C, M)/9:00-10pm (K) | **Module 1:**AI in Business / Dr. Müller-Seitz | * TBD
 | * TBD
 |
| **7** | Apr. 11(Mon) | 7:00-8:00pm (I, T, V)/8:00-9:00pm (C, M)/9:00-10pm (K) | **Module 1:**AI in Business / Dr. Müller-Seitz | * TBD
 | * TBD
 |
| **8** | Apr. 13(Wed) | 7:00-8:00pm (I, T, V)/8:00-9:00pm (C, M)/9:00-10pm (K) | **Module 1:**AI in Business / Dr. Müller-Seitz | * TBD
 | * TBD
 |
| **9** | Apr. 18(Mon) | 7:00-8:00pm (I, T, V)/8:00-9:00pm (C, M)/9:00-10pm (K) | **Module 1:**AI in Business / Dr. Zühlke | *Special Lectures by Guest faculty*:**Dr. Detlaf Zühlke*** + - * Head of the Smart Factory Systems at the German Research Center for AI, Germany
			* Industry 4.0 scientific advisory board member of German National Academy of Science & Engineering
			* Ph.D. from Aachen University (Germany)

**Topic: Smart Factory:*** Smart-Factory
* Core technologies of Smart-Factory
* The relationship among those technologies
* Future manufacturing Industry & cases
 | * Detlef Zuehlke. “SmartFactory – A Vision becomes Reality”
* Detlef Zuehlke. “Are we facing the 4th Industrial Revolution?”

Watch the videos:* https://www.youtube.com/watch?v=06nH12SRGXY
* https://www.youtube.com/watch?v=ME7CNbMSqZ0
 |
| **10** | Apr. 20(Wed) | 7:00-8:00pm (I, T, V)/8:00-9:00pm (C, M)/9:00-10pm (K) | **Module 1:**AI in Business / Dr. Zühlke |
| **11** | Apr. 25 (Mon) | 7:00-8:00pm (I, T, V)/8:00-9:00pm (C, M)/9:00-10pm (K) | **Module 2:**Strategy in Digital Transformation/Dr. Iman (UGM) | **Understanding Digital Innovation:*** Understand the characteristics of digital innovation
* Distinguish the nature of digital innovation vs. traditional/conventional innovation
* Appreciate the complexity and paradoxes in digital innovation
 | * Pre-Class video on LMS
* Quiz on LMS
* Yoo, Y., Boland, R. J., Lyytinen, K., & Majchrzak, A. (2012). “Organizing for innovation in the digitized world”
* “How AI-Generated Music Is Changing The Way Hits Are Made”
 |
| **12** | Apr. 27 (Wed) | 7:00-8:00pm (I, T, V)/8:00-9:00pm (C, M)/9:00-10pm (K) | **Module 2:**Strategy in Digital Transformation/Dr. Iman (UGM) | **Platformification in Business and Industries:*** Recognize digital platform as one of the fundamental properties of digital technology
* Understand the characteristics of platform innovation in business and industries
* Appreciate the impact of digital innovation in organization
 | * Pre-Class video on LMS
* Quiz on LMS
* Hagiu, A. (2014). “Strategic Decisions for Multisided Platforms”
* “Blockchain, the amazing solution for almost nothing”
 |
| **13** | May. 2(Mon) | 7:00-8:00pm (I, T, V)/8:00-9:00pm (C, M)/9:00-10pm (K) | **Module 2:**Strategy in Digital Transformation/Dr. Iman (UGM) | **Network Externalities and Standard in Digital Innovation:*** Characterize the nature of network externalities behind digital innovation
* Understand the role of technological standard in digital innovation
 | * Pre-Class video on LMS
* Quiz on LMS
* Team Assignment on LMS
* David, P. A. (1985). “CLIO and the economics of QWERTY. American Economic Review”
* Why do most countries use different railway gauges? https://youtu.be/Y-1EVvE8KGE (5:48)
 |
| **14** | May. 4(Wed) | 7:00-8:00pm (I, T, V)/8:00-9:00pm (C, M)/9:00-10pm (K) | **Module 2:**Strategy in Digital Transformation/Dr. Iman (UGM) | **Strategies for Adoptions of Innovation:*** Understand the diffusion process of technological innovation
* Identify the characteristics that makes innovation spread through the society
 | * Pre-Class video on LMS
* Quiz on LMS
* Rogers, E. M. (1995). “Diffusion of Innovations” Ch. 1
* “Machines set loose to slaughter: the dangerous rise of military AI”
 |
| **15** | May. 9(Mon) | 7:00-8:00pm (I, T, V)/8:00-9:00pm (C, M)/9:00-10pm (K) | **Module 3:**Big Data Marketing/Dr. Shen (SYSU) | **Demand Estimation*** Data analysis
* Logit regression
* Maximum Likelihood Estimation
 | * Pre-Class video on LMS
* Quiz on LMS
 |
| **16** | May. 11(Wed) | 7:00-8:00pm (I, T, V)/8:00-9:00pm (C, M)/9:00-10pm (K) | **Module 3:**Big Data Marketing/Dr. Shen (SYSU) | **Data-driven Marketing Application I: Product Line Design*** Customer choice model and estimation
* Product line optimization model formulation
 | * Pre-Class video on LMS
* Quiz on LMS
 |
| **17** | May. 16(Mon) | 7:00-8:00pm (I, T, V)/8:00-9:00pm (C, M)/9:00-10pm (K) | **Module 3:**Big Data Marketing/Dr. Shen (SYSU) | **Data-driven Marketing Application II: E-coupon Promotion Decision*** Coupon redemption rate estimation
* Coupon allocation optimization model formulation
 | * Pre-Class video on LMS
* Quiz on LMS
 |
| **18** | May. 18(Wed) | 7:00-8:00pm (I, T, V)/8:00-9:00pm (C, M)/9:00-10pm (K) | **Module 3:**Big Data Marketing/Dr. Shen (SYSU) | **Data-driven Marketing Application III: Ad Delivery Planning*** Ad clicks estimation
* Ad delivery planning optimization model formulation
 | * Pre-Class video on LMS
* Quiz on LMS
 |
| **19** | May. 23(Mon) | 7:00-8:00pm (I, T, V)/8:00-9:00pm (C, M)/9:00-10pm (K) | **Module 4:**Finance in Digital Transformation/Dr. Wong (UKM) | **Fundamentals of Blockchain*** What is Blockchain technology?
* How does Blockchain works?
* Benefits of Blockchain technology
* Types OF Blockchain
* Blockchain and Web 3.0

**Smart Contract*** What are Smart Contracts?
* How smart contract works?
* Advantages and disadvantages of smart contracts
* Use cases of Smart Contracts
 | * Pre-Class video on LMS
* Quiz on LMS
 |
| **20** | May. 25(Wed) | 7:00-8:00pm (I, T, V)/8:00-9:00pm (C, M)/9:00-10pm (K) | **Module 4:**Finance in Digital Transformation/Dr. Wong (UKM) | **Blockchain Digital Transformation*** The 9 verticals of Blockchain transformation
* Bitcoin and Altcoins
* Top 20 enterprises changed by Blockchain

**Does Everyone Need Blockchain?*** Digital Assets and Multiple Parties
* Technical Approach
* Network Configuration
 | * Pre-Class video on LMS
* Quiz on LMS
 |
| **21** | May. 30(Mon) | 7:00-8:00pm (I, T, V)/8:00-9:00pm (C, M)/9:00-10pm (K) | **Module 4:**Finance in Digital Transformation/Dr. Hasimi (UKM) | **Fintech:*** History of FinTech
* Evolution of FinTech
* AI & Machine Learning: Tool vs Service?
* Application of AI & machine learning in finance
 | * Pre-Class video on LMS
* Quiz on LMS
* What is Fintech: <https://youtu.be/-EoNrg_DR3s>
 |
| **22** | Jun. 1(Wed) | 7:00-8:00pm (I, T, V)/8:00-9:00pm (C, M)/9:00-10pm (K) | **Module 4:**Finance in Digital Transformation/Dr. Hasimi (UKM) | **Fintech:*** Finance: Public policy & AI
* Benefit of using AI in finance
* Case study
 | * Pre-Class video on LMS
* Quiz on LMS
 |
| **23****\* This session is a 3-hr session.** | Jun. 6(Mon) | 5:00-8:00pm (I, T, V)/6:00-9:00pm (C, M)/7:00-10:00pm (K) | **Student Team Project Competition & End-of-semester Celebration** |  |